NASA Reference Publication 1224, Volume II

A High-Resolution Atlas of the Infrared Spectrum of the Sun and the Earth Atmosphere from Space

A Compilation of ATMOS Spectra of the Region from 650 to 4800 cm^{-1} (2.3 to 16 μm)

Volume II. Stratosphere and Mesosphere, 650 to 3350 cm^{-1}

Crofton B. Farmer
Robert H. Norton
Jet Propulsion Laboratory
California Institute of Technology

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Preface to Volume II

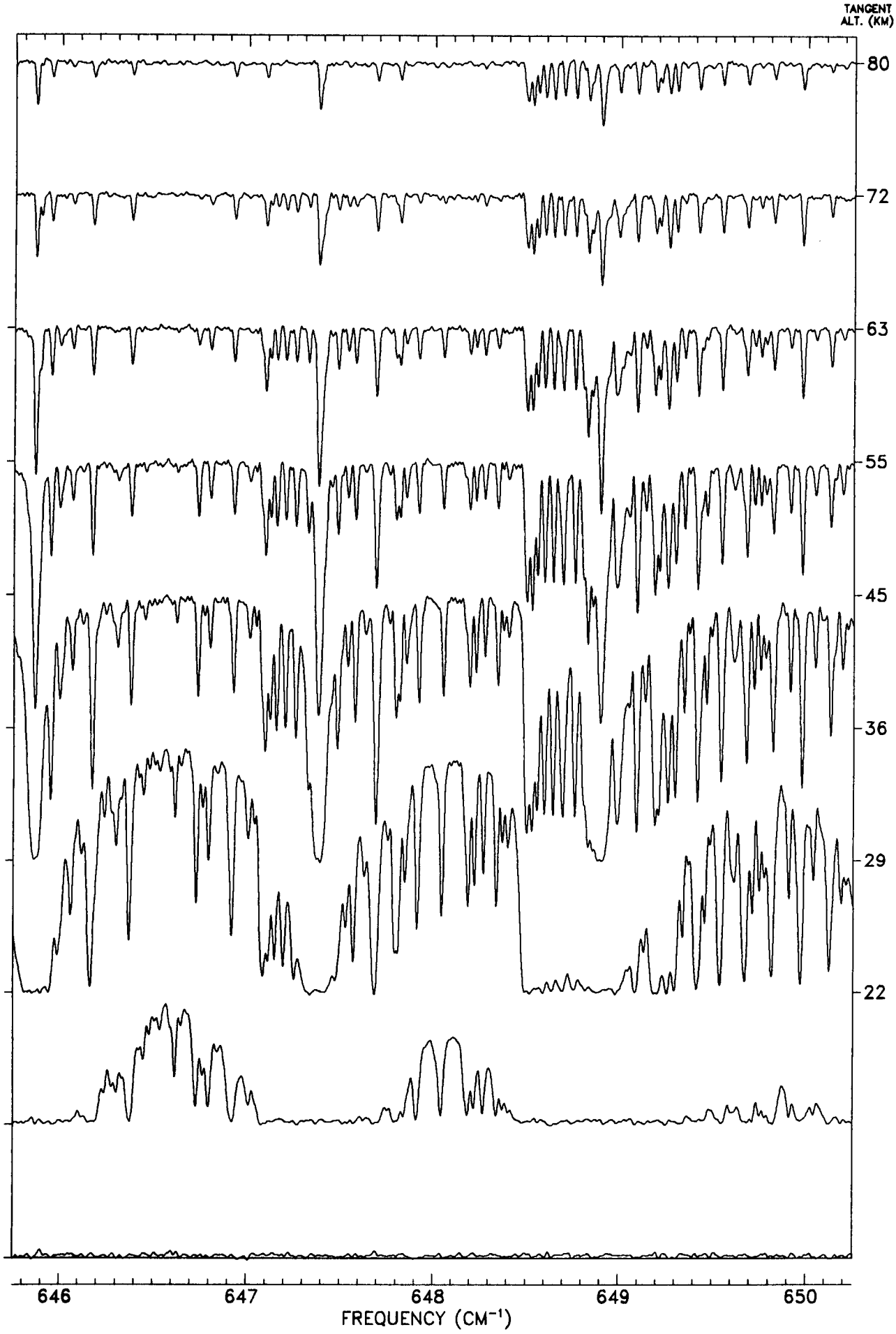
This volume, Volume II, of the ATMOS spectral atlas contains atmospheric spectra covering altitudes from the top of the mesosphere (i.e., about 80 km) to the lower stratosphere (20 km). The spectra have been compiled from the zonal averages of the ATMOS sunset occultations, with the frequency range of the present volume extending from 650 cm^{-1} to 3380 cm^{-1}. A description of the observations, the data reduction procedures, and matters relating to the presentation of the spectra (e.g., the frequency convention and scaling of the data) are given in Volume I of this atlas.

The complete ATMOS data set covers tangent-point altitudes that extended well into the thermosphere (i.e., to about 150 km), and frequencies up to 4800 cm^{-1}. Spectra were also obtained from sunrise occultations and, in a few cases, a clear Sun-spacecraft line-of-sight was maintained well into the lower troposphere. These additional spectra will be included in future volumes of the atlas. The ATMOS data can be obtained by writing to:

National Space Science Data Center
NASA/Goddard Space Flight Center
Greenbelt, MA 20771

Alternatively, interested users can access the data using the display and analysis software available at the ATMOS Data Analysis Facility by writing to the authors at:

Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109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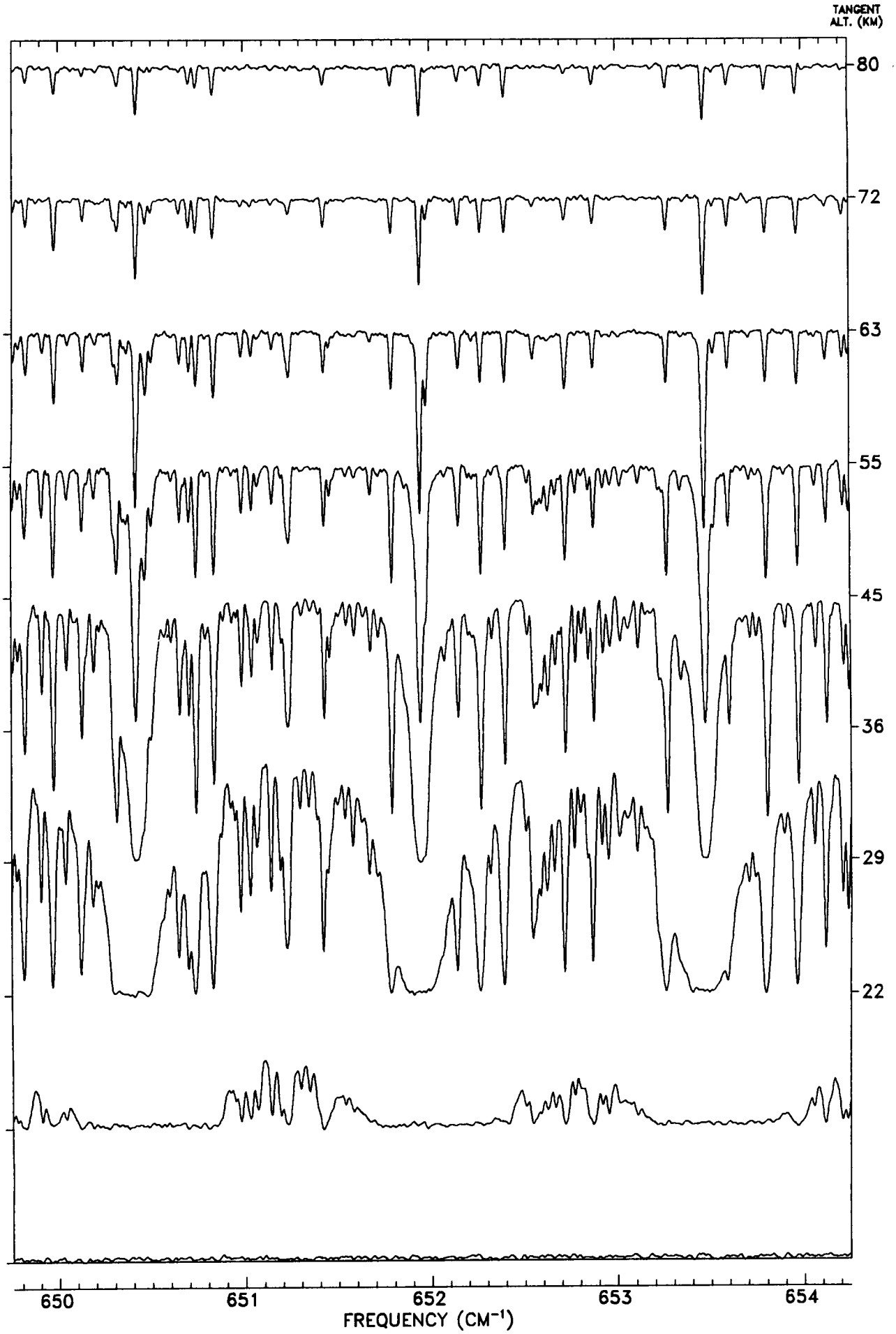
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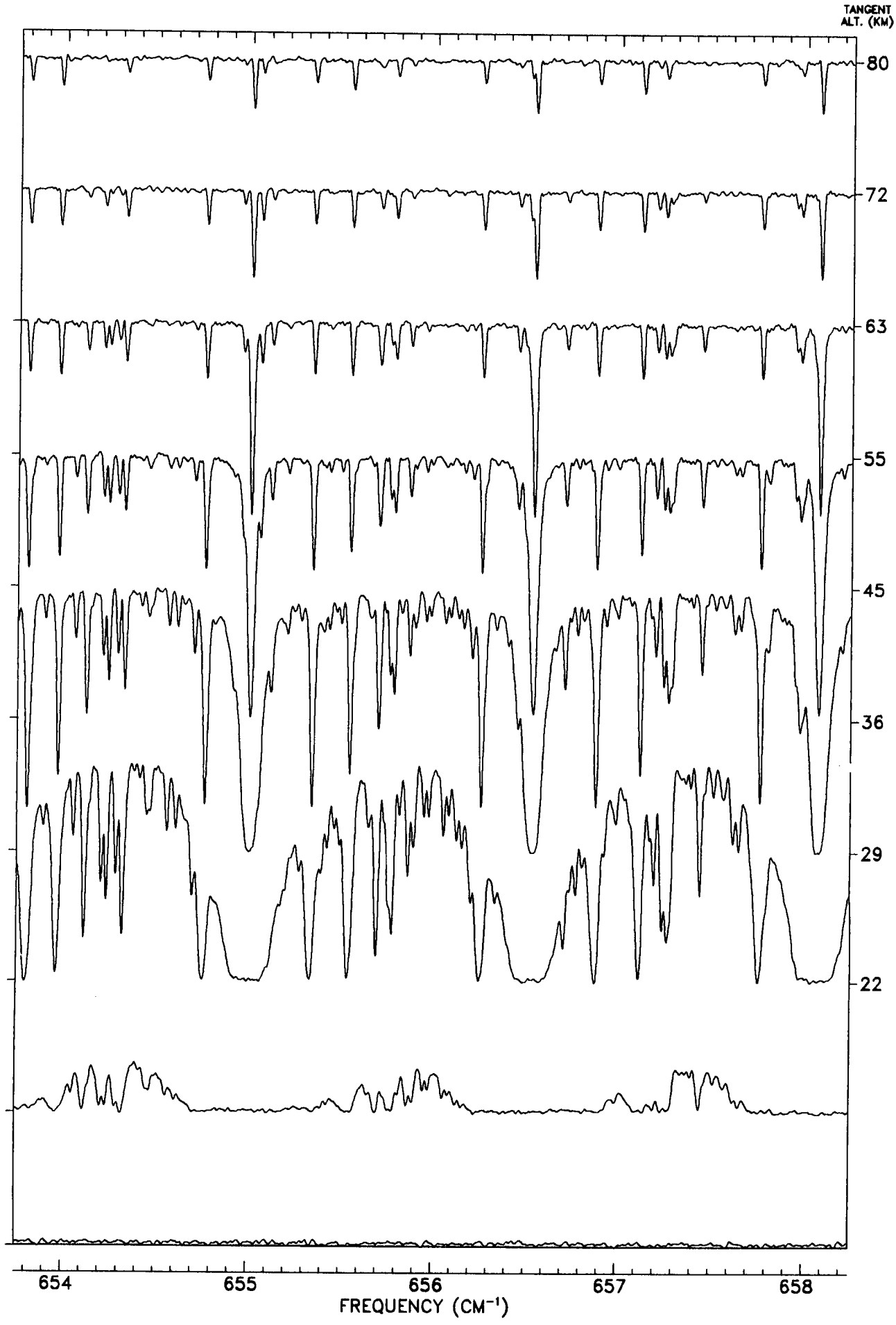
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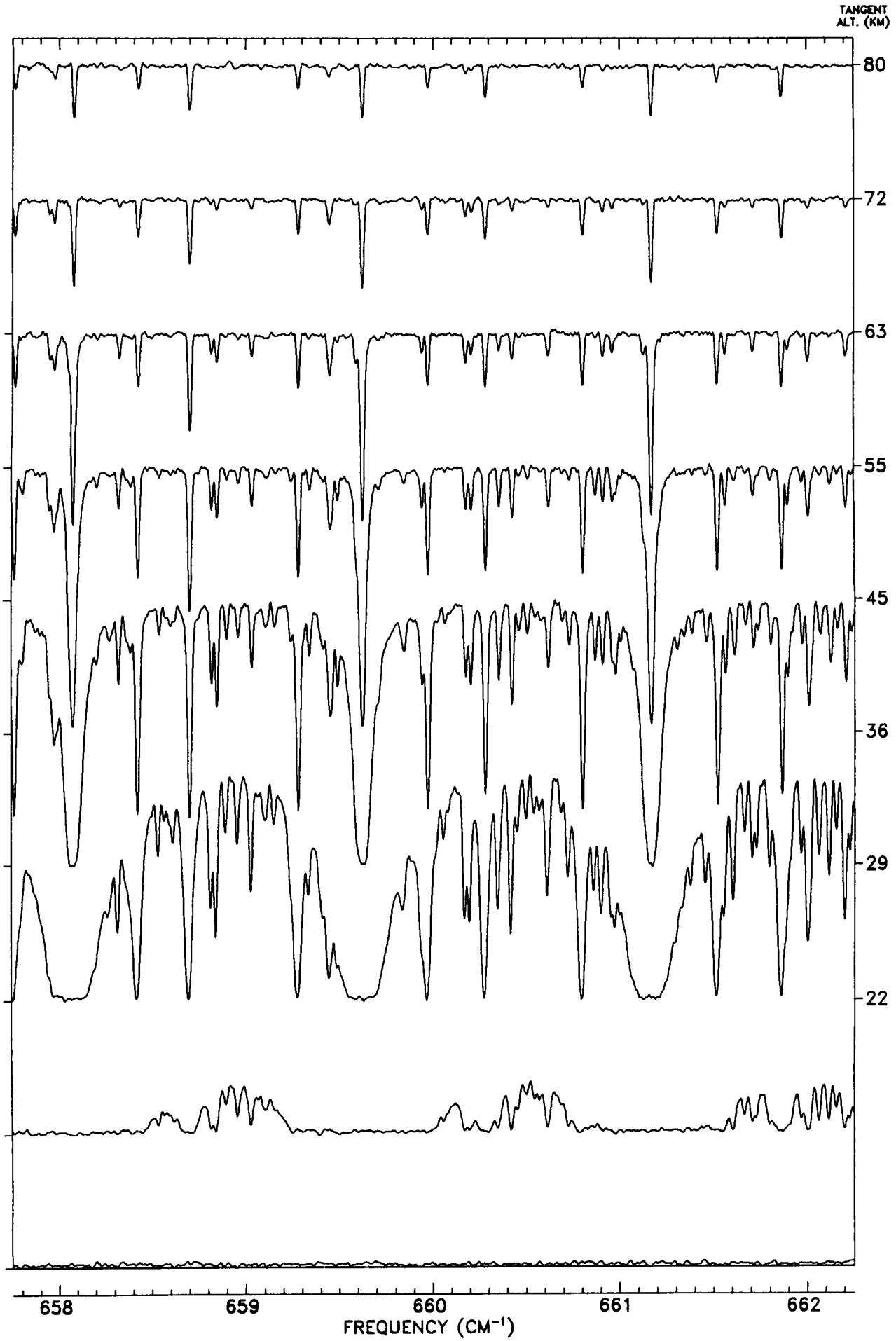
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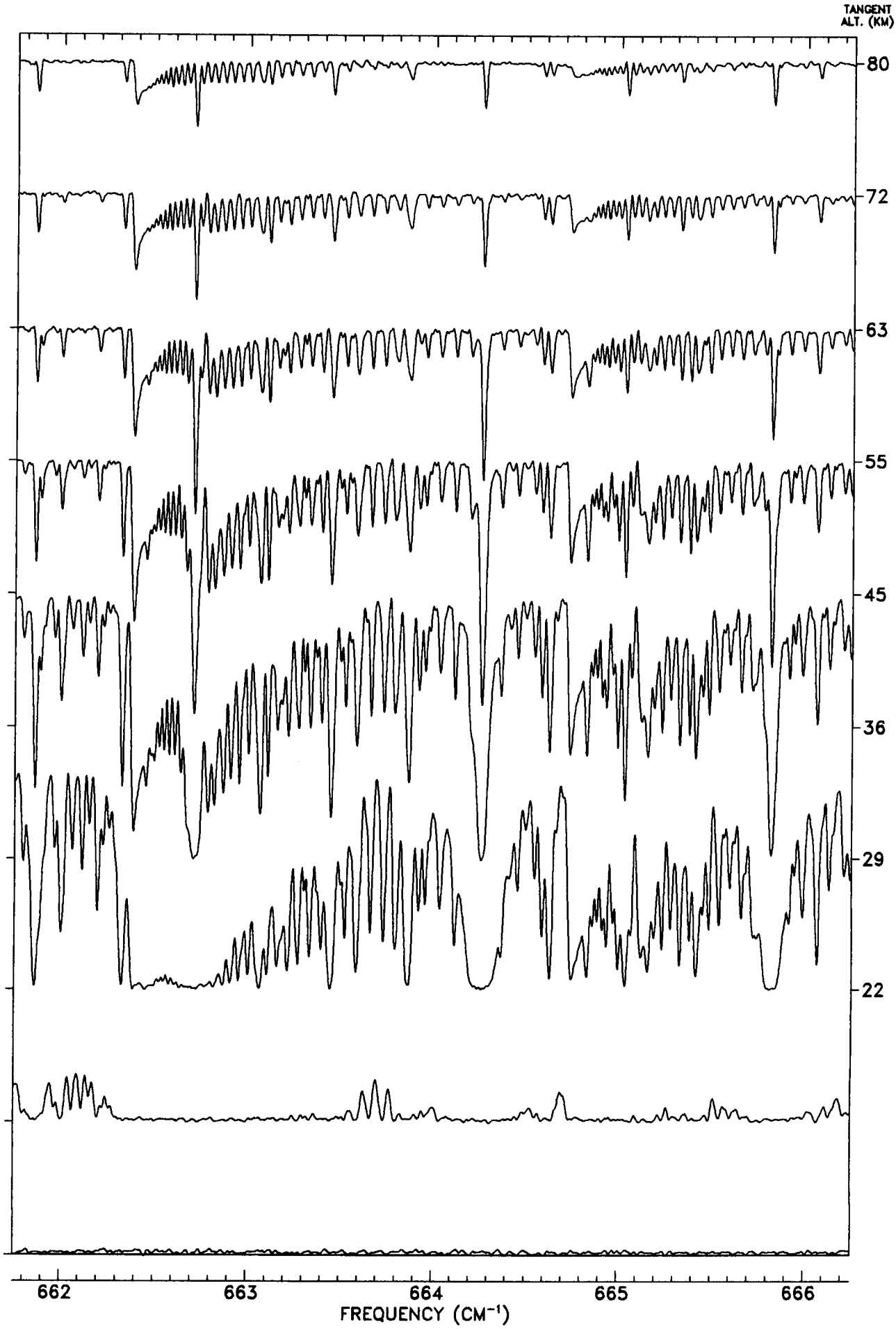
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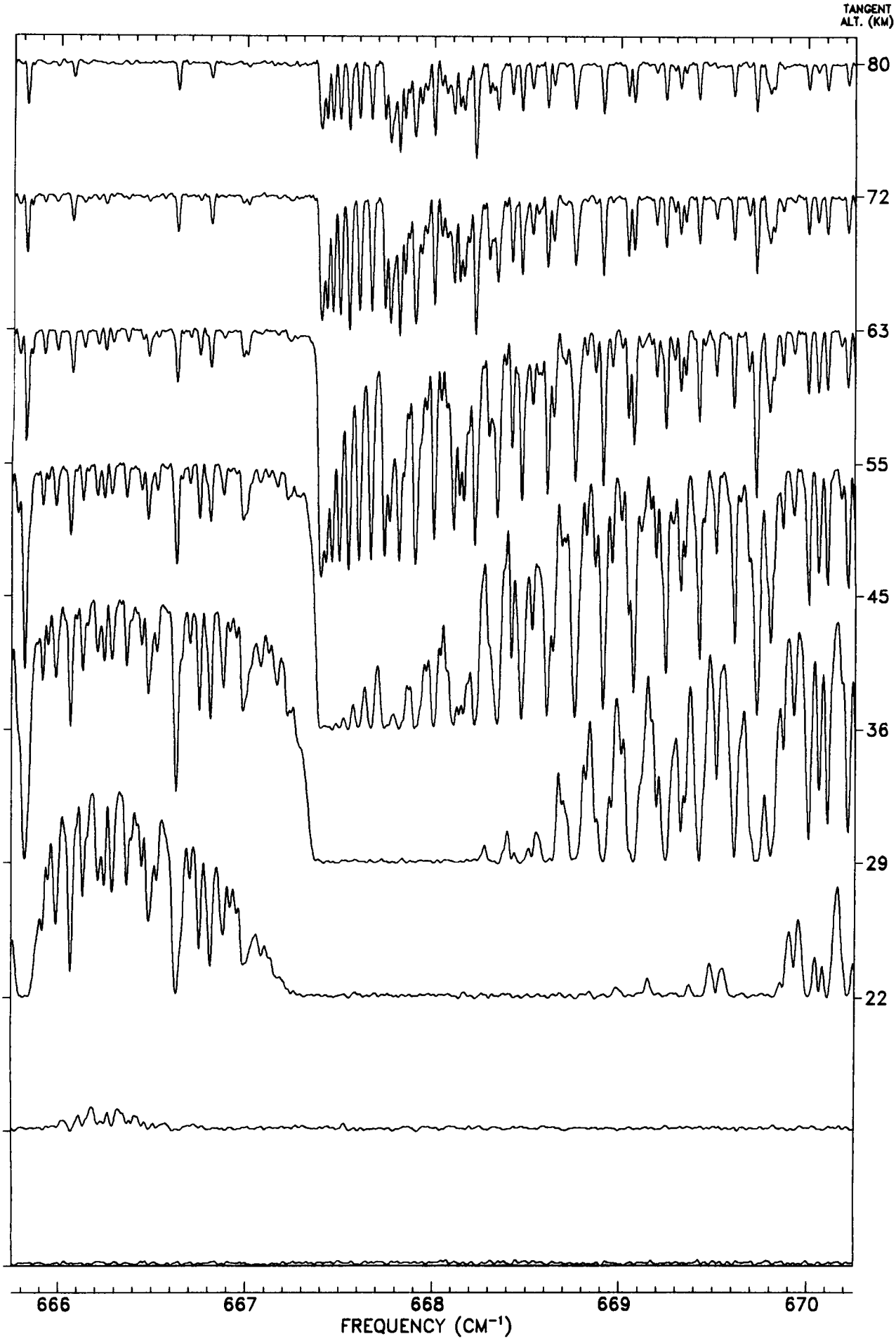
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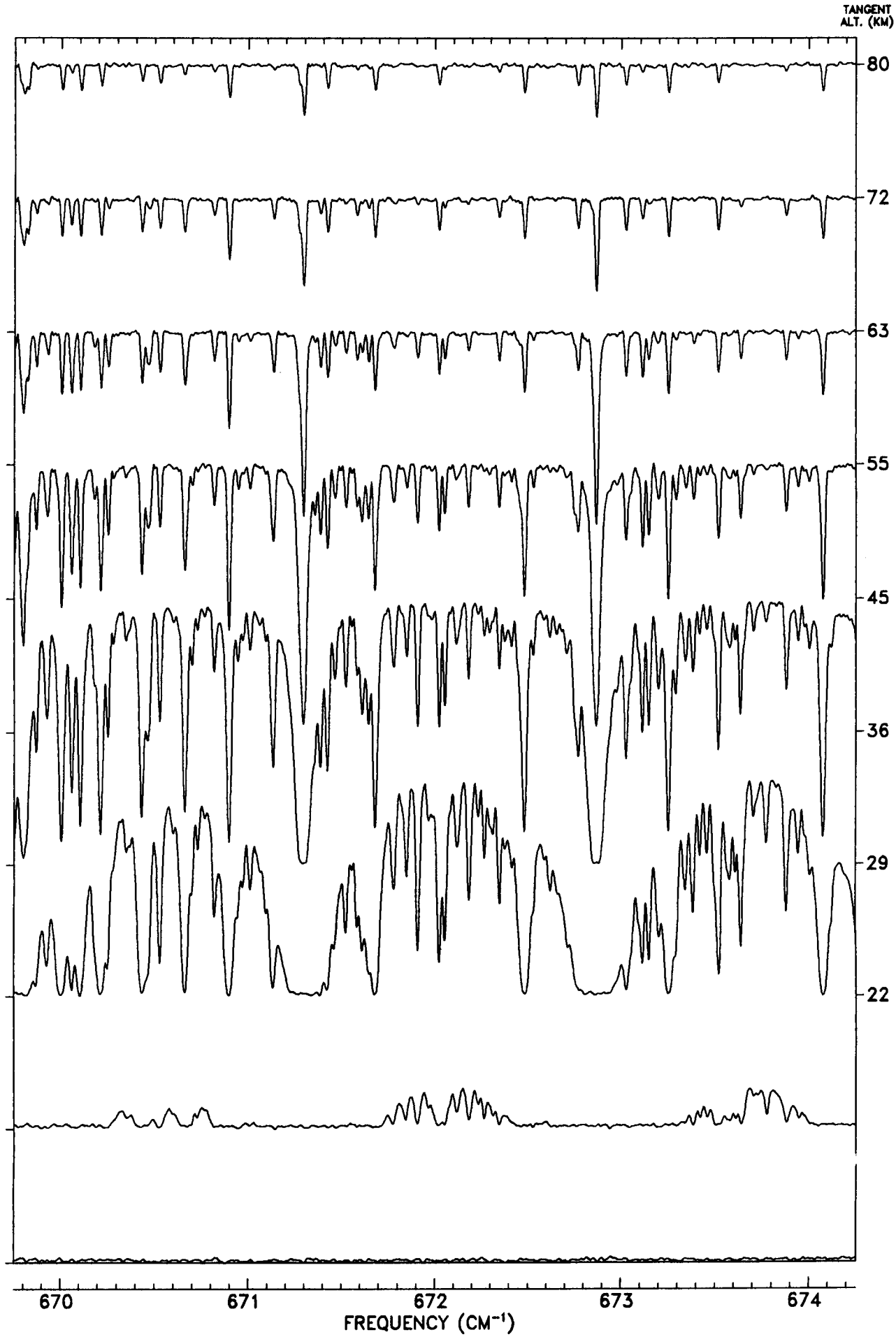
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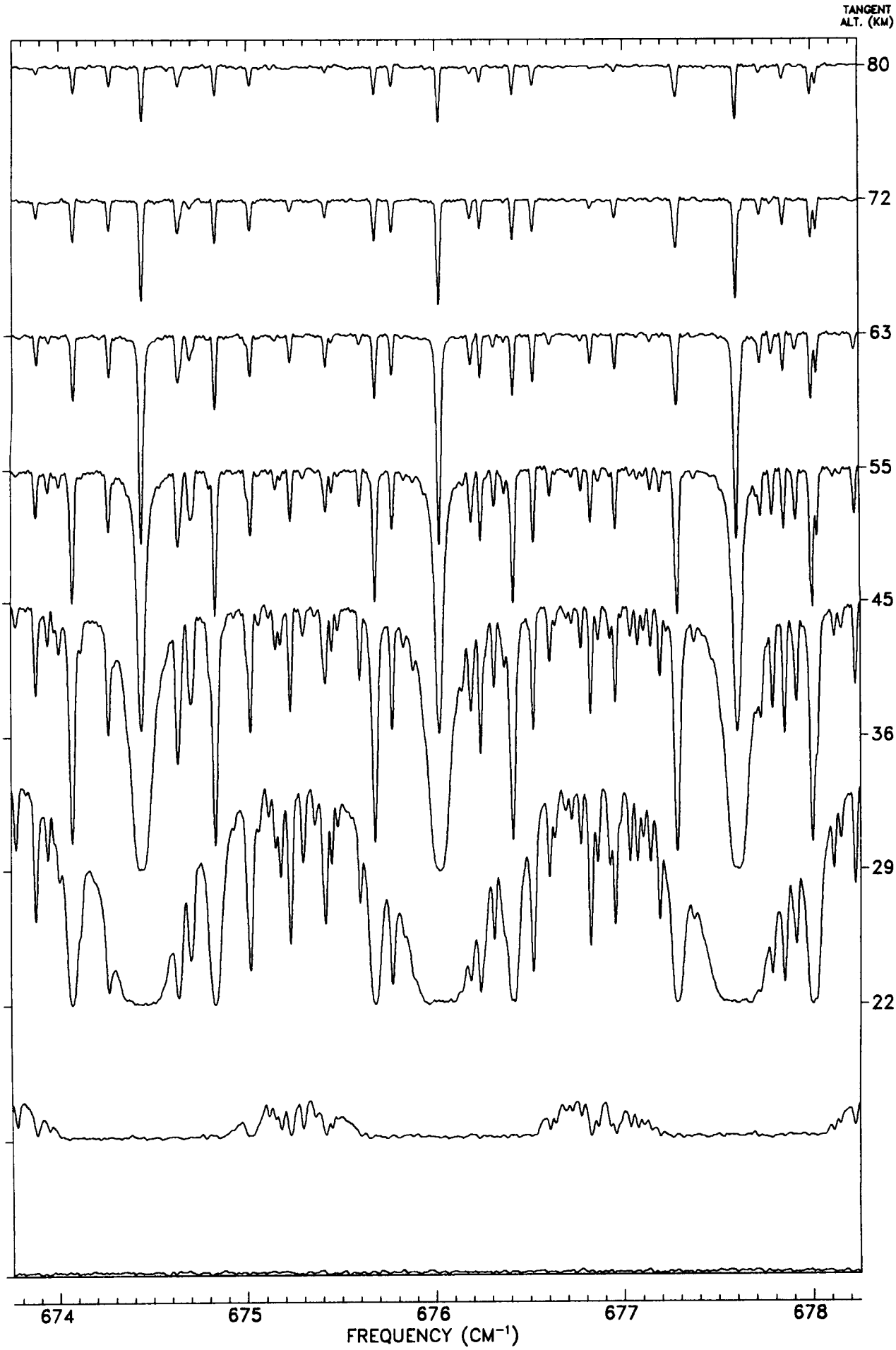
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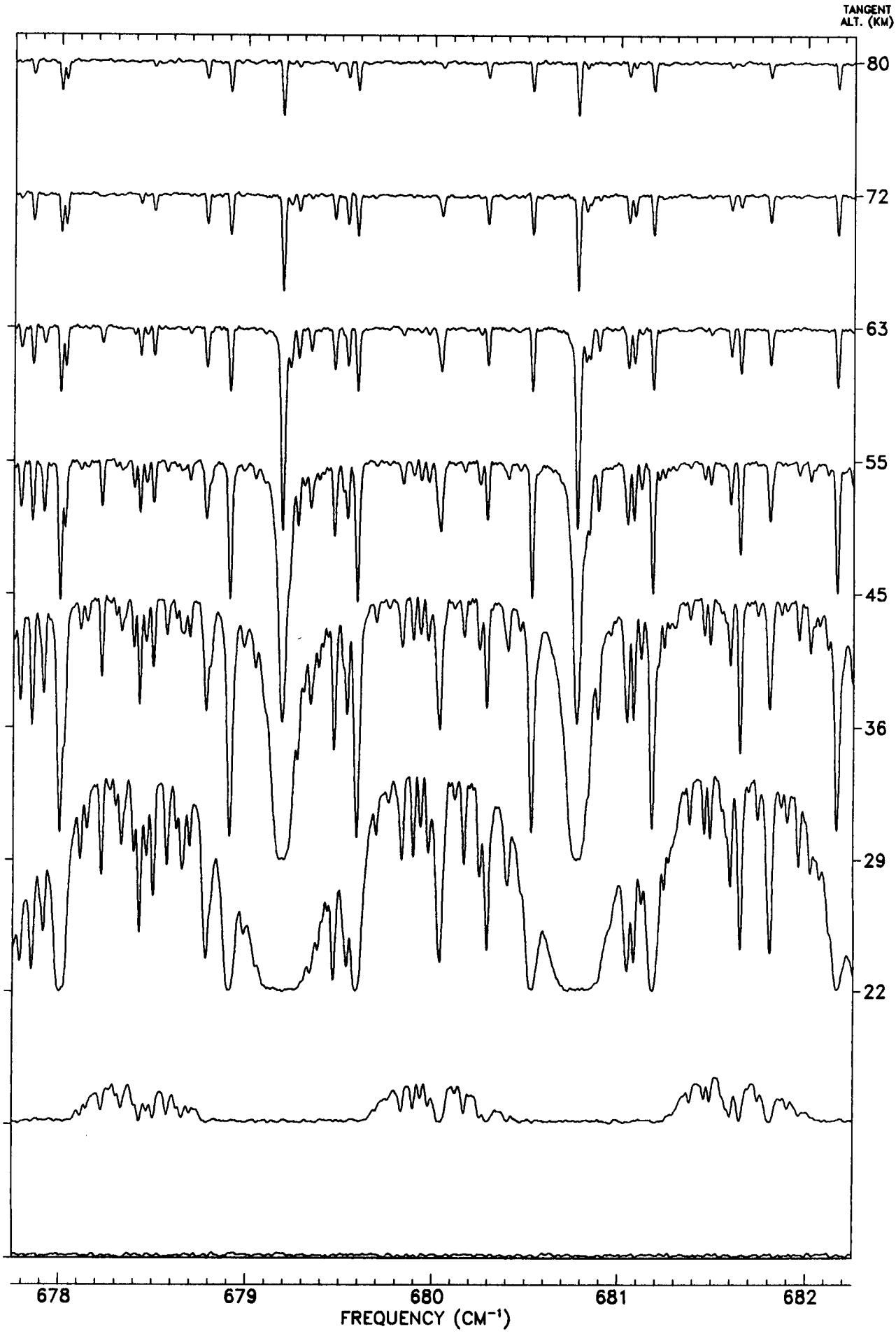
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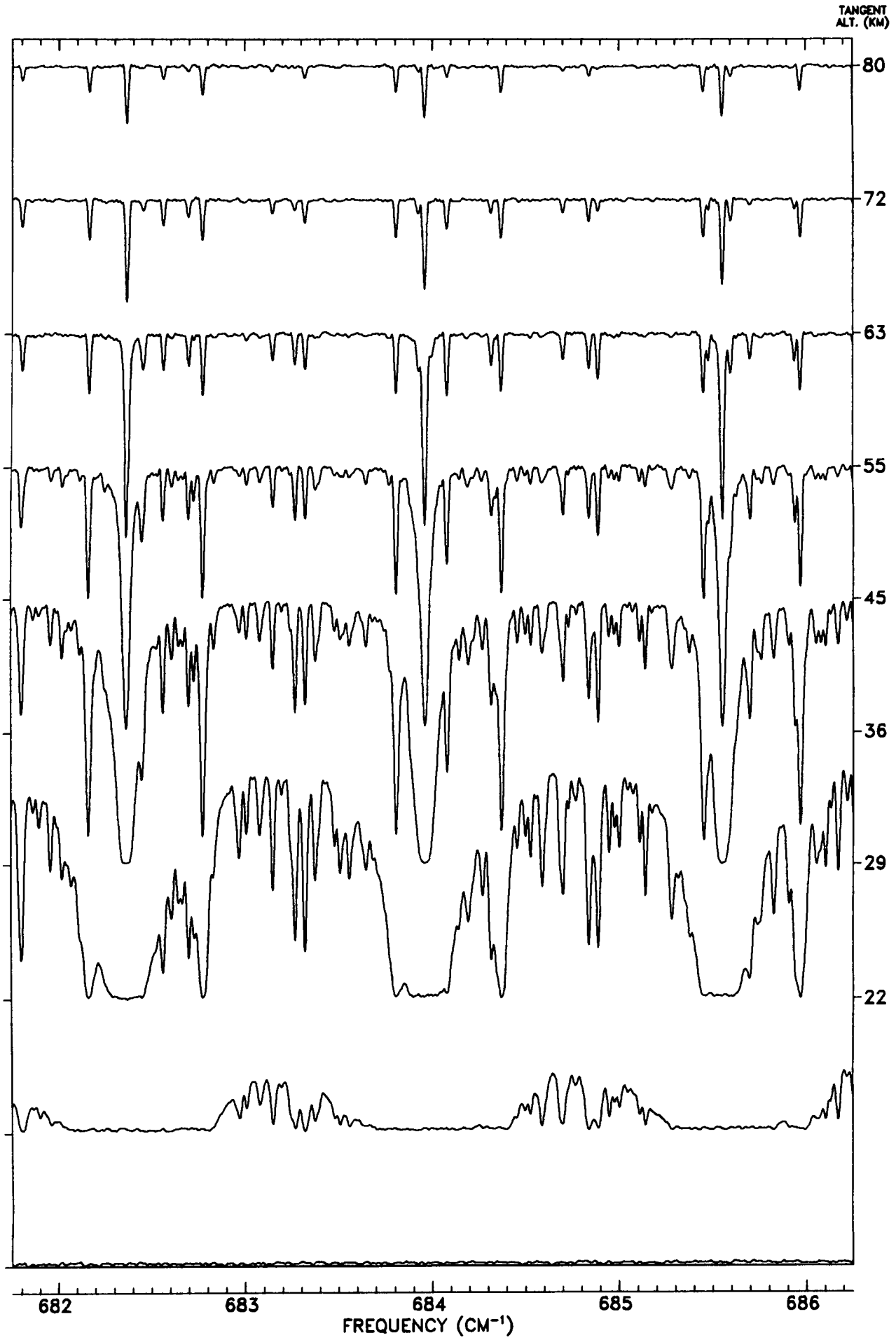
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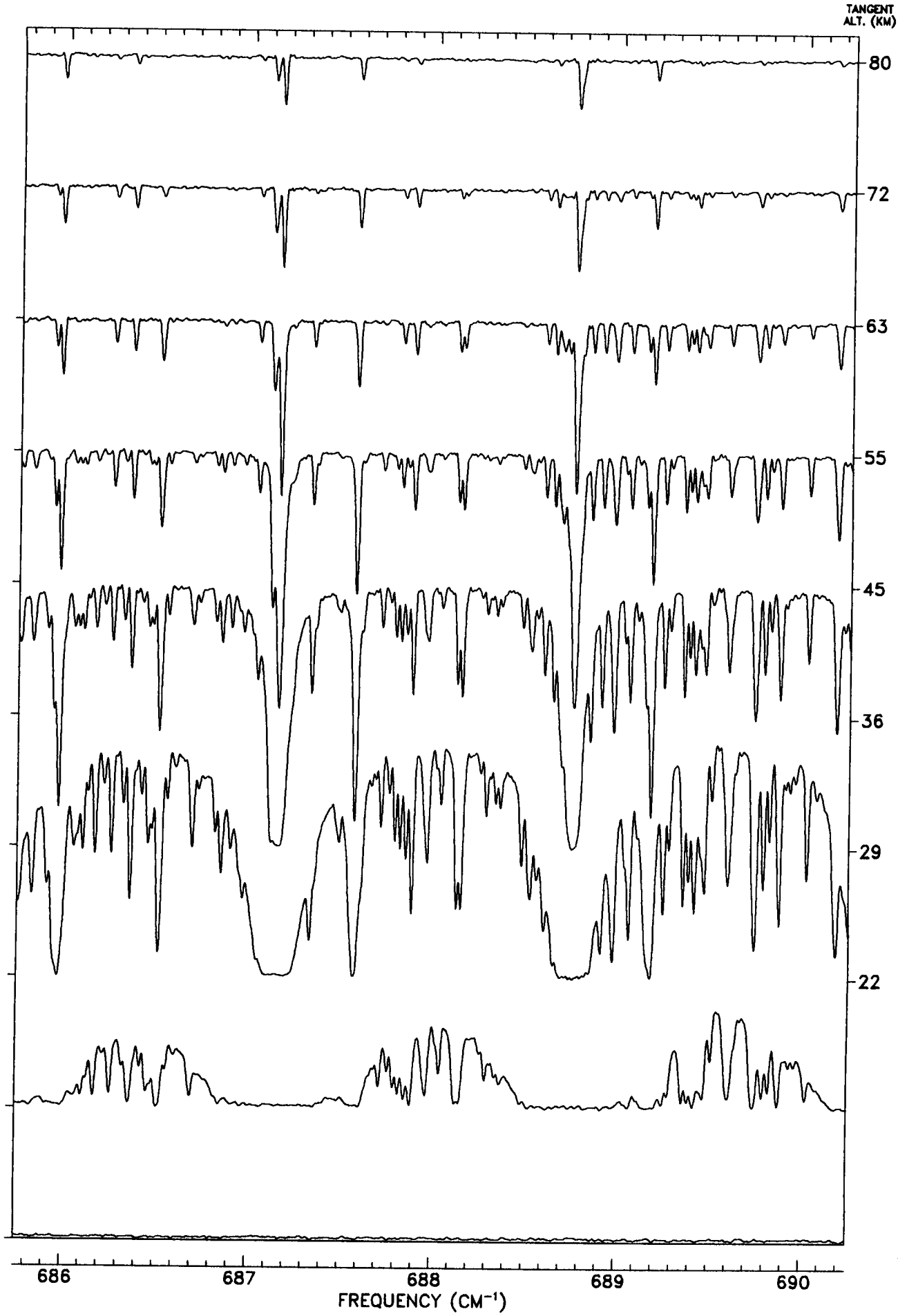
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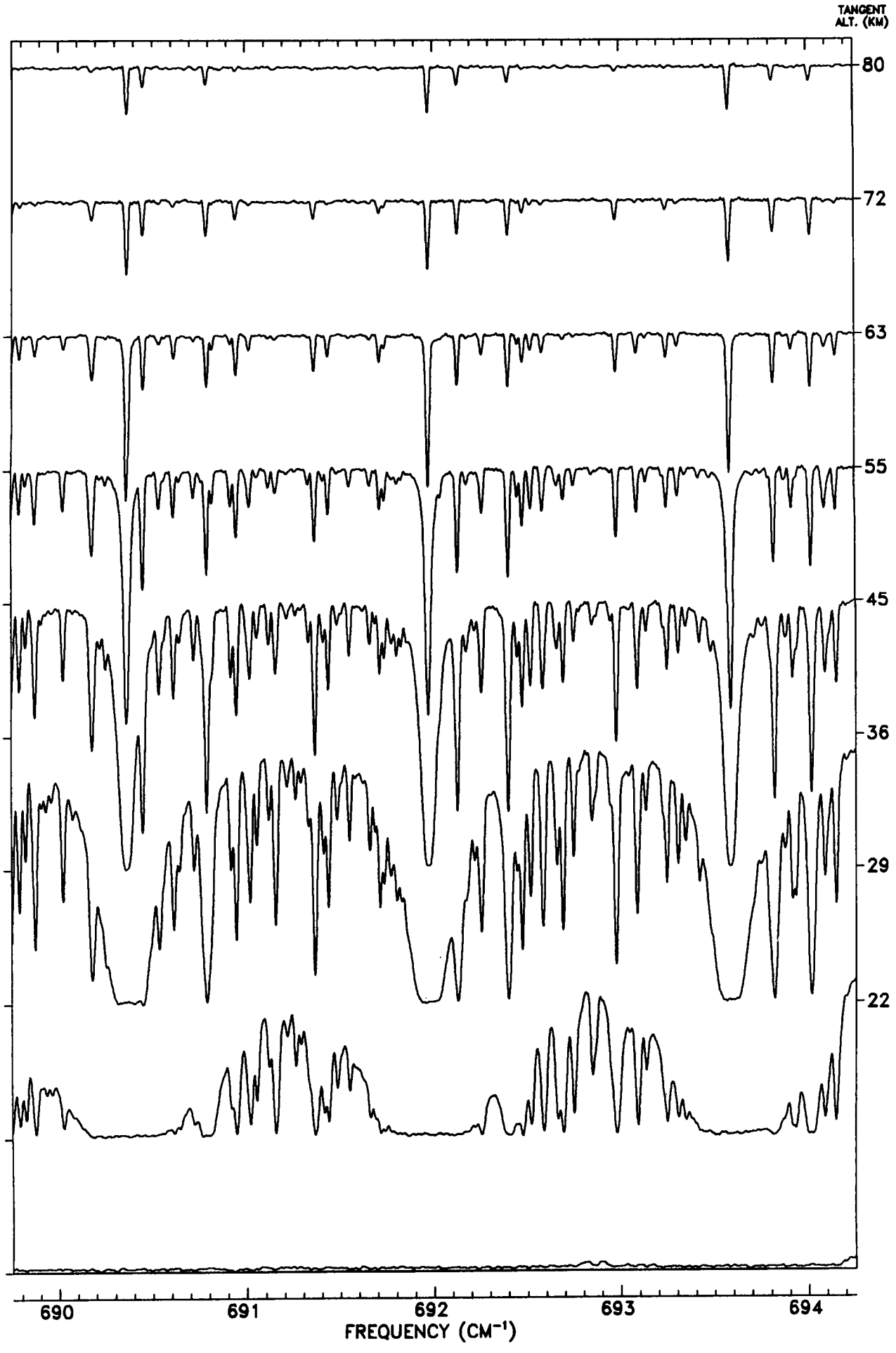
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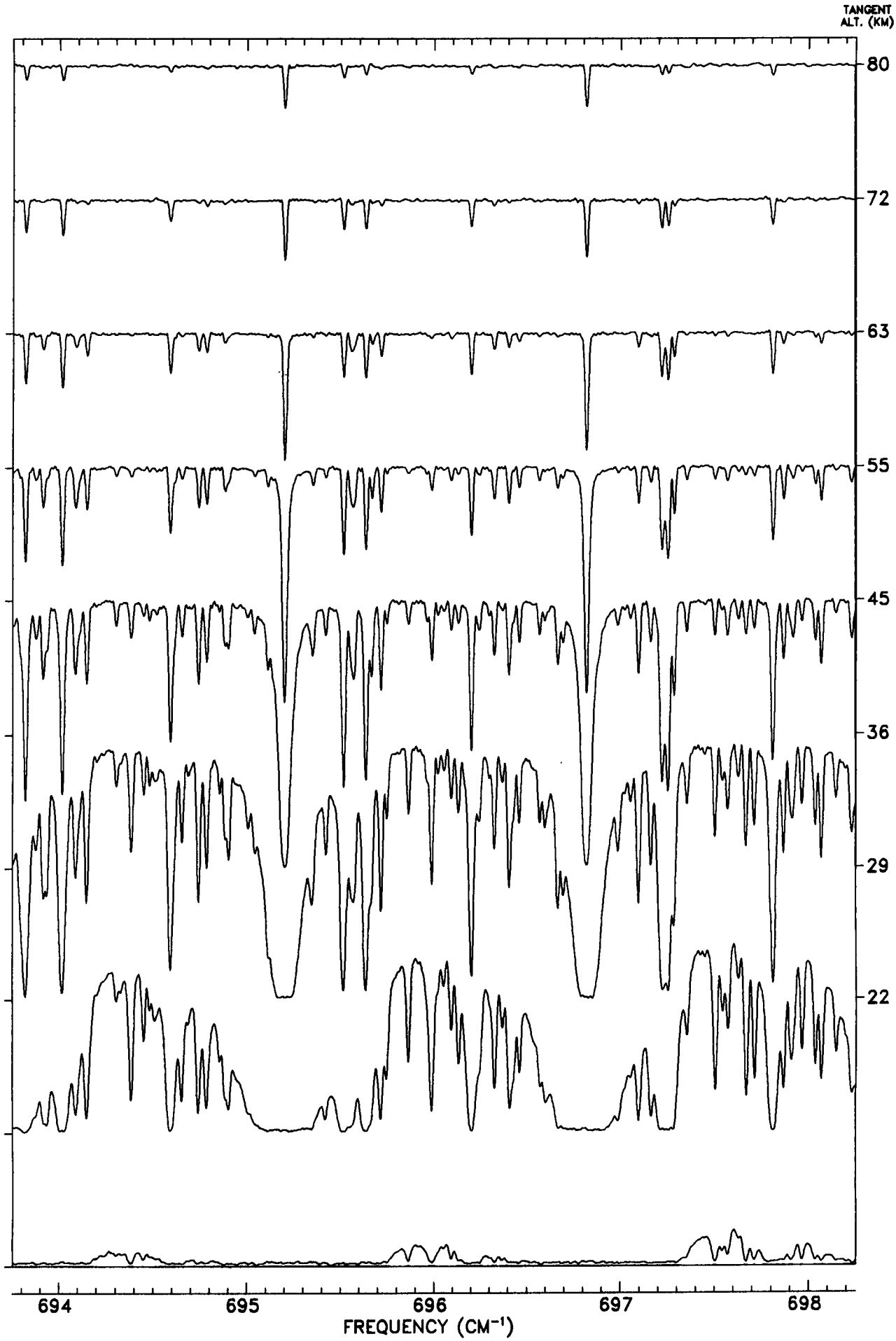
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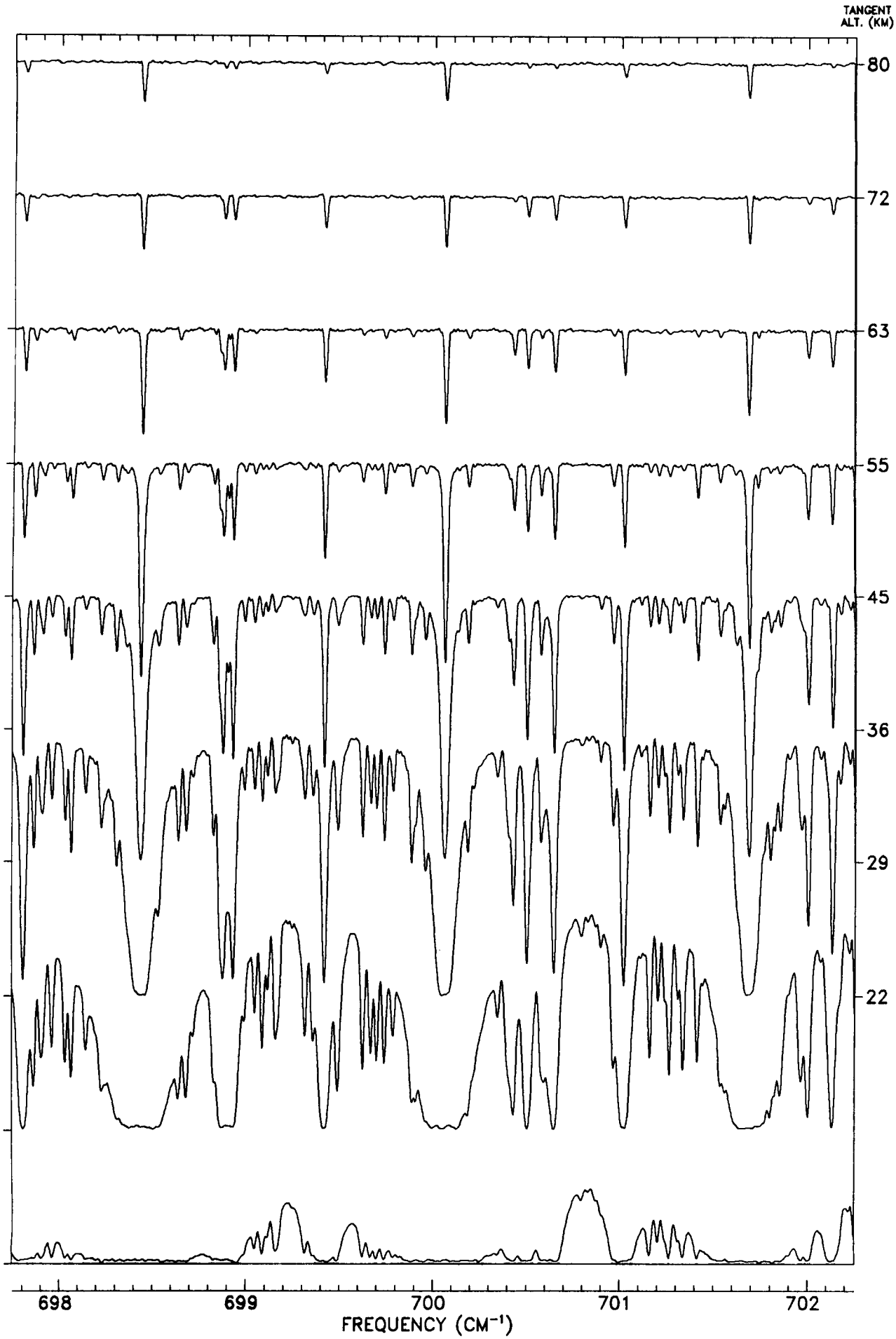
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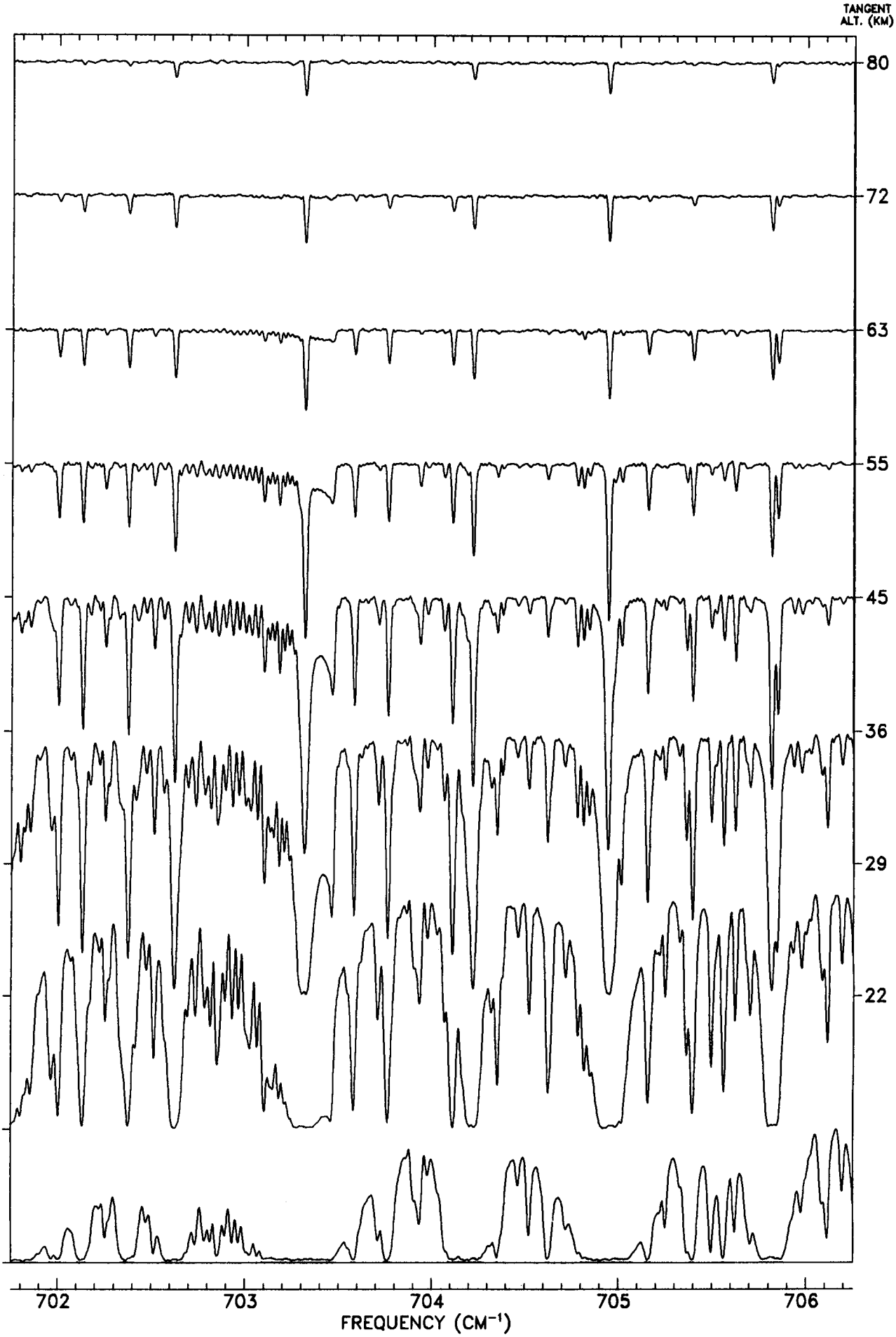
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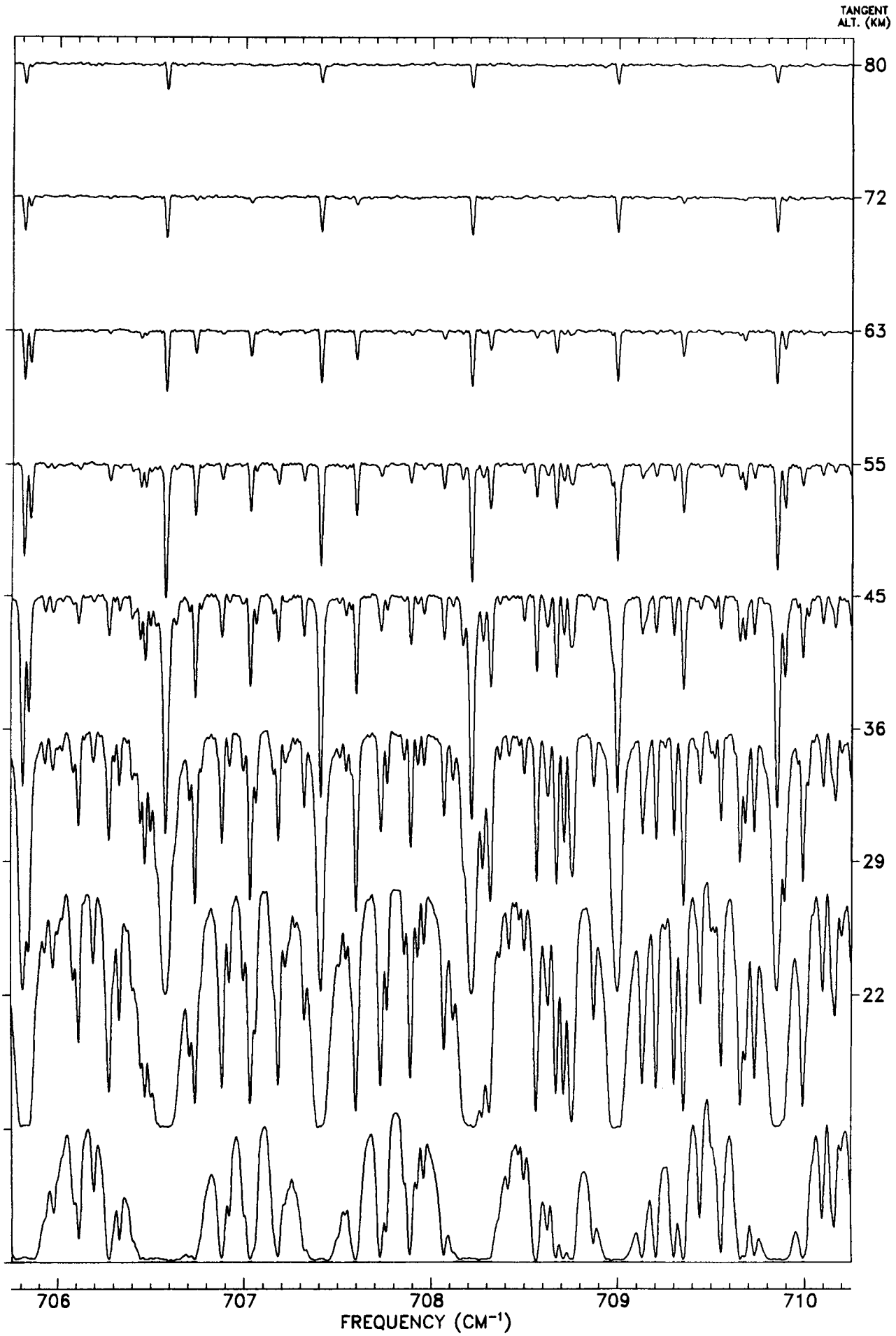
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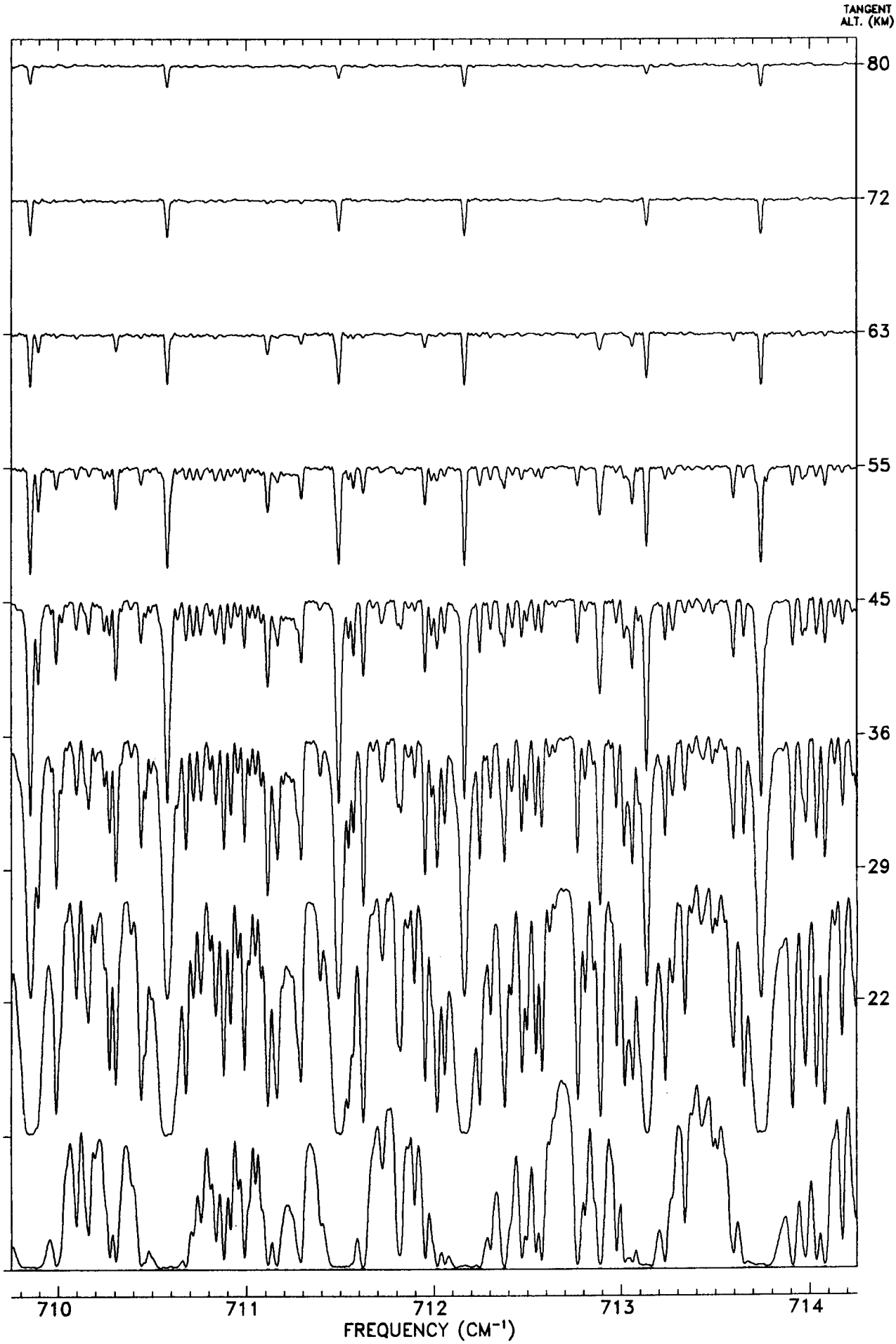
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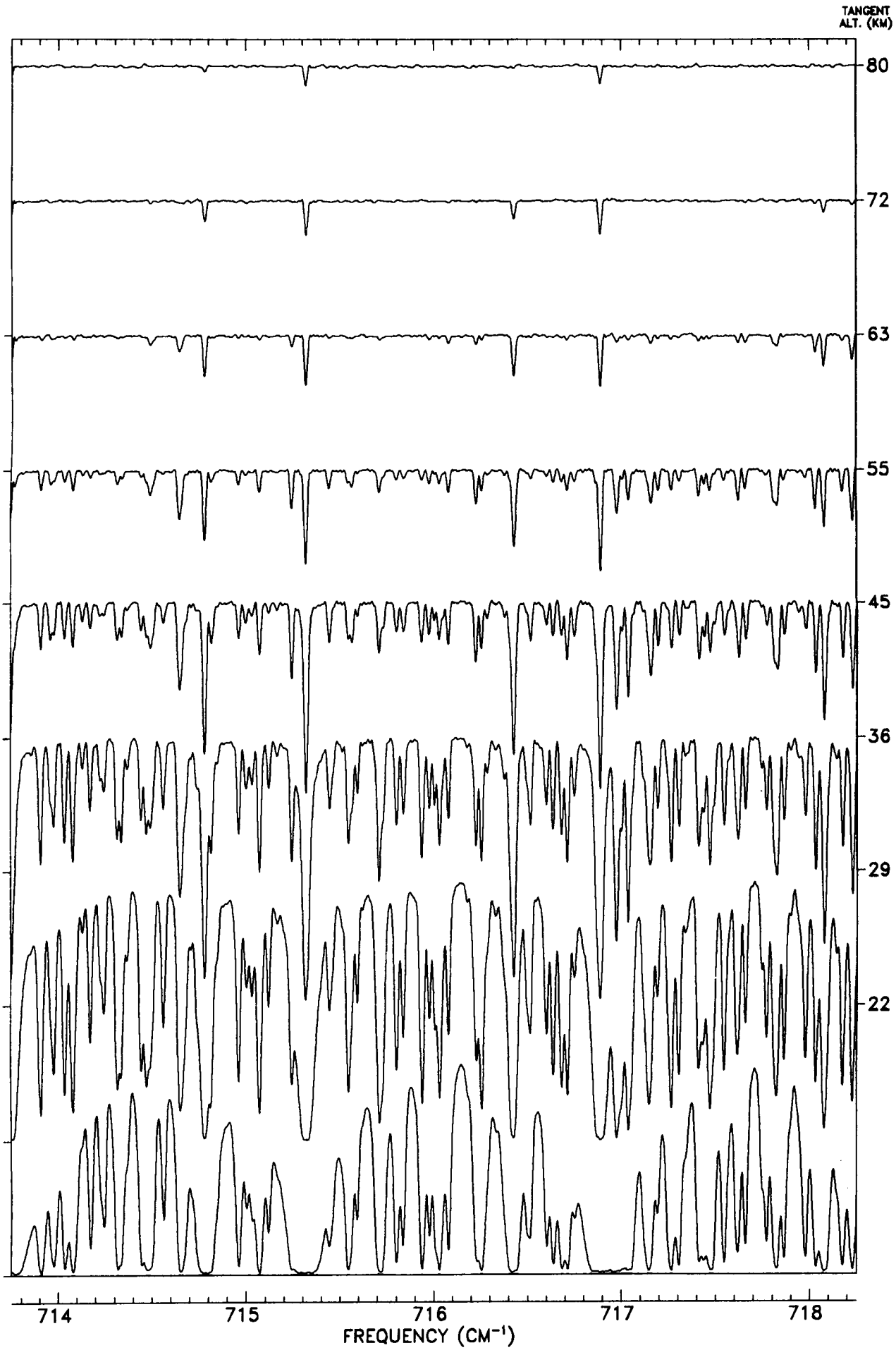
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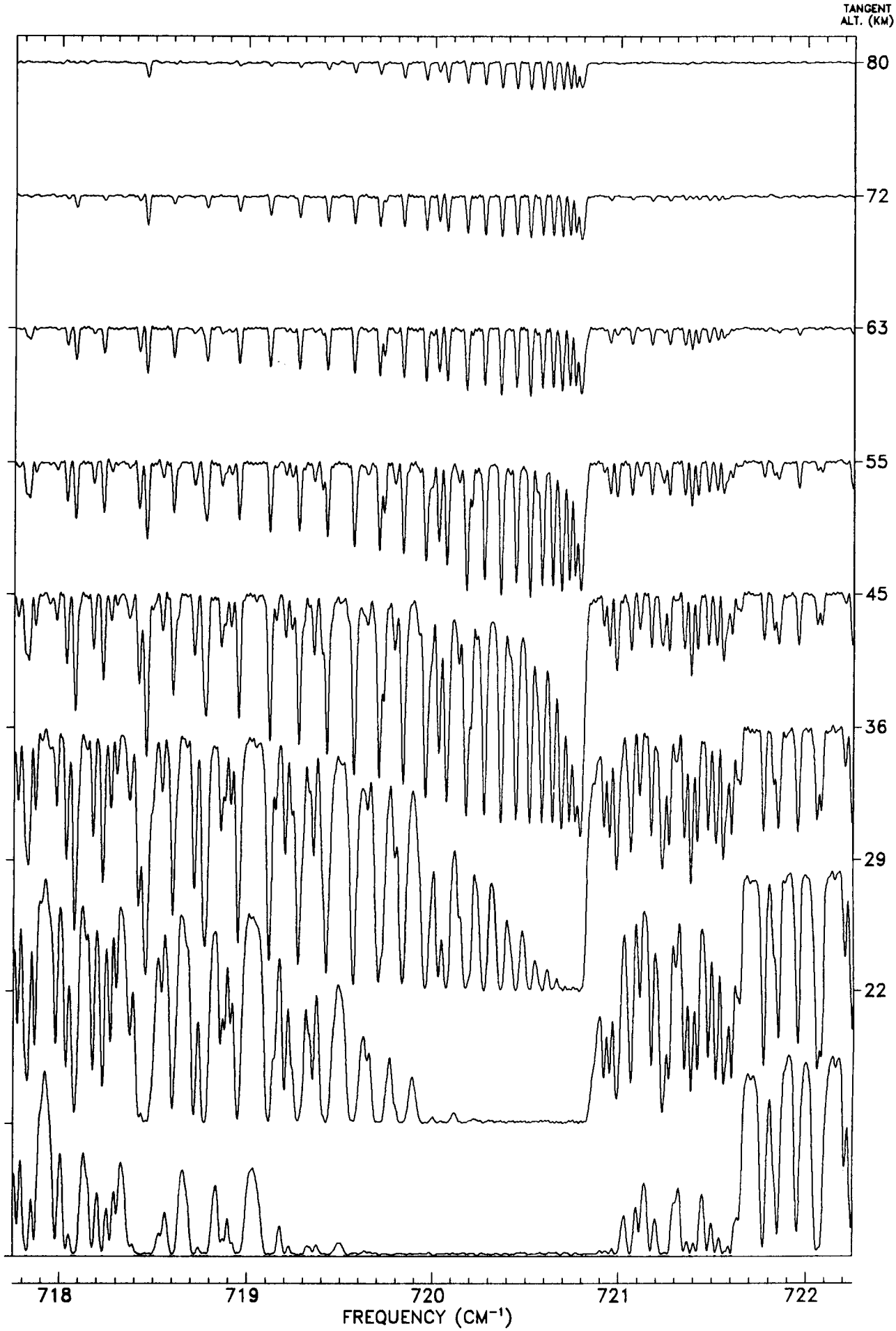
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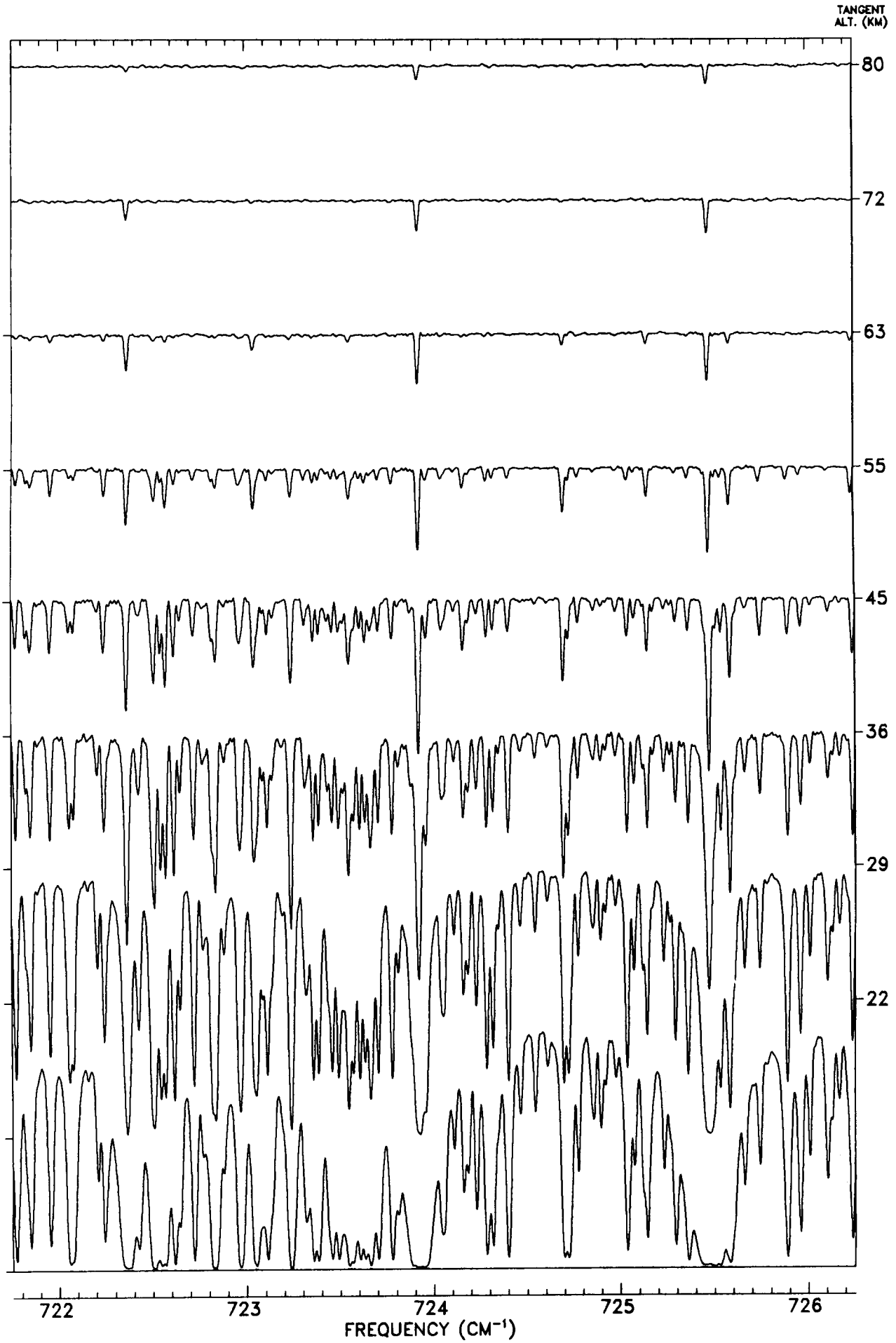
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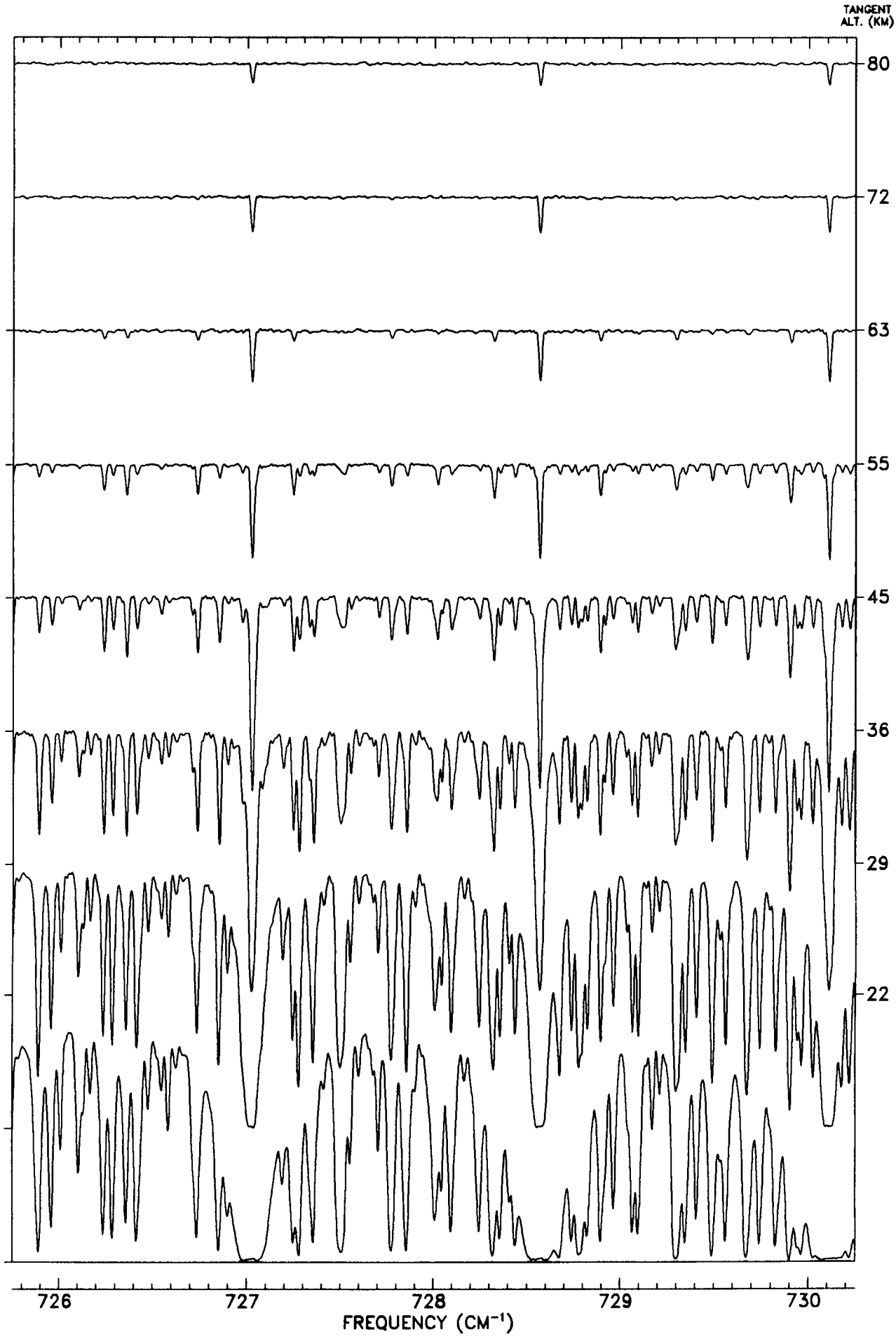
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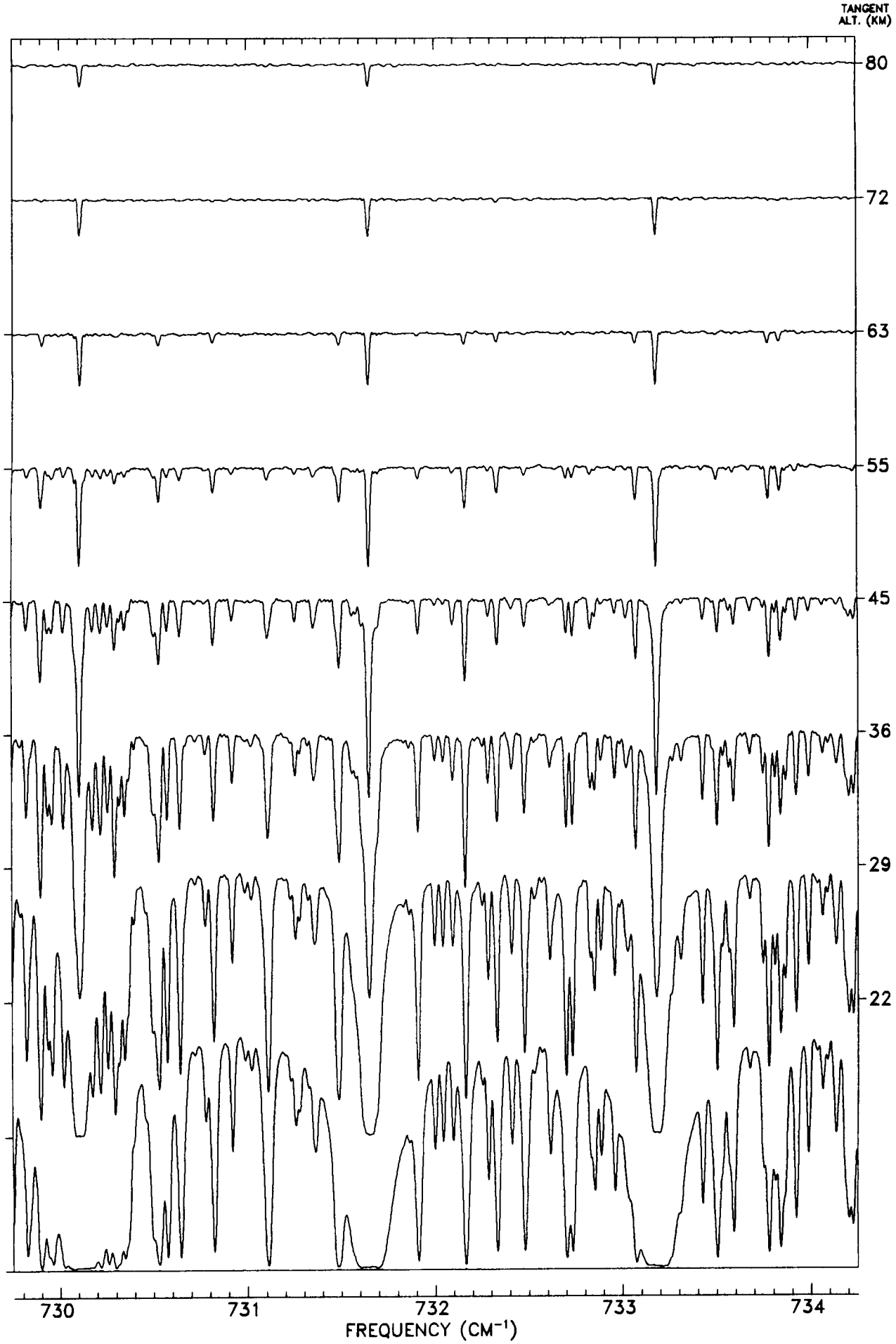
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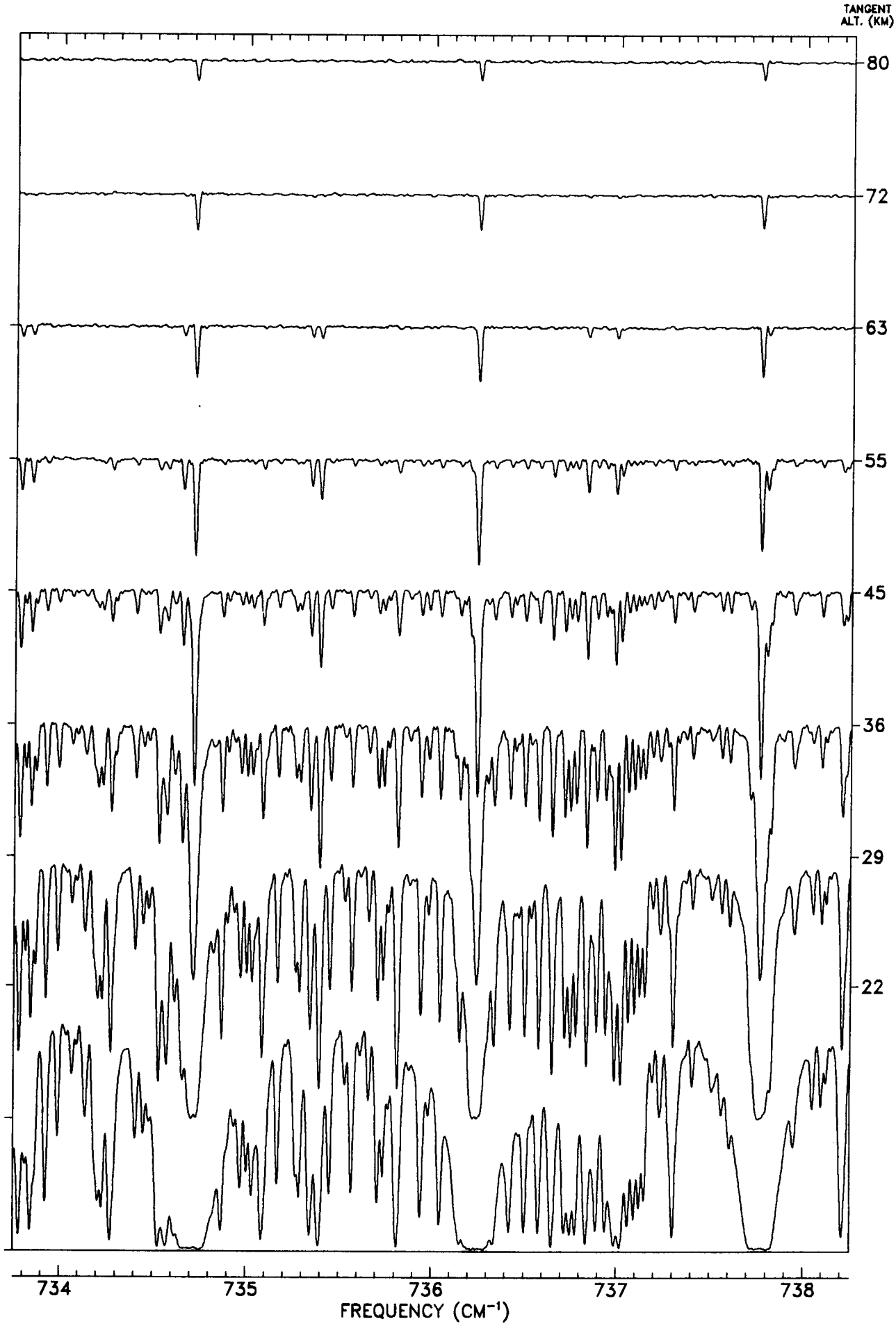
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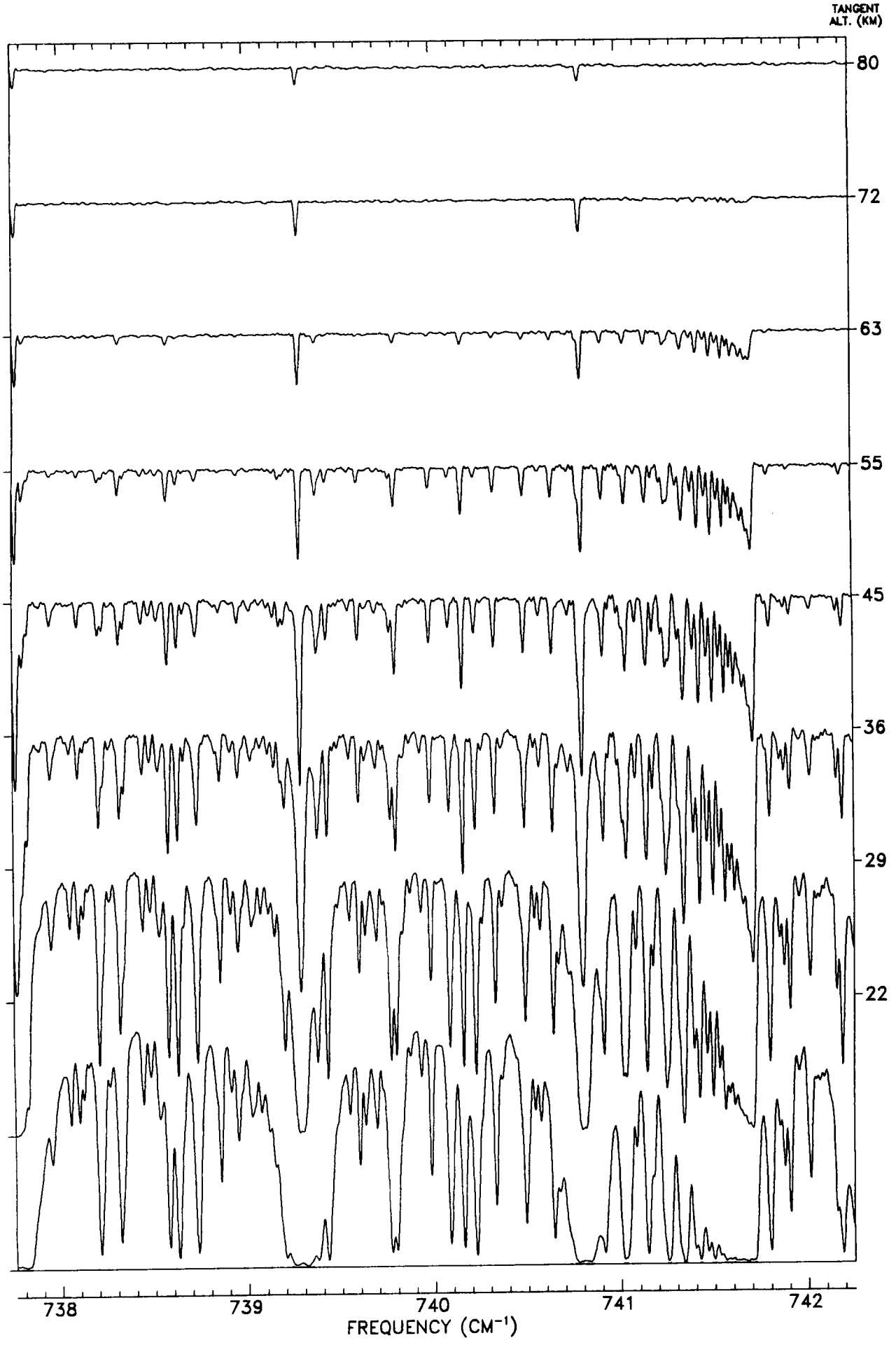
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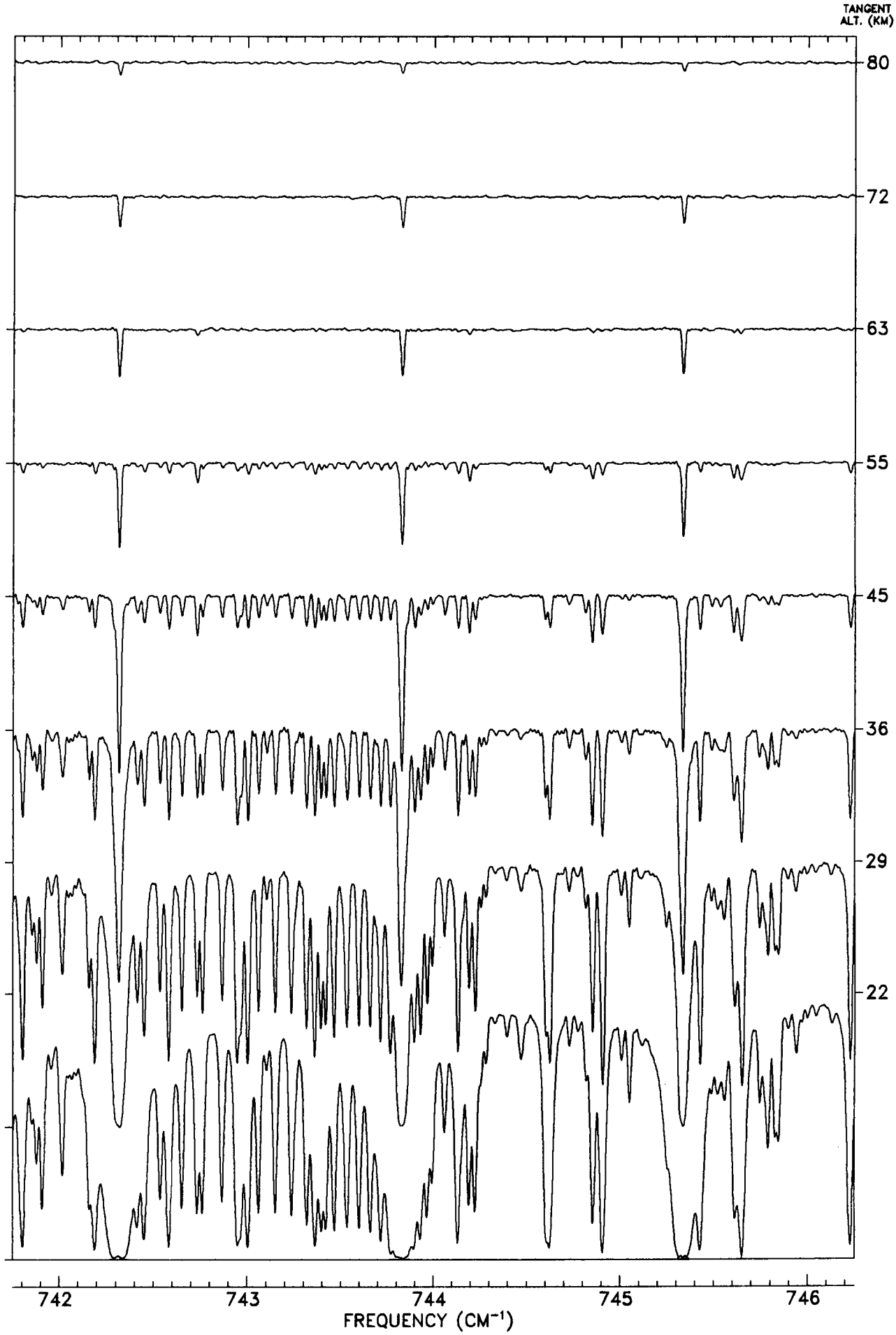
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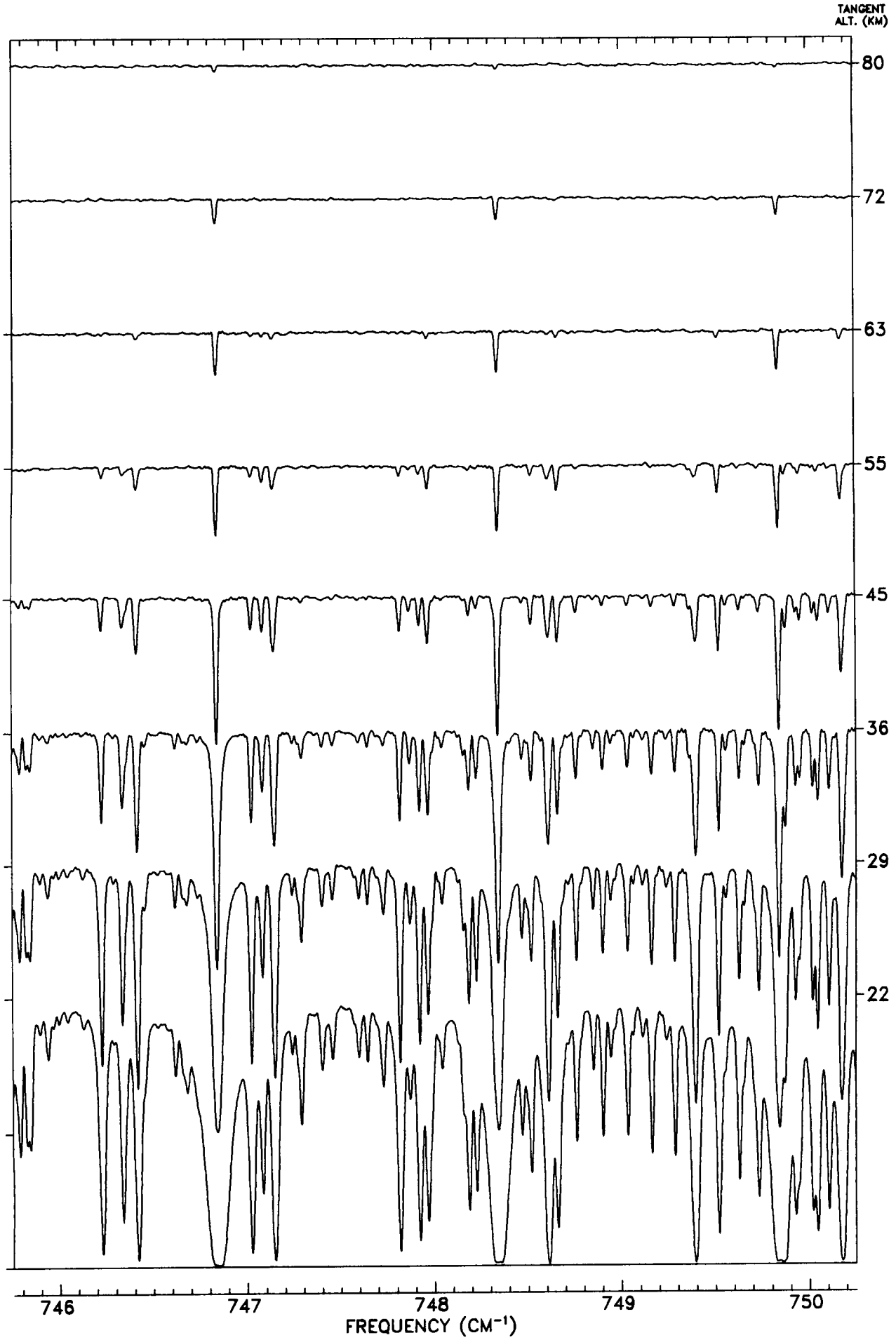
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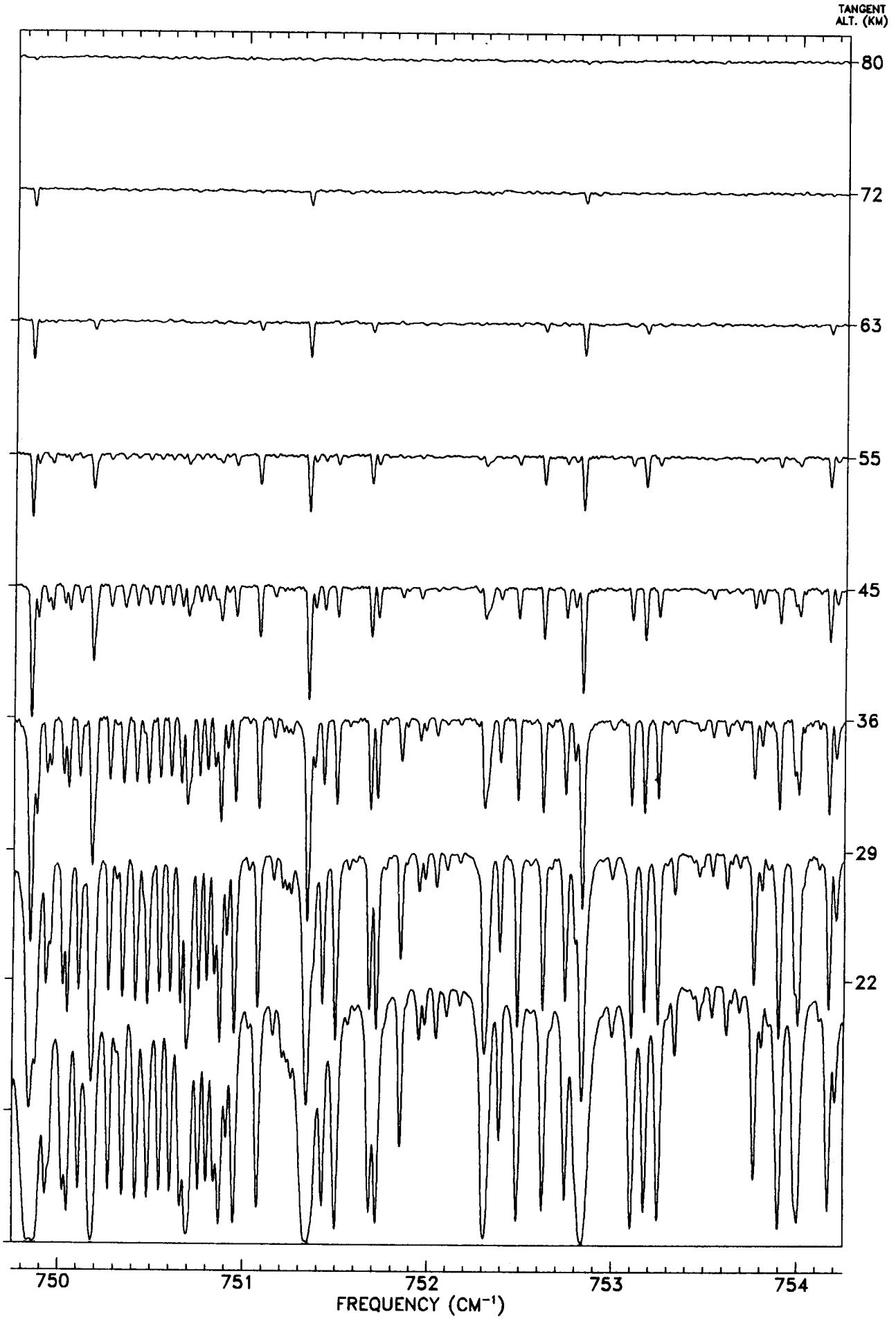
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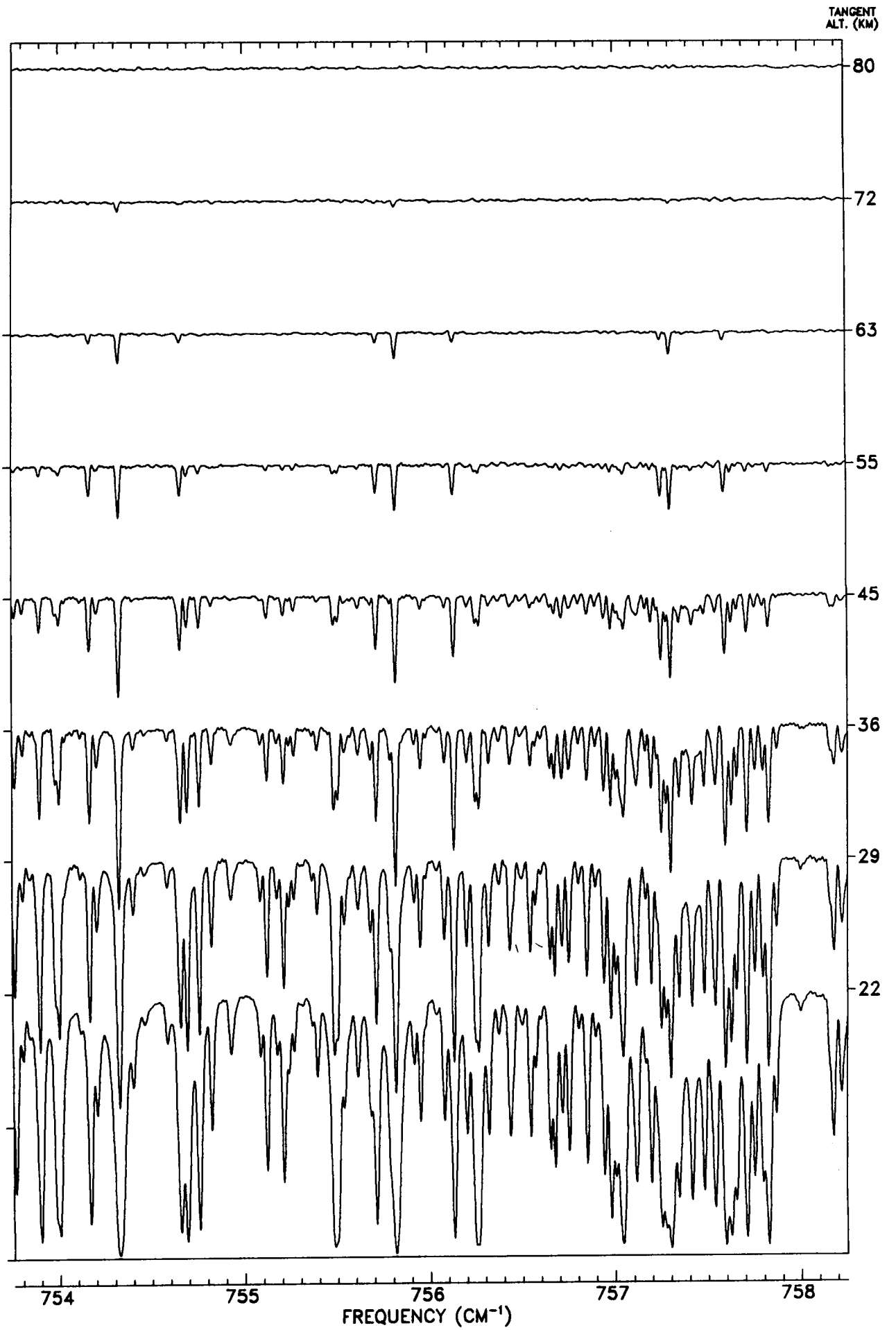
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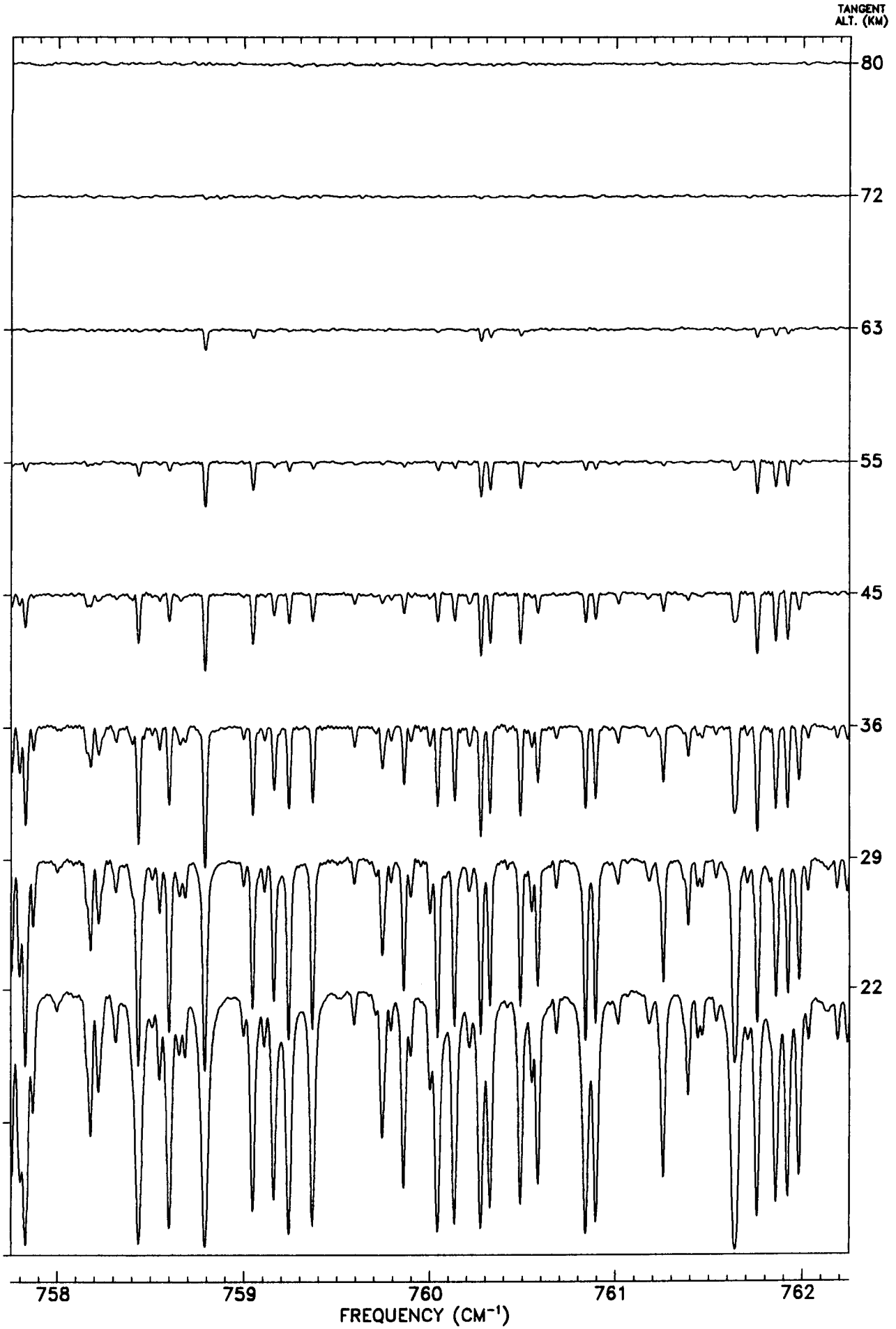
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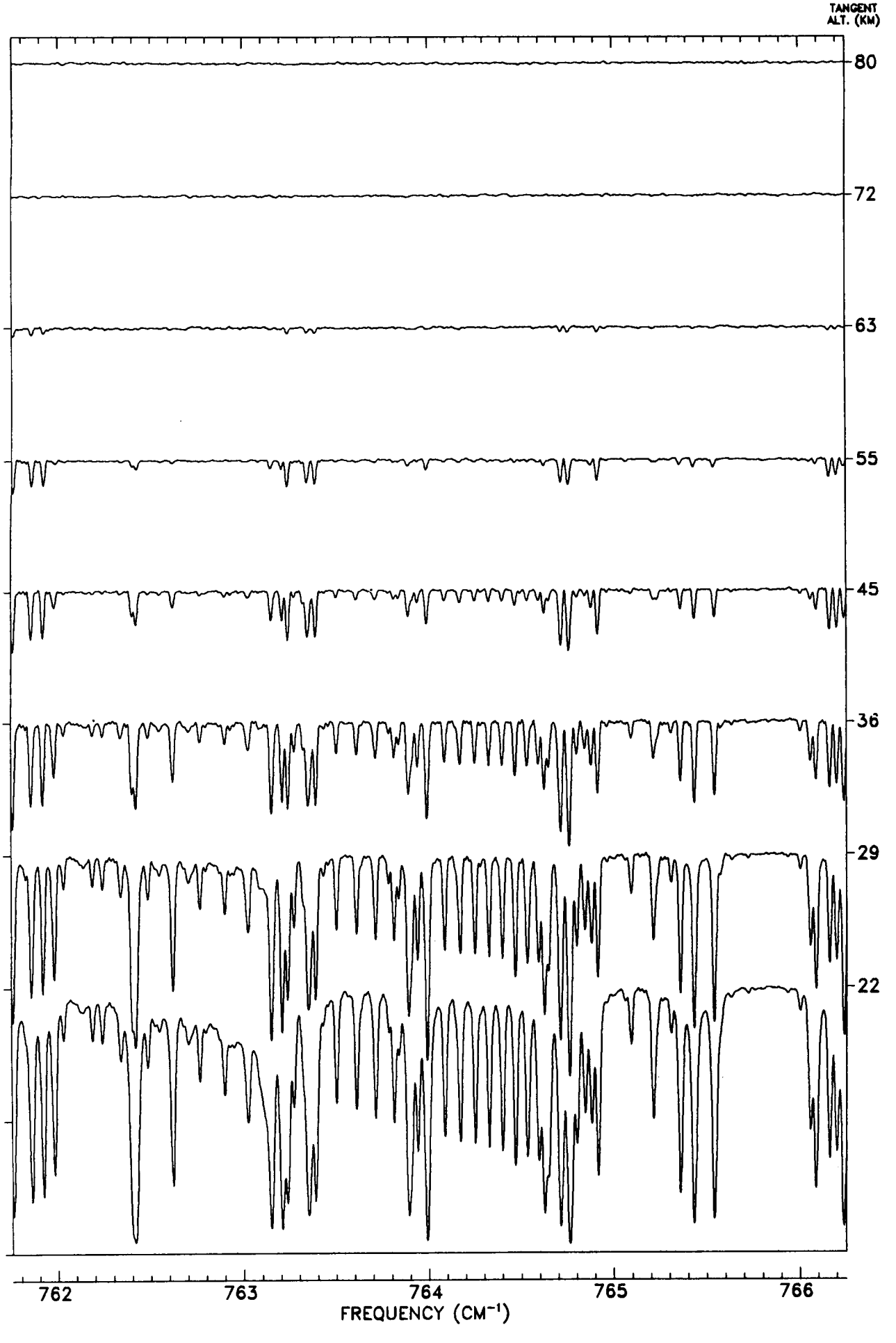
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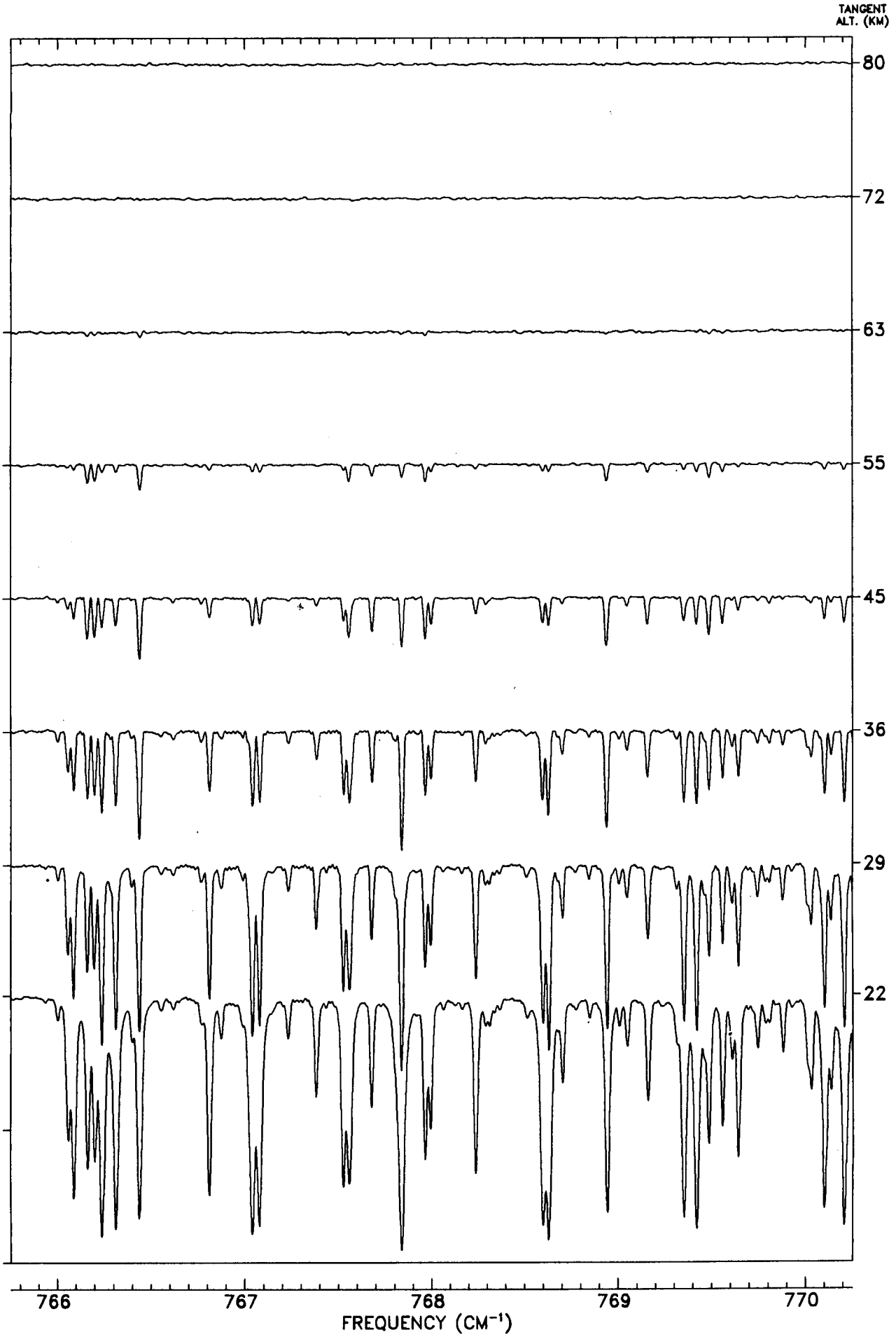
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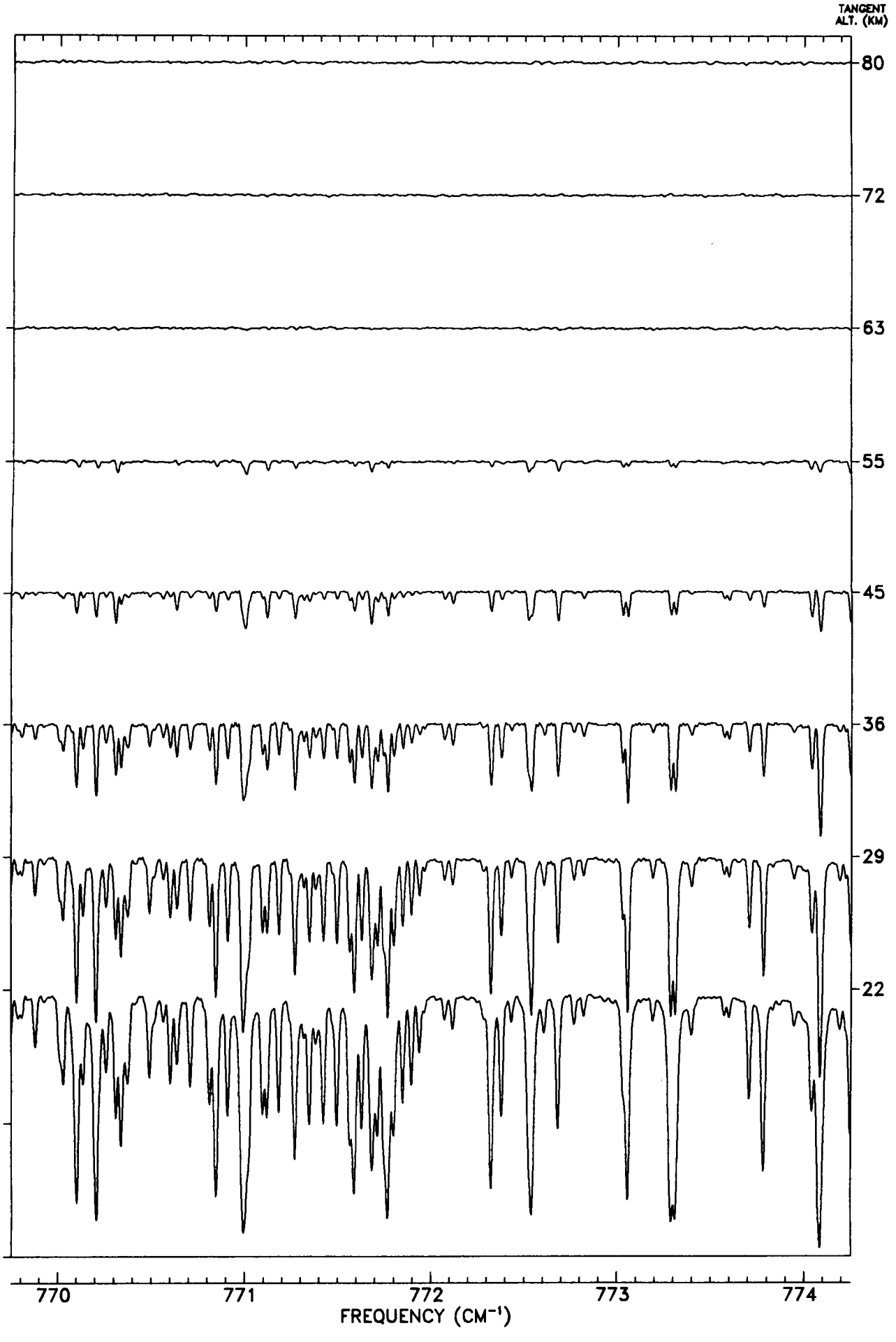
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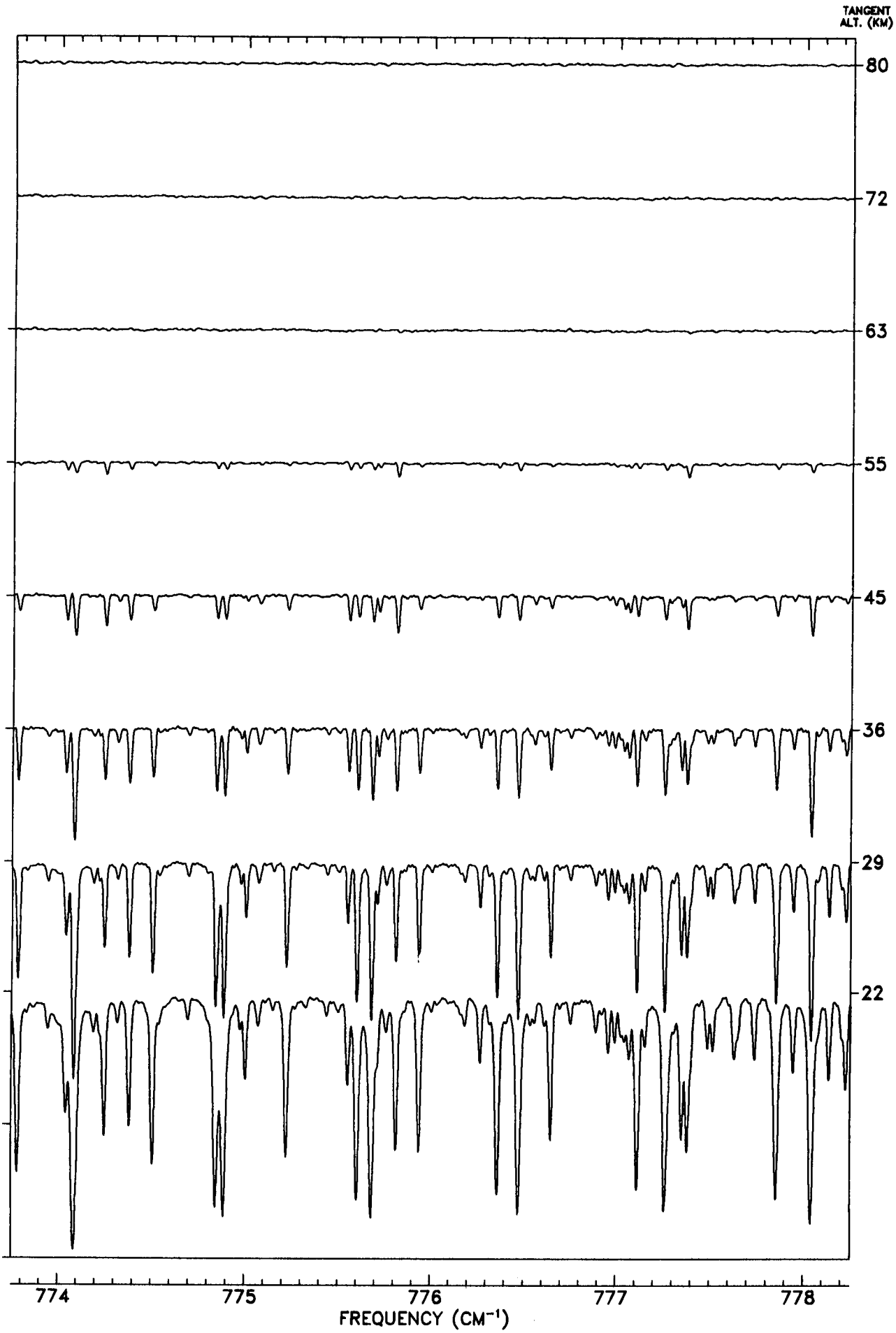
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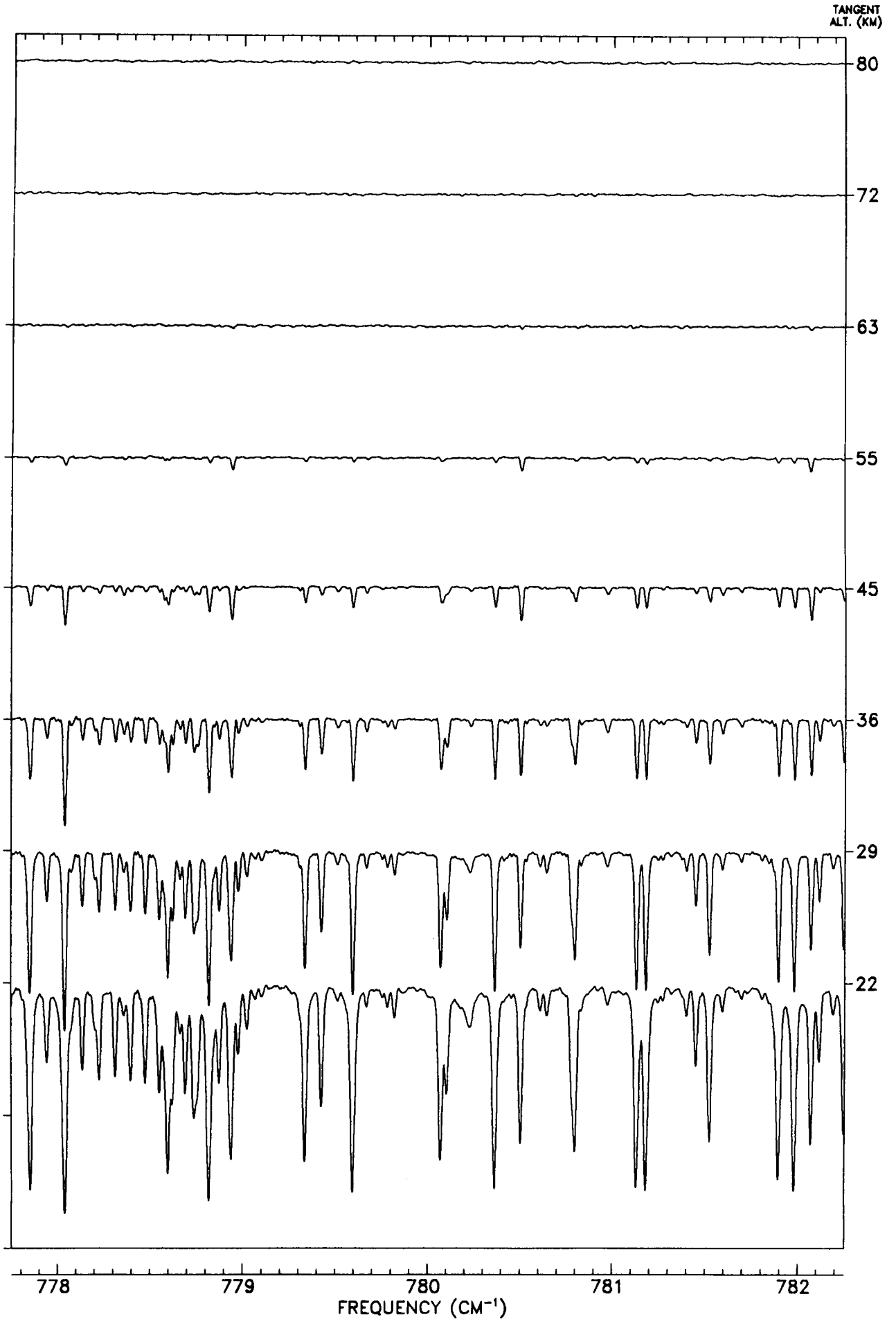
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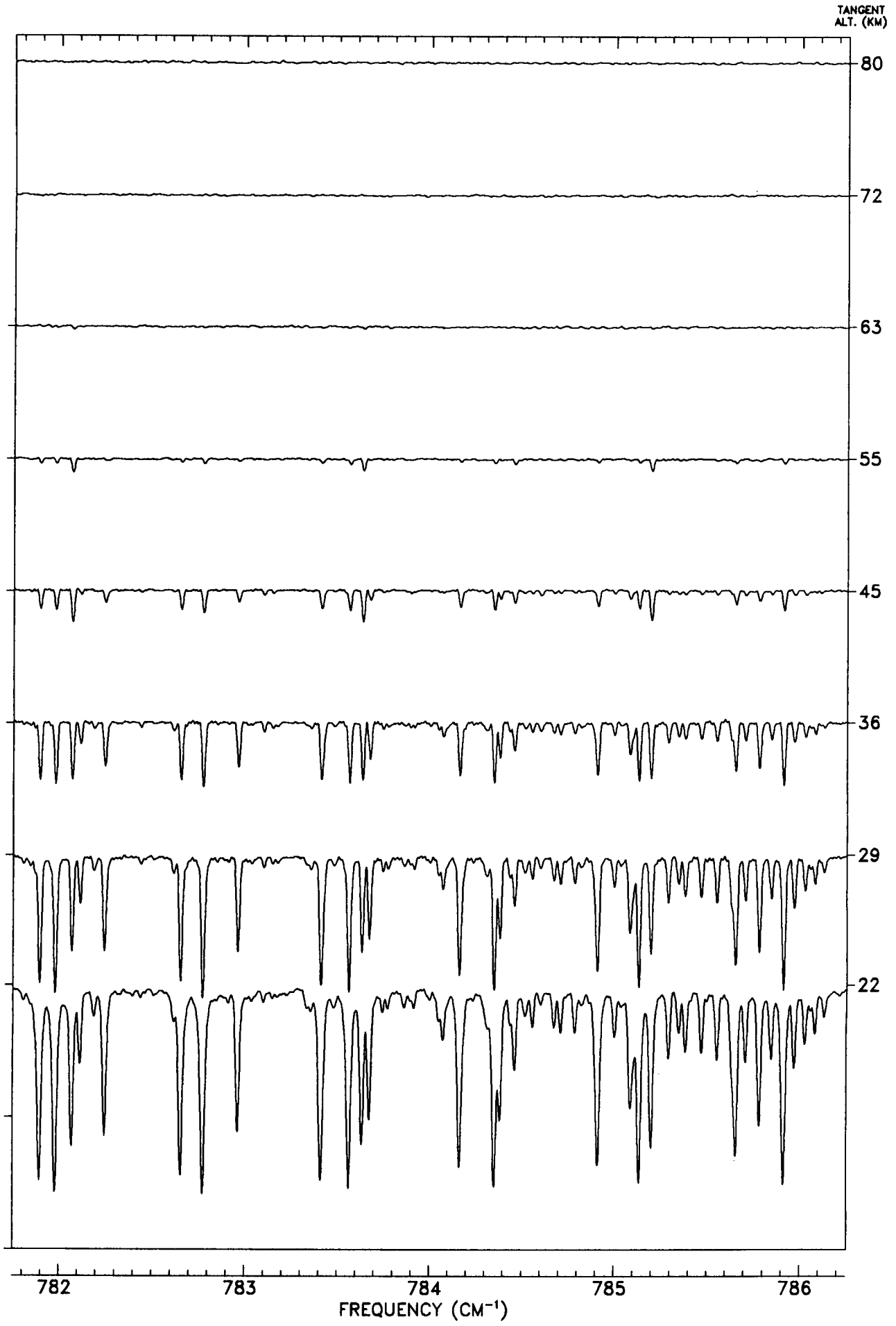
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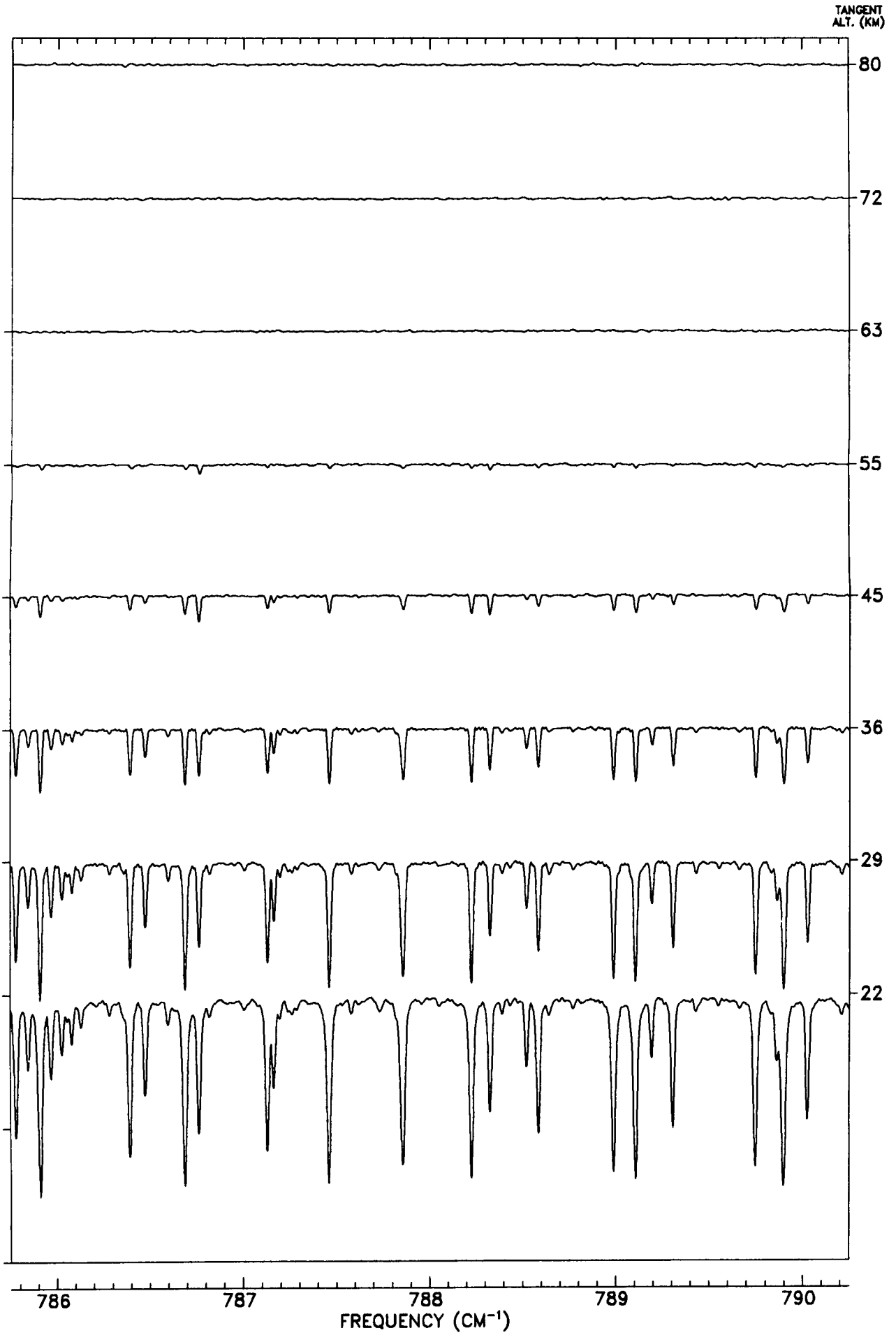
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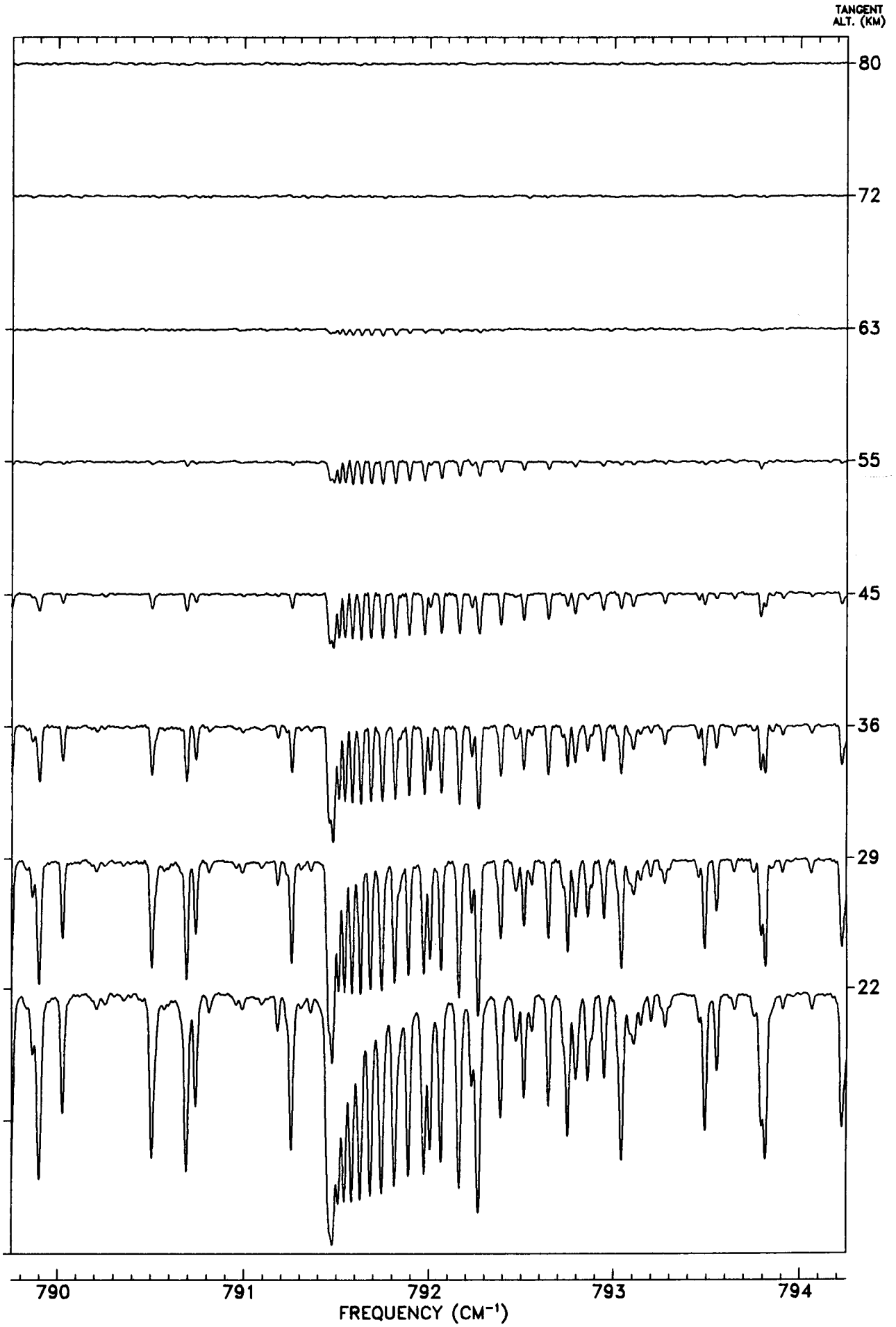
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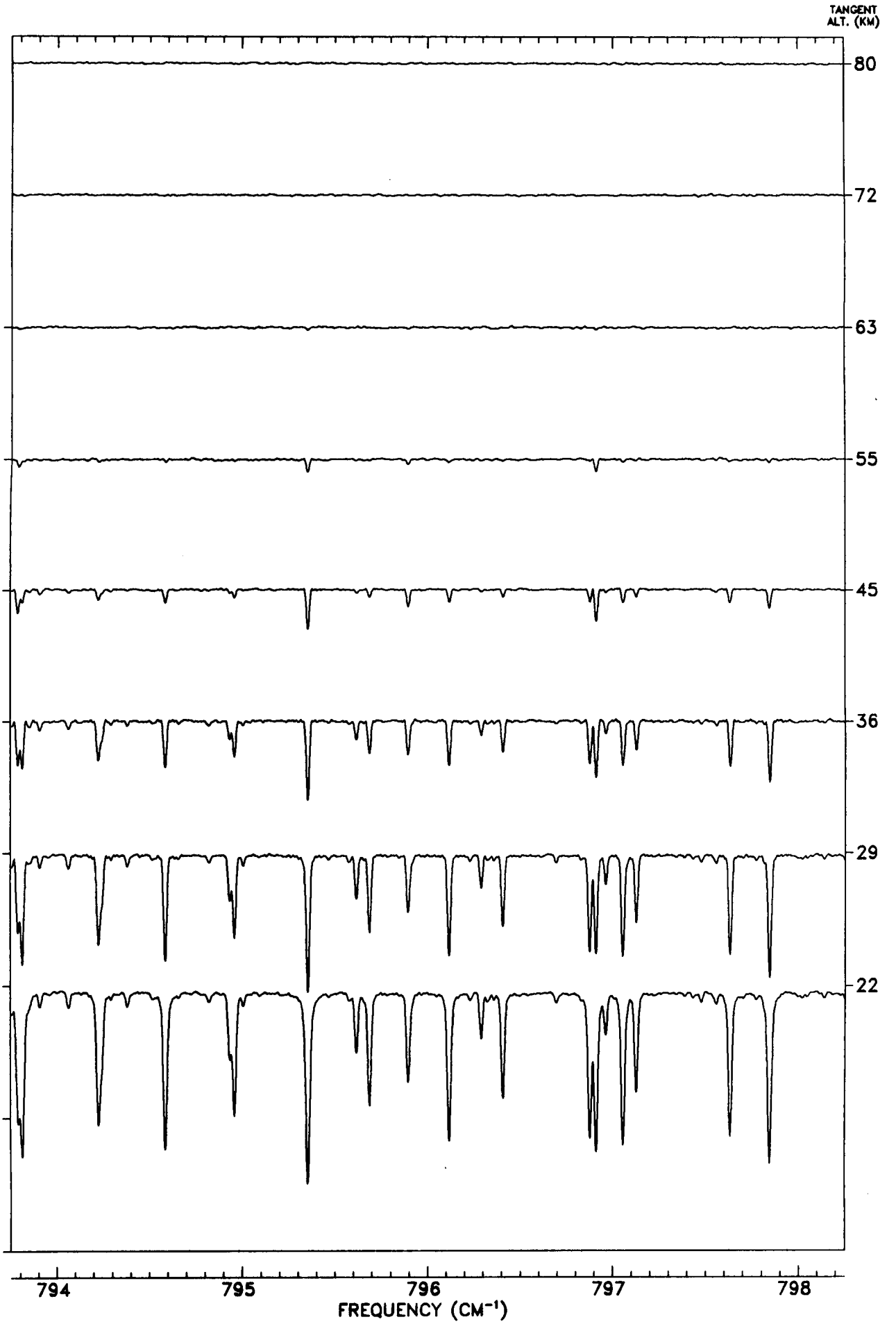
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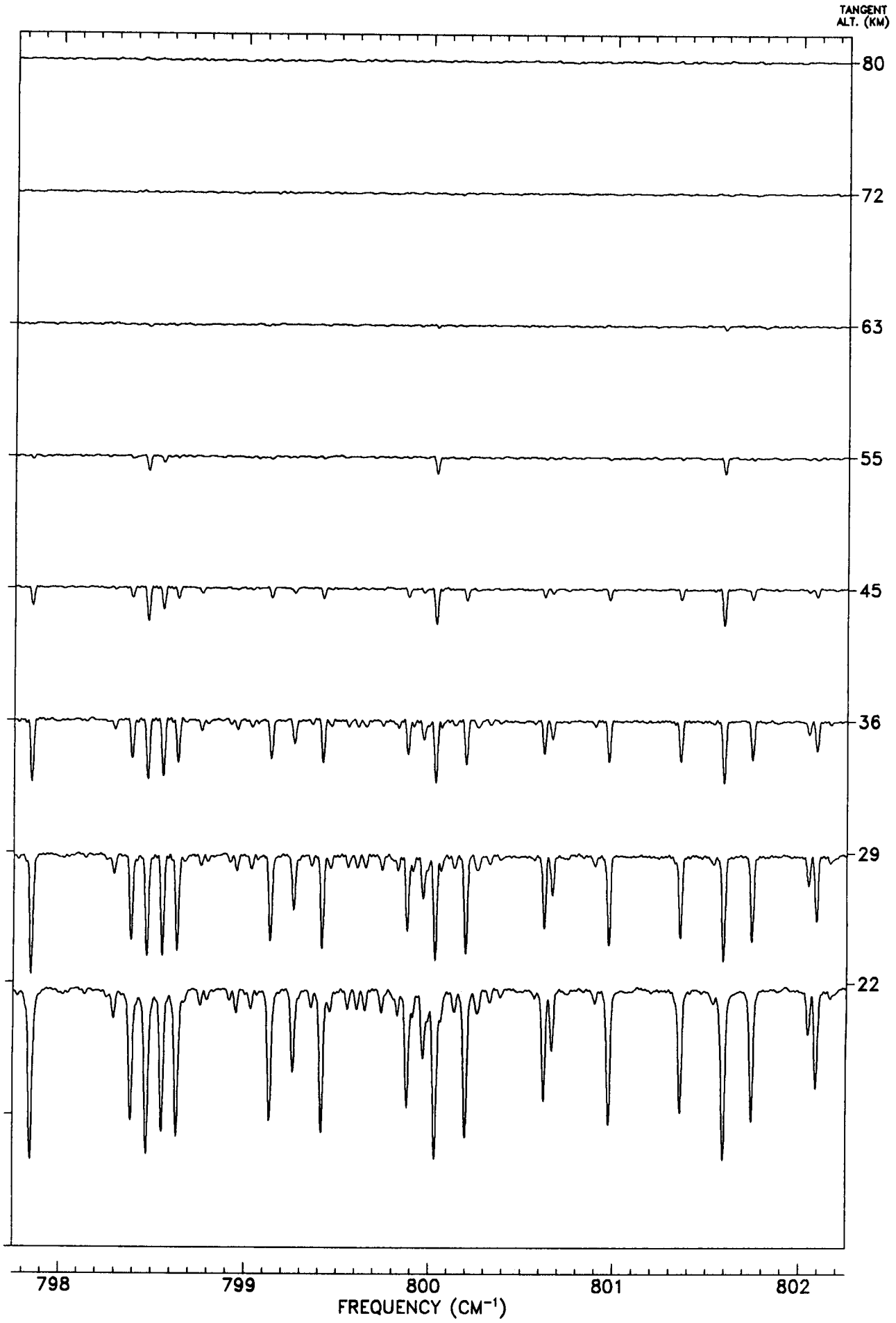
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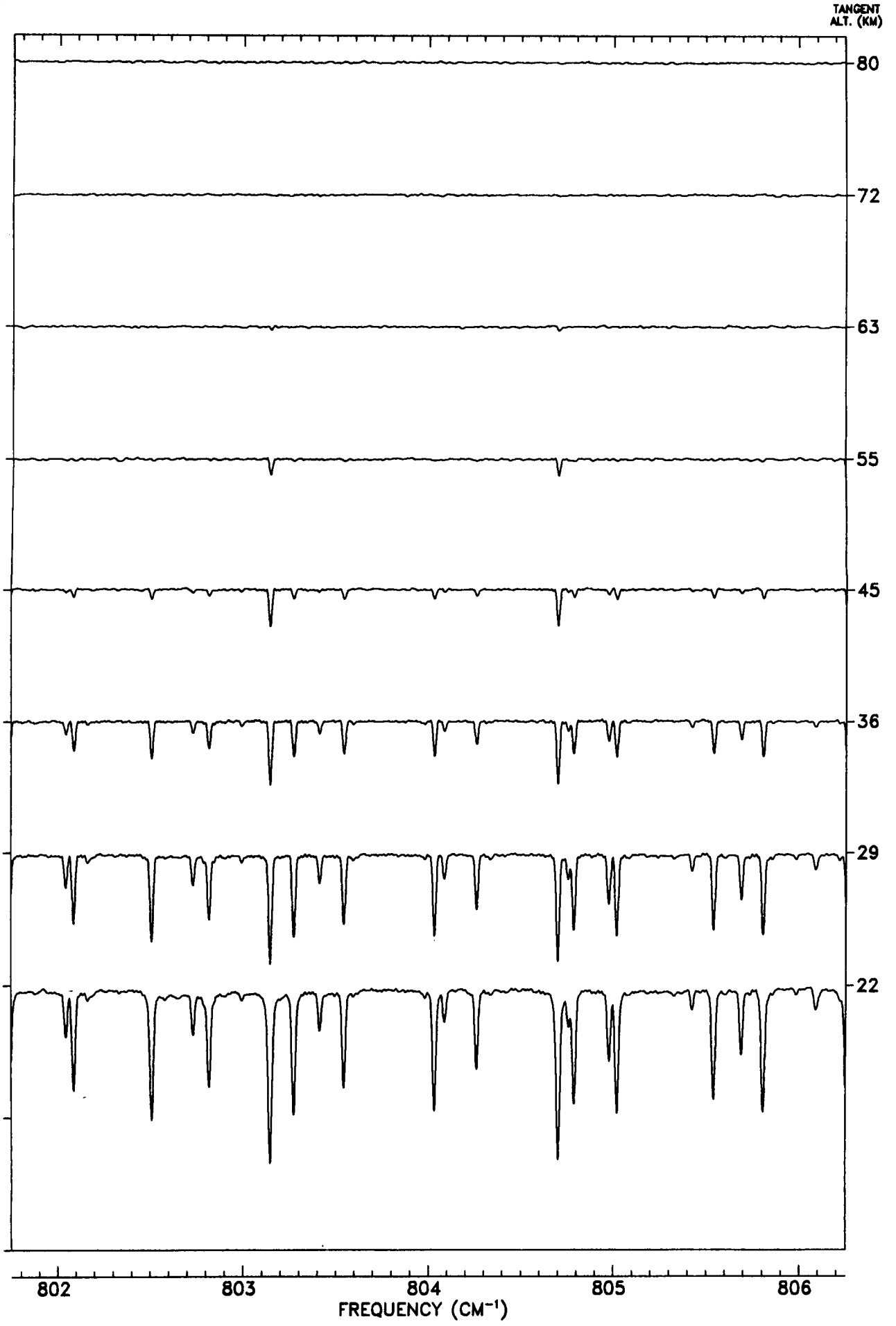
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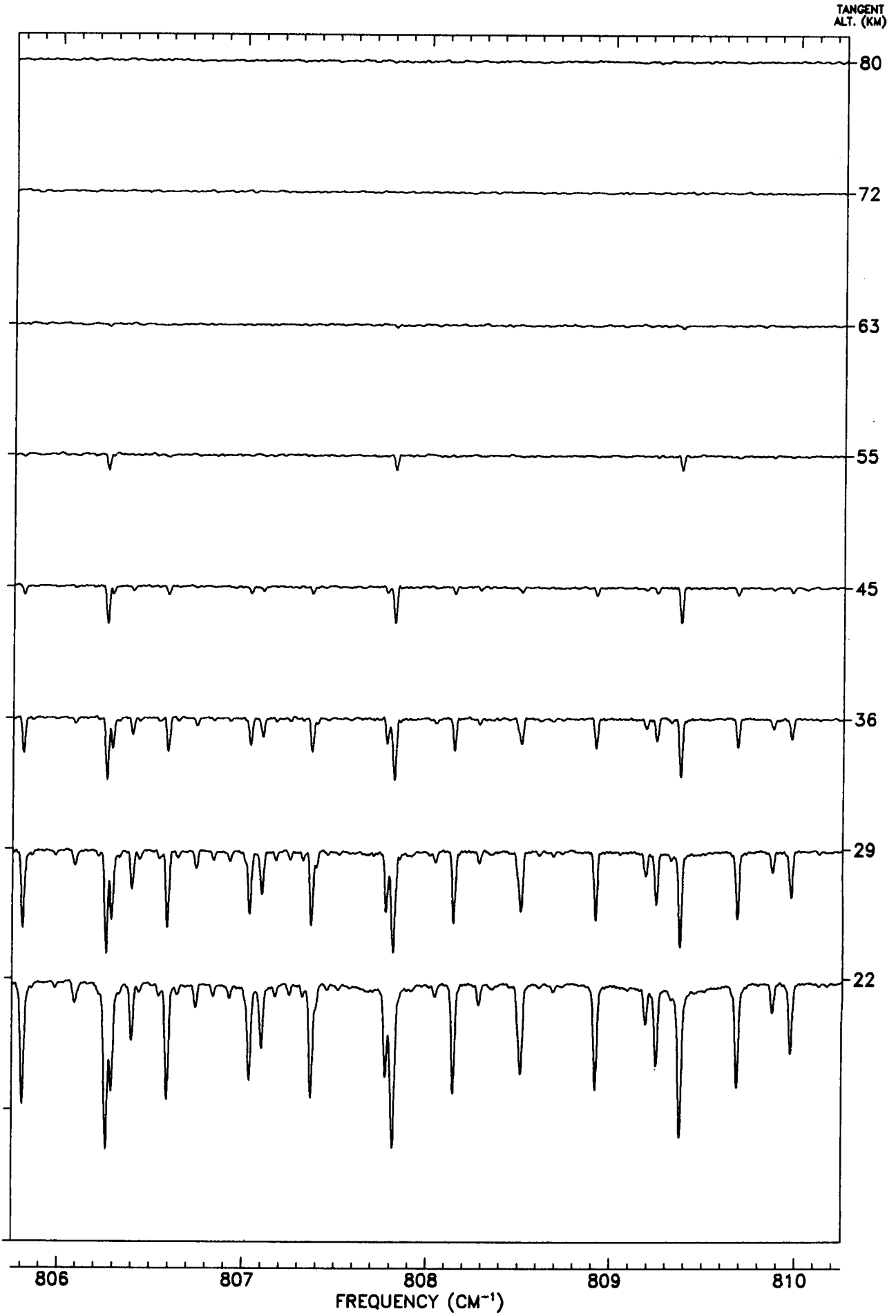
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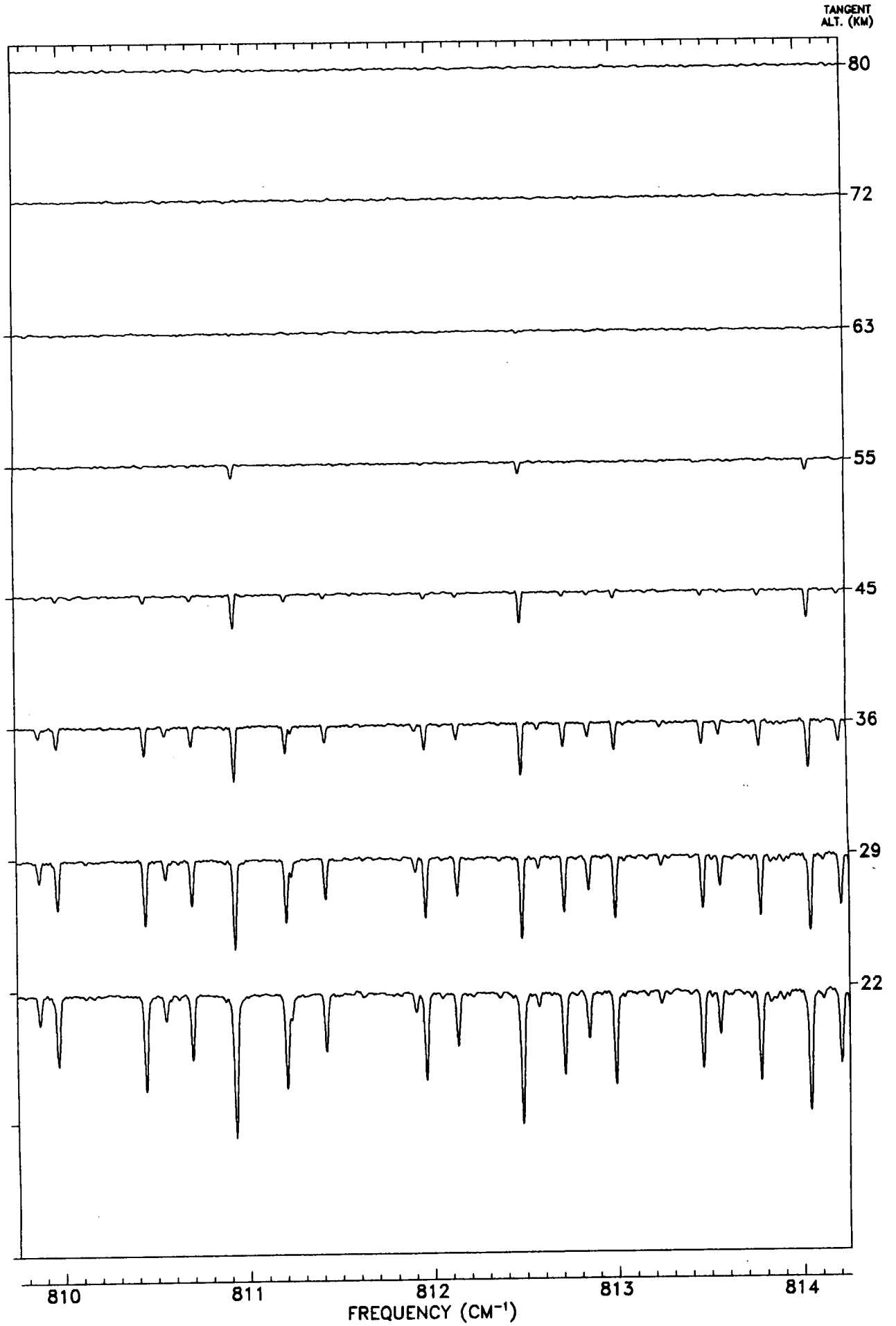
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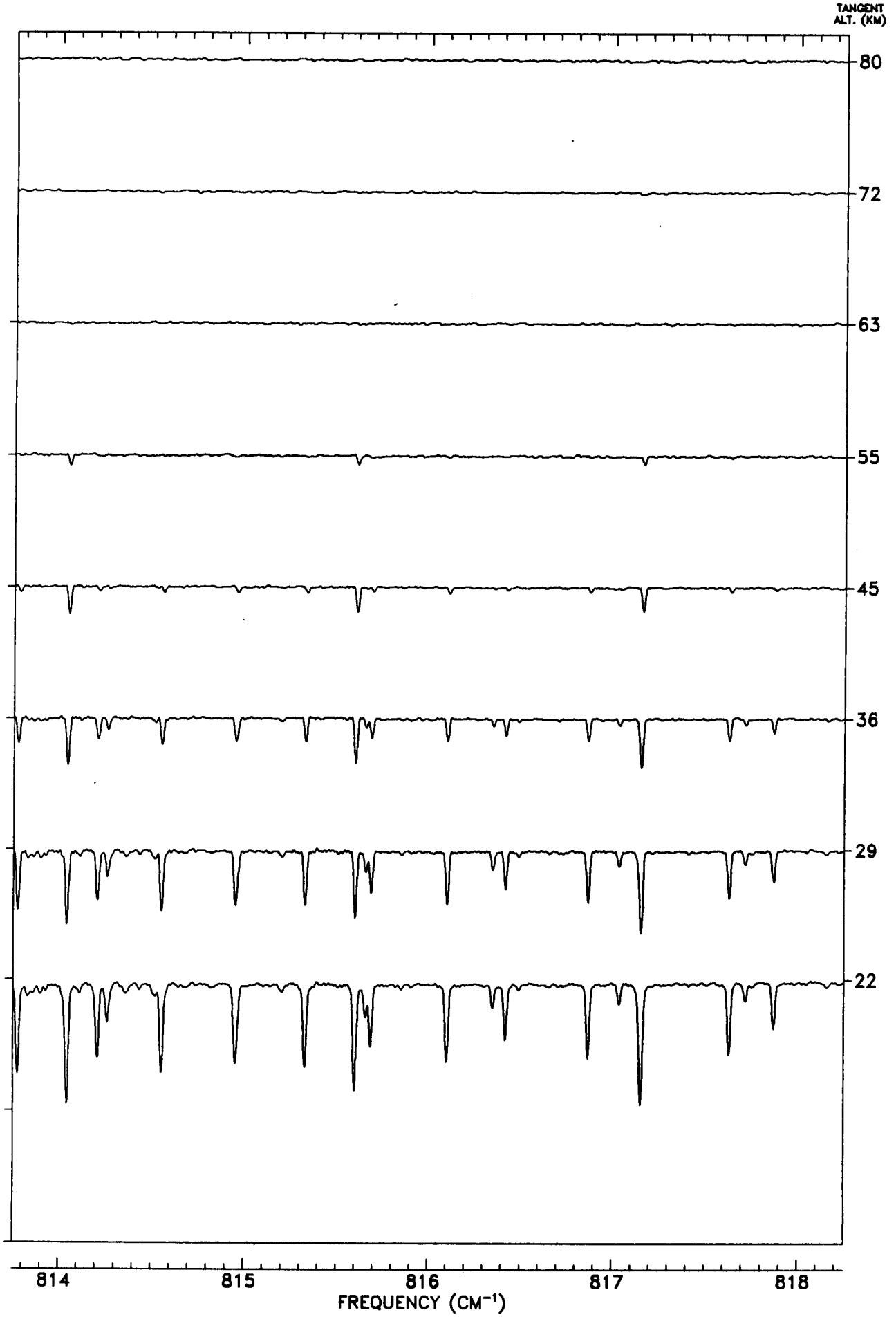
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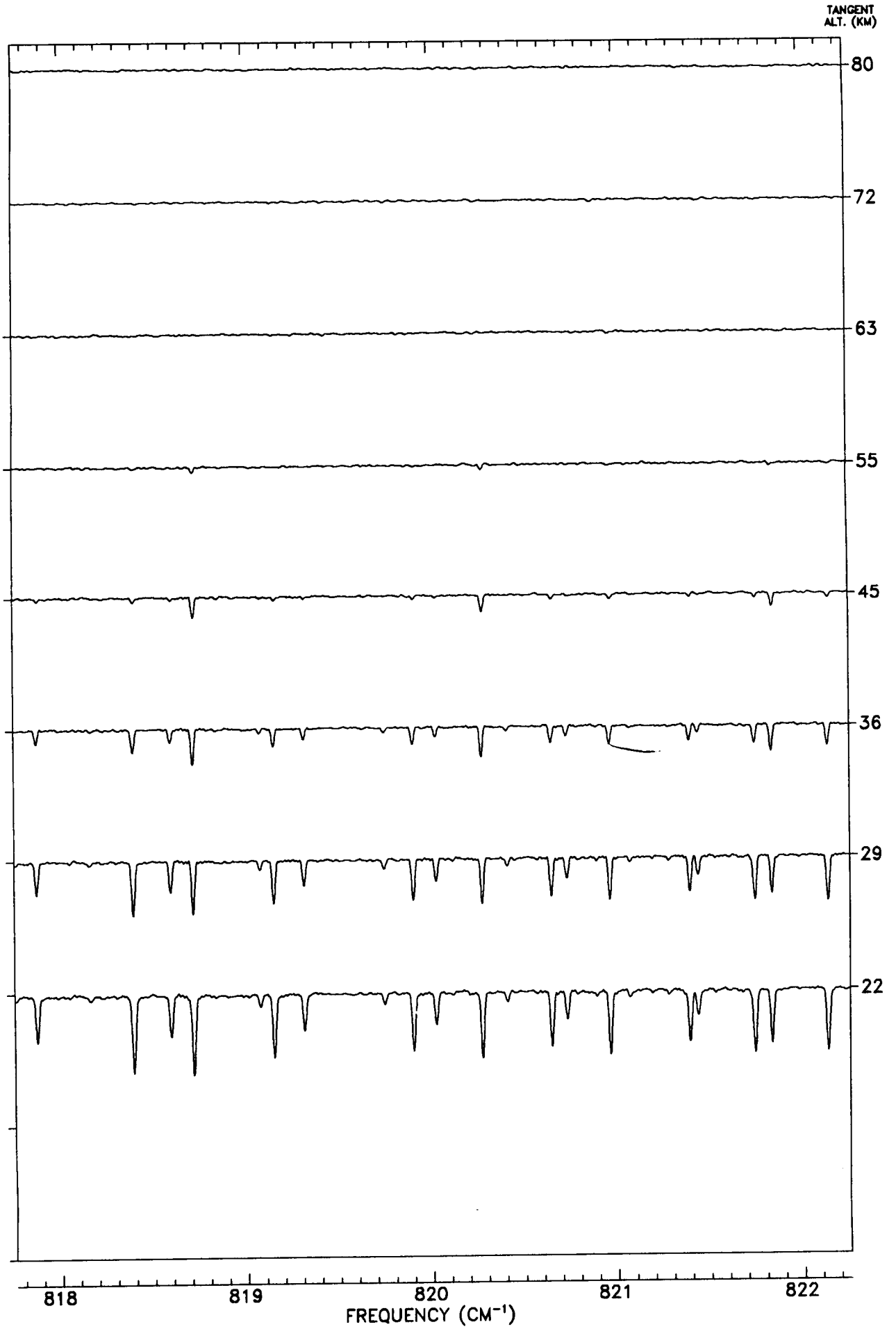
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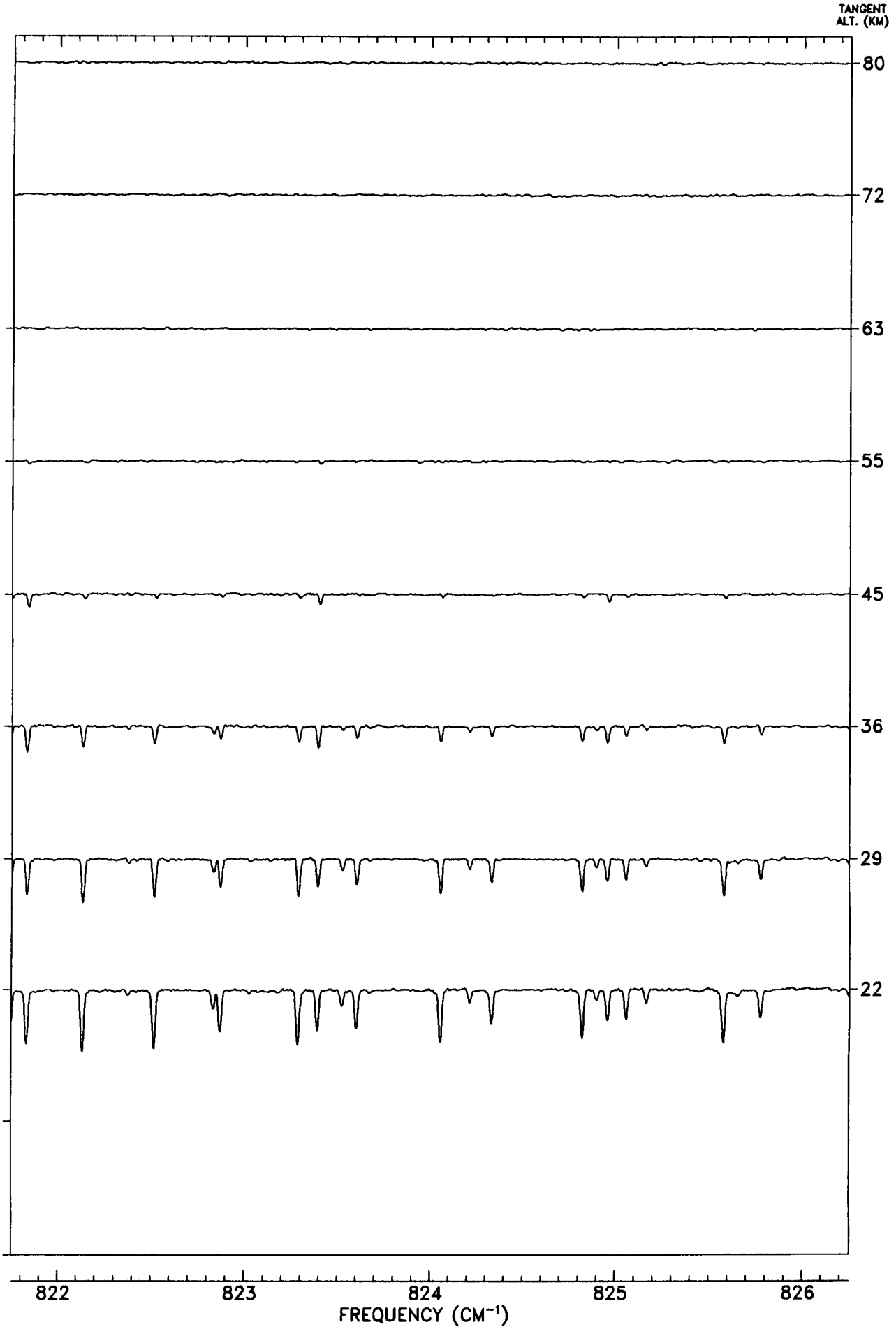
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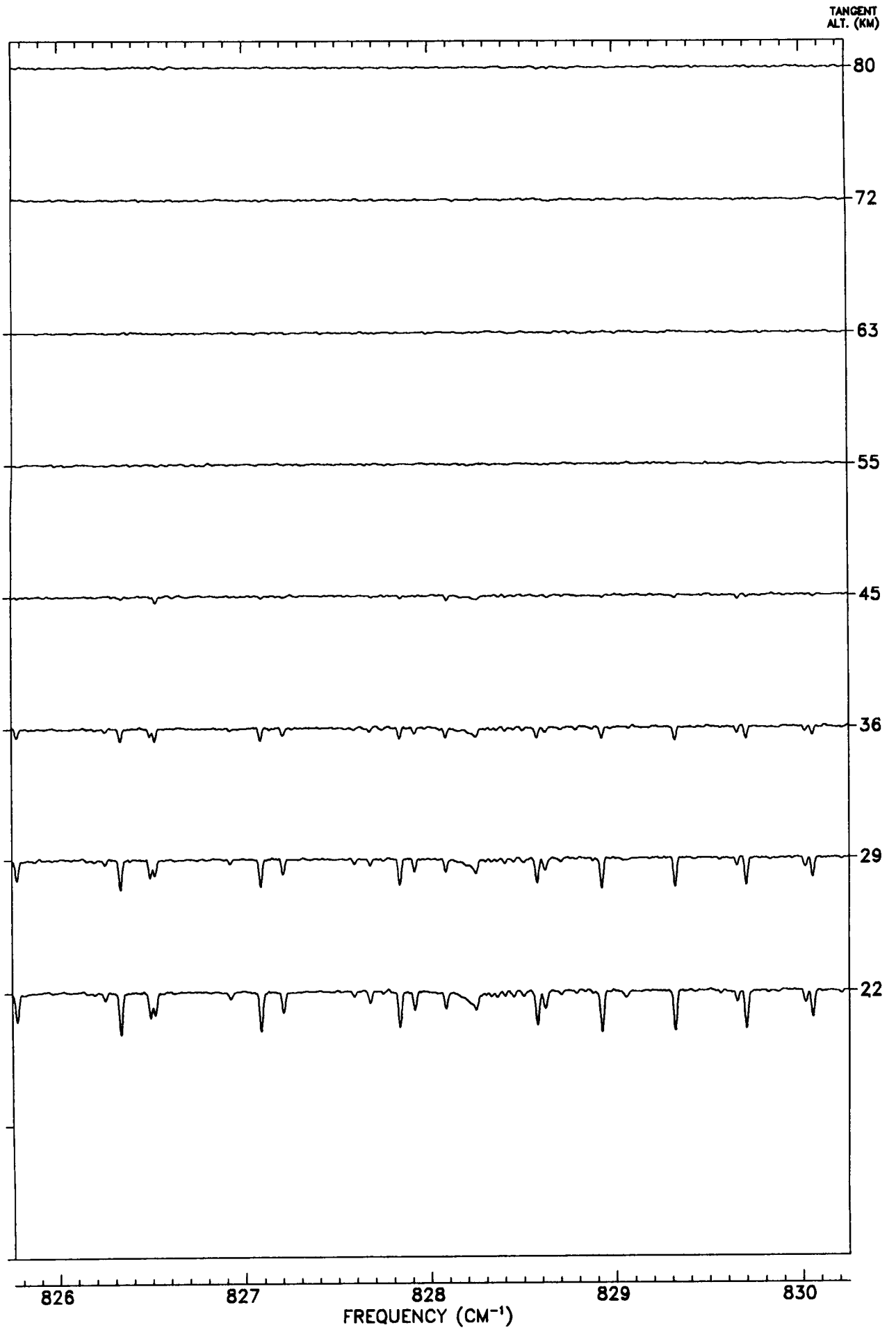
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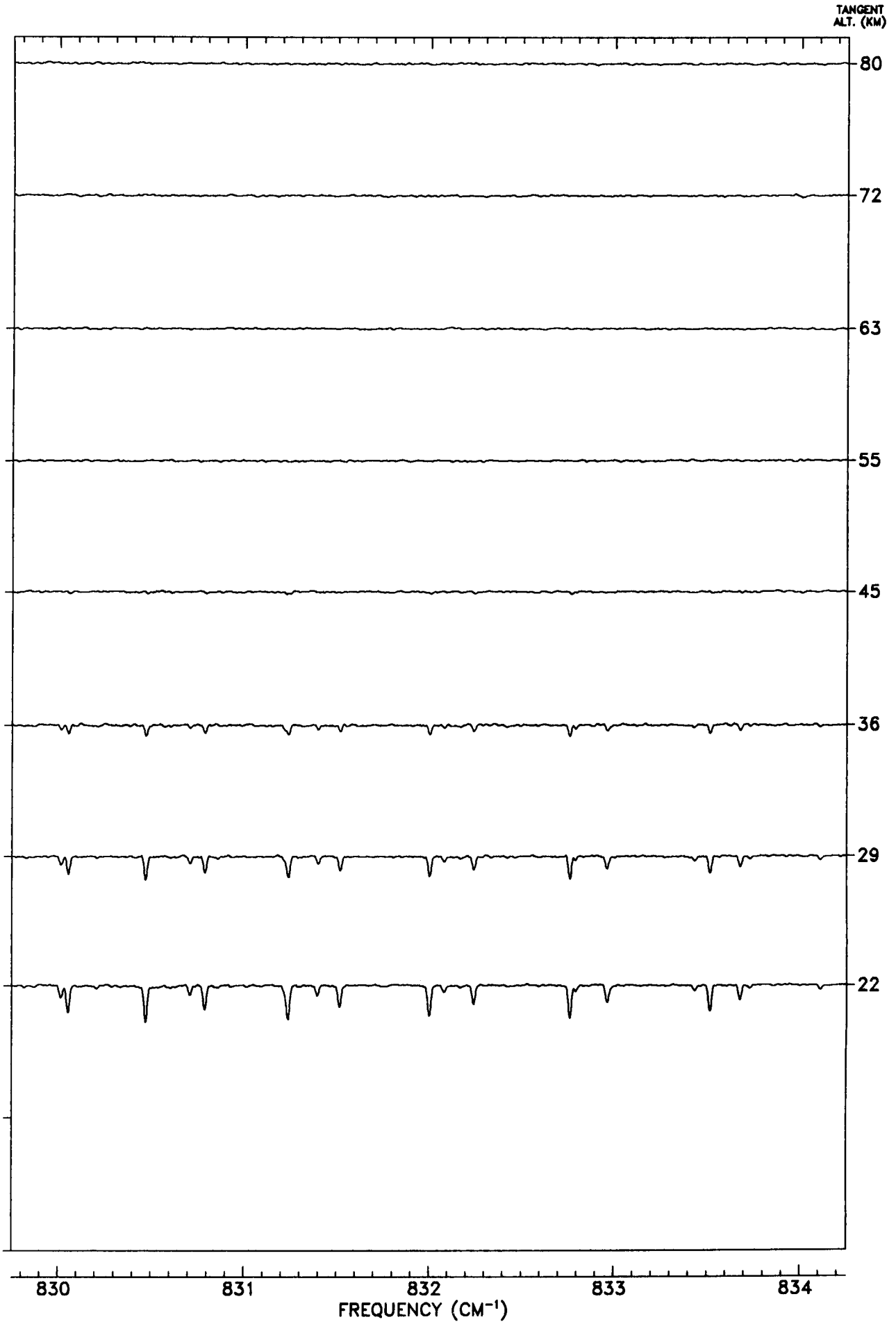
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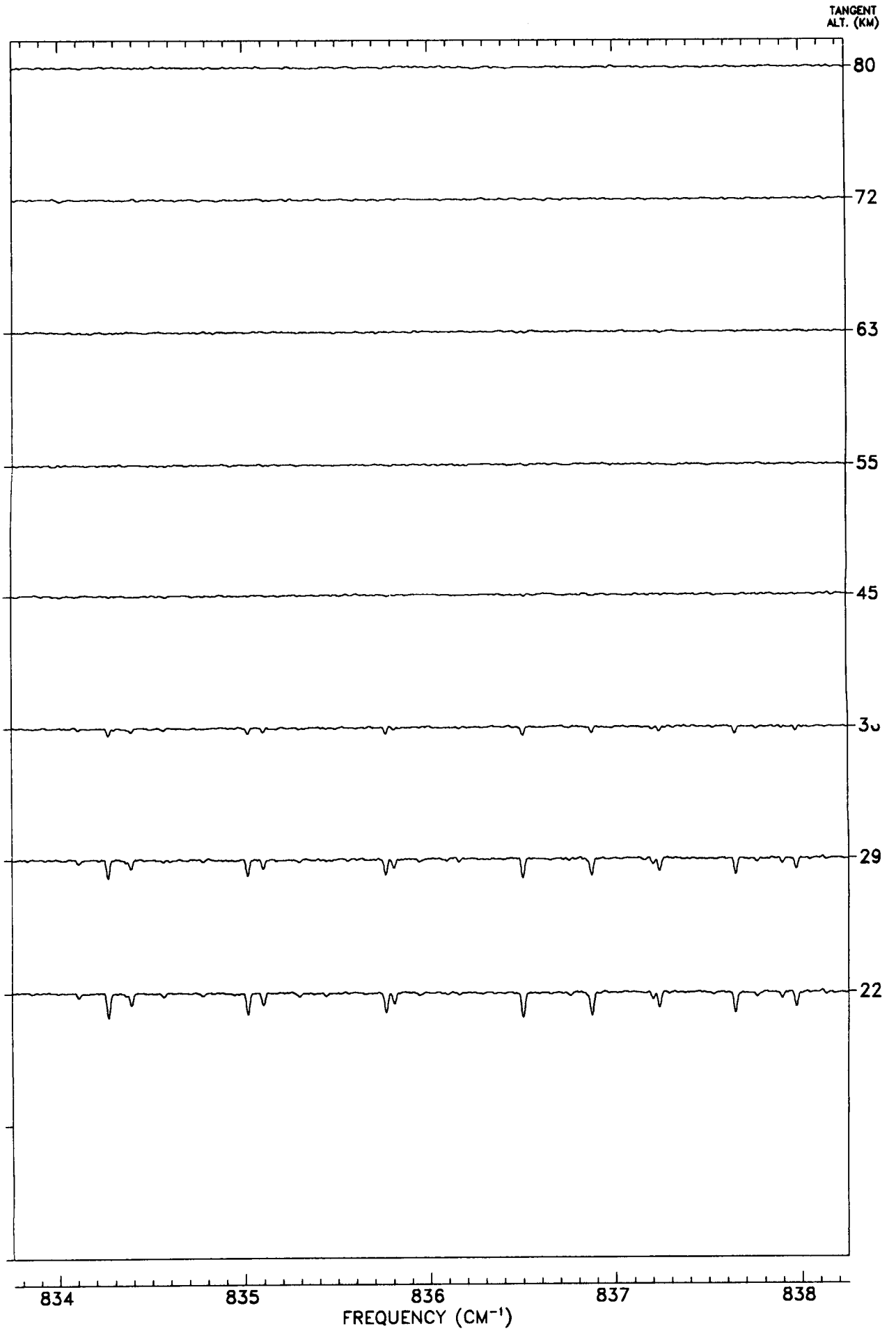
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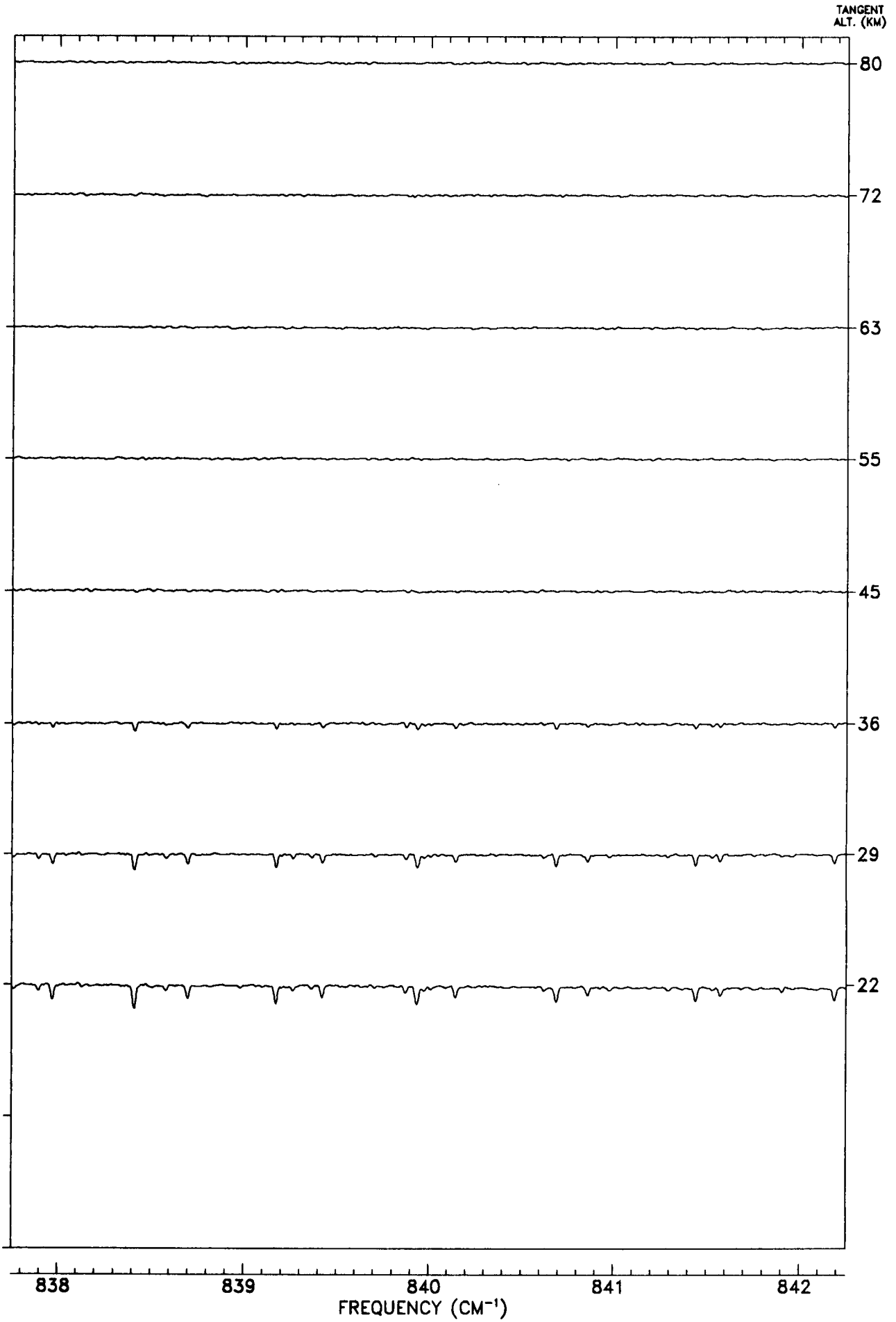
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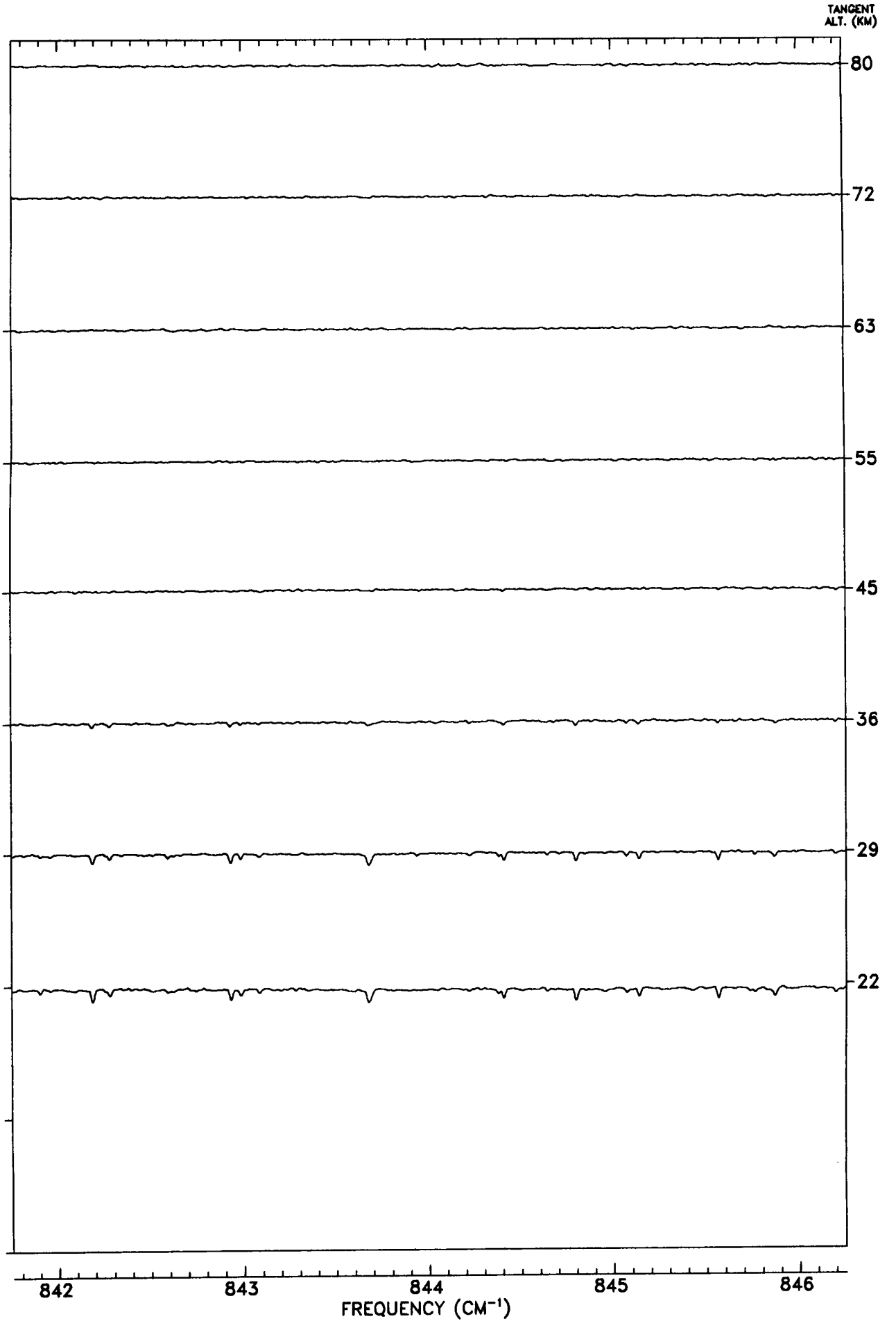
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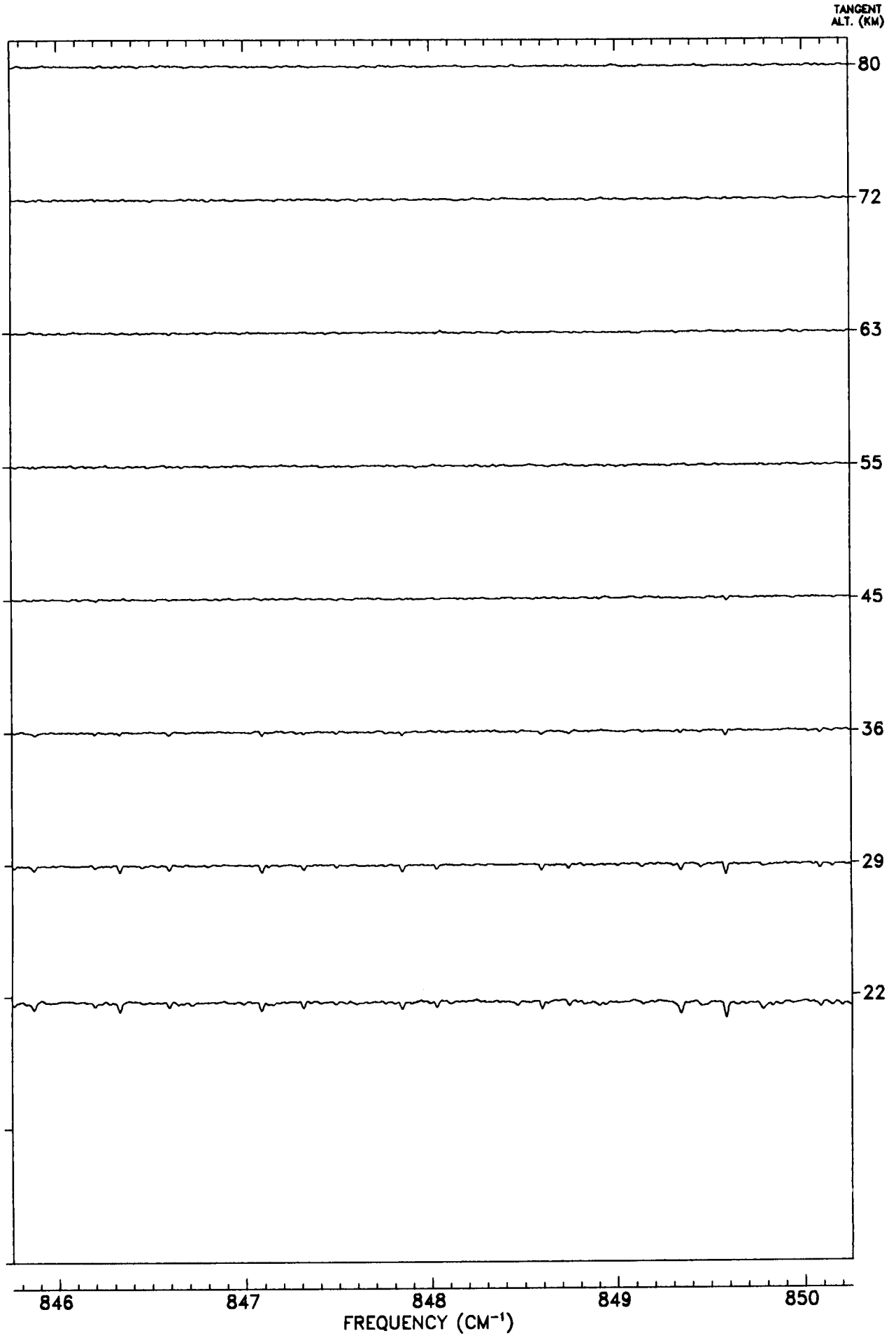
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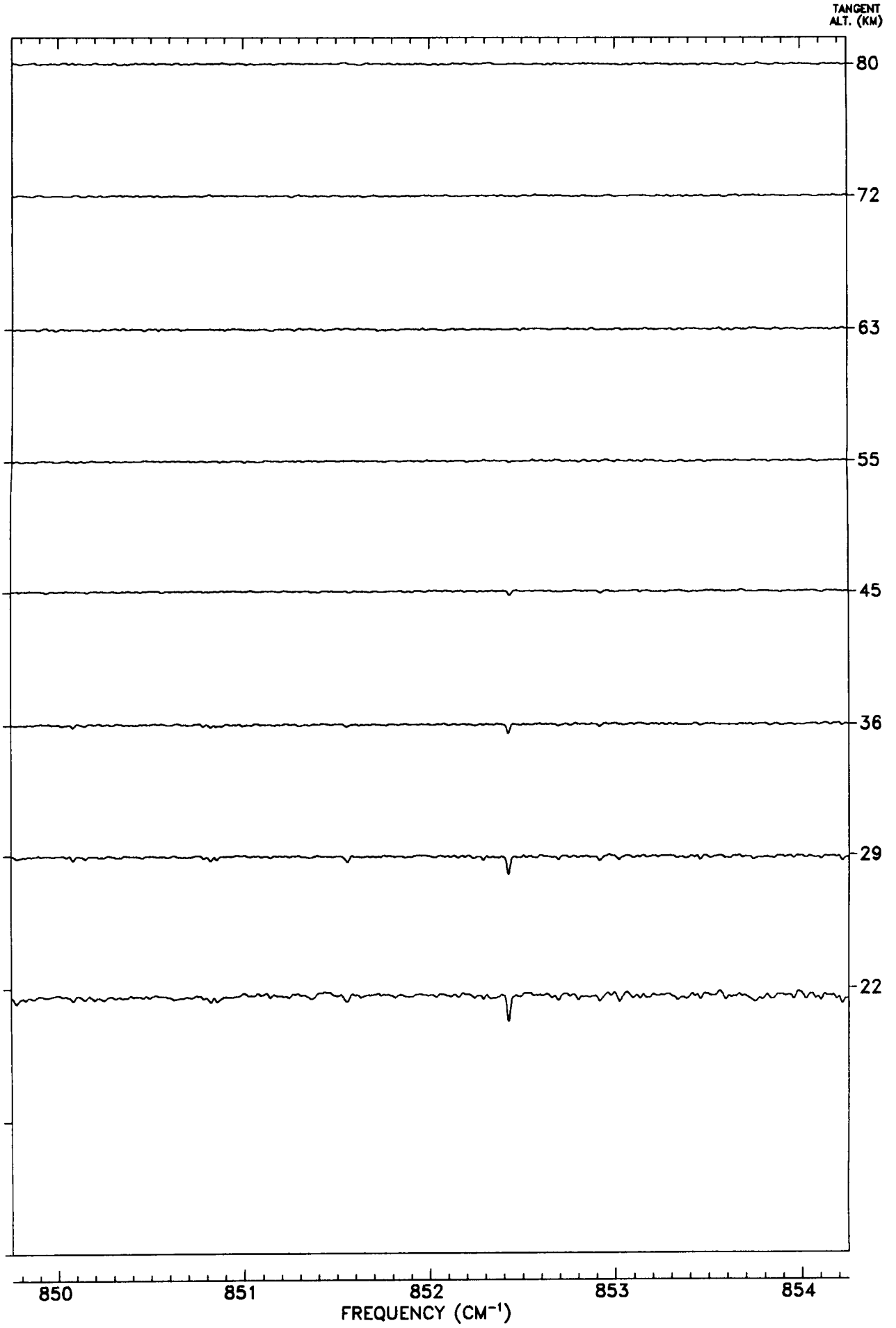
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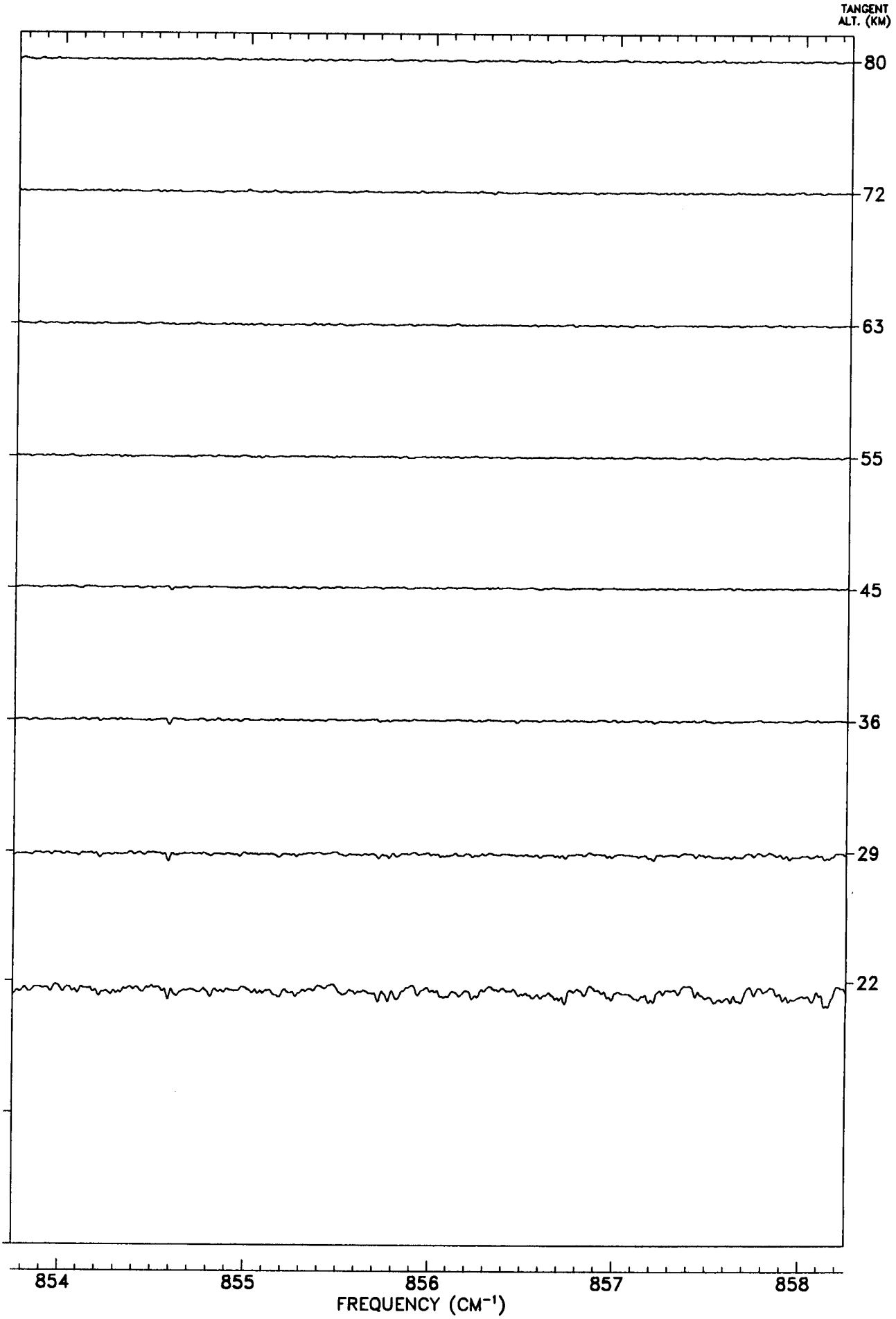
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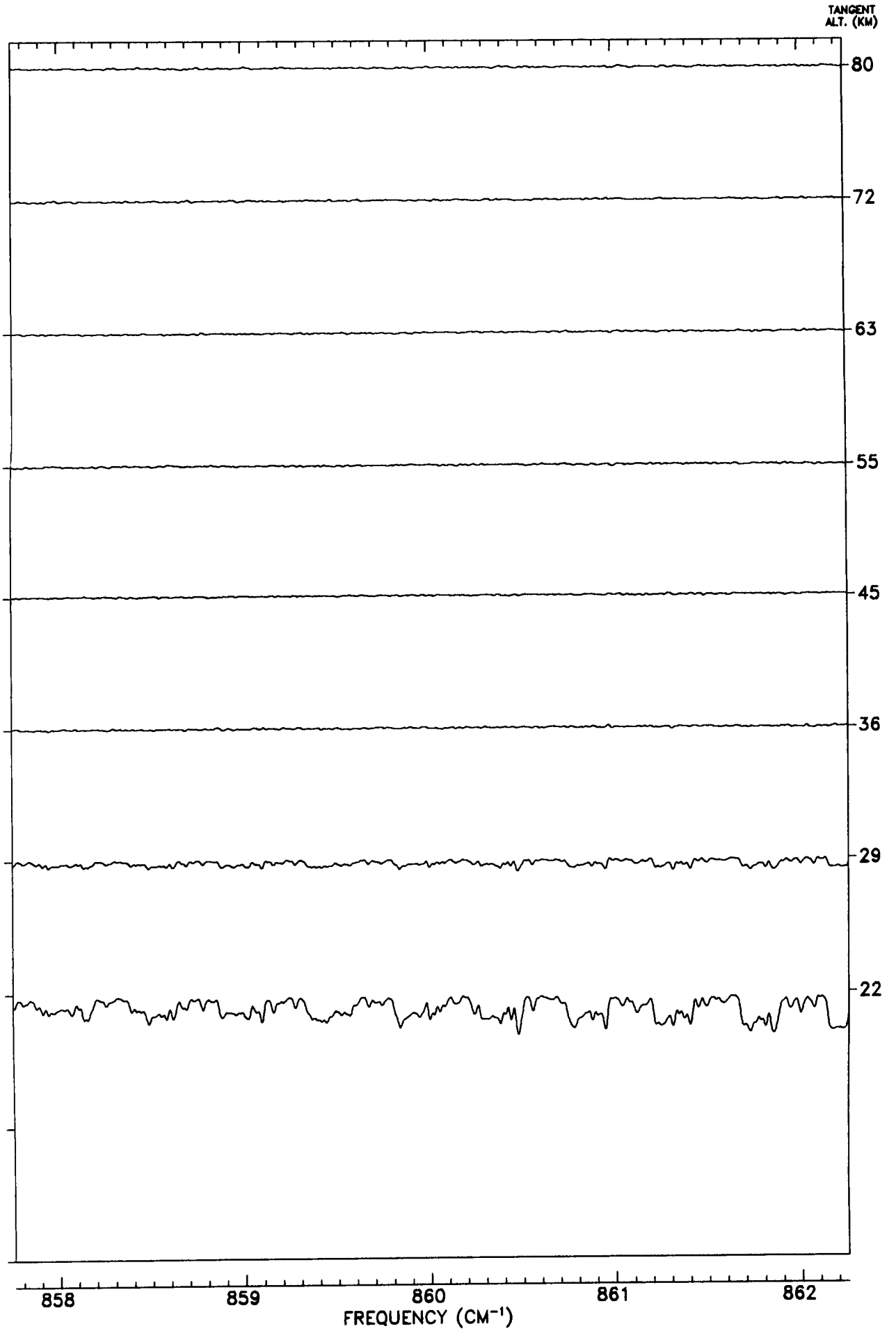
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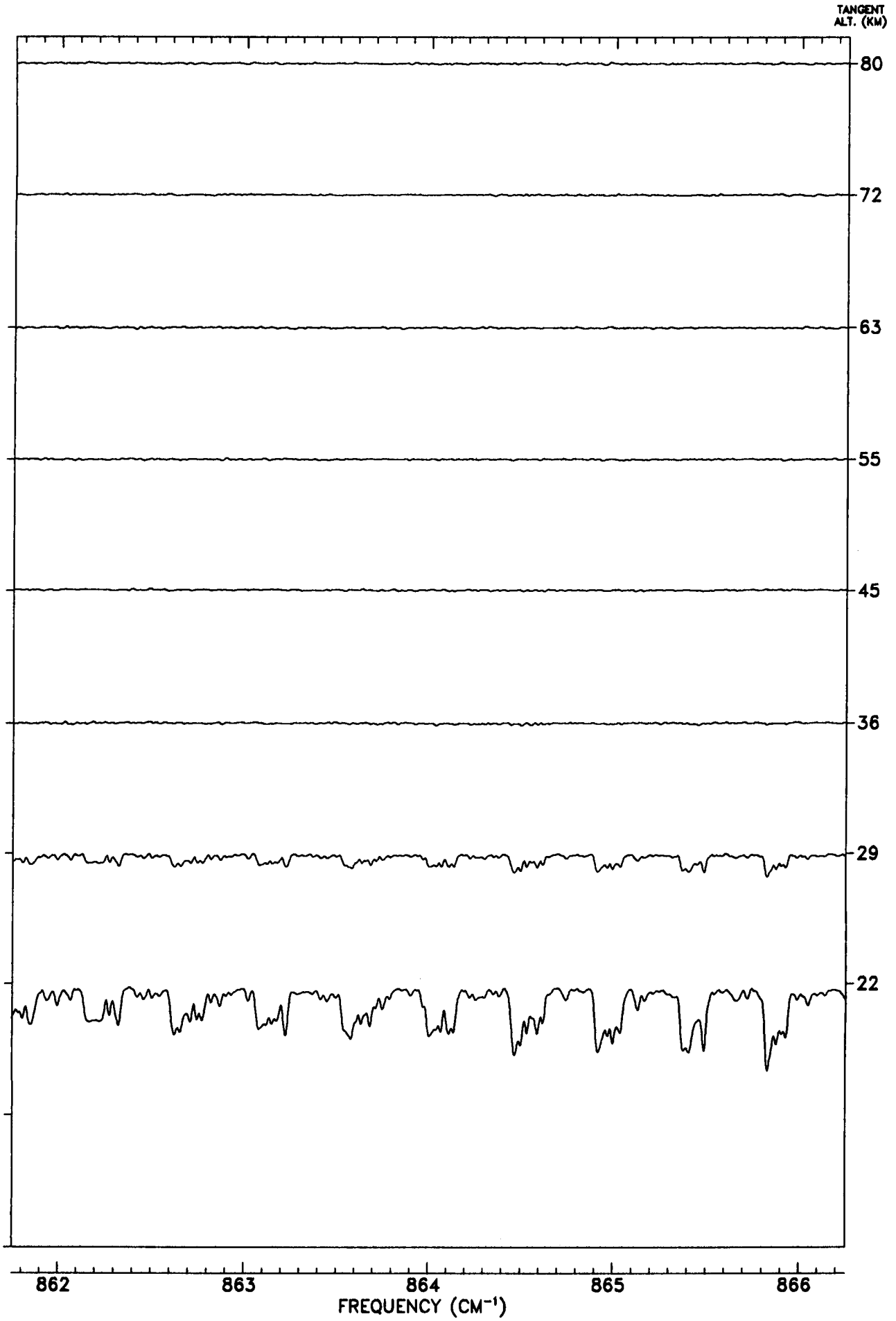
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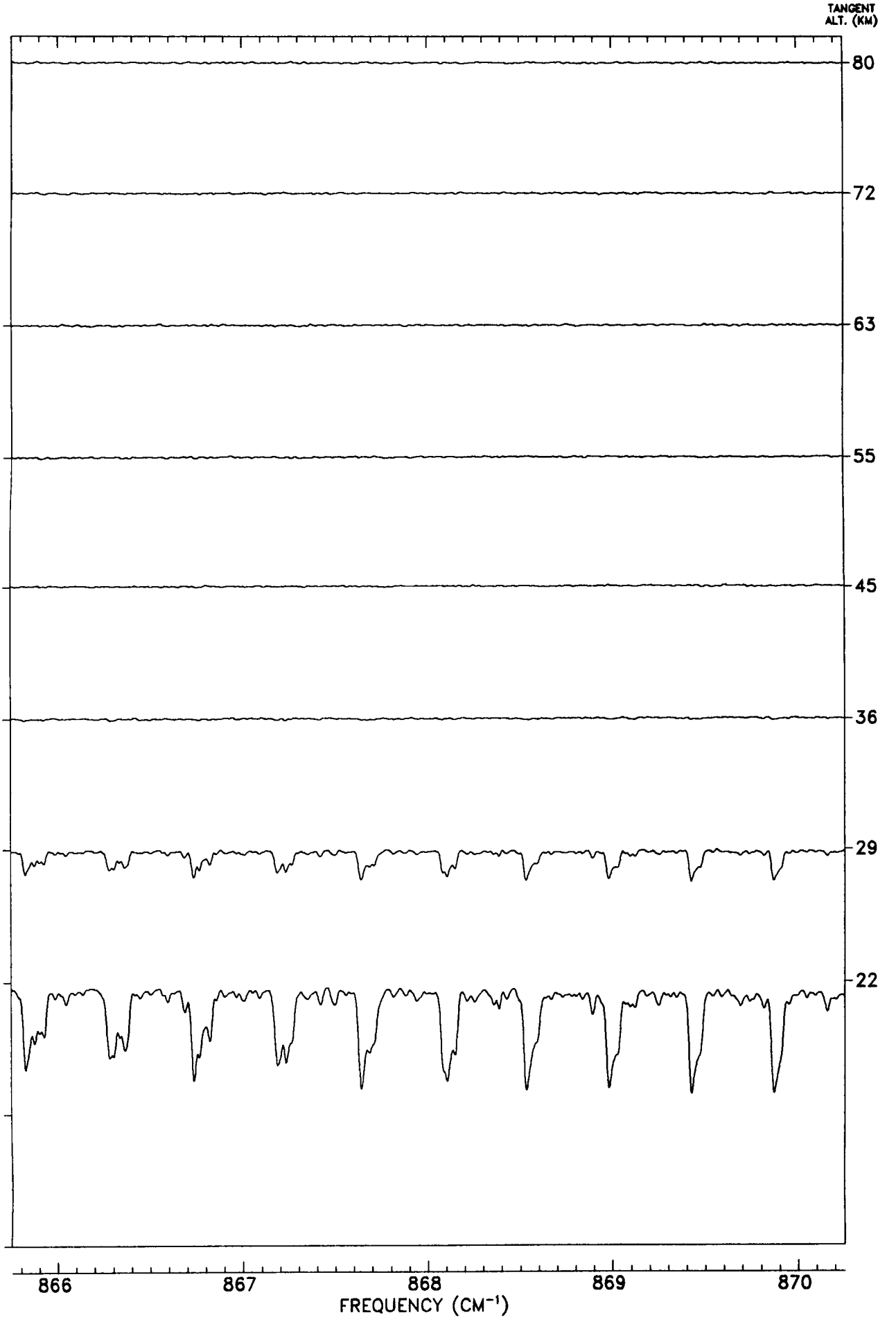
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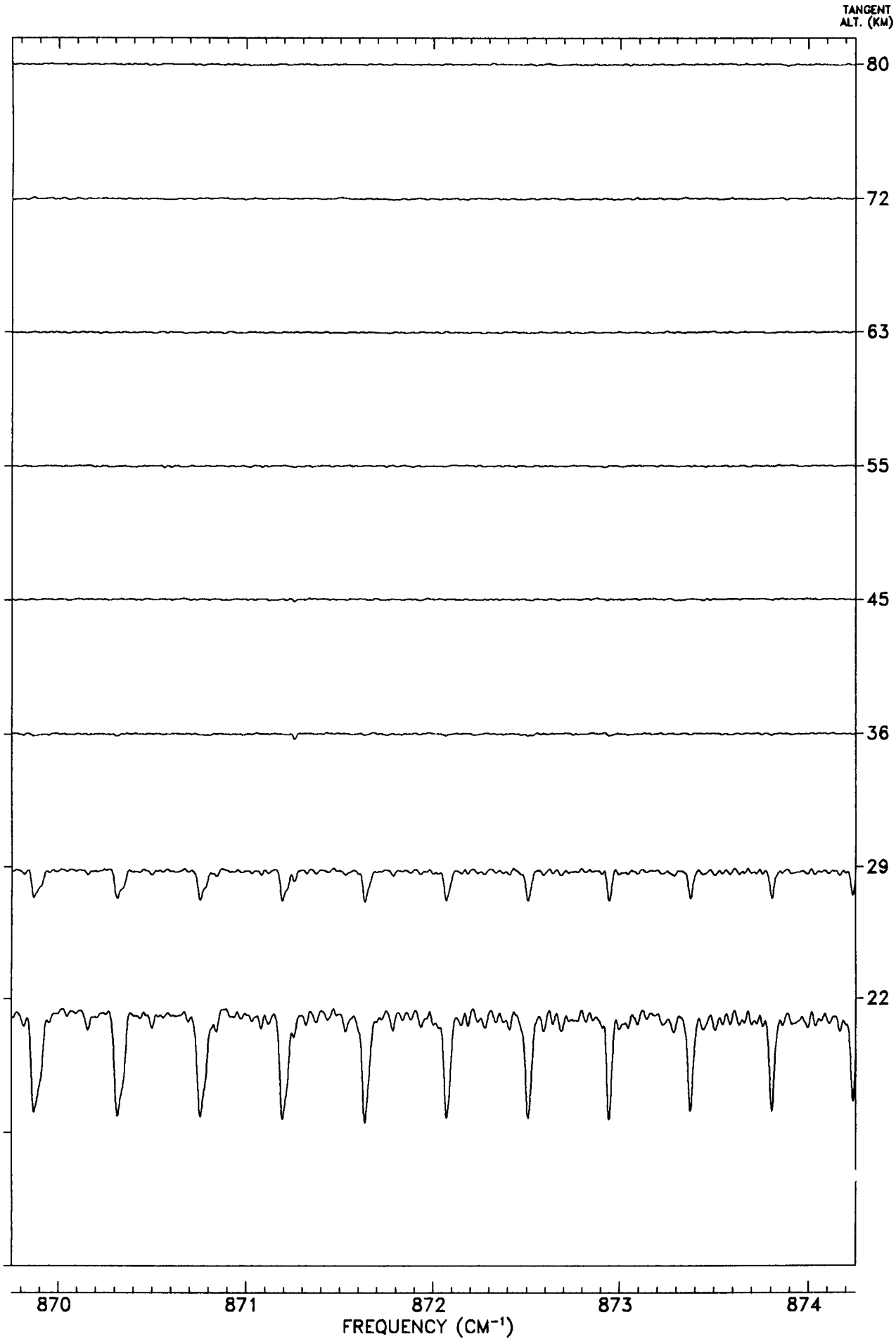
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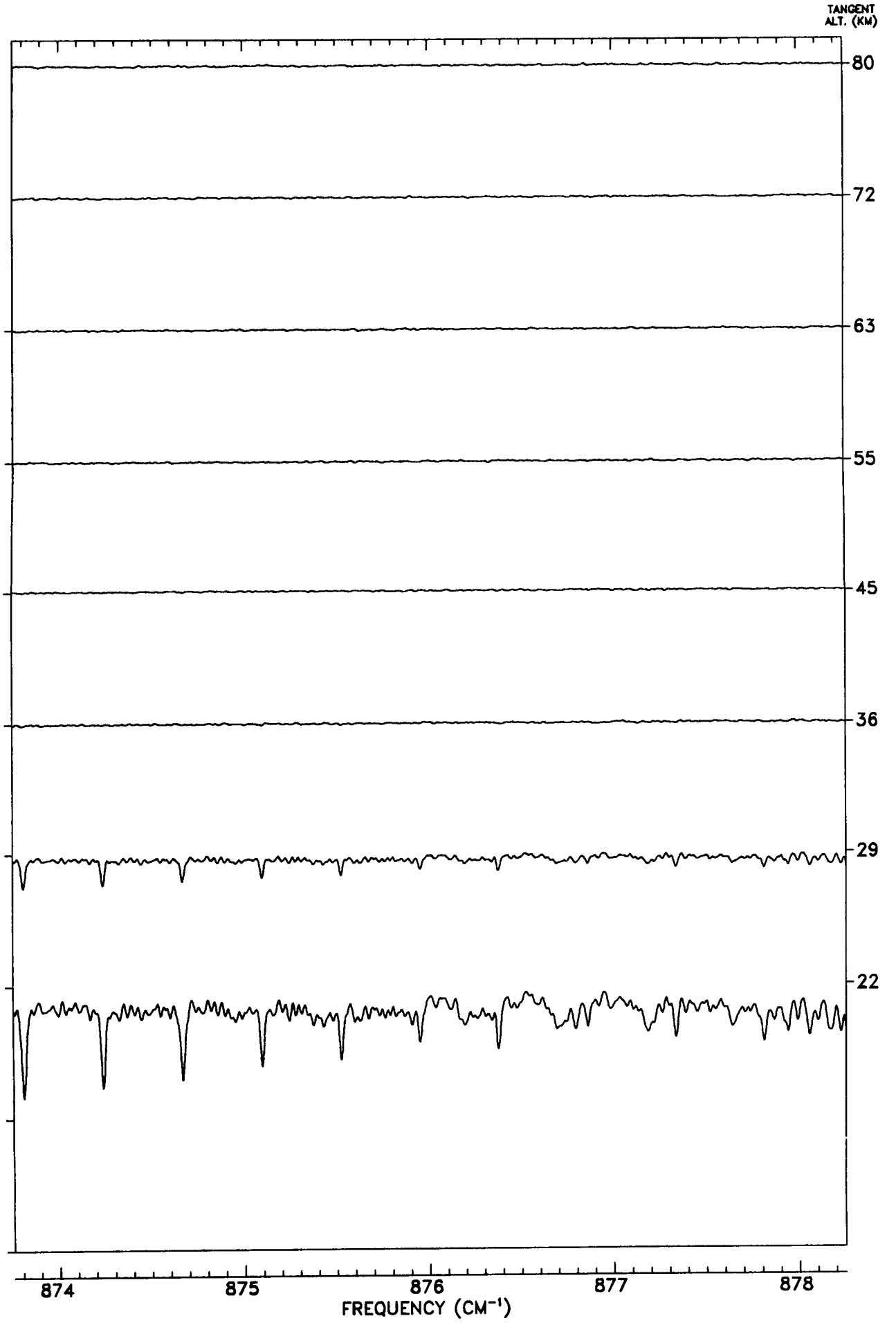
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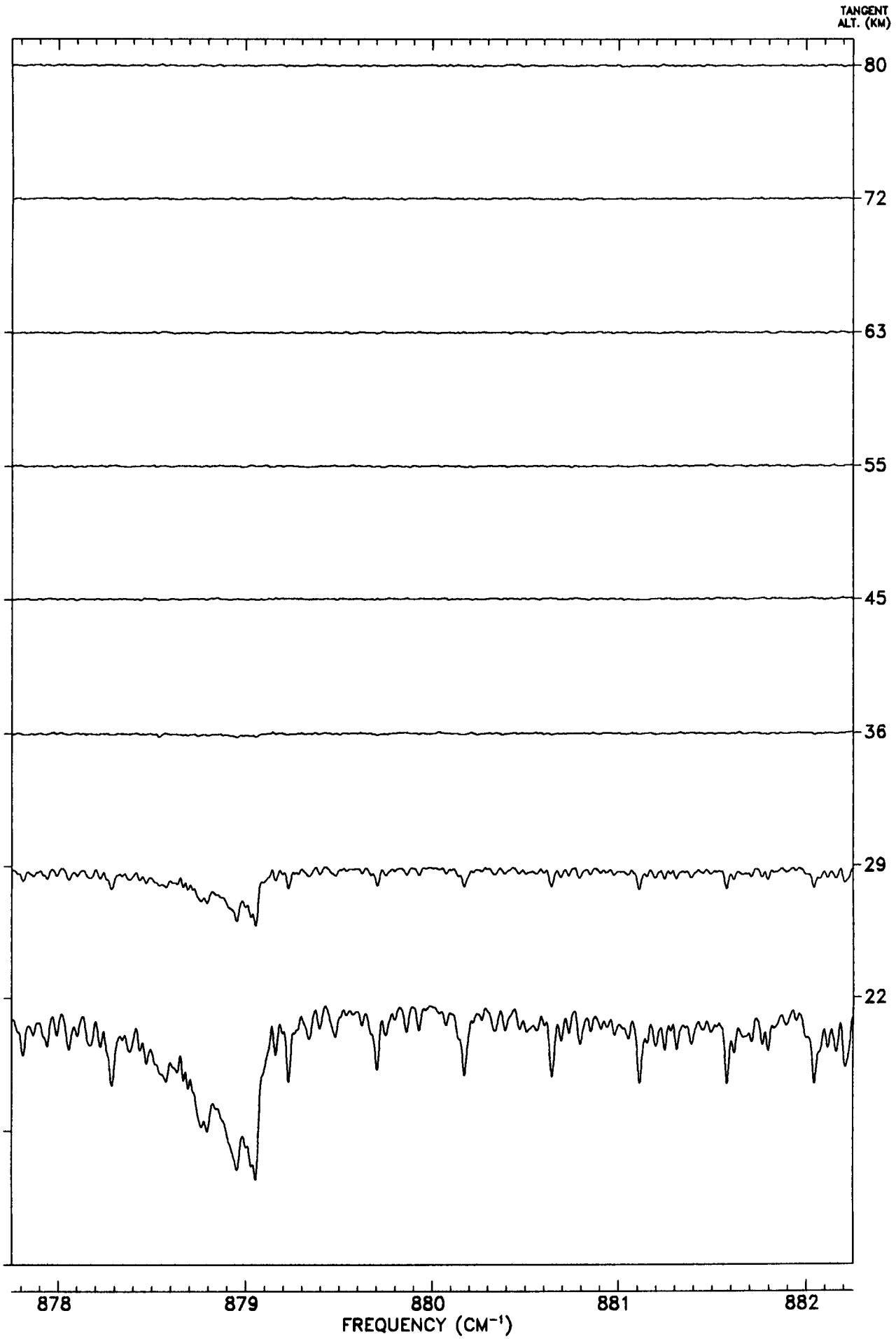
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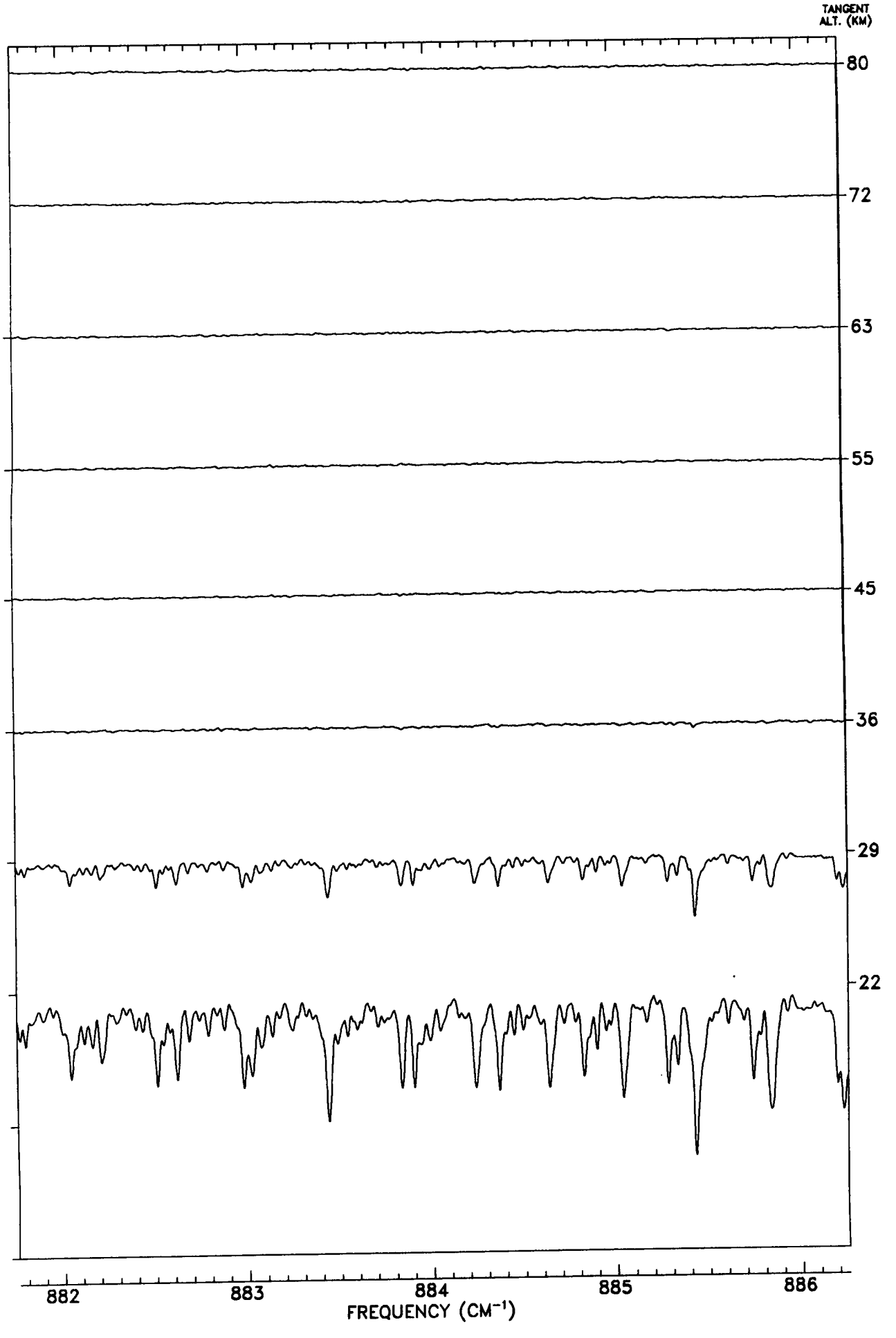
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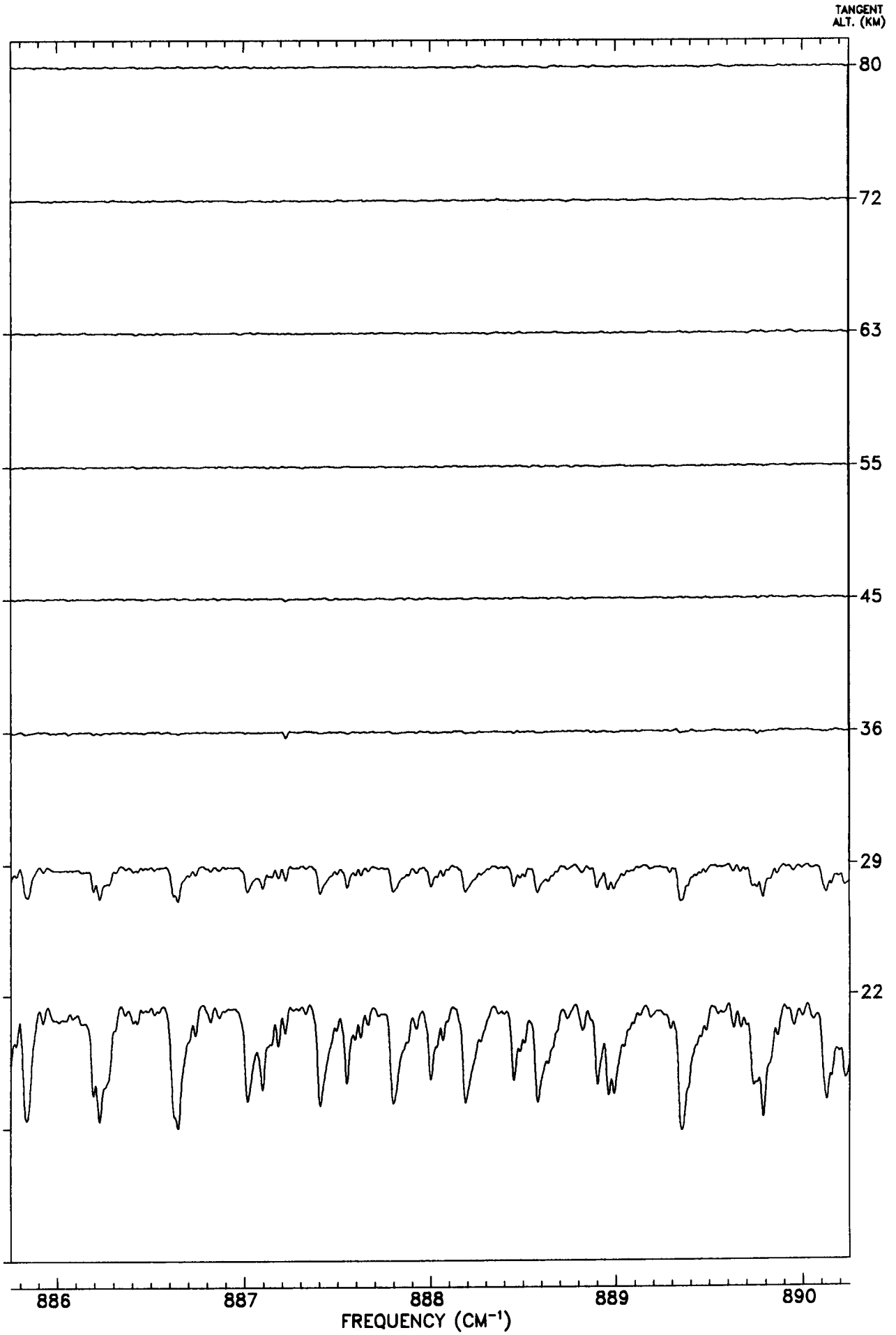
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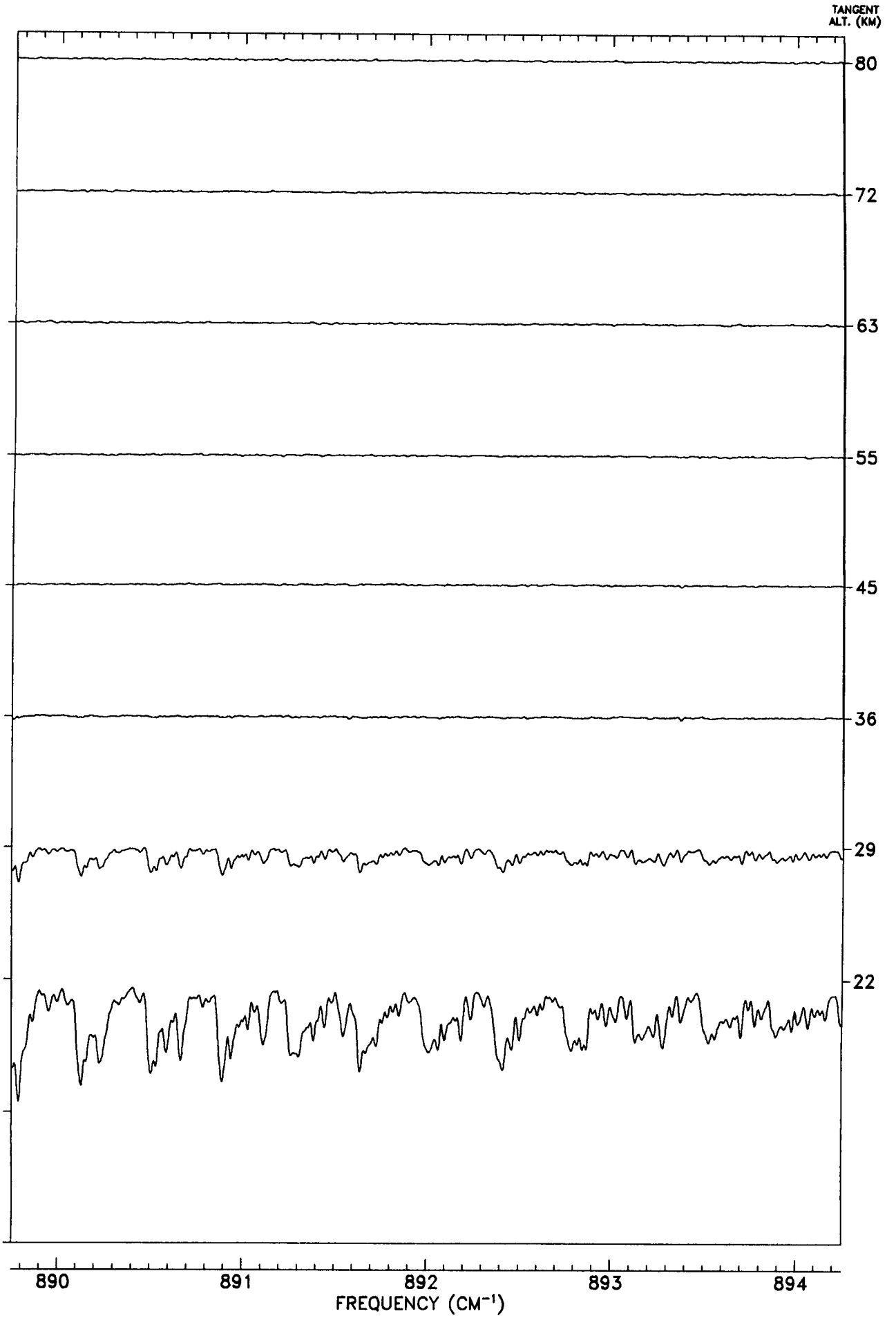
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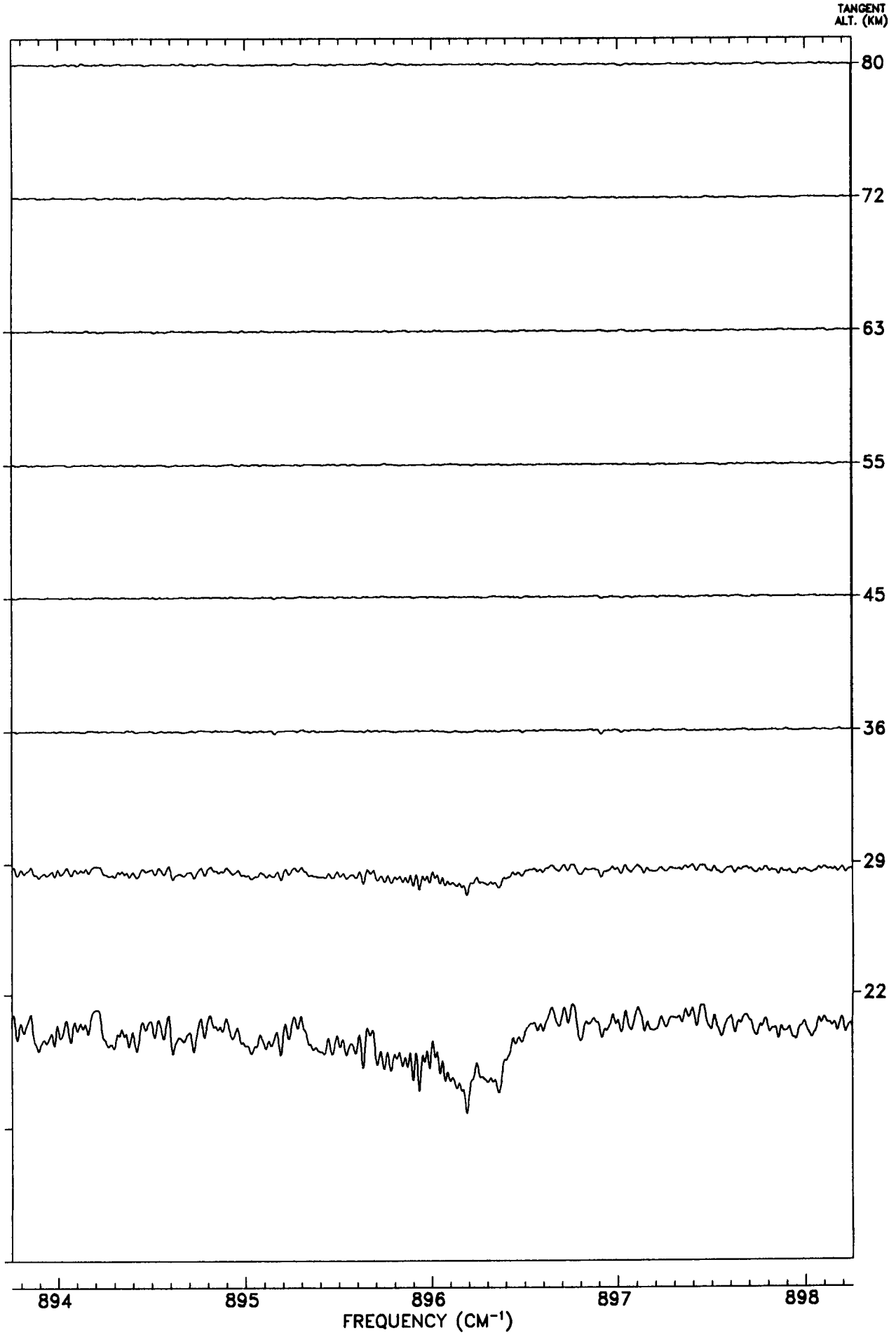
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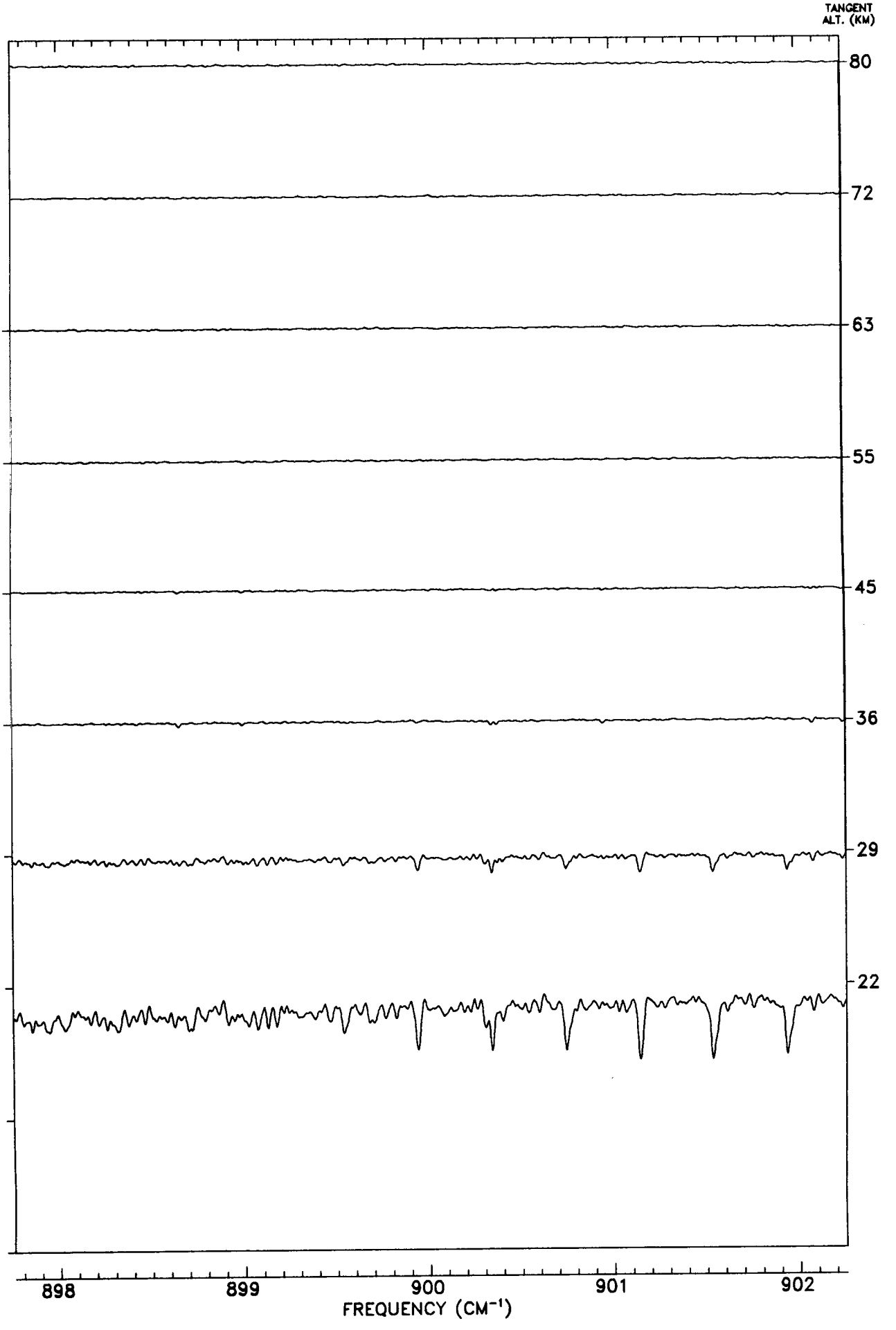
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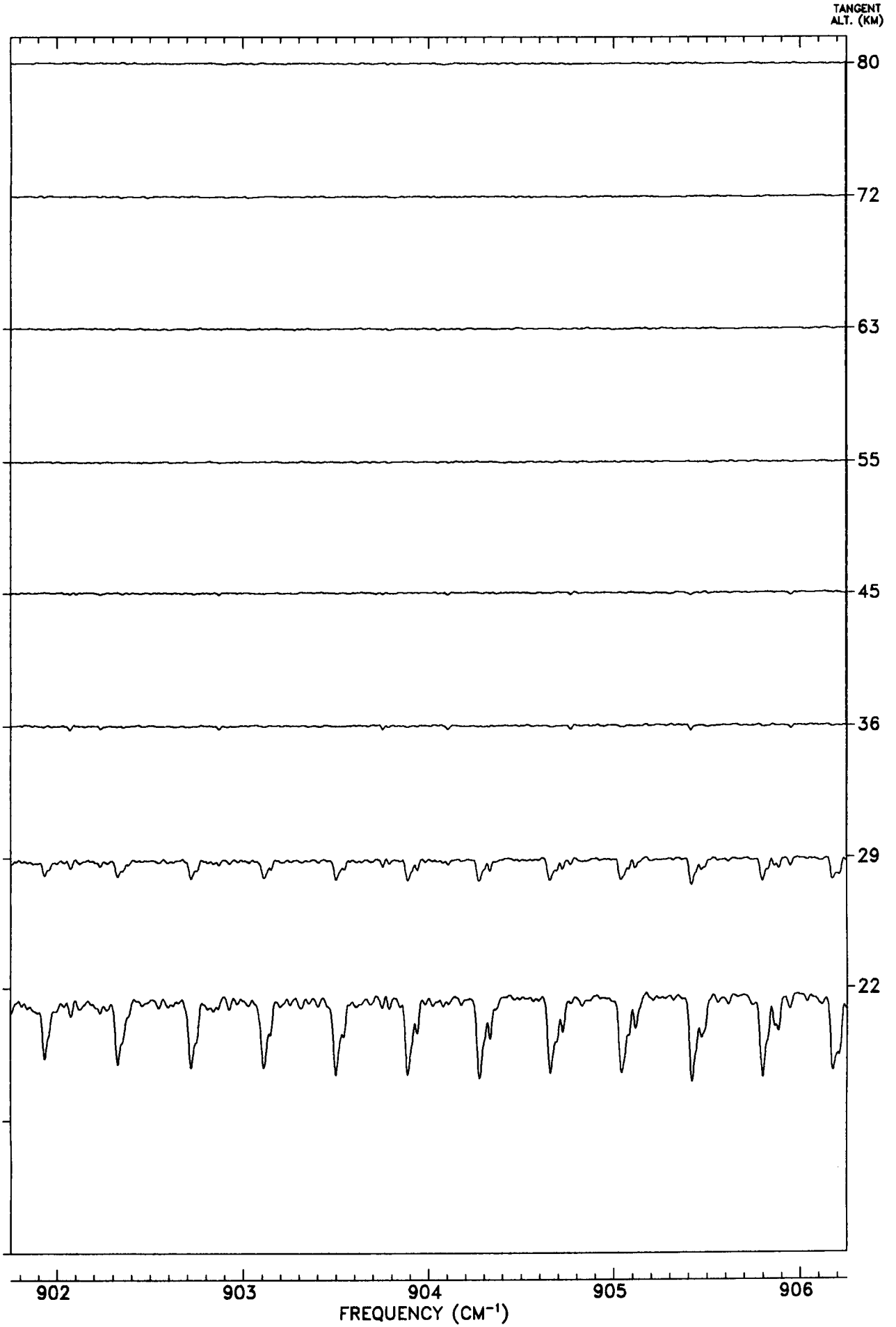
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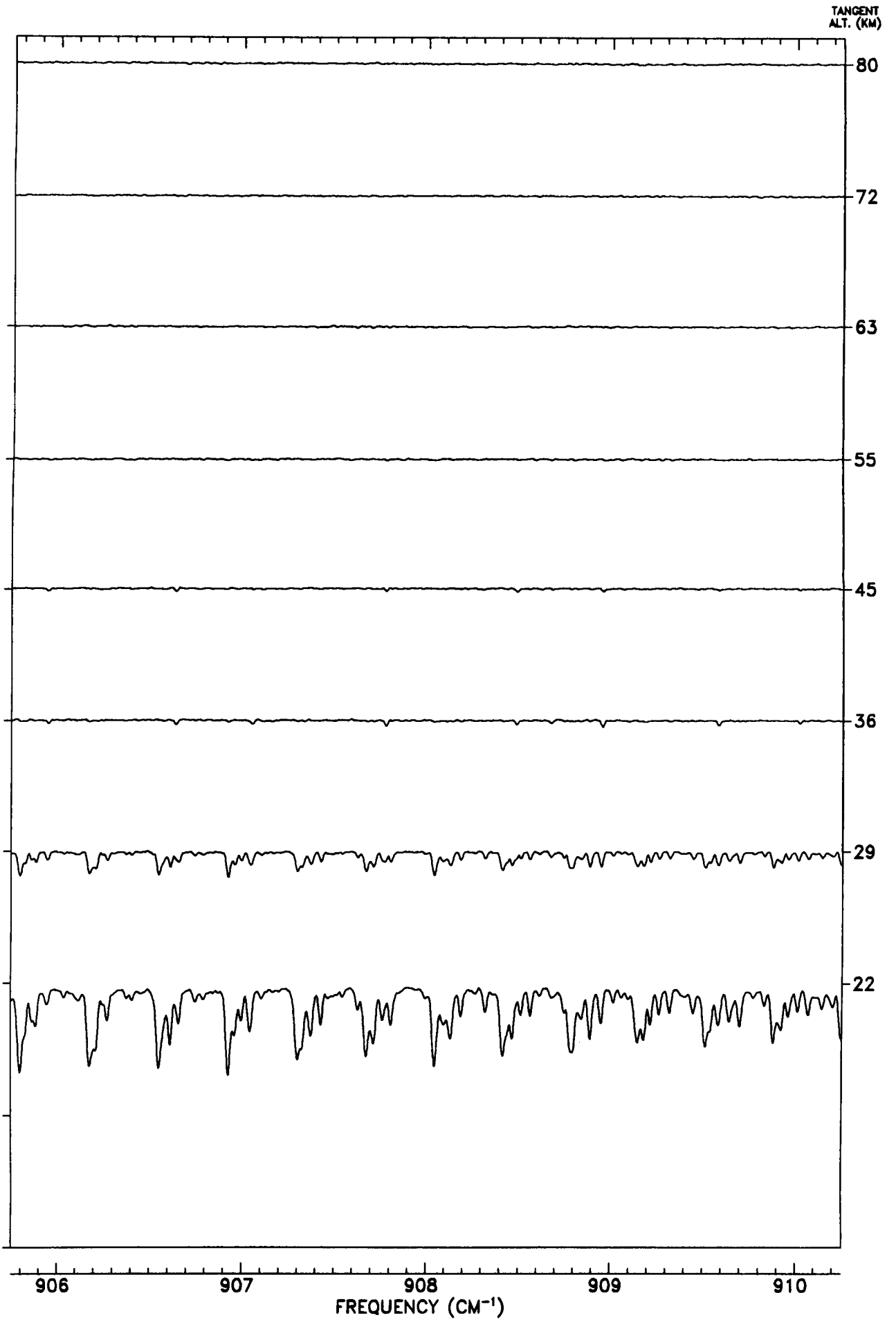
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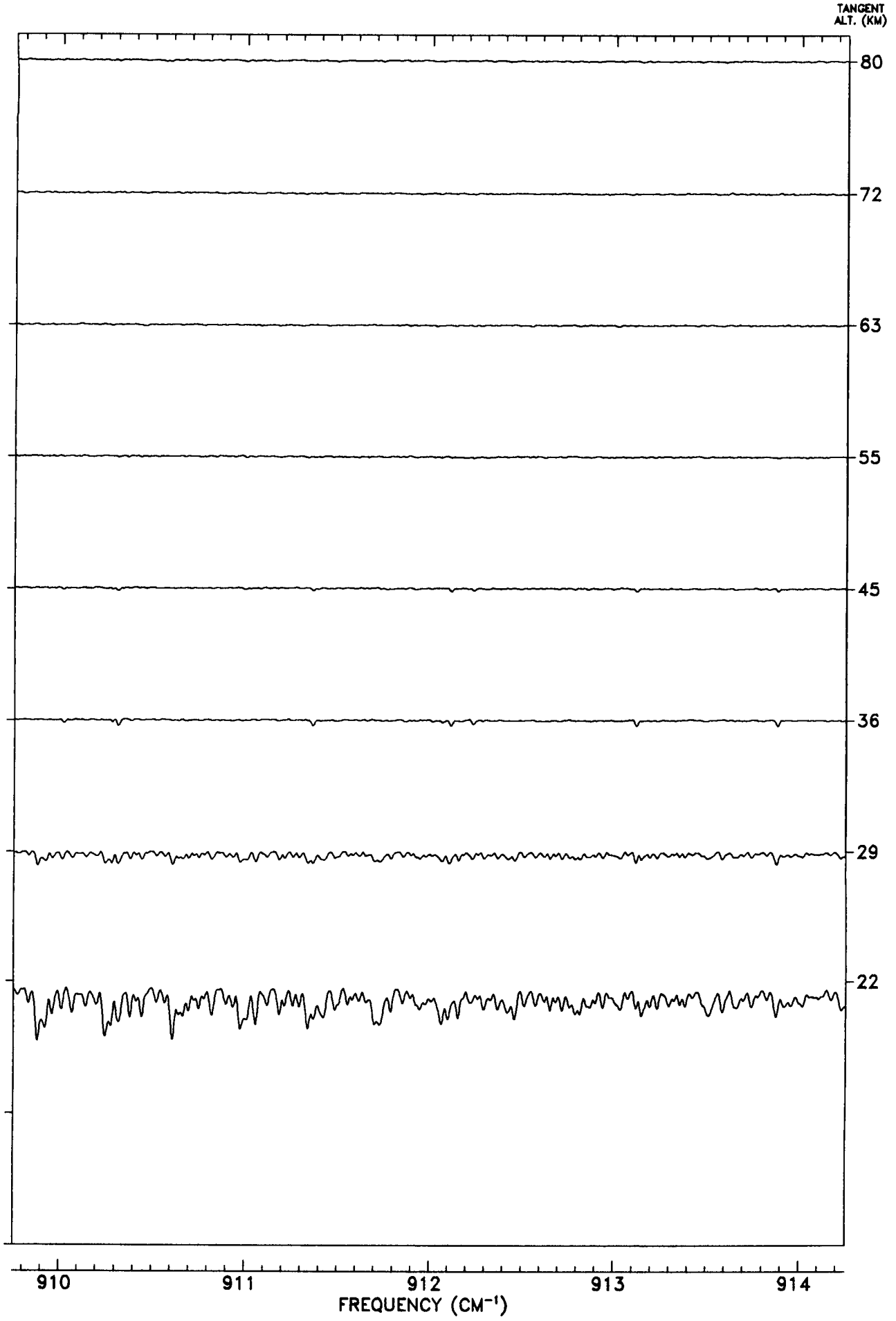
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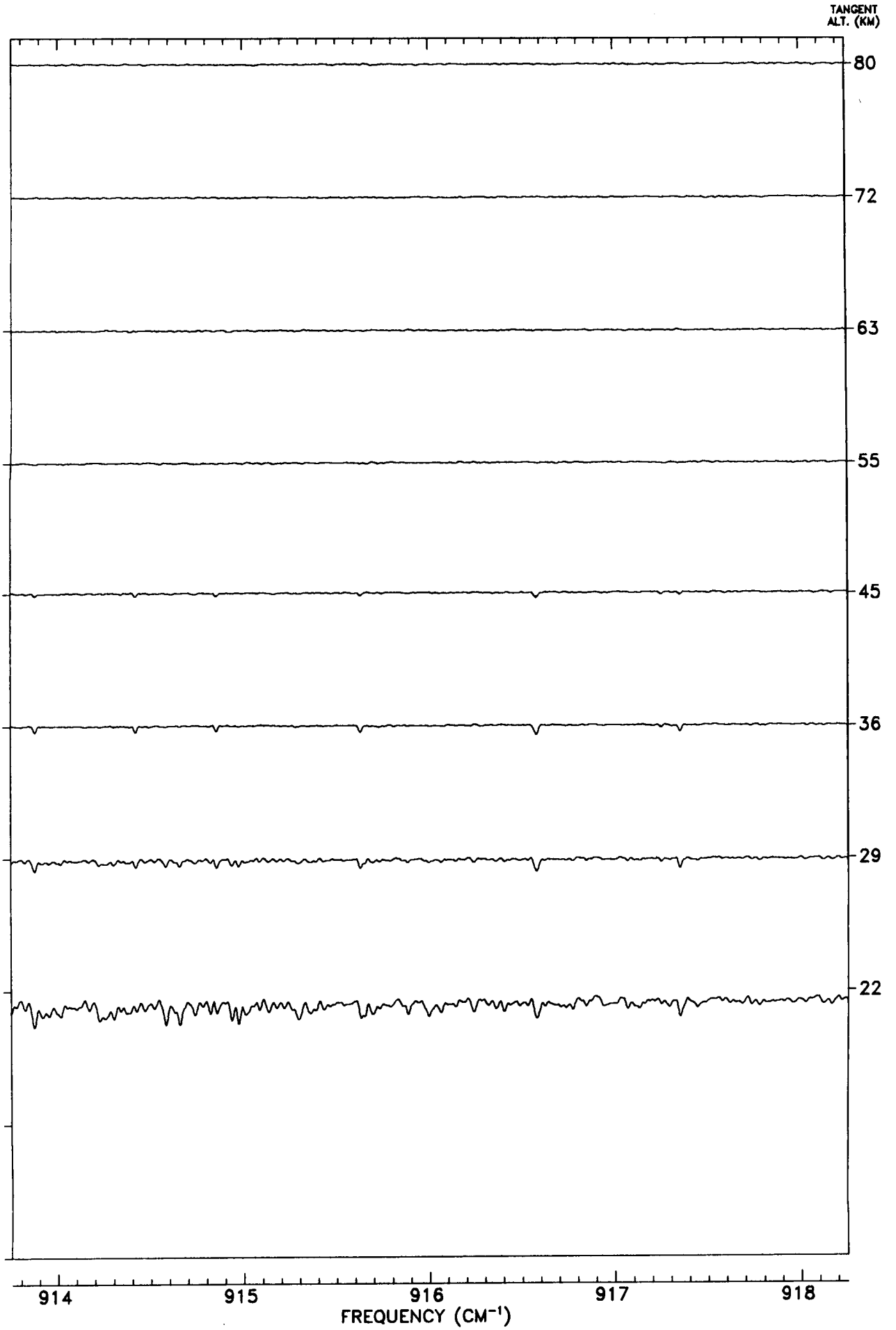
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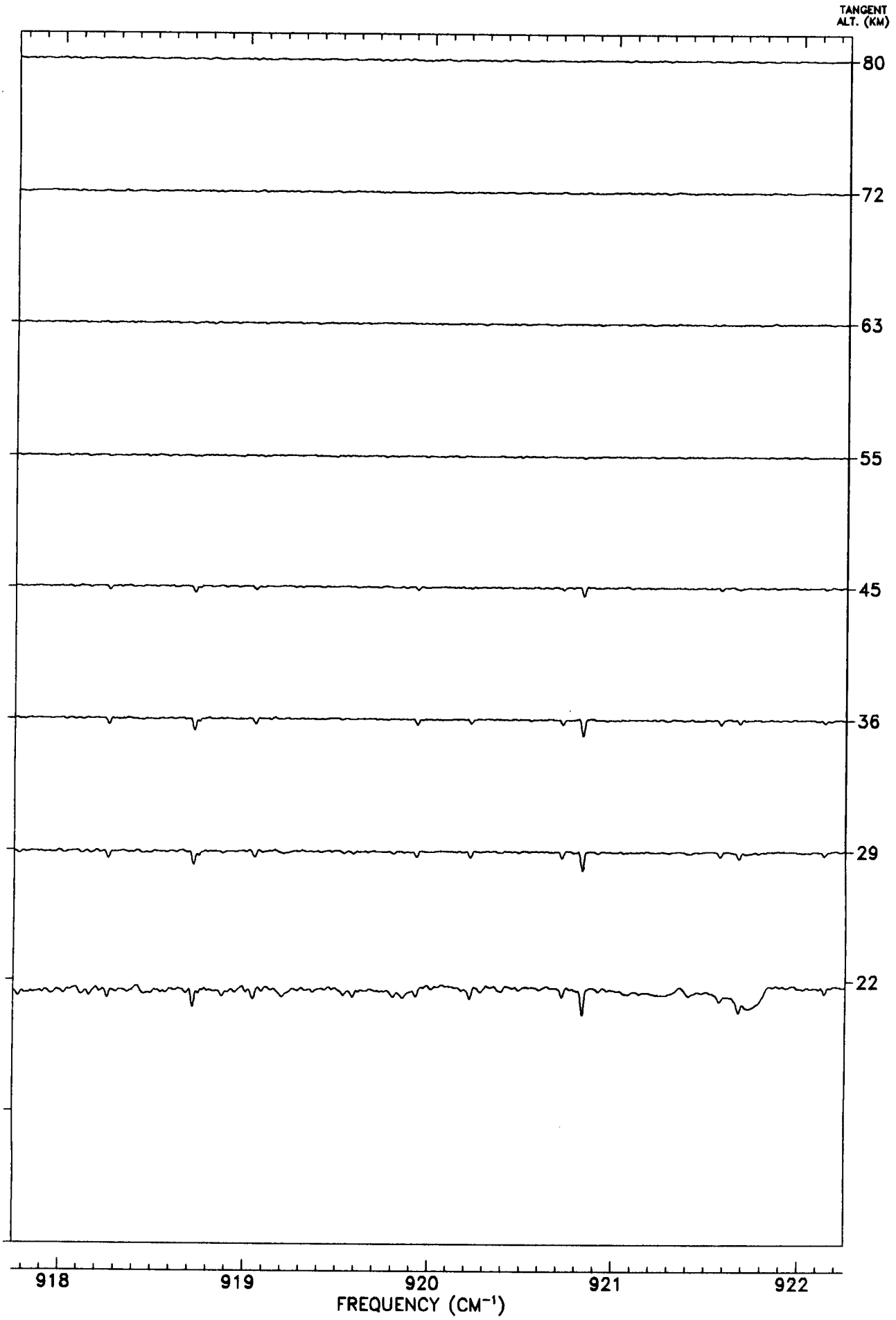
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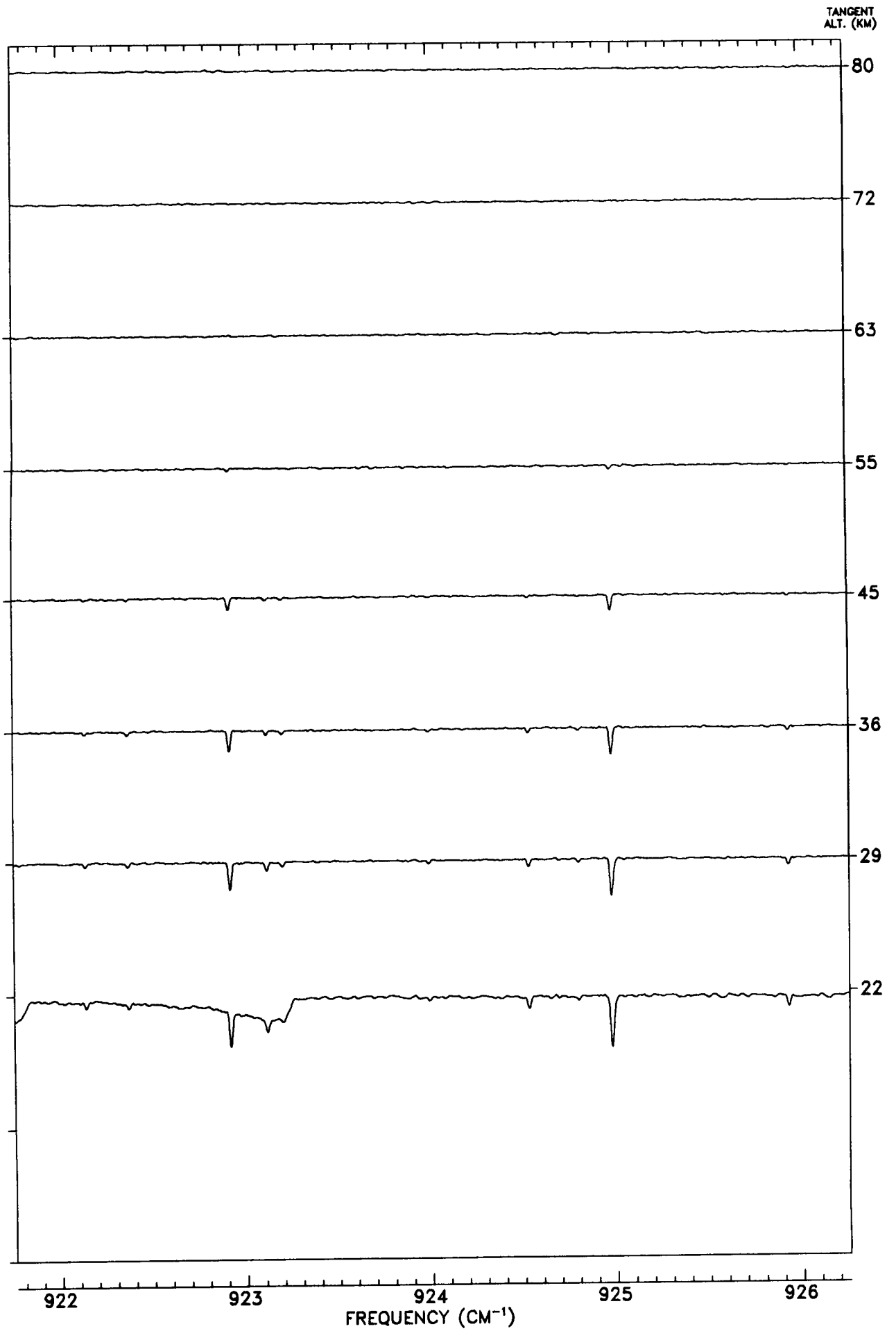
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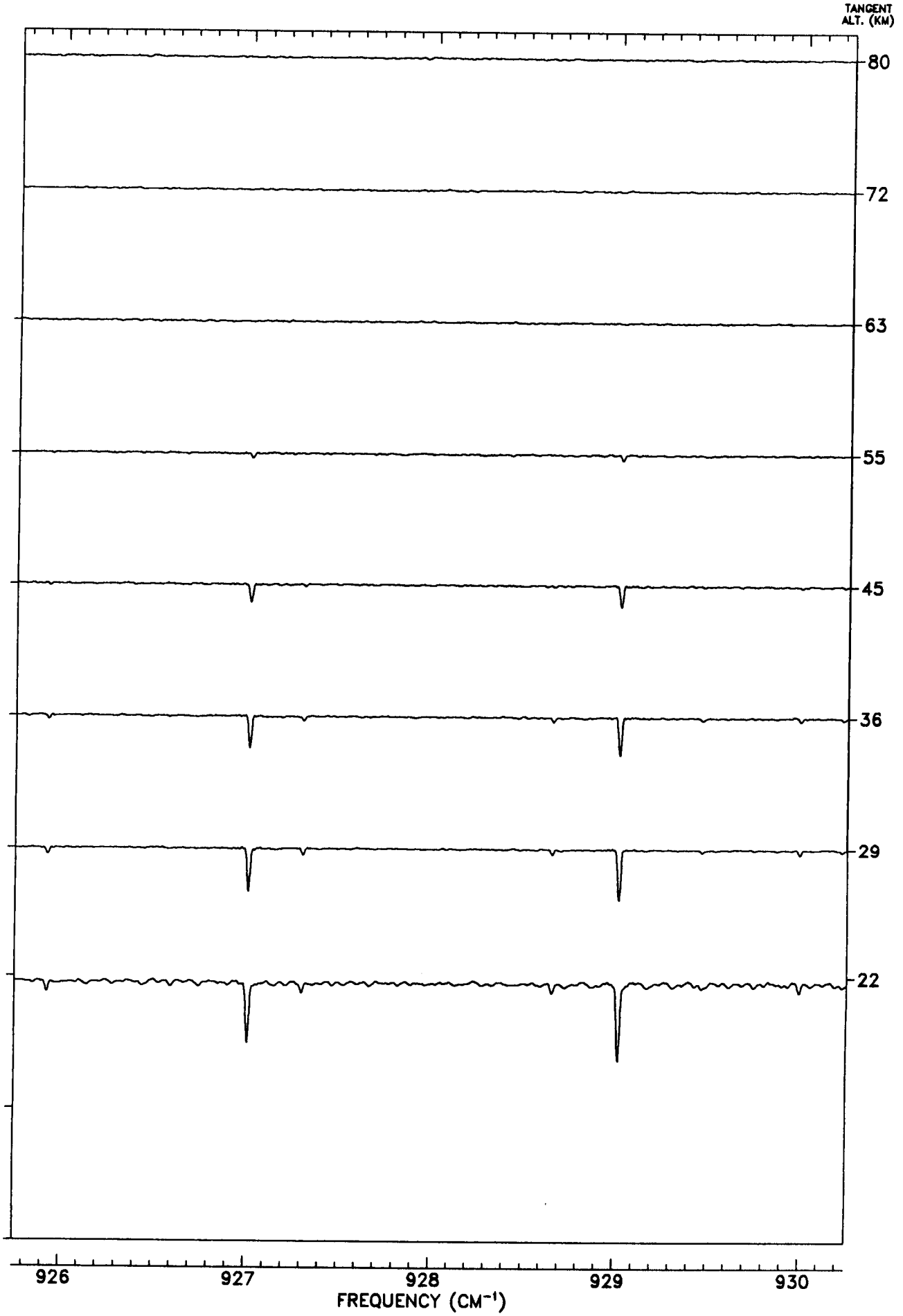
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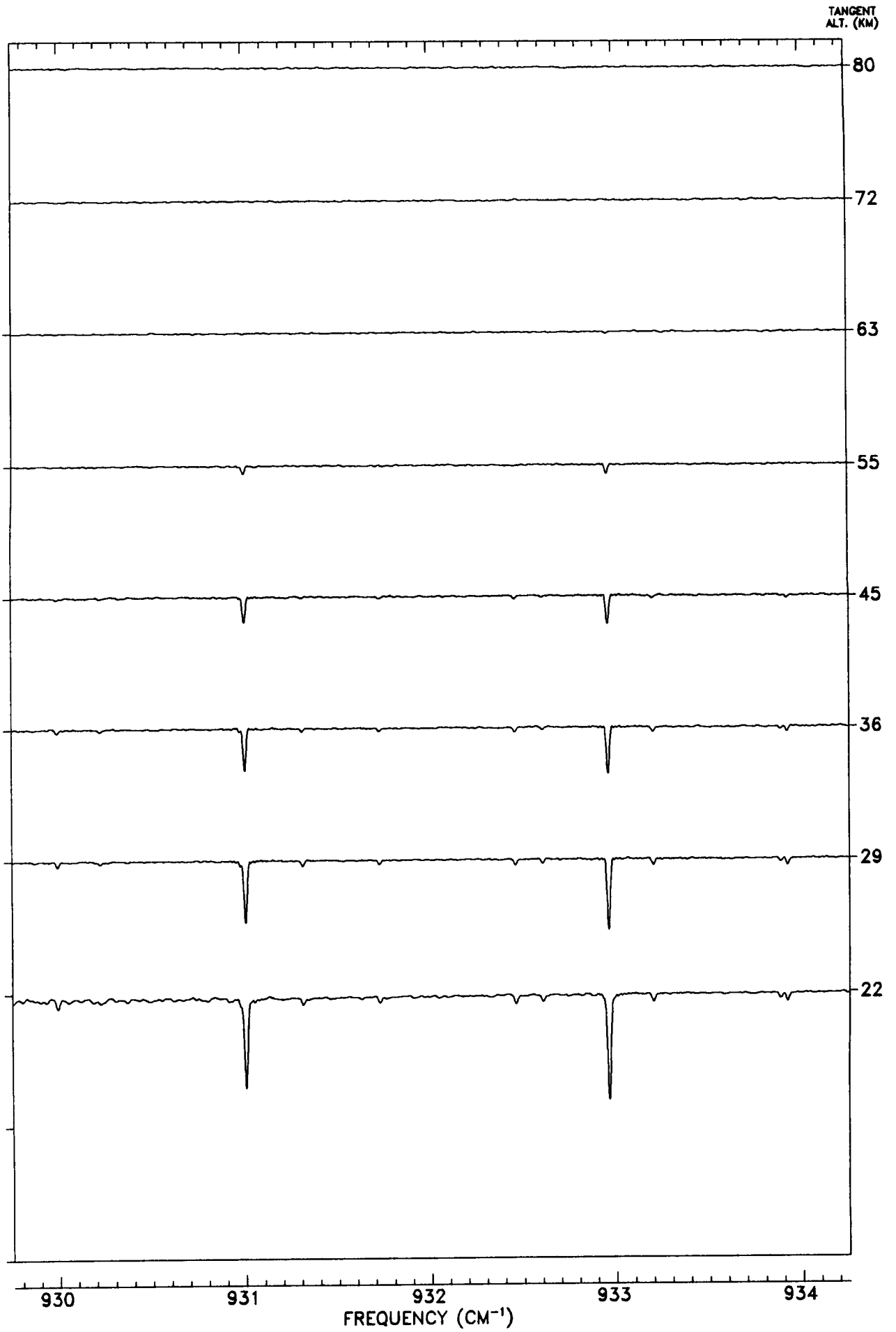
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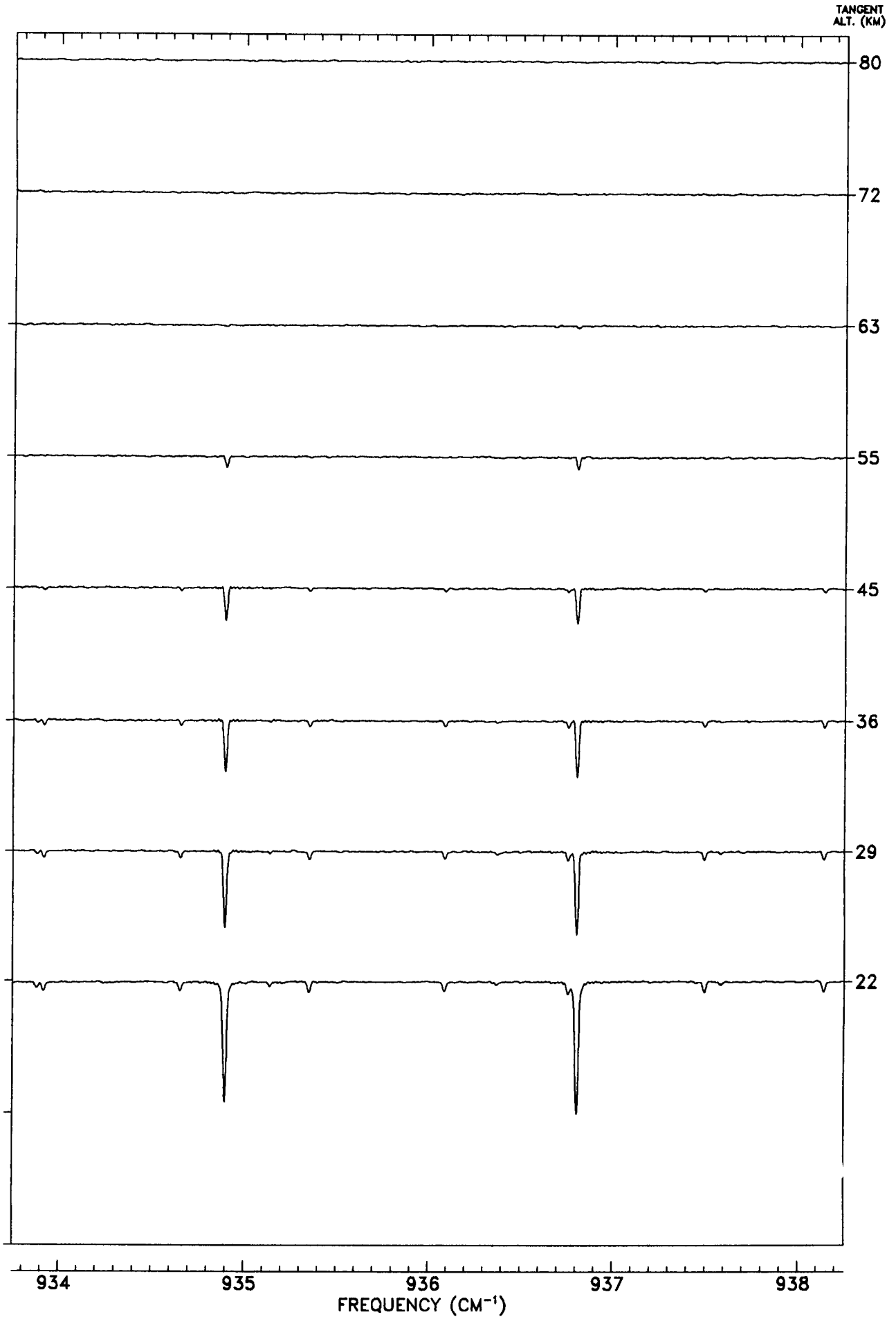
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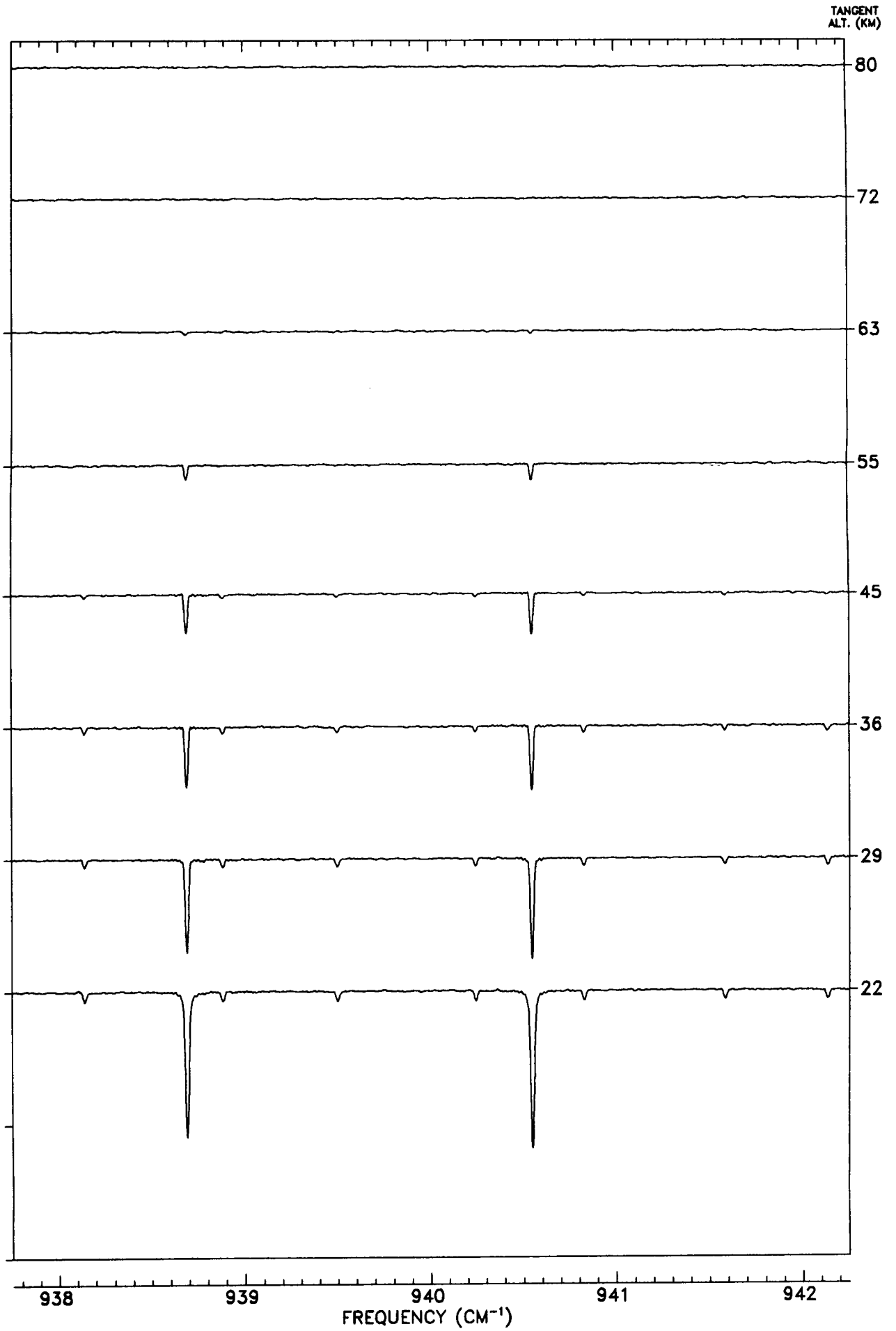
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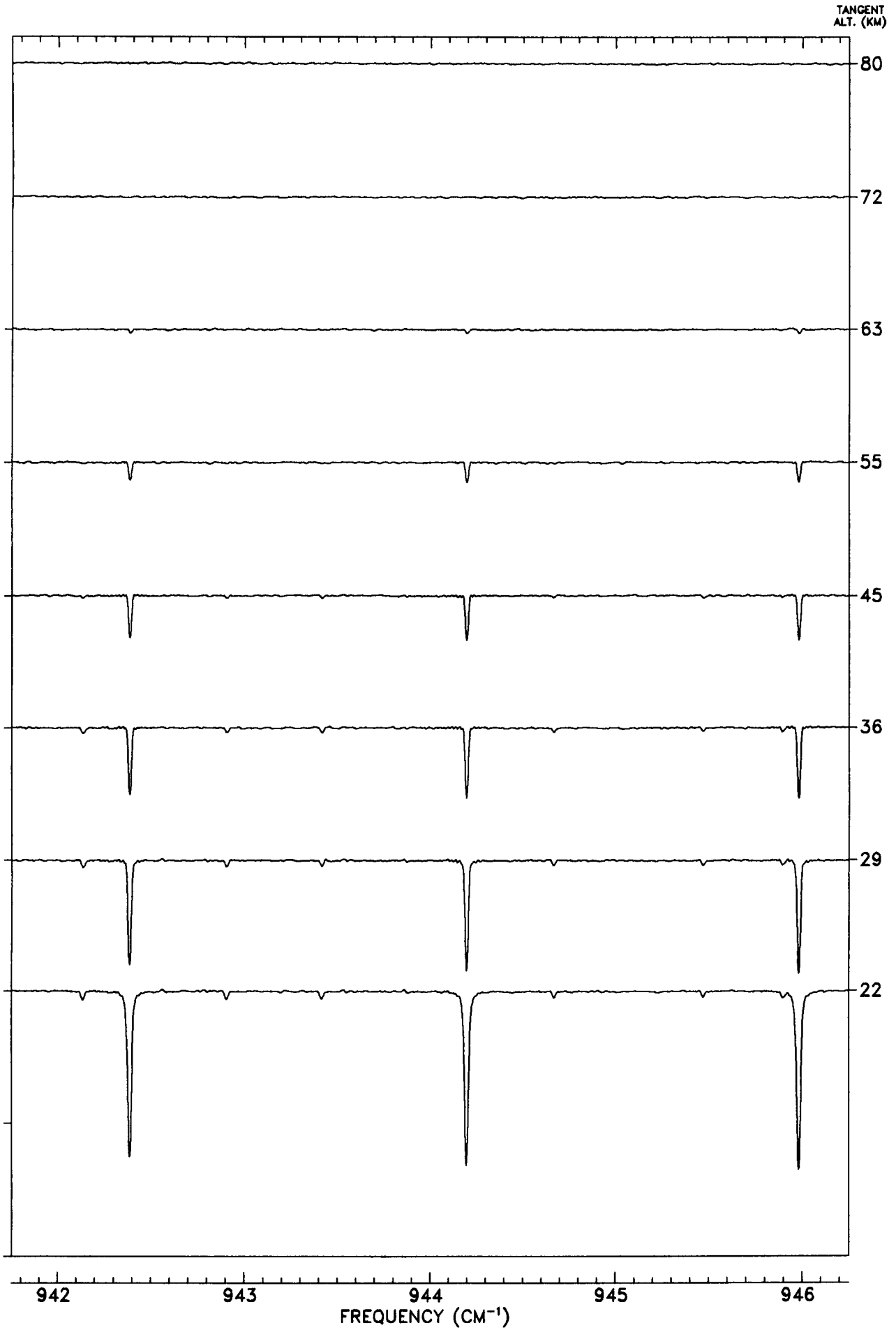
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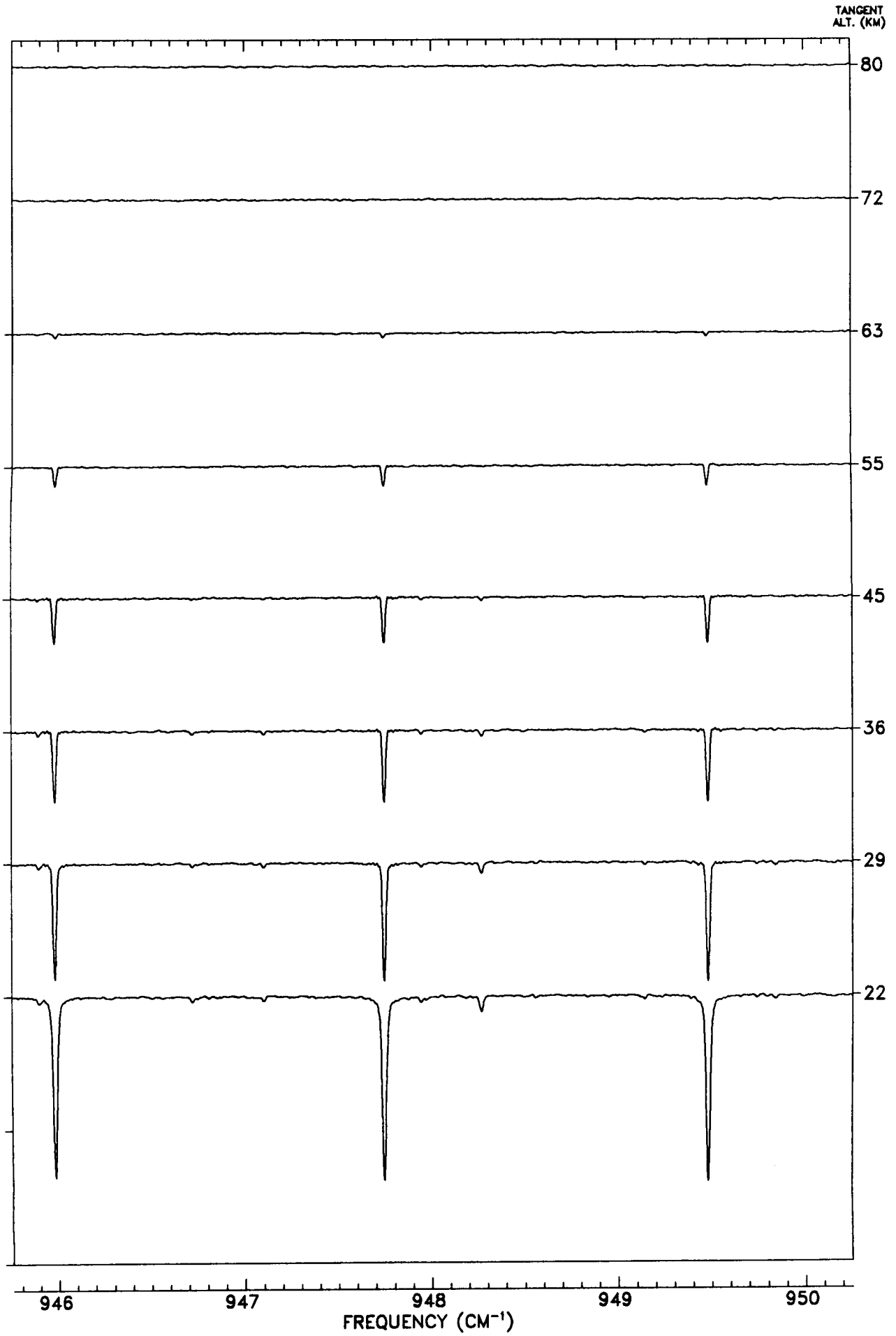
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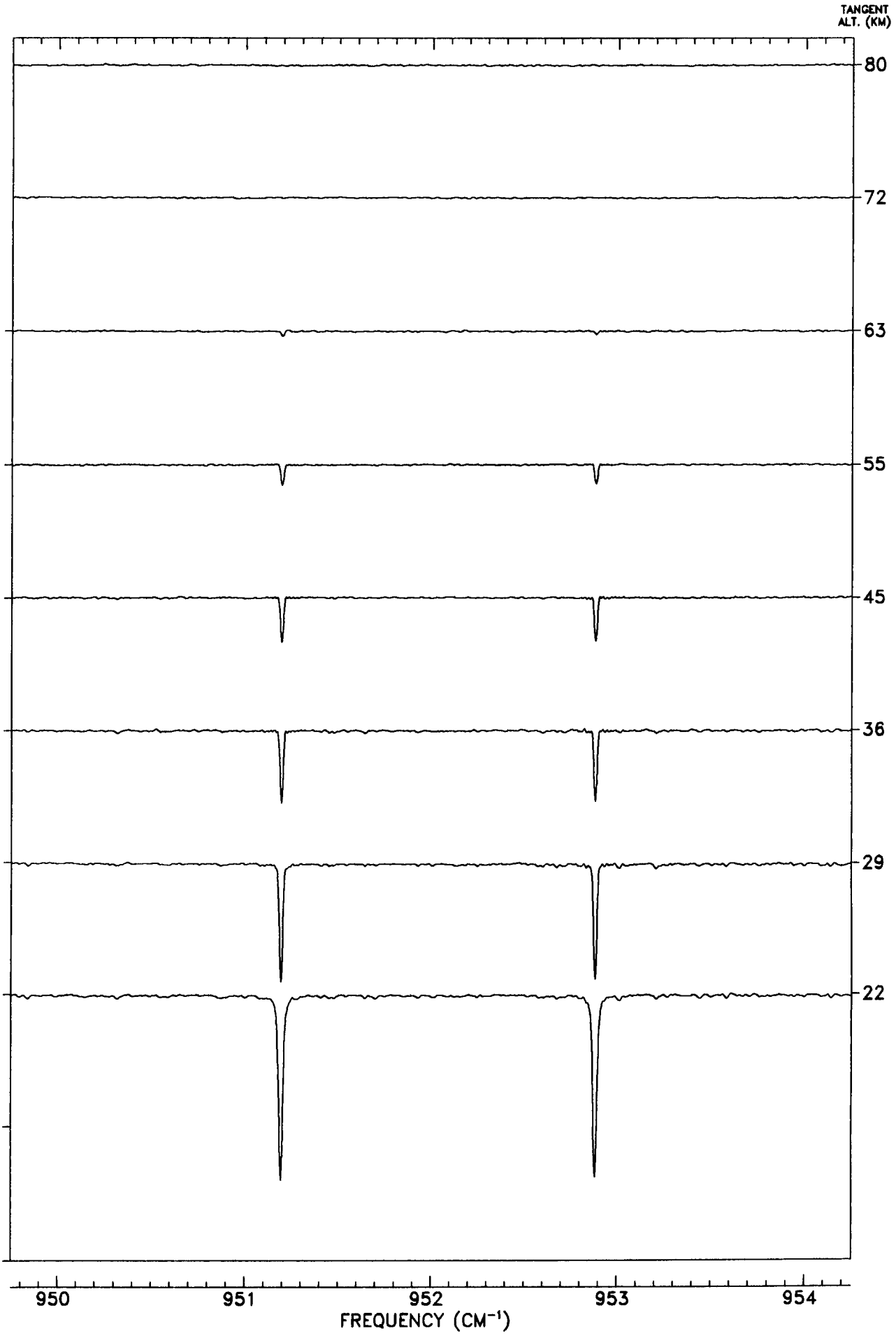
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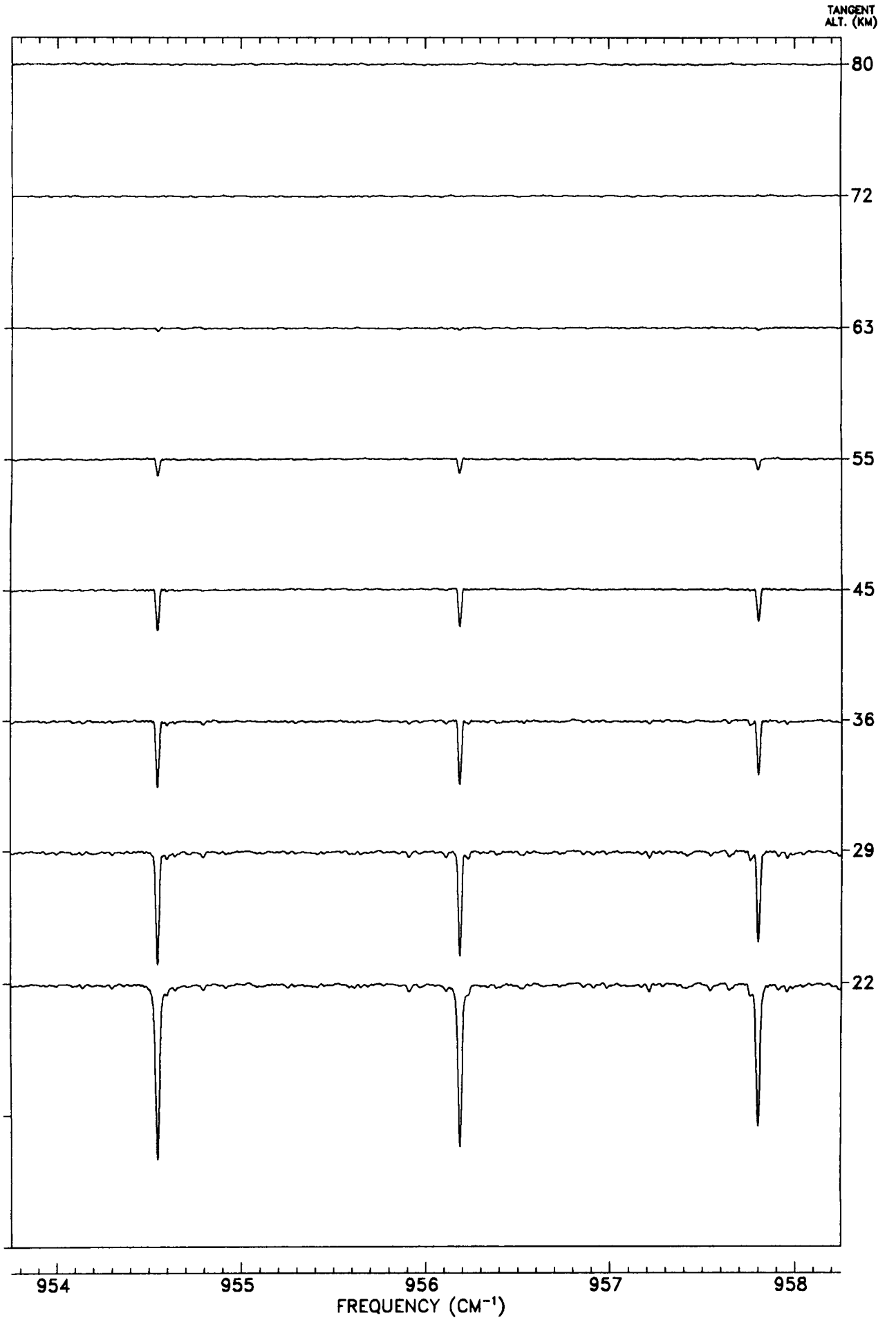
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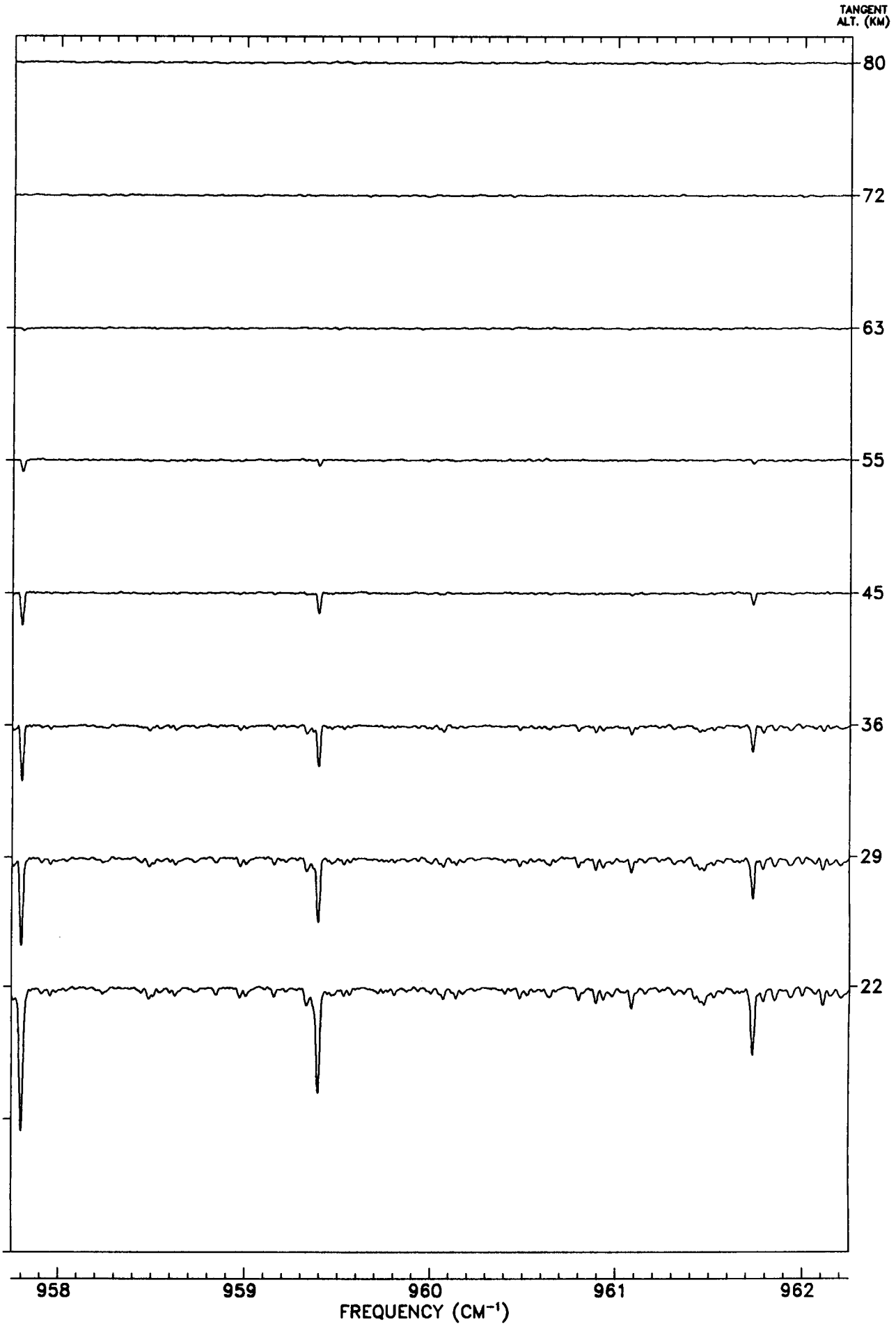
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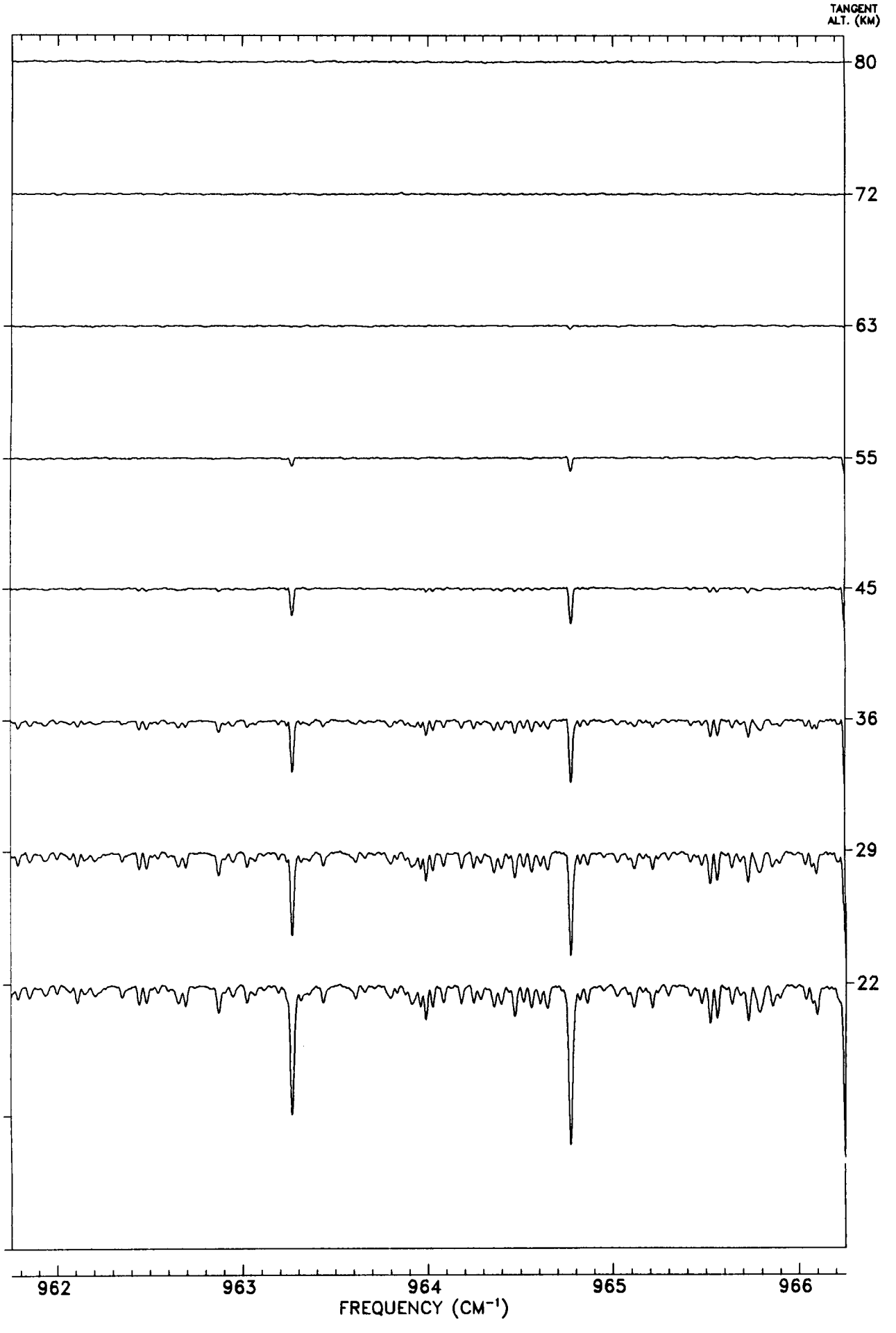
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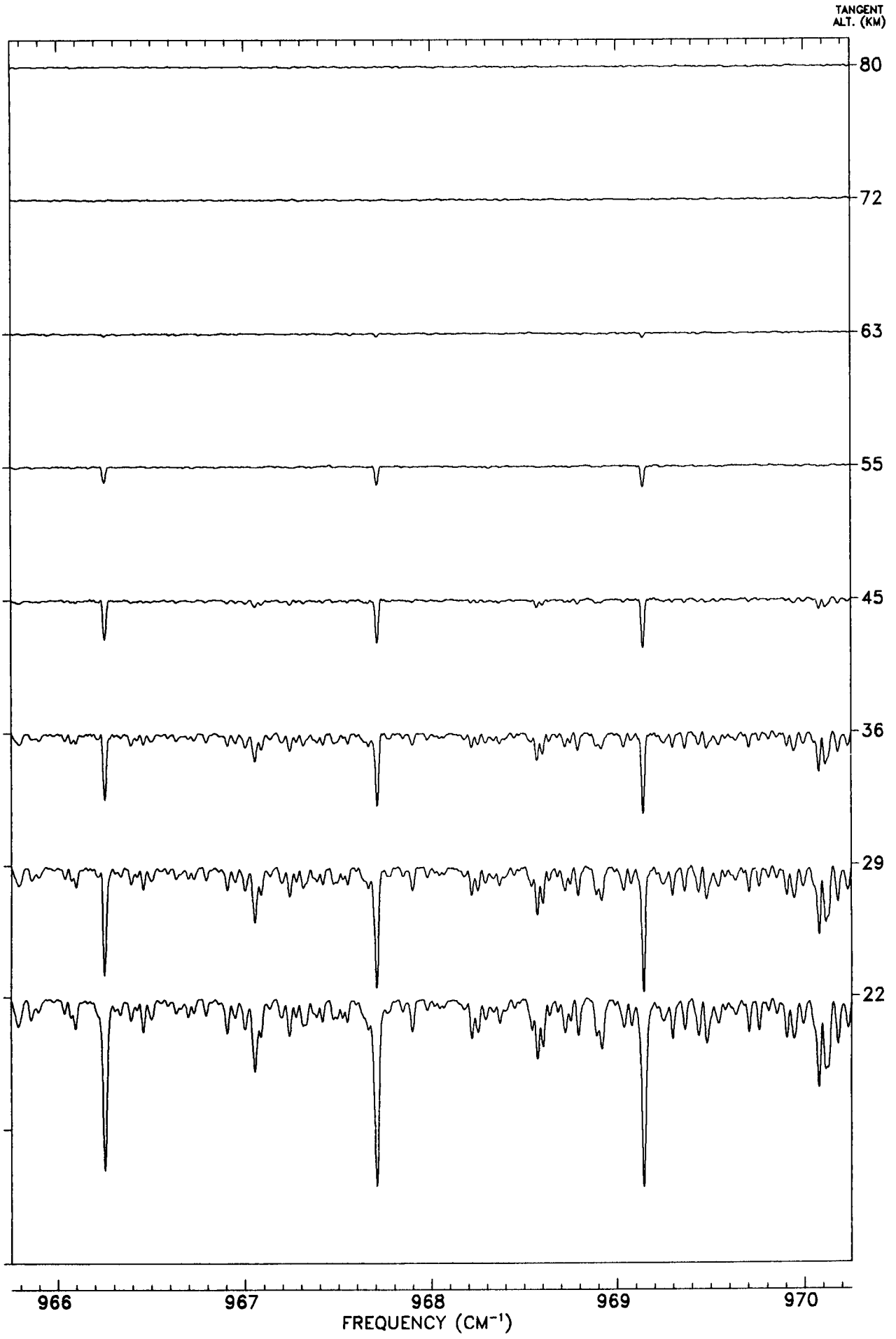
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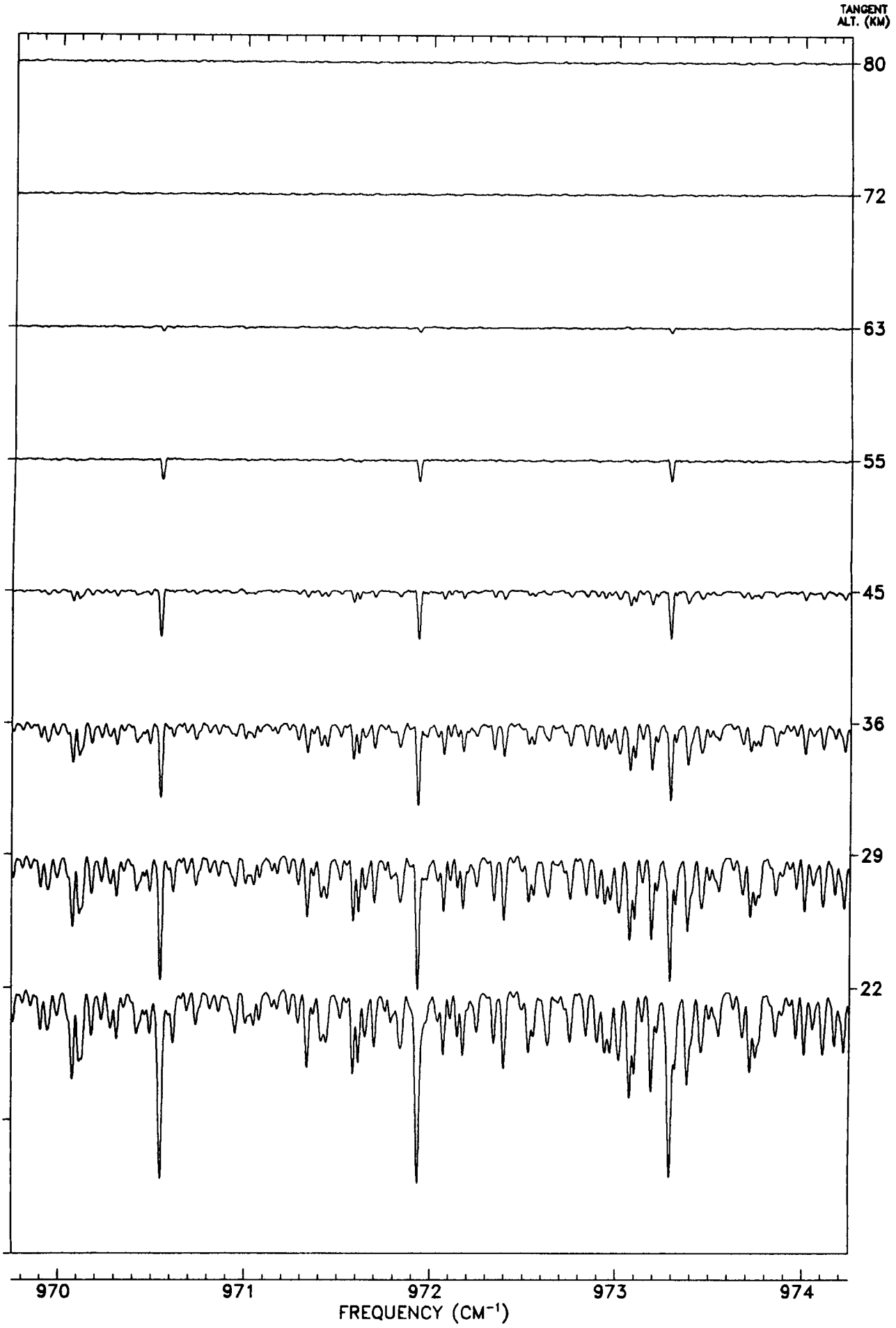
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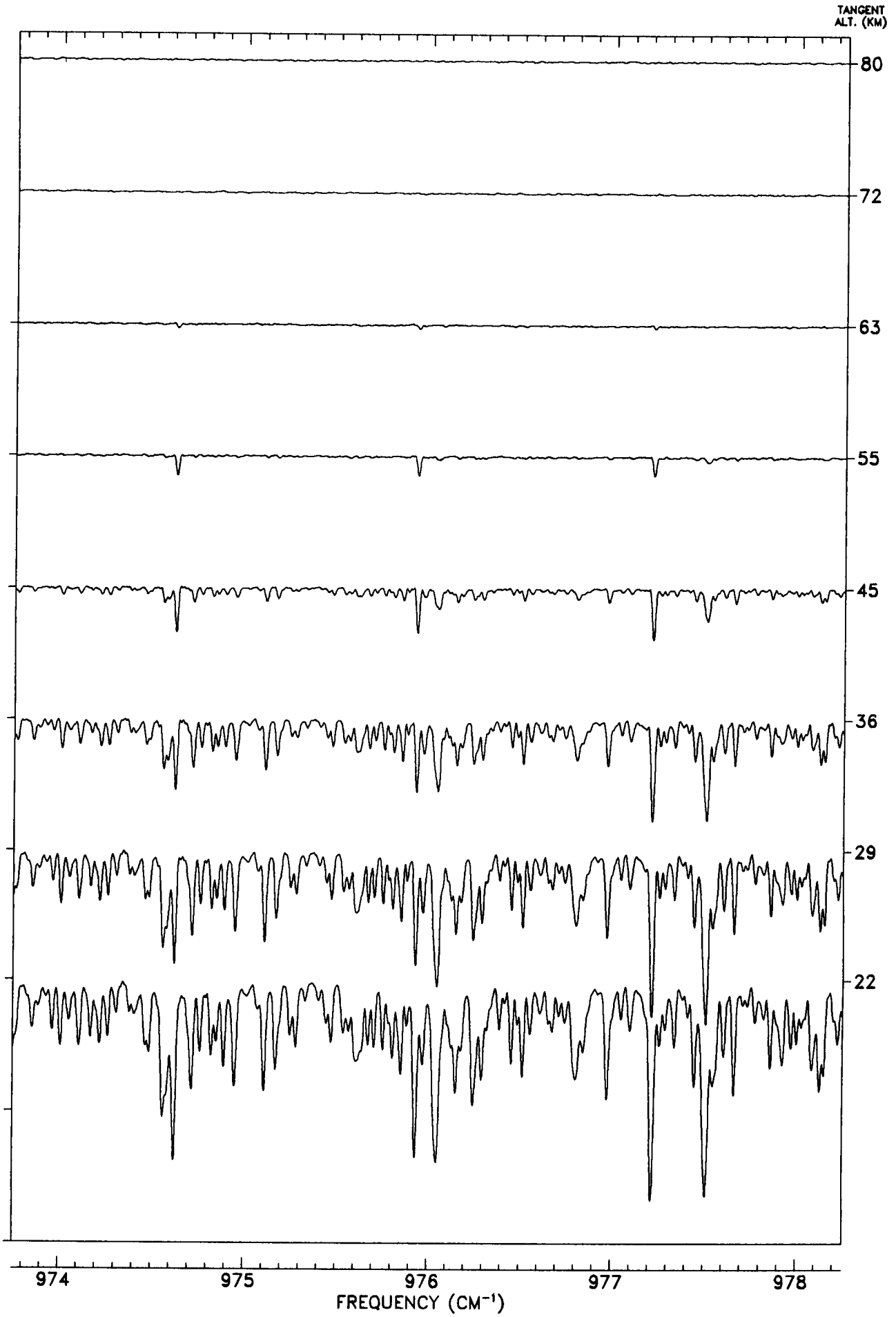
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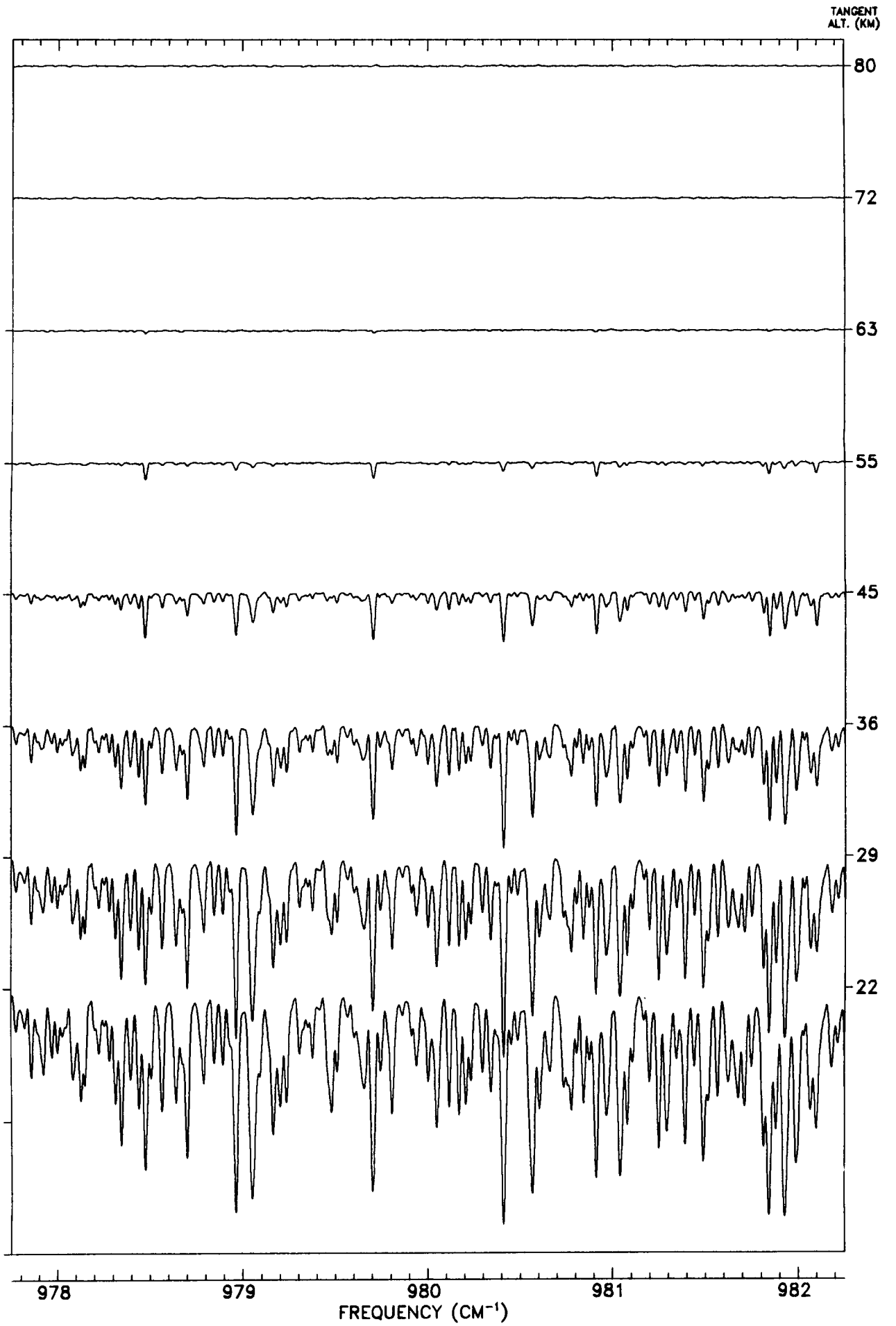
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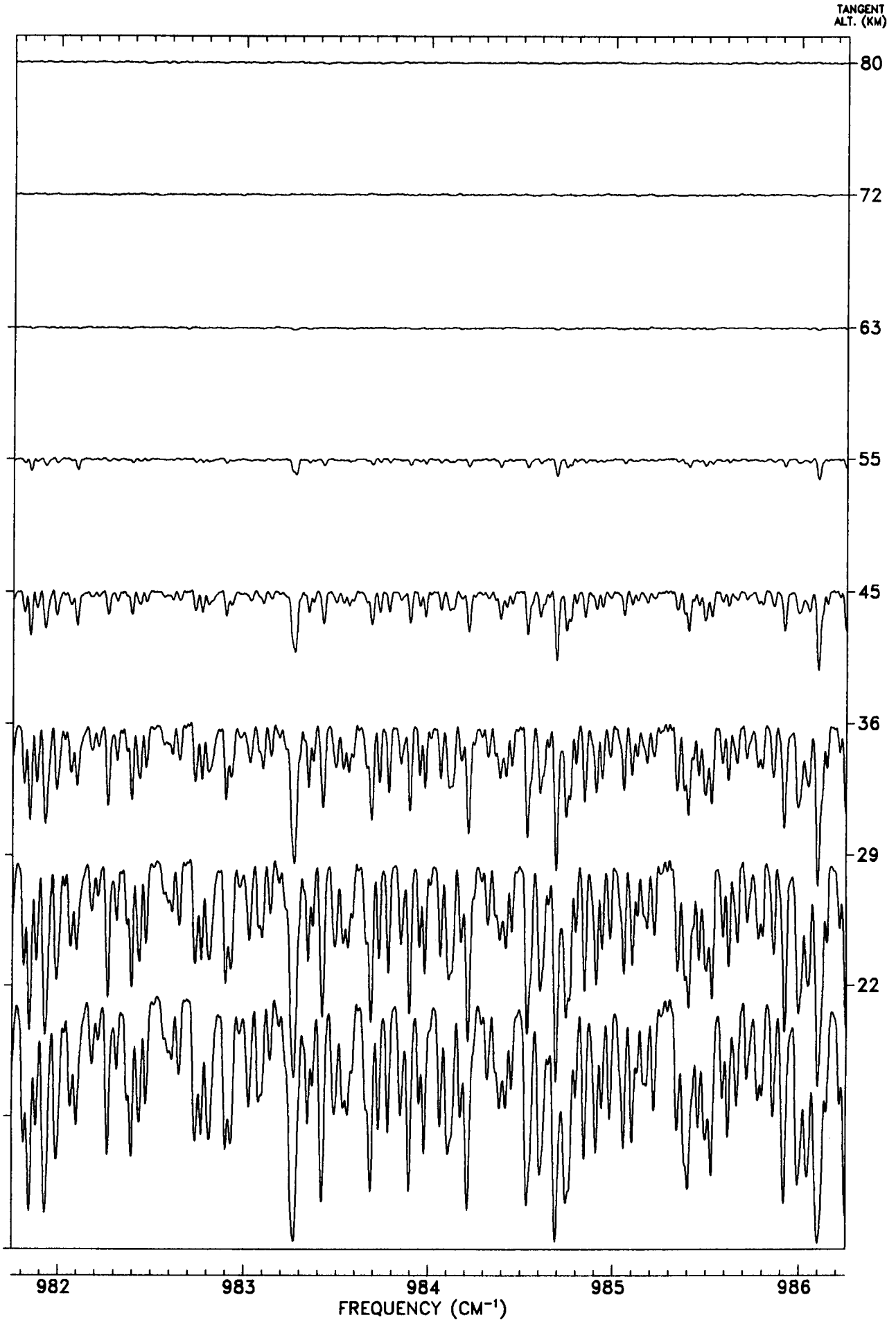
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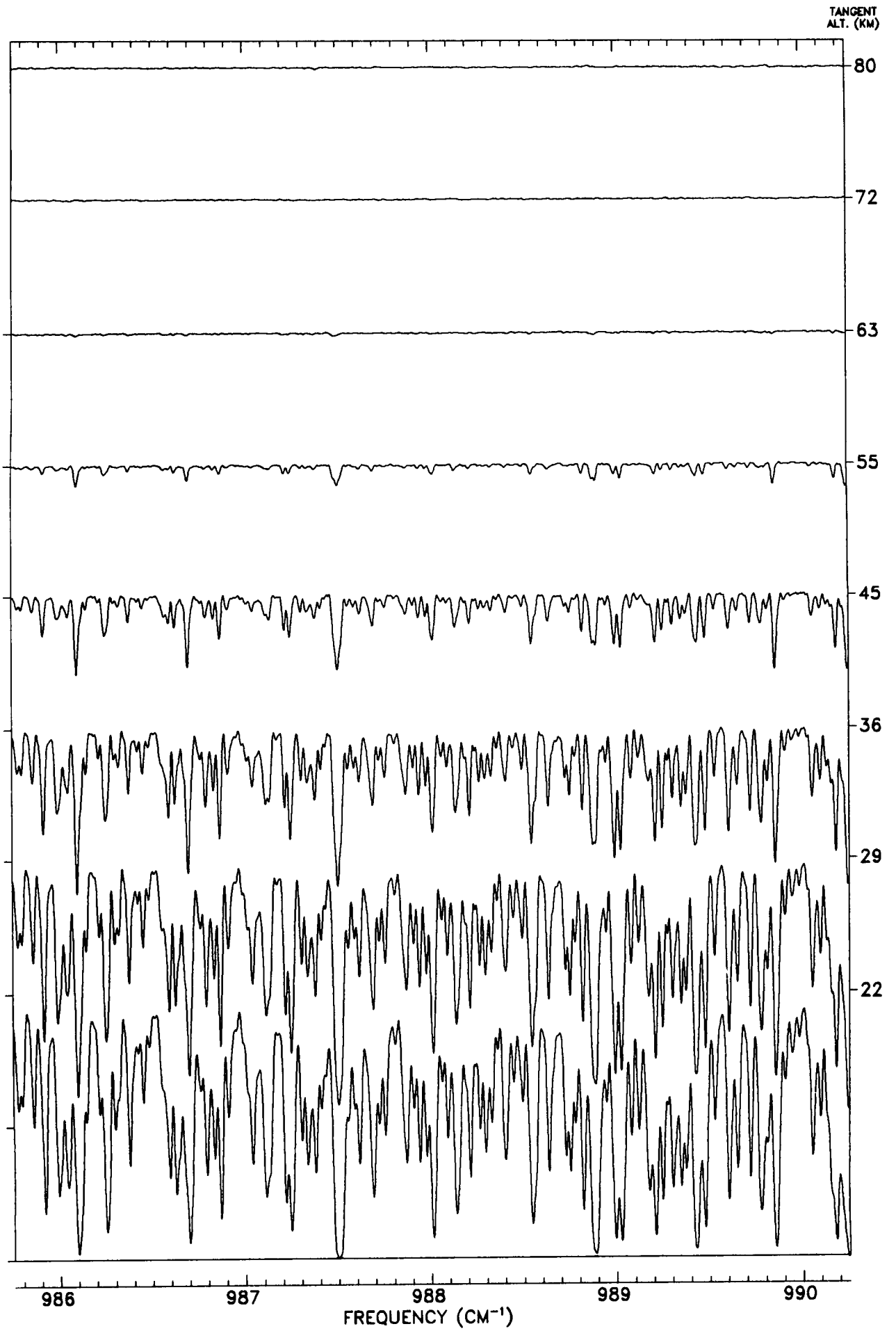
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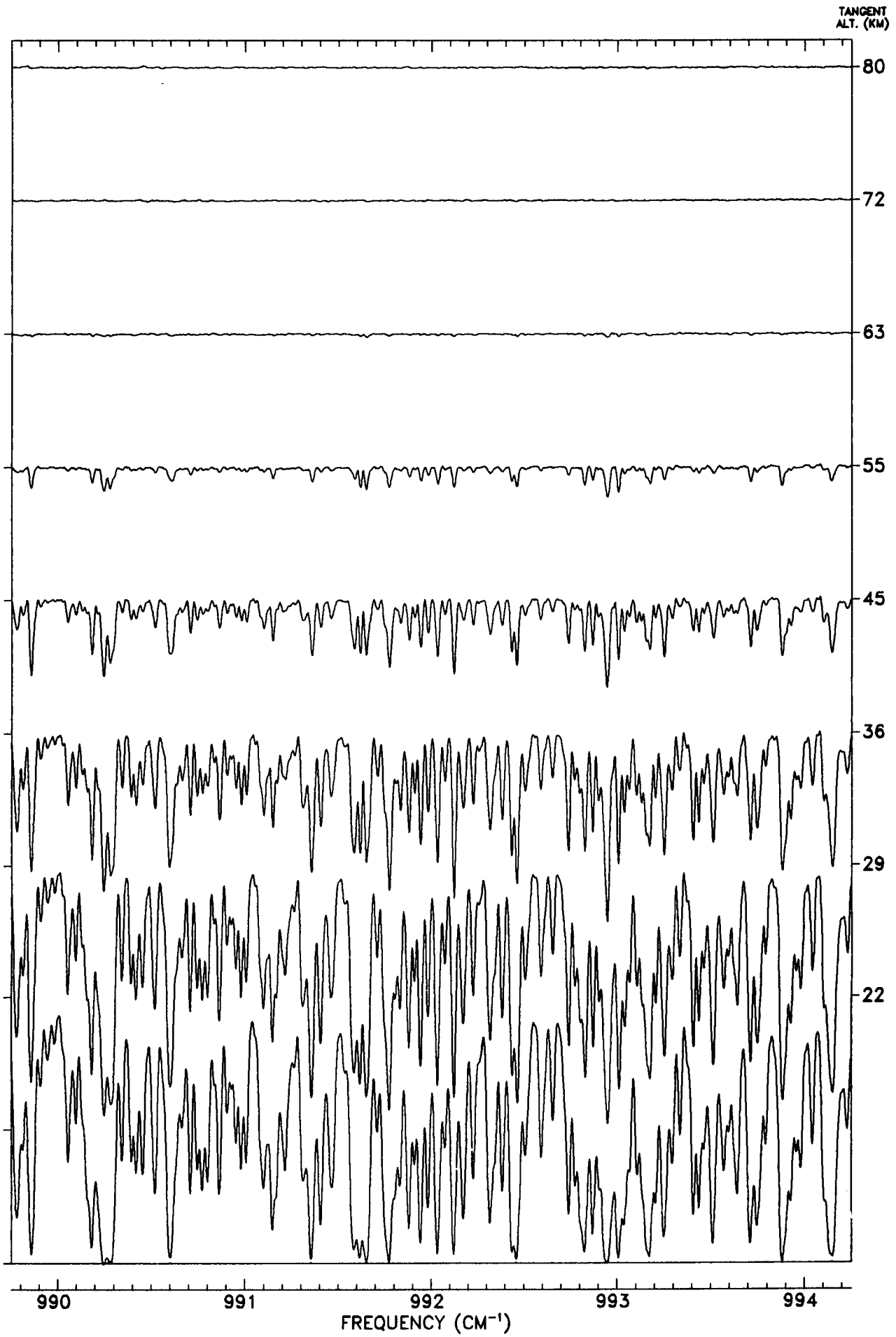
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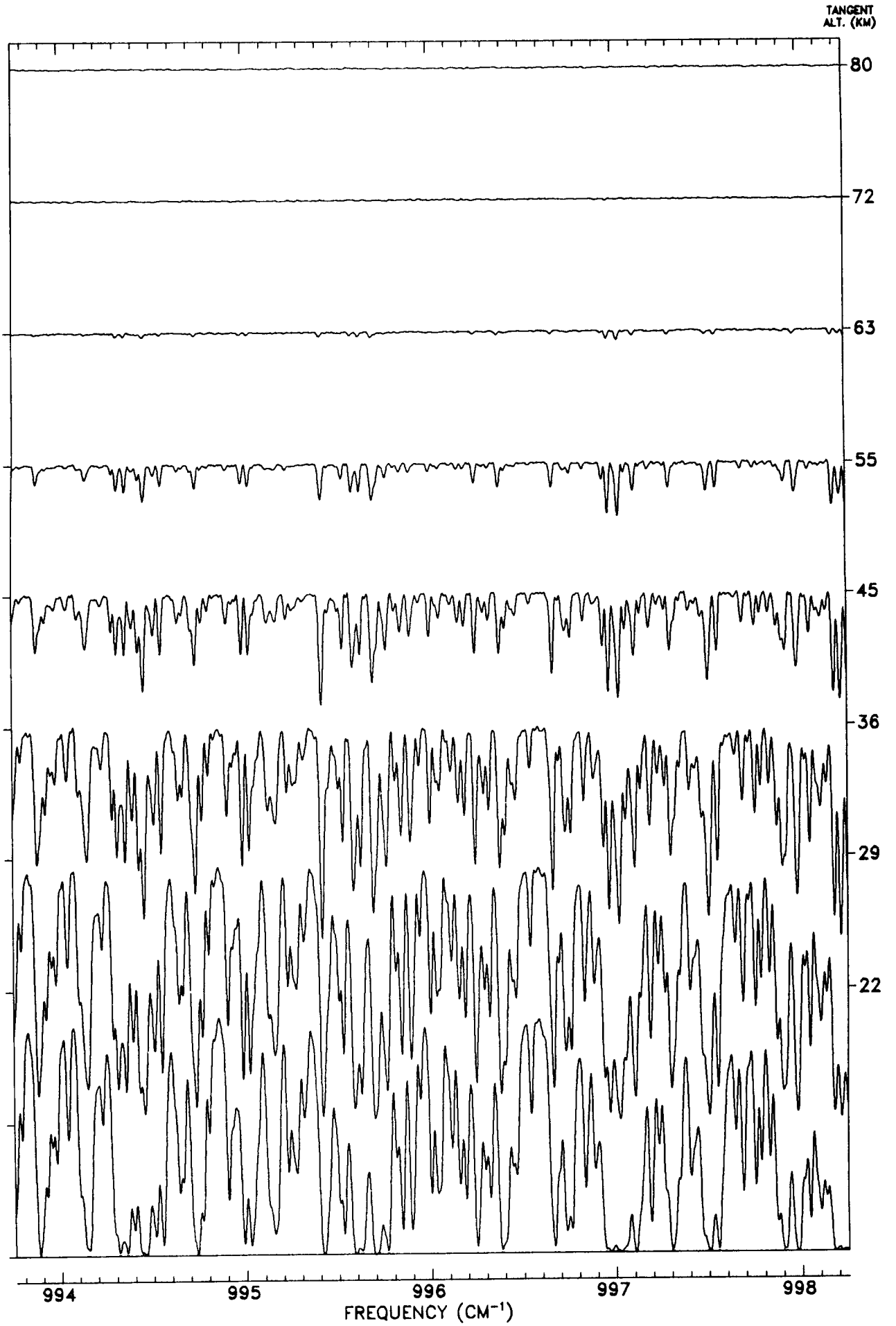
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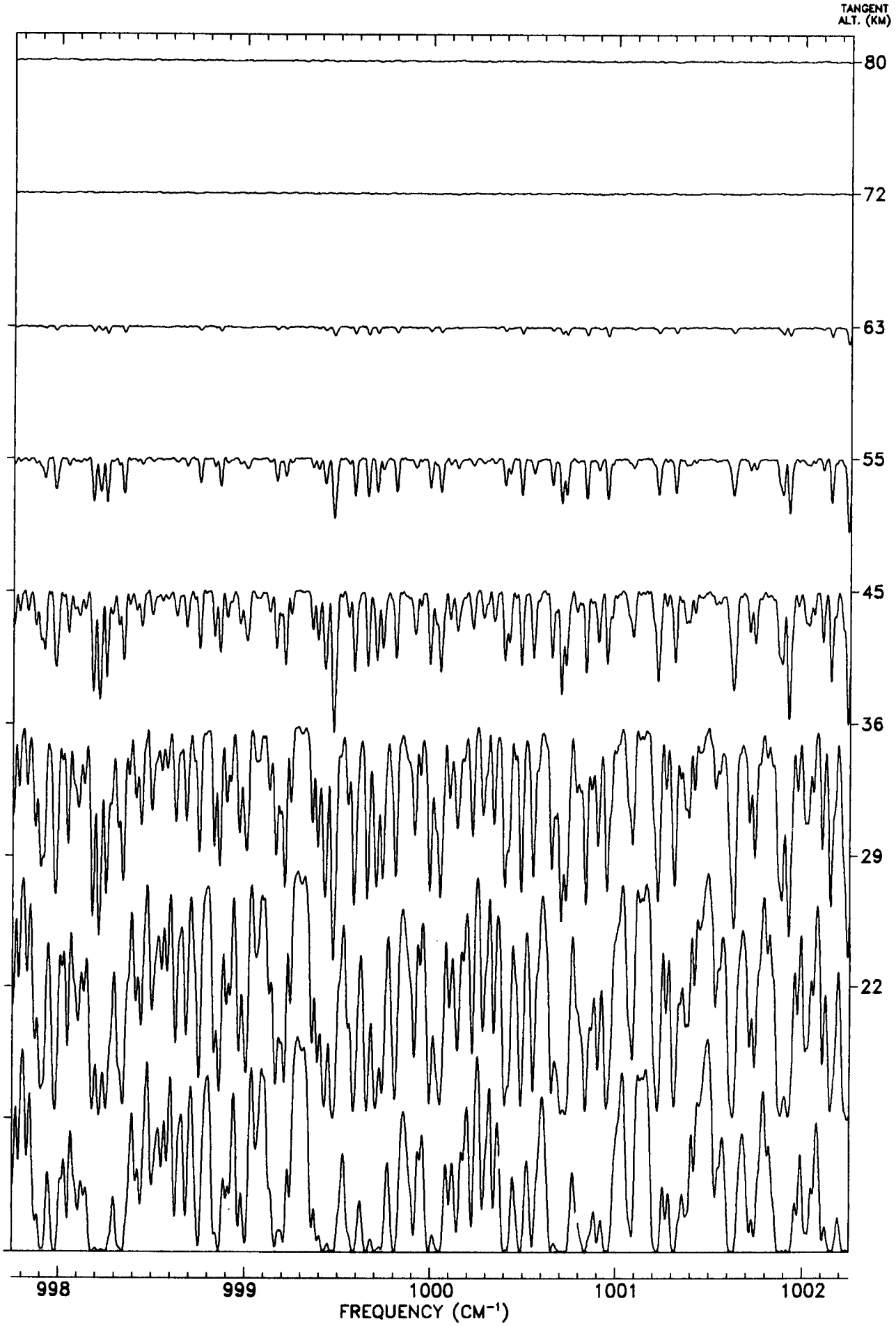
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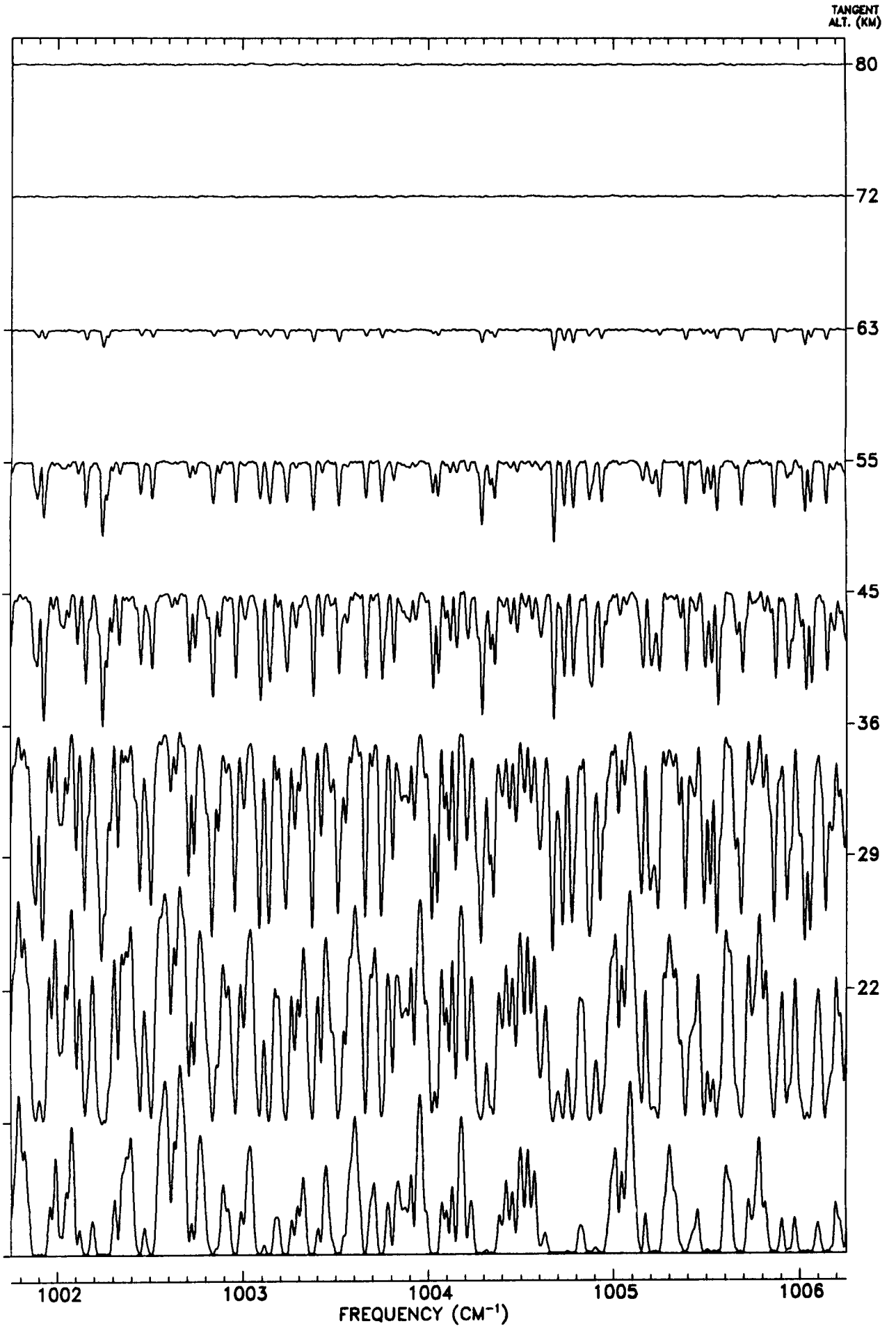
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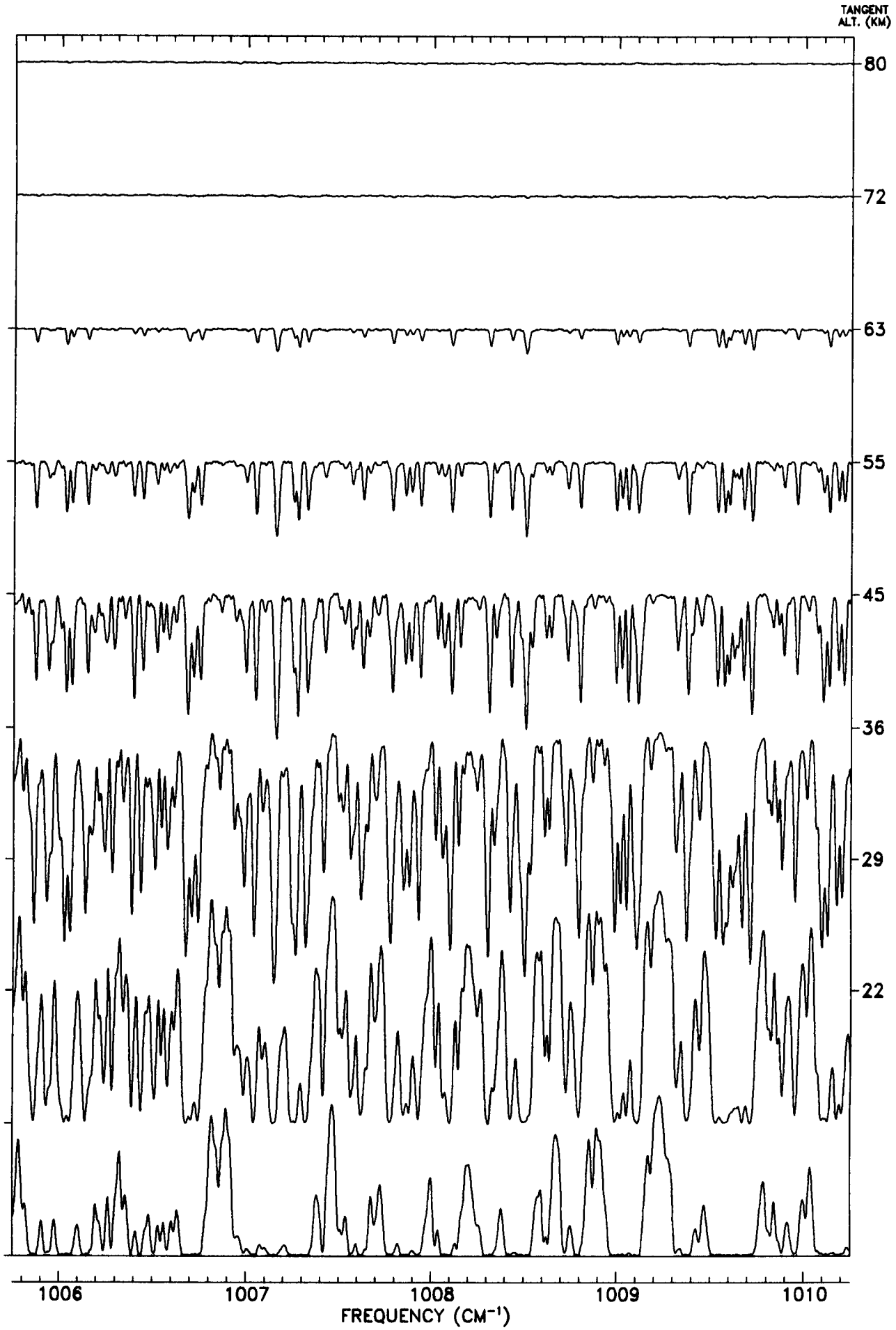
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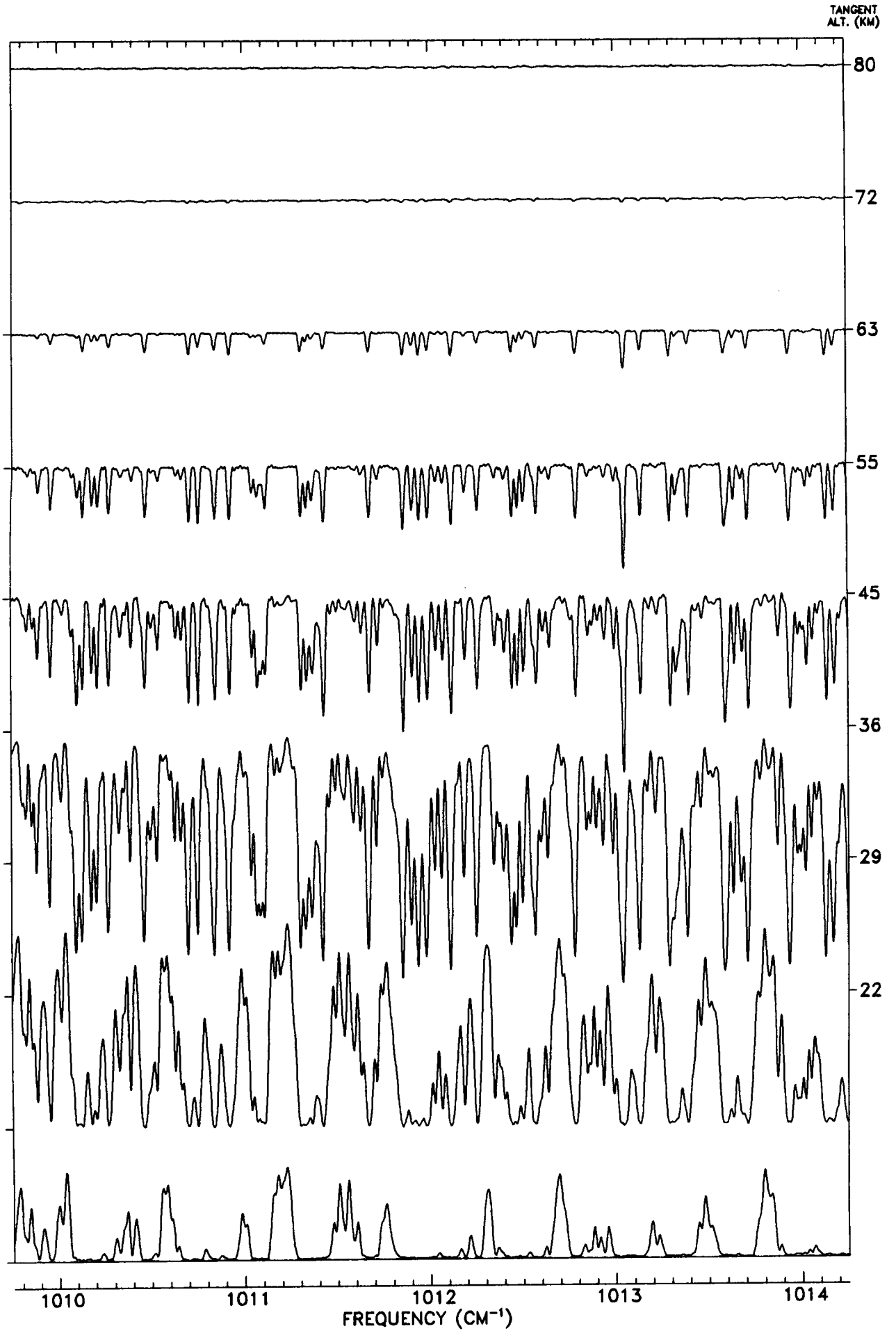
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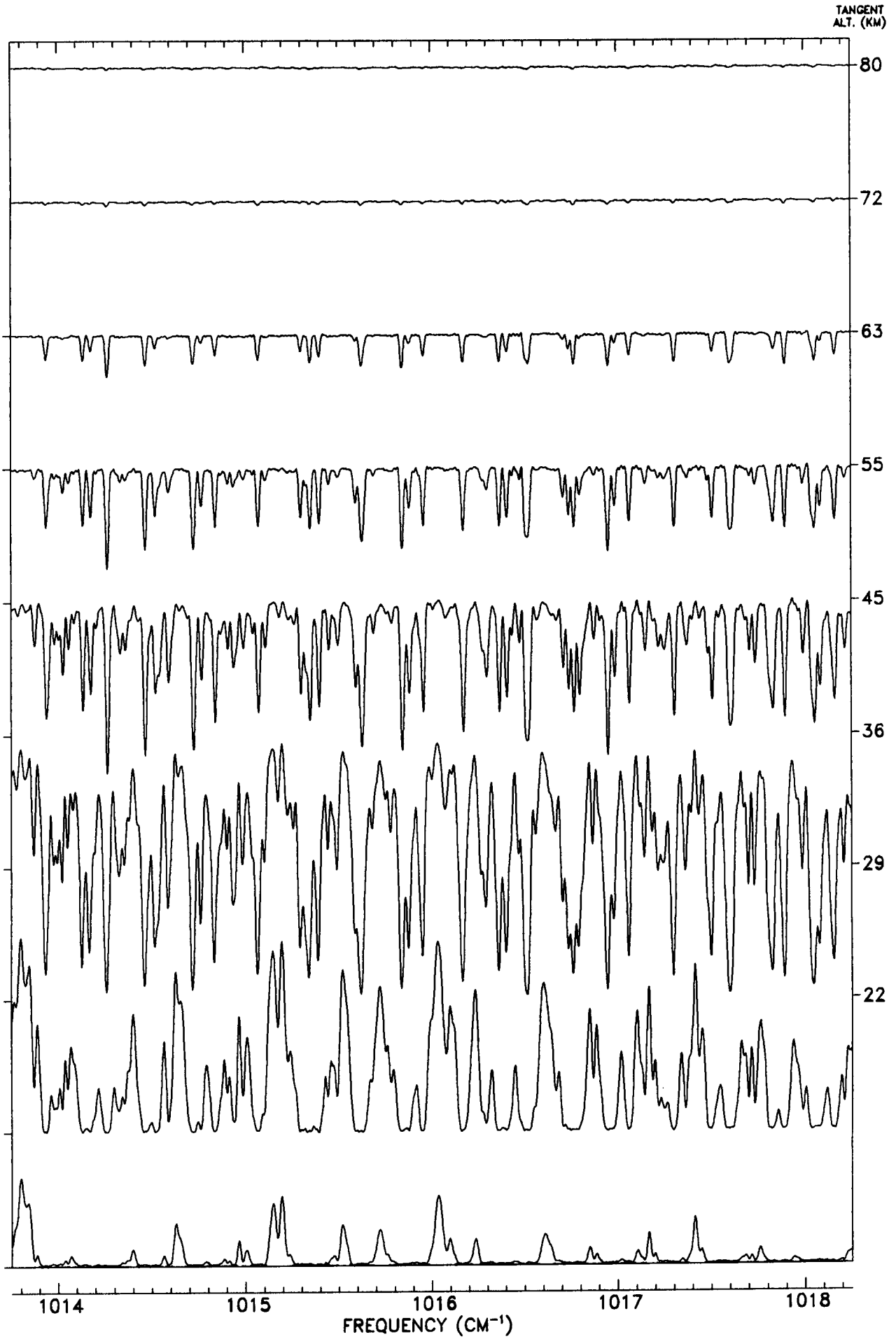
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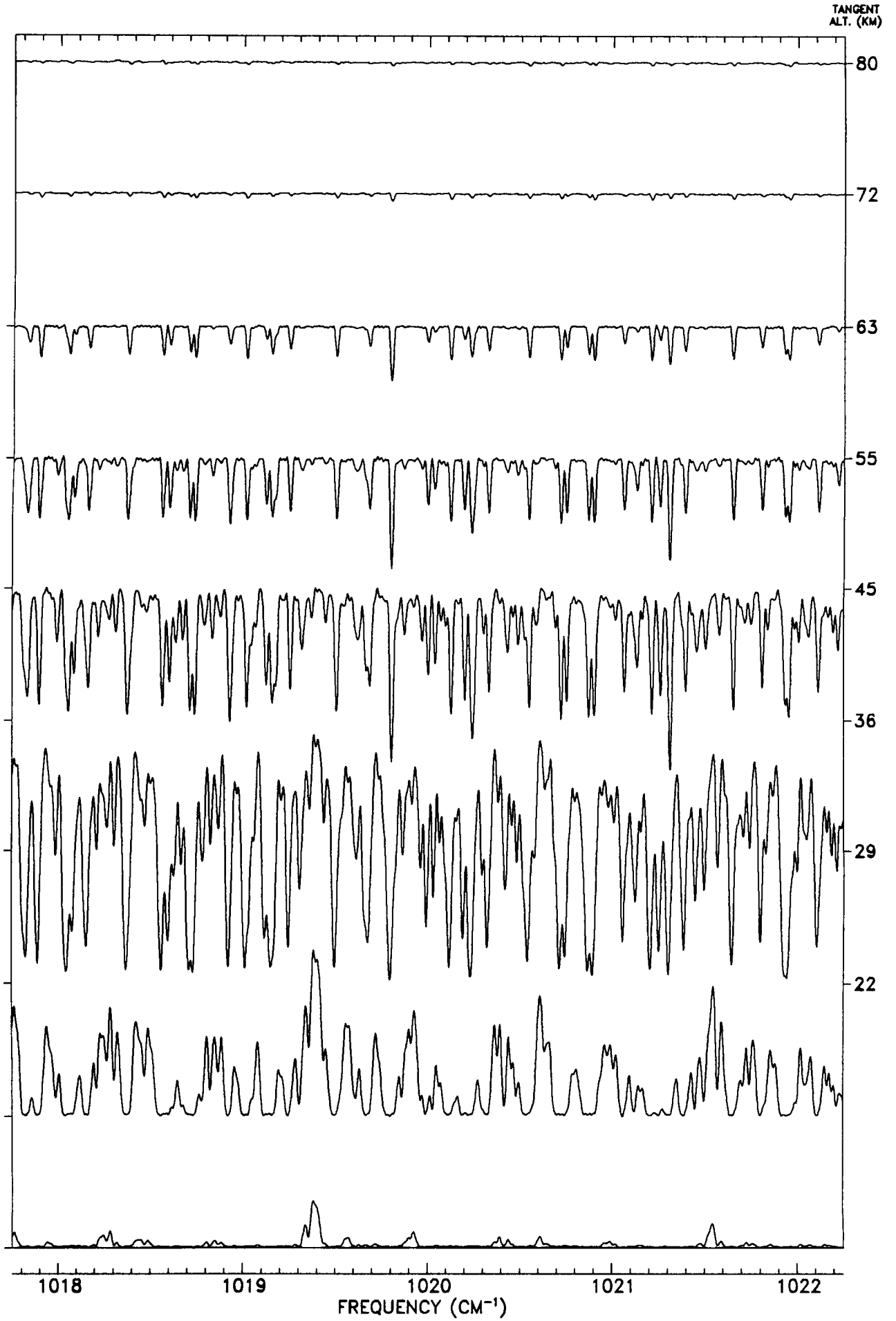
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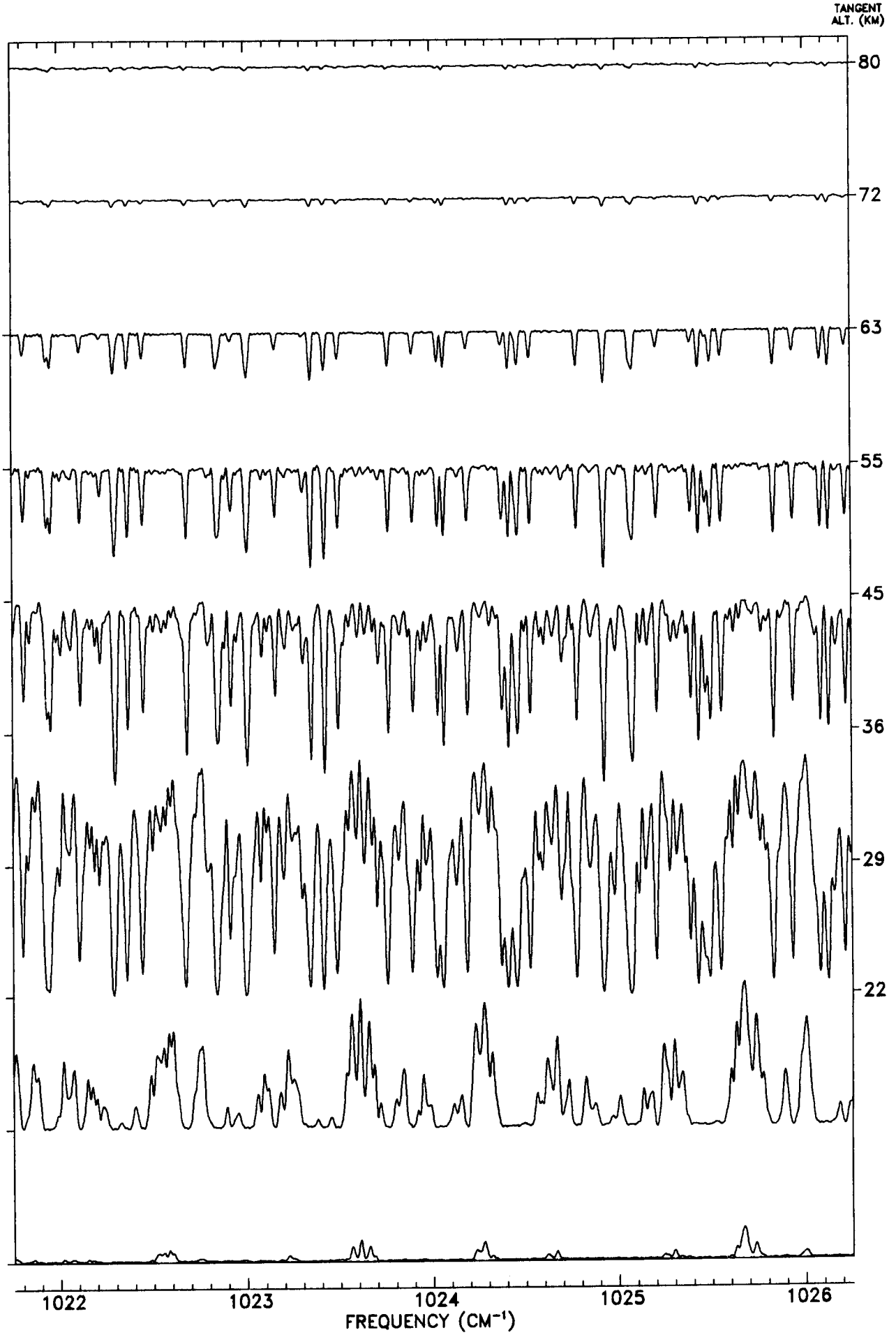
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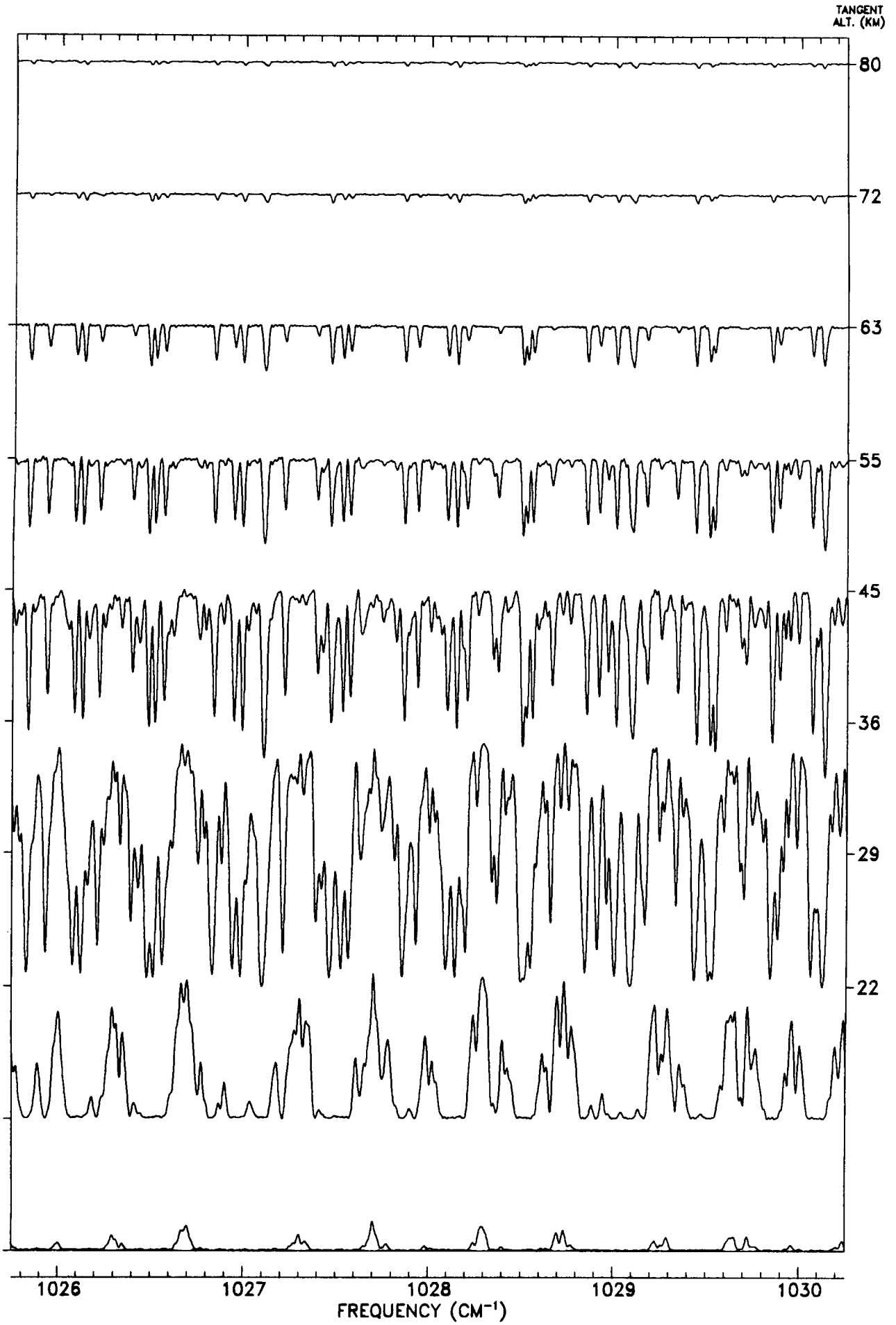
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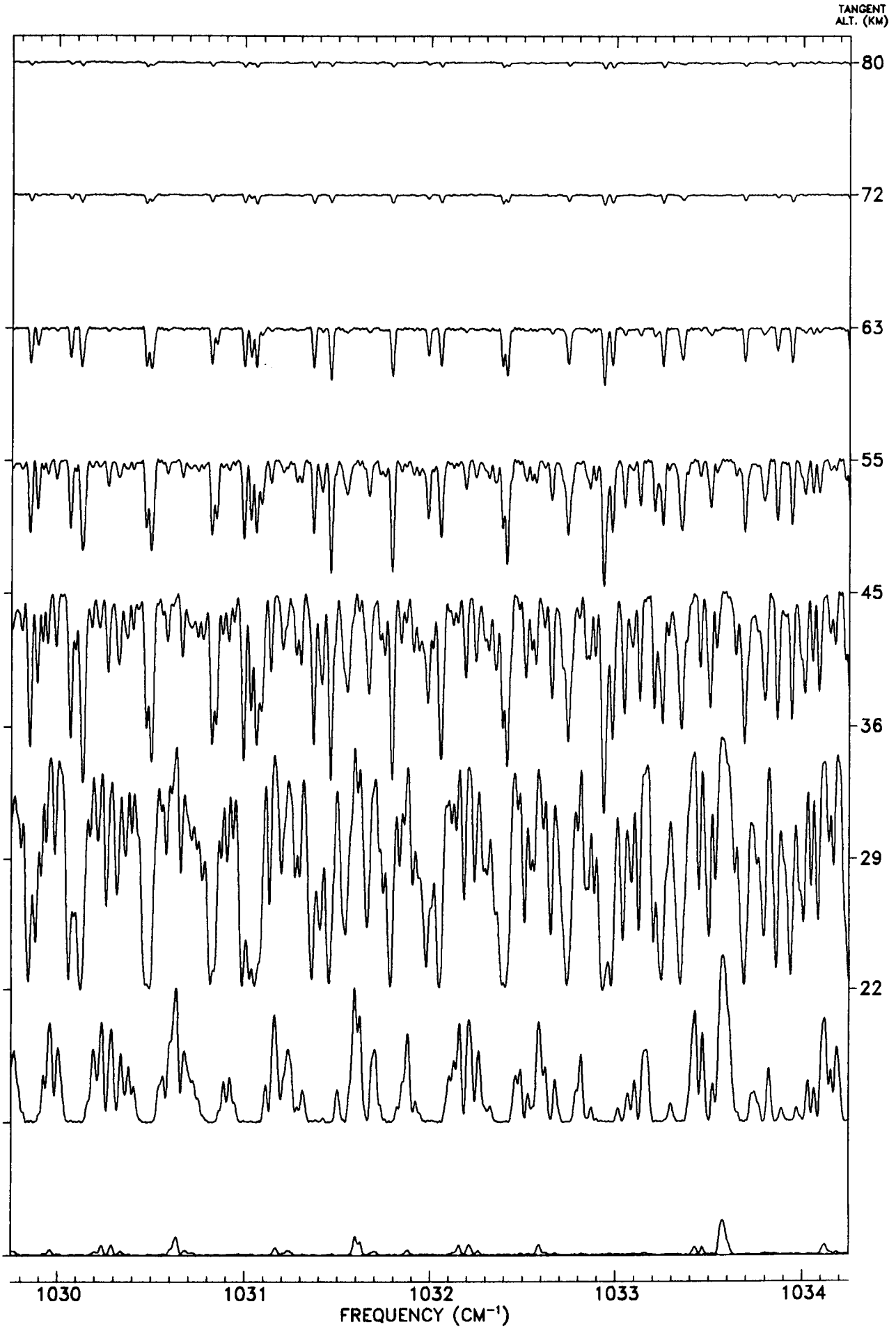
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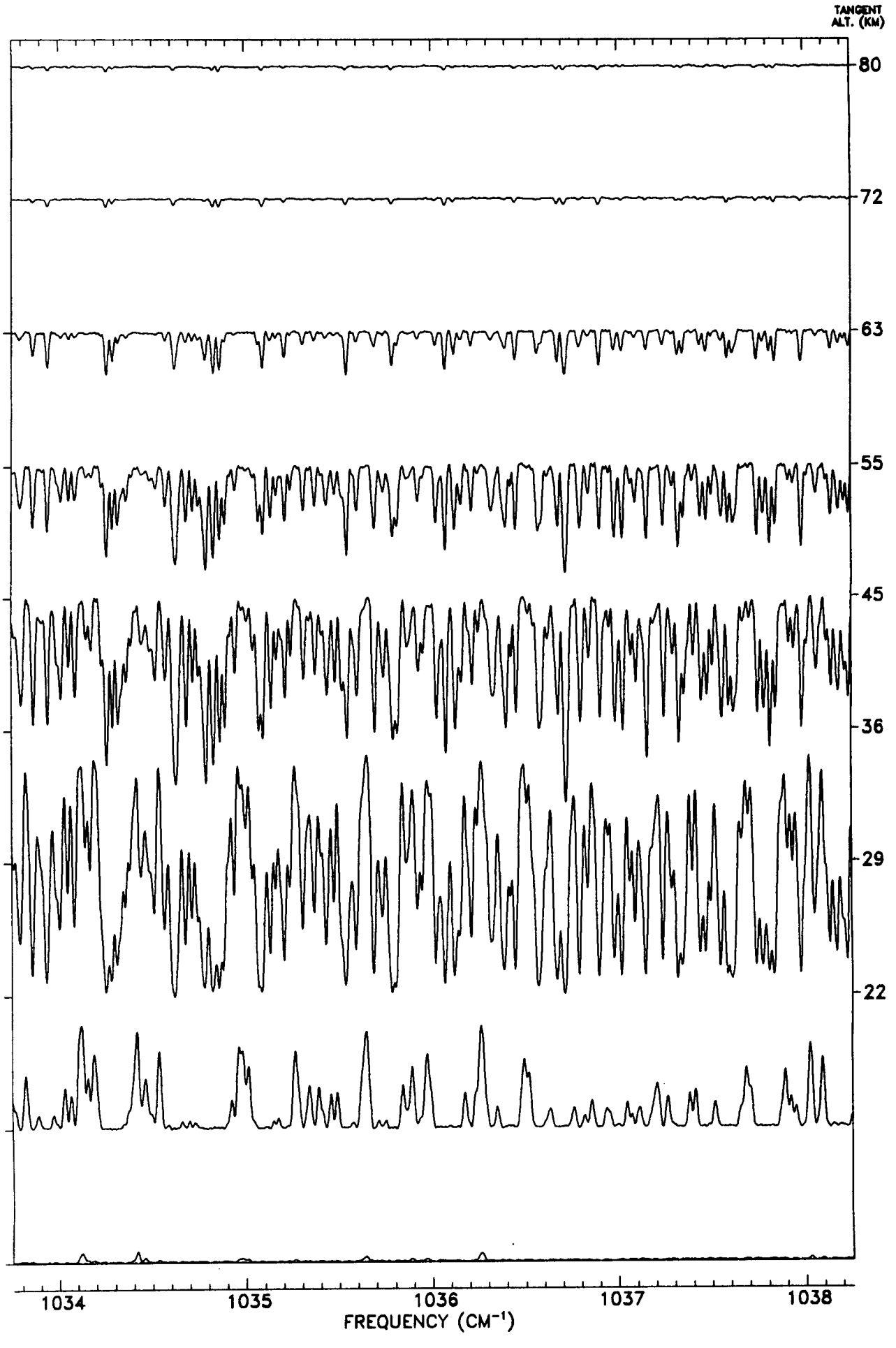
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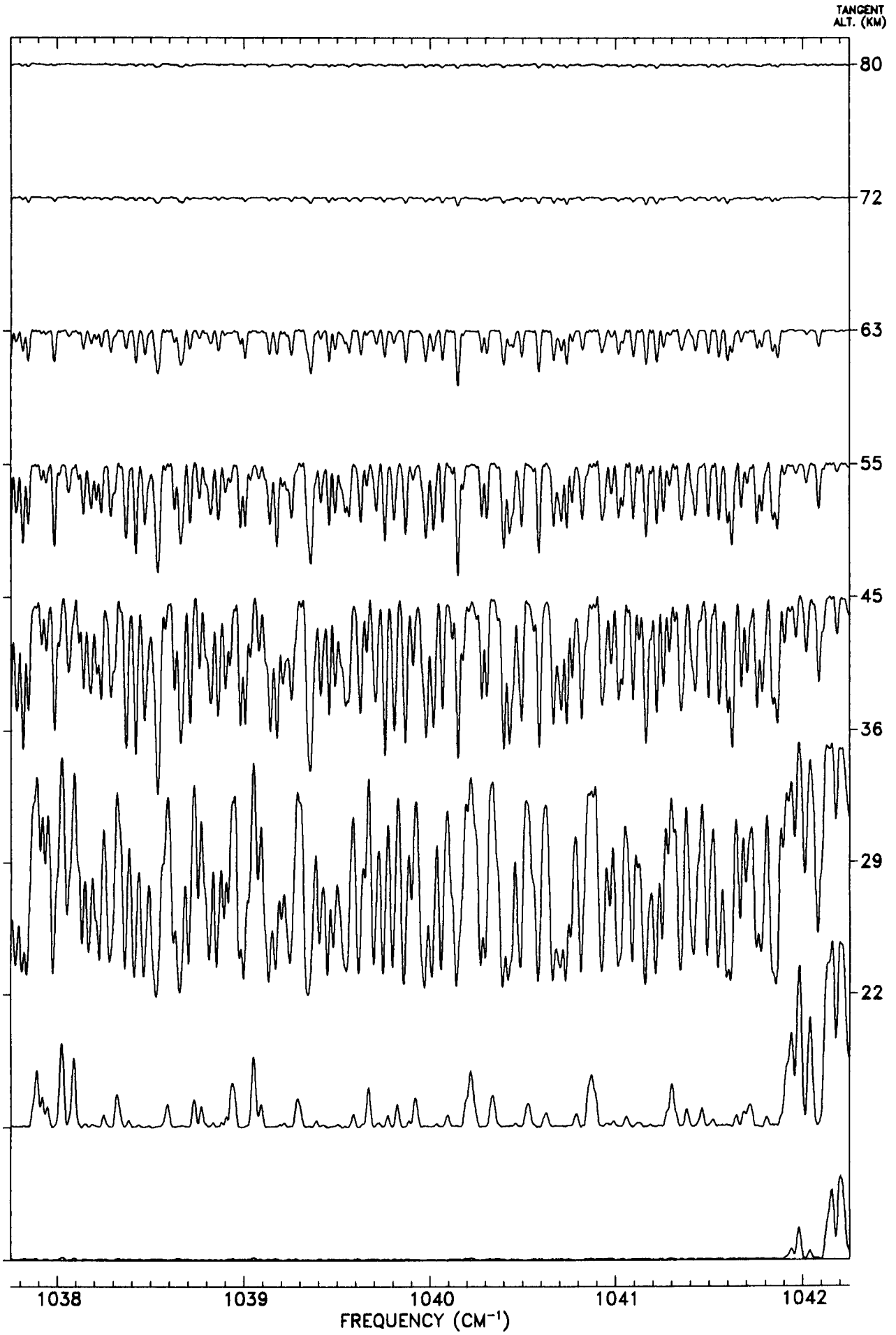
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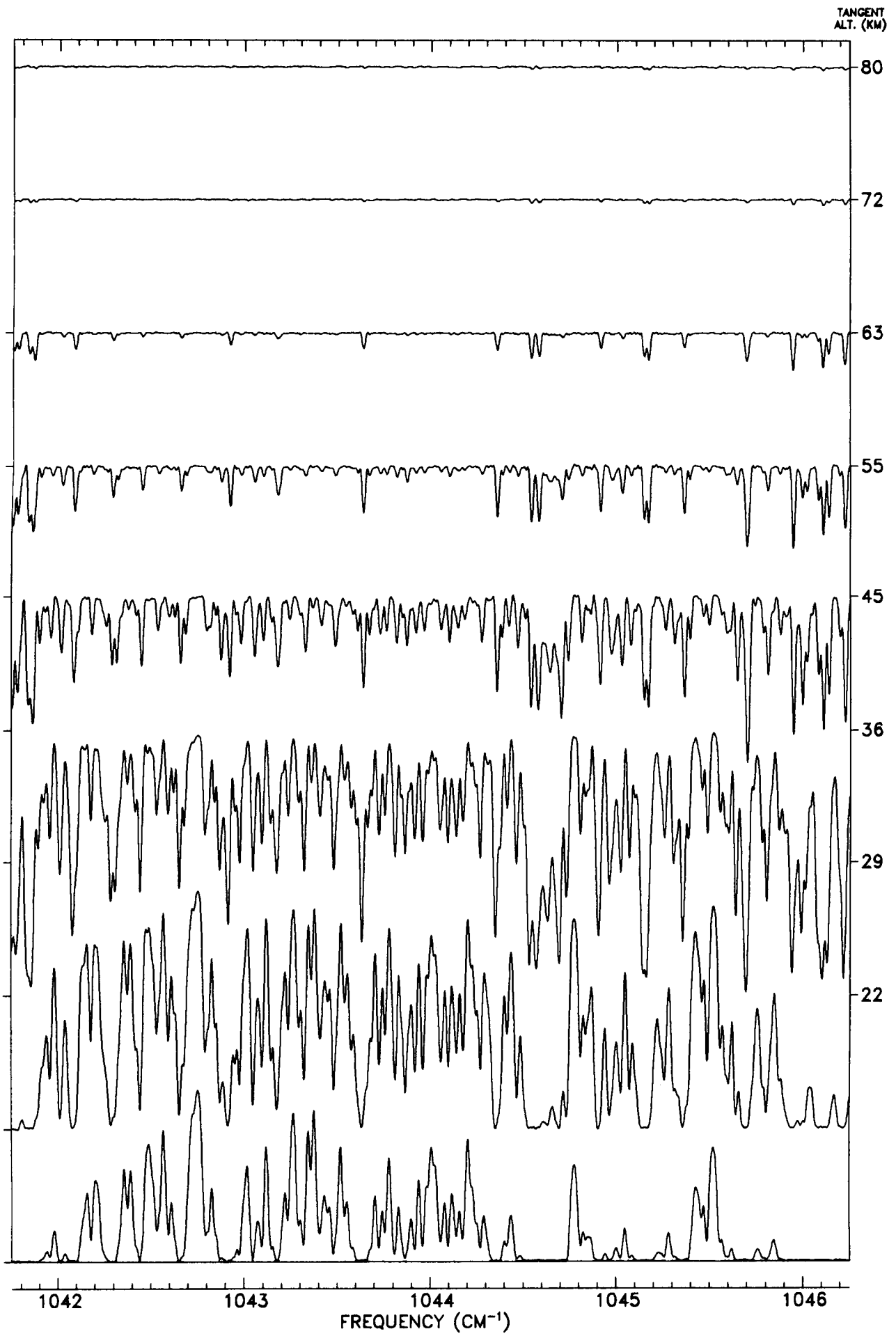
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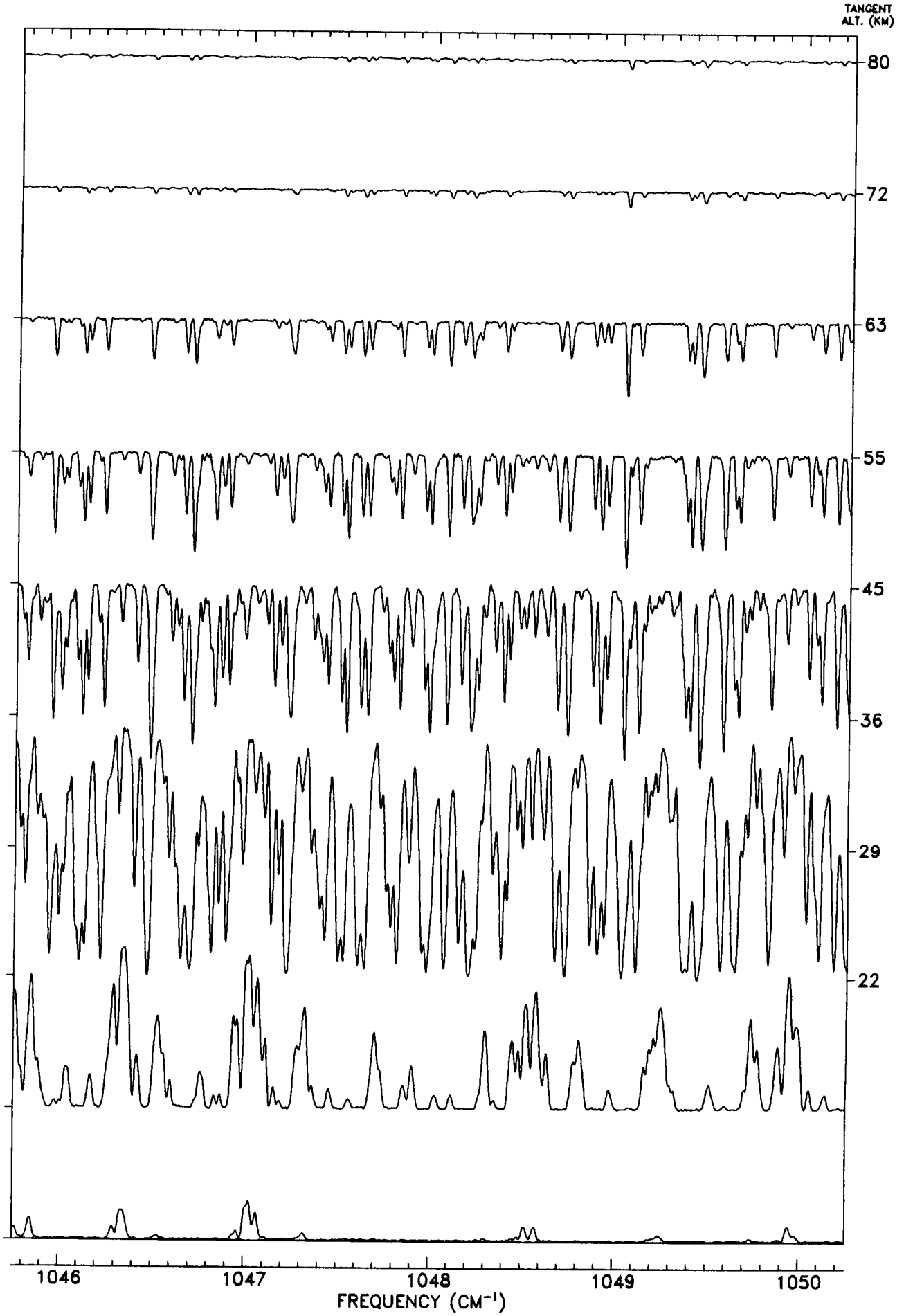
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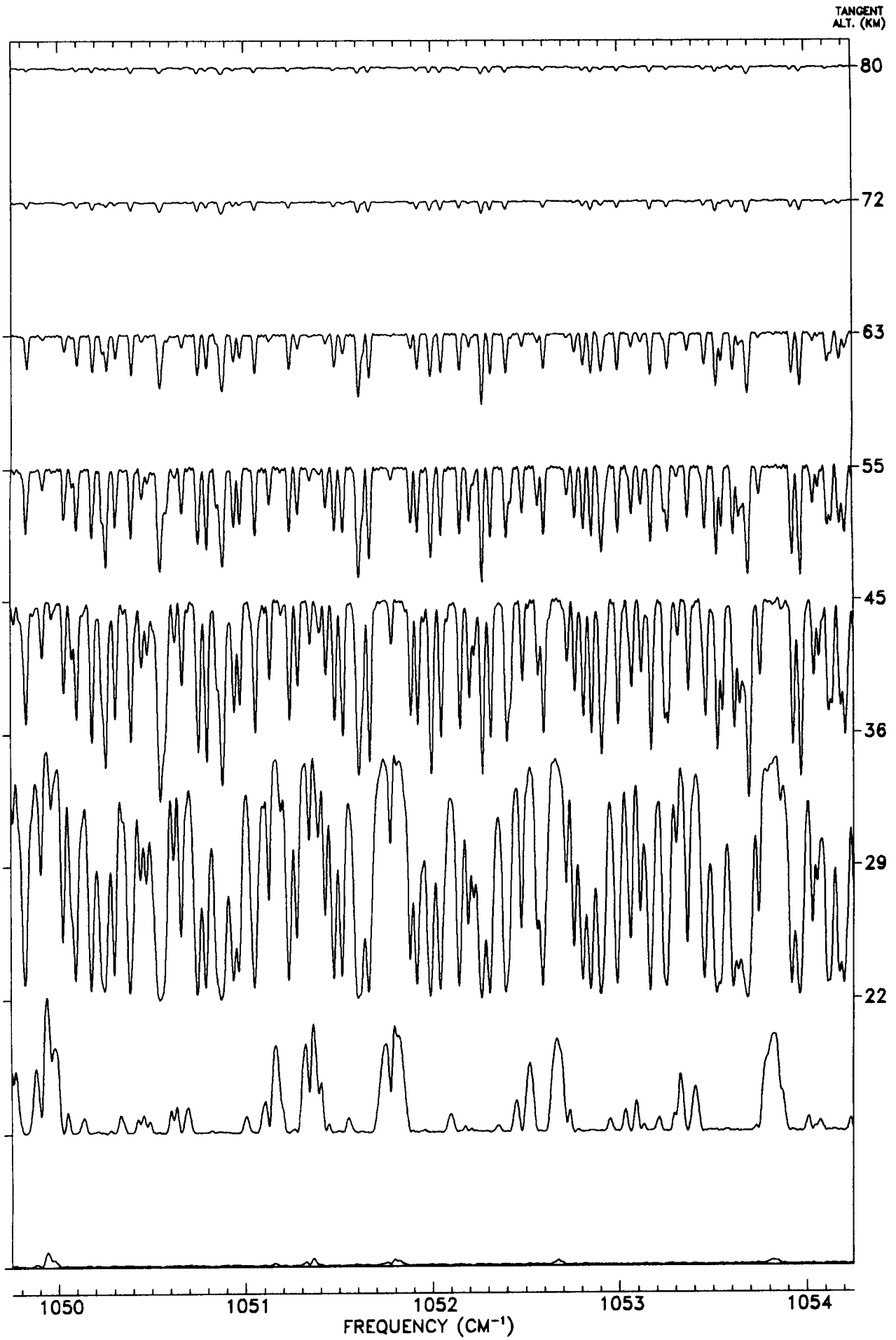
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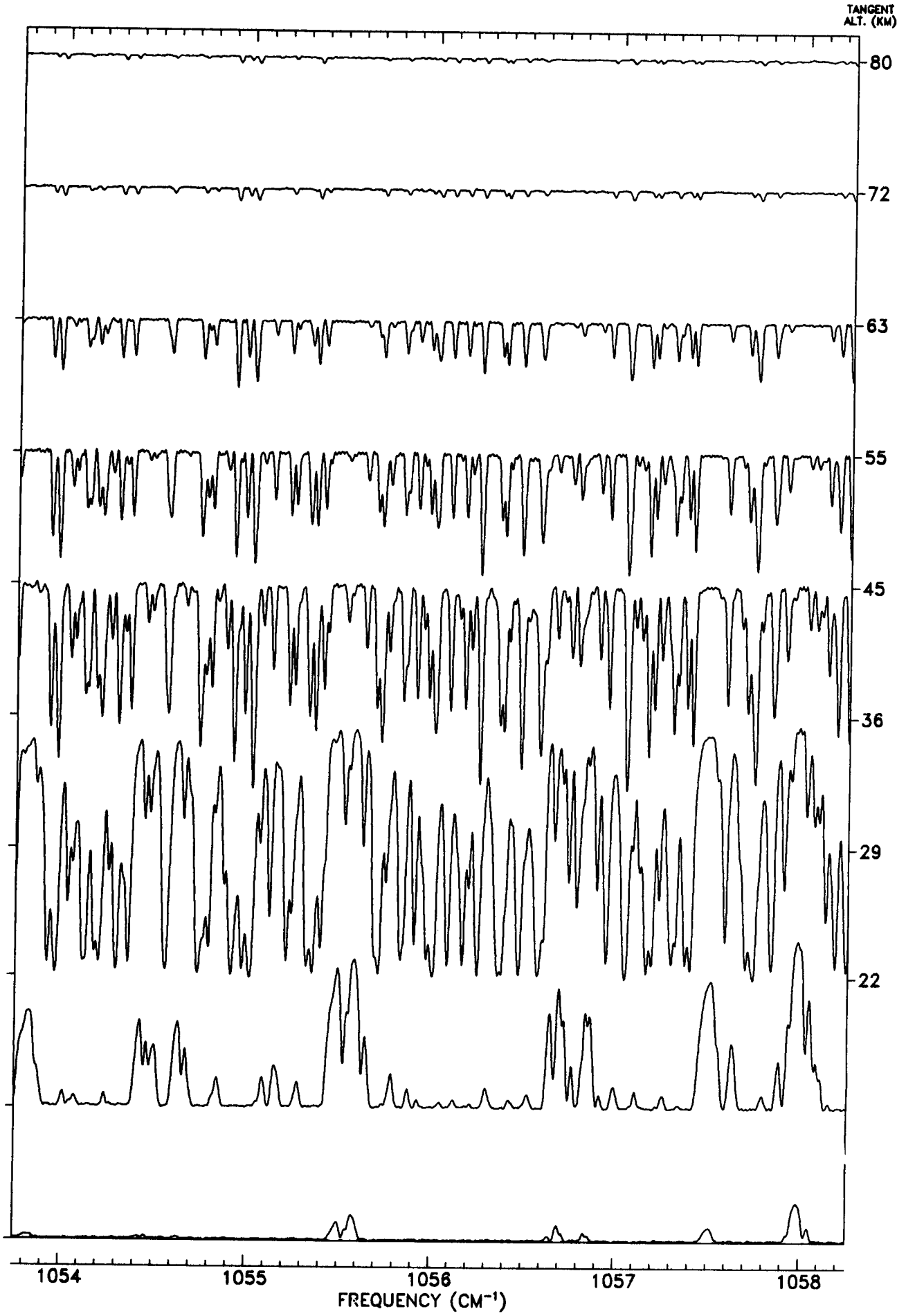
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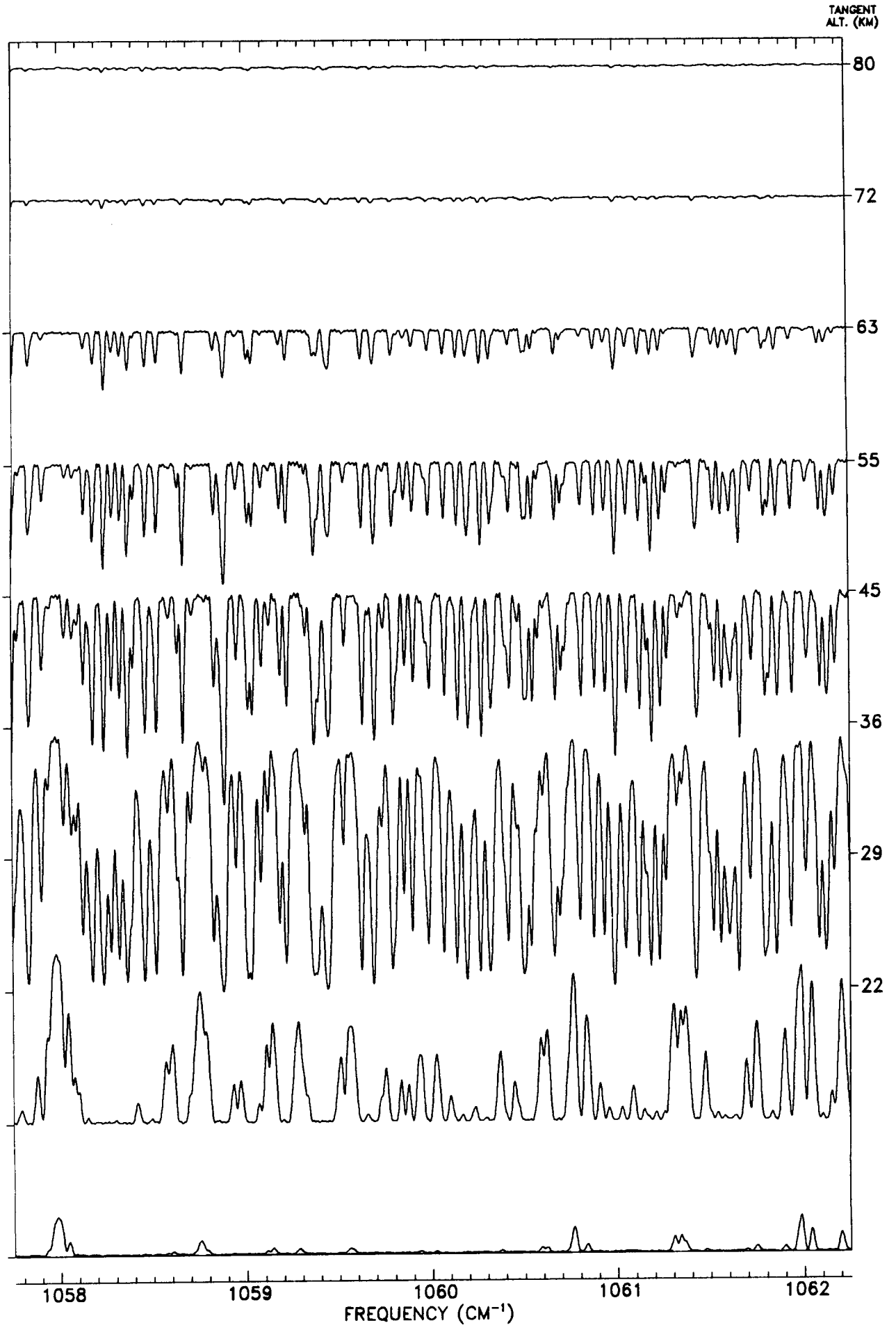
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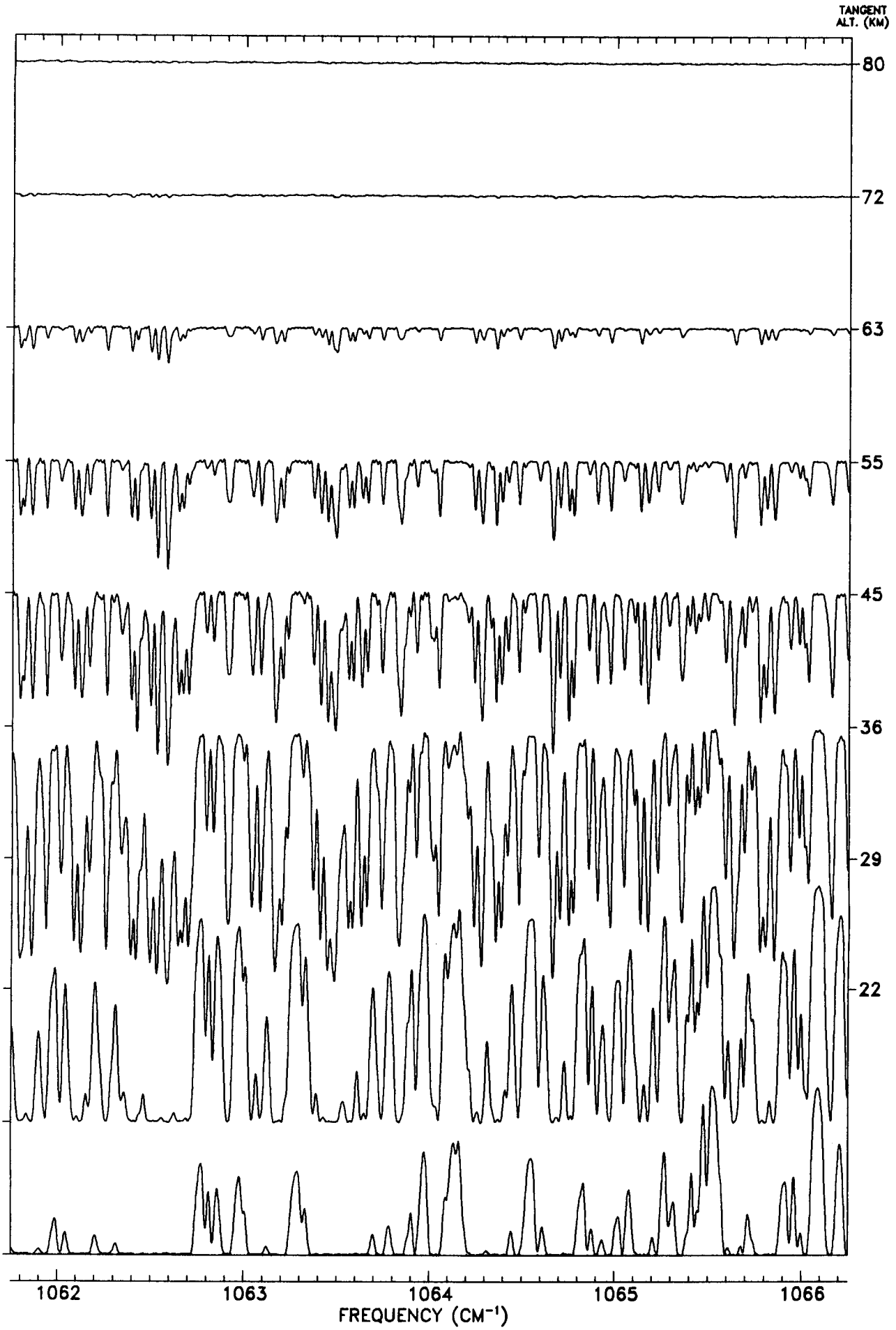
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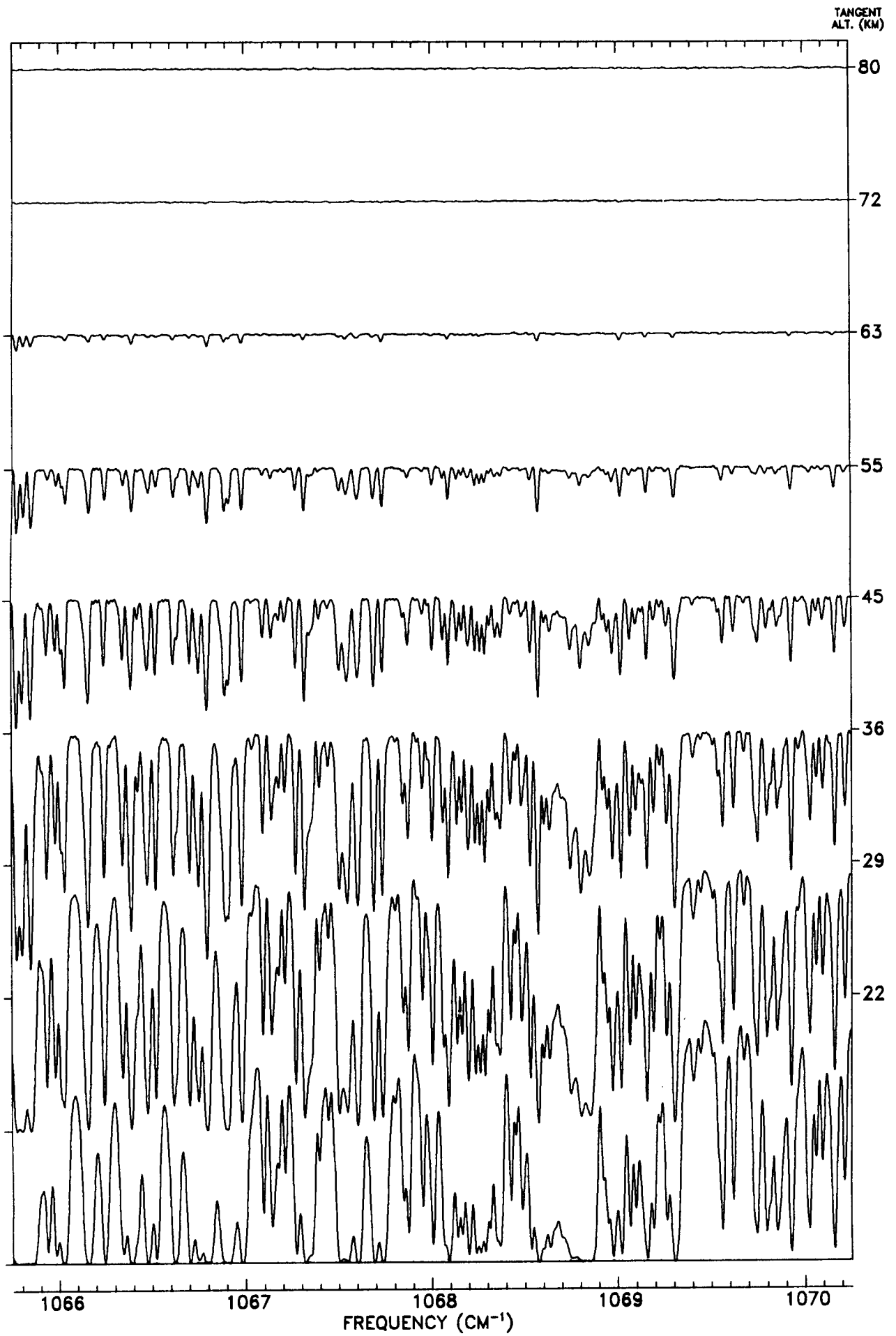
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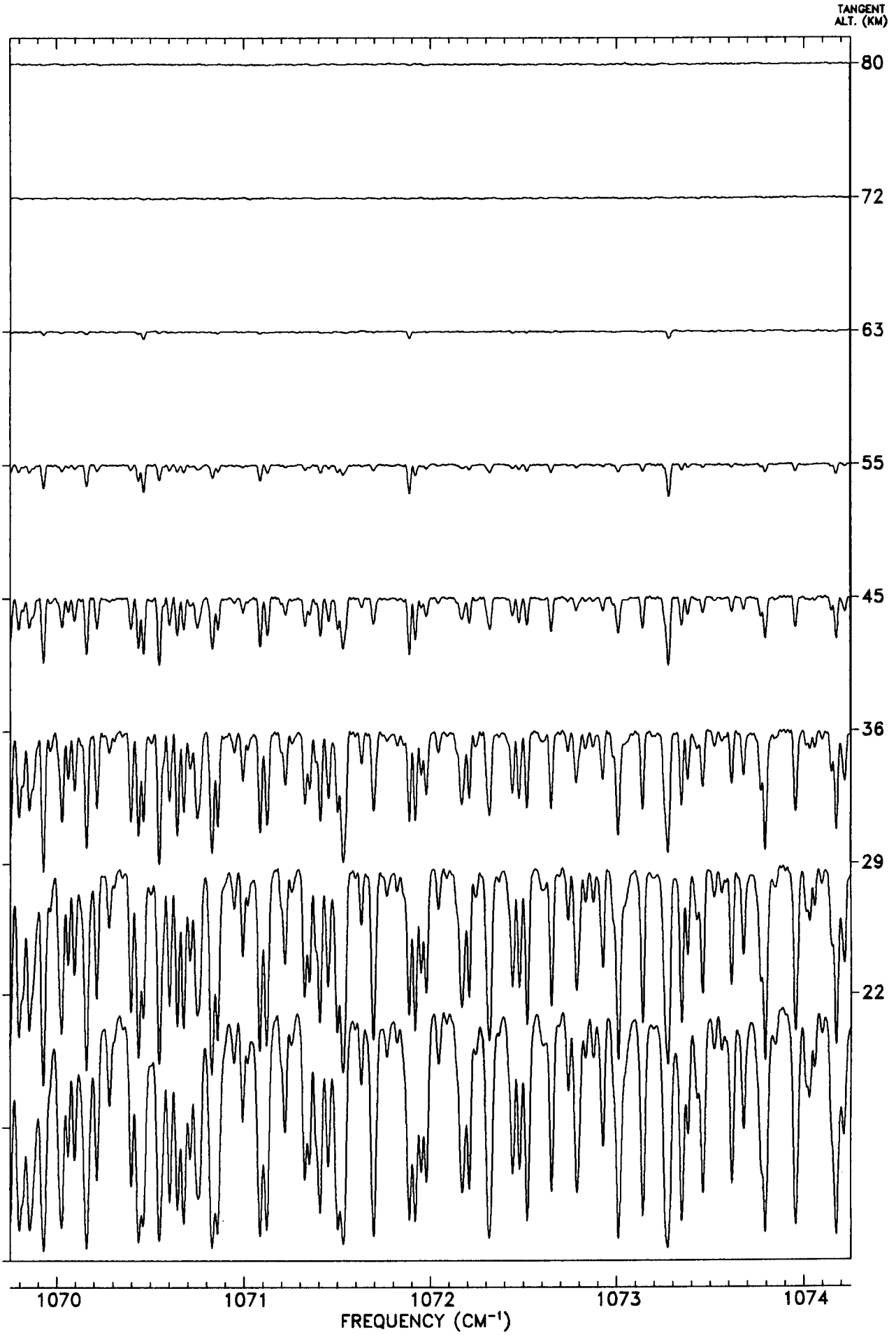
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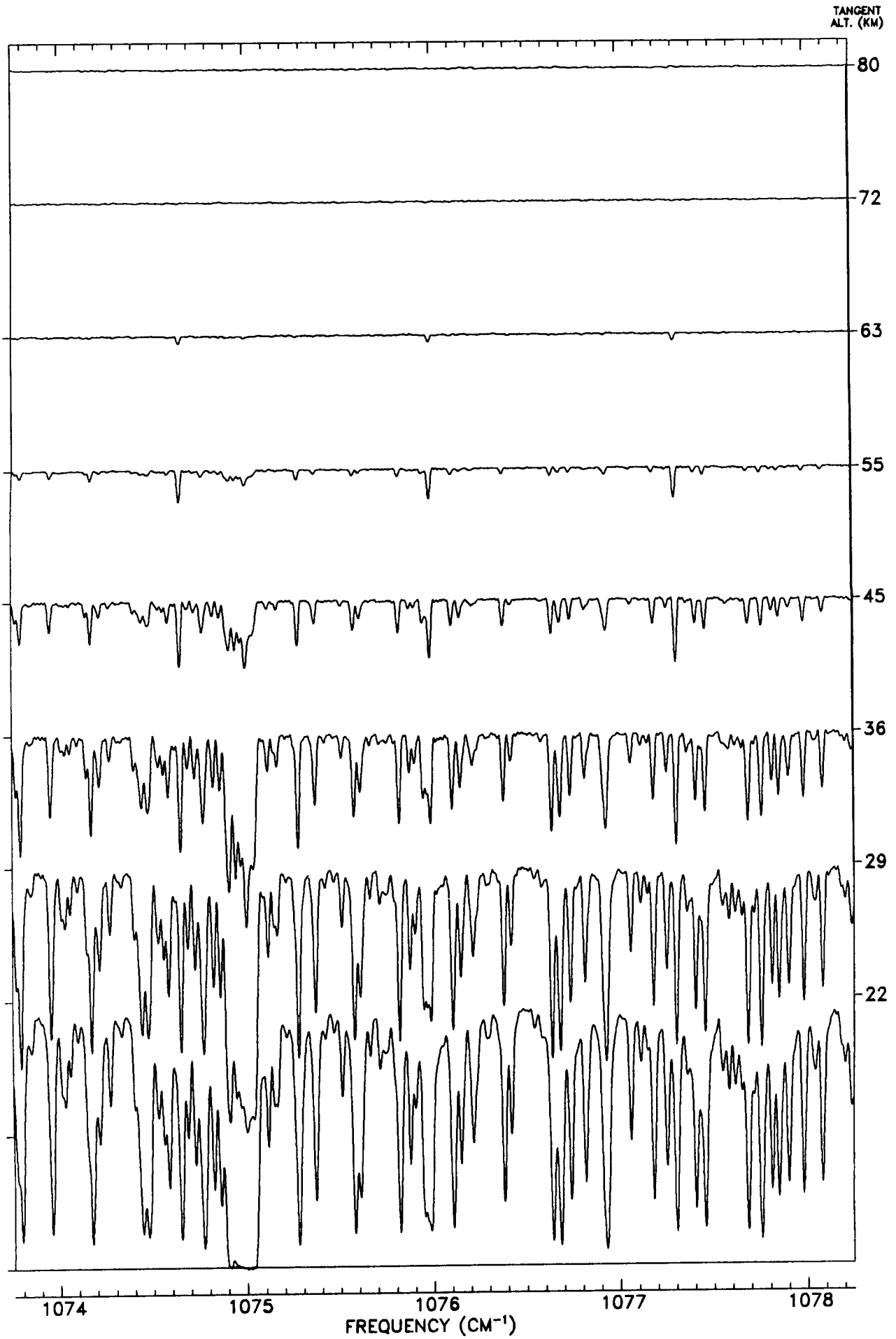
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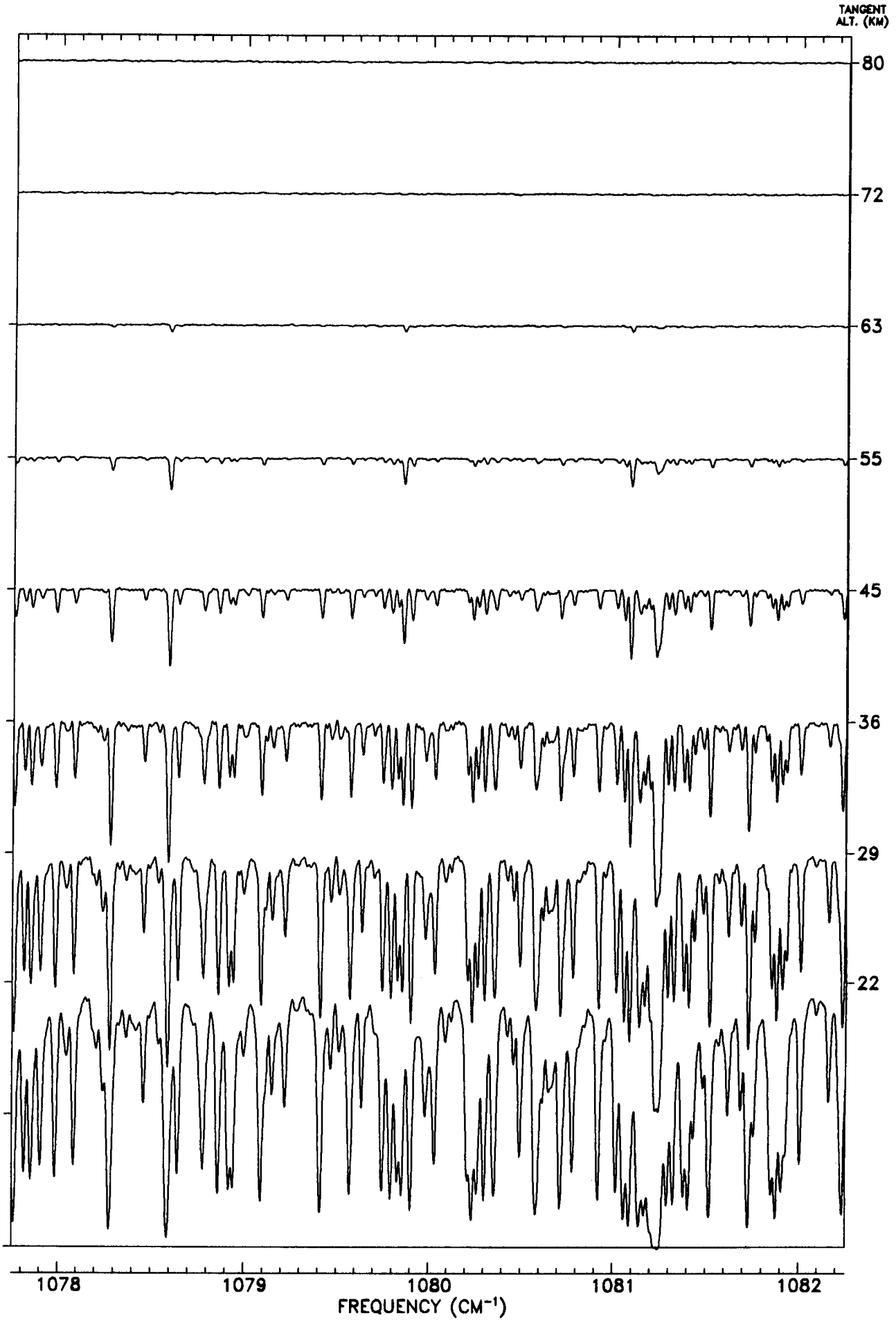
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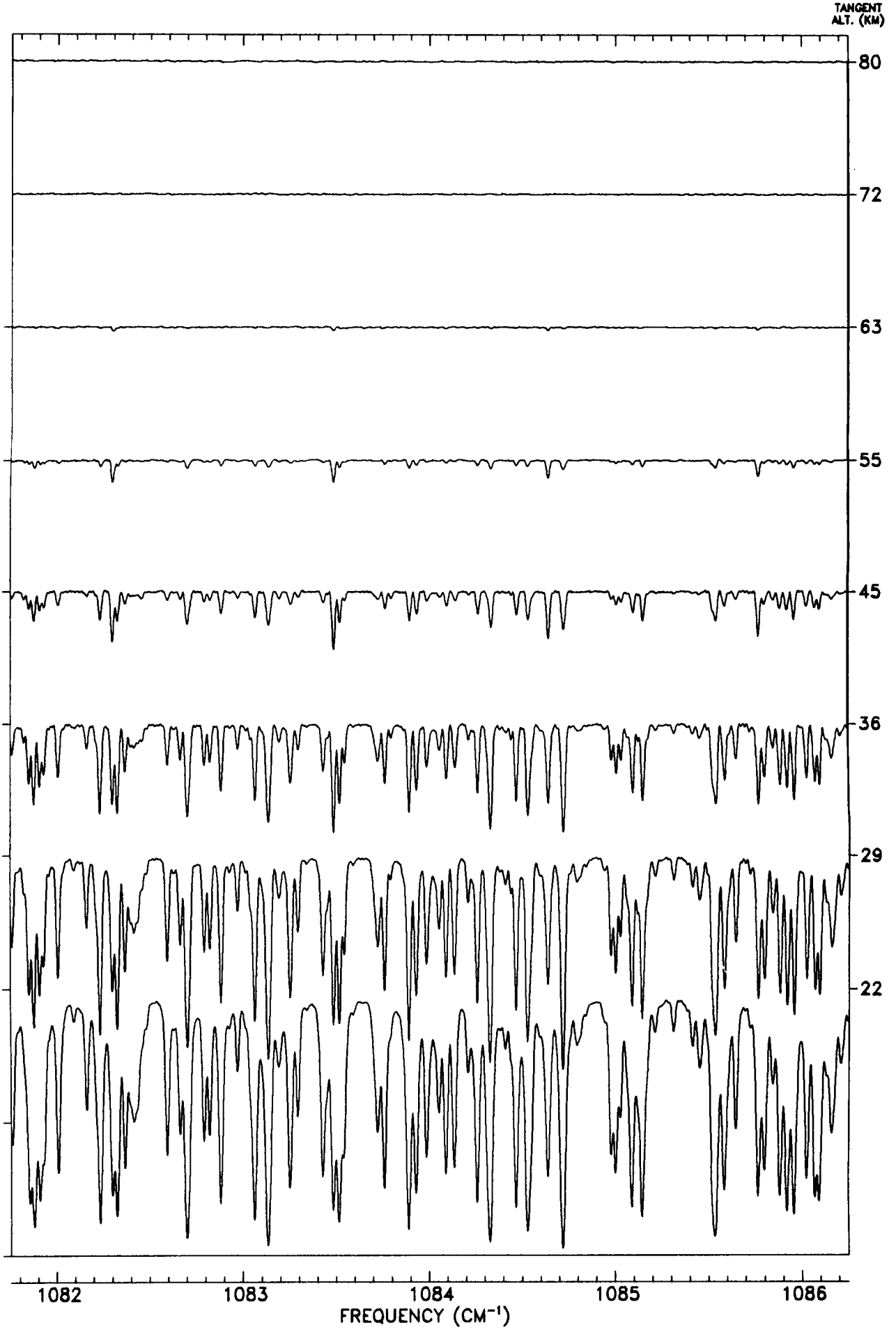
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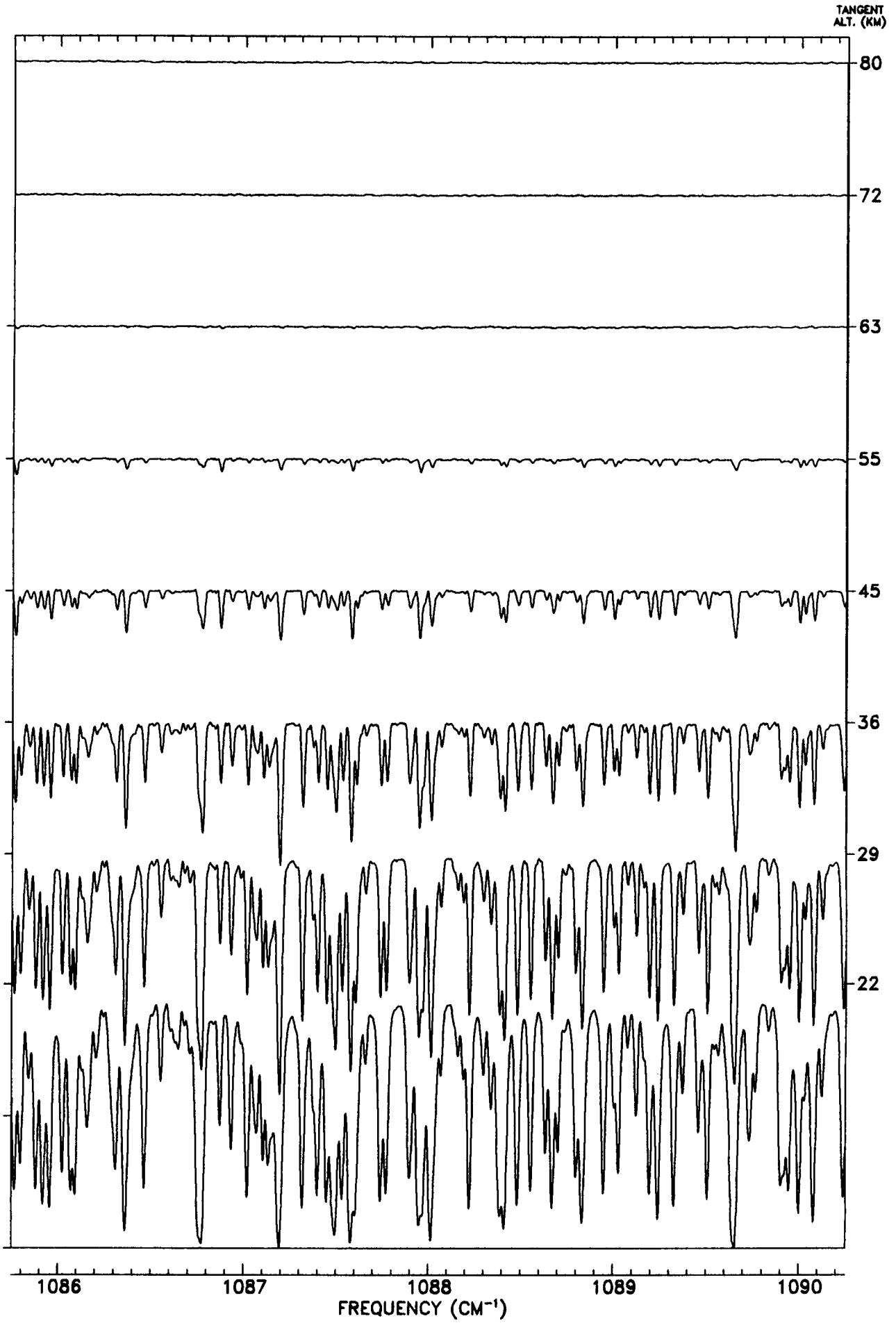
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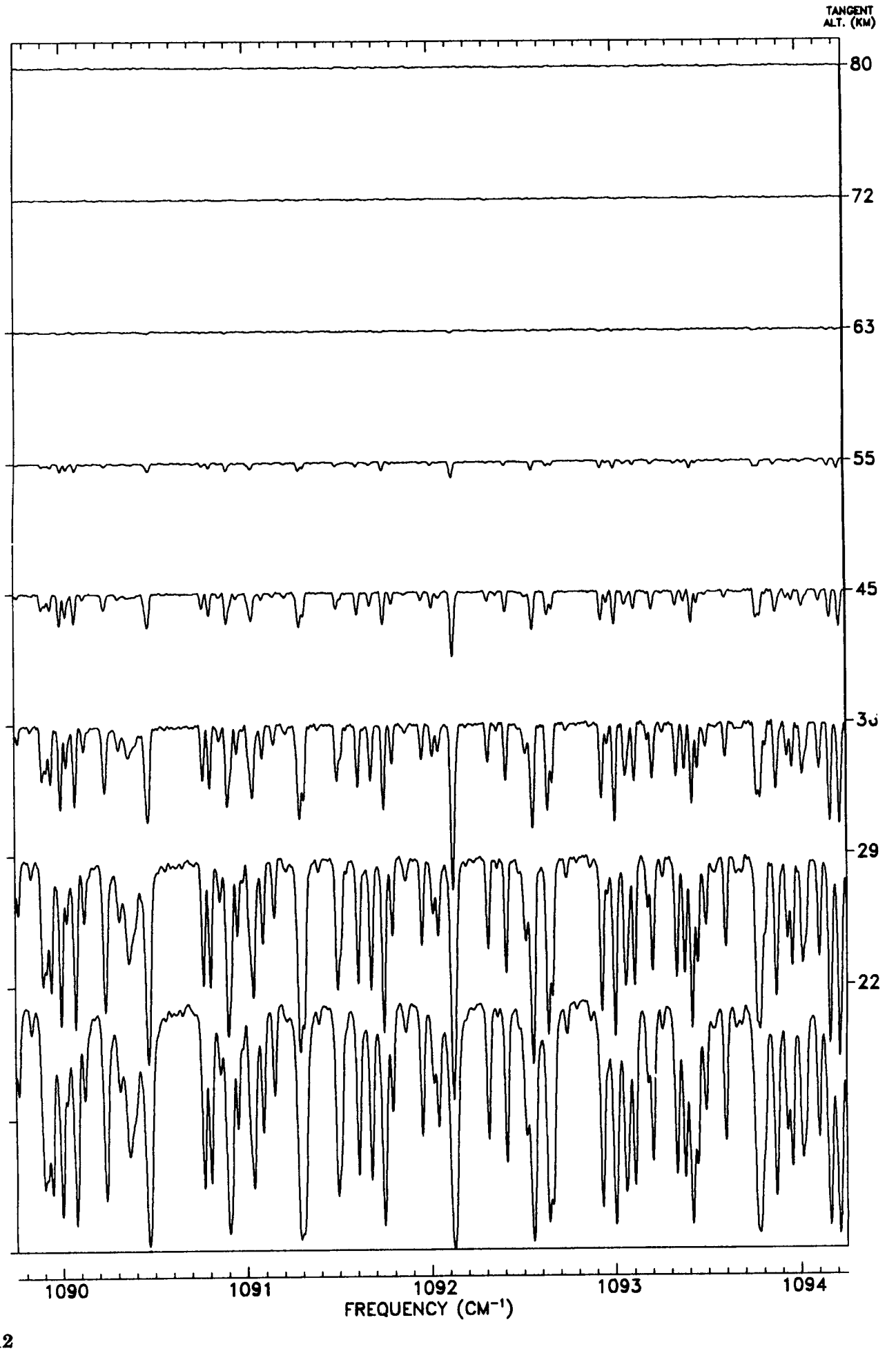
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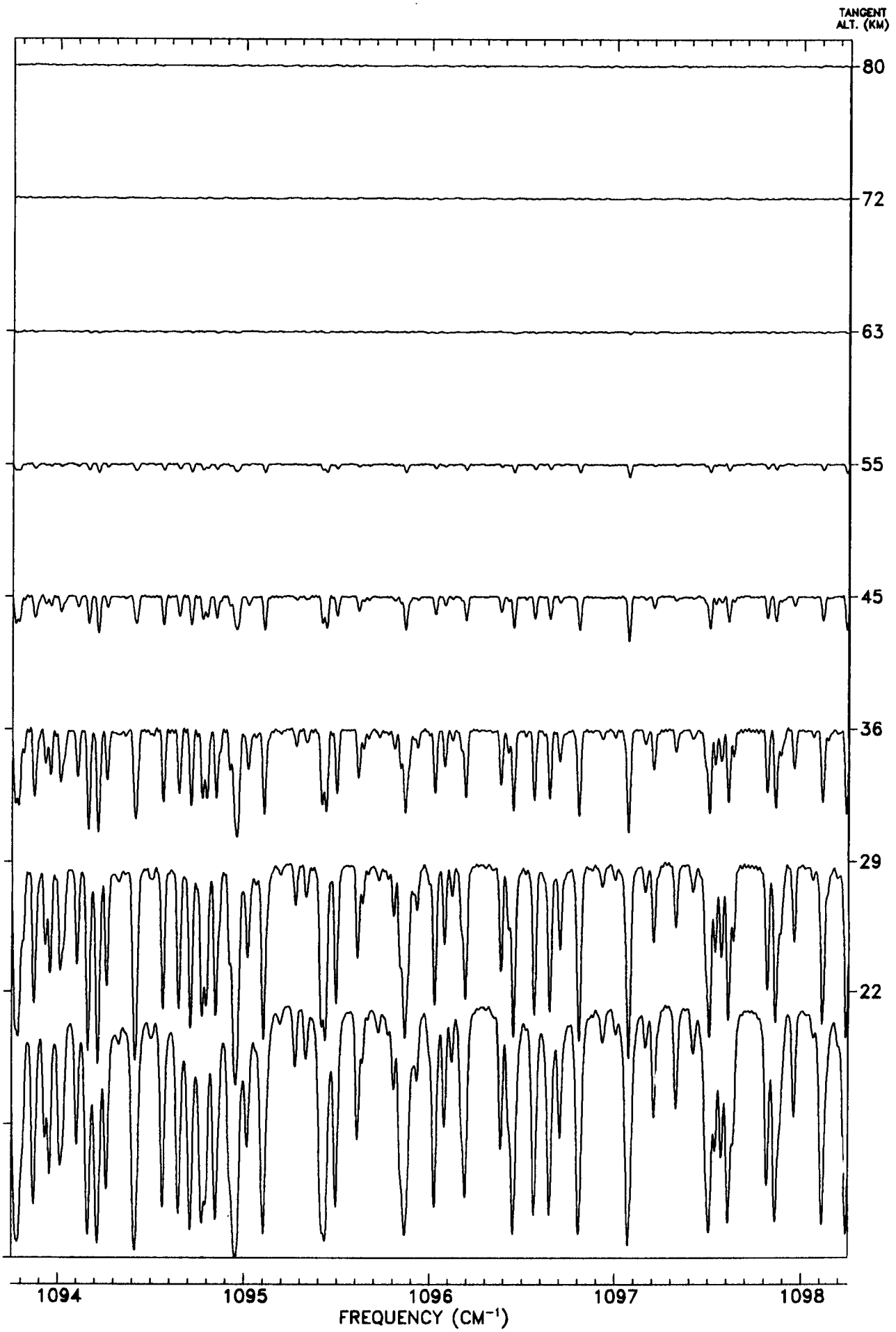
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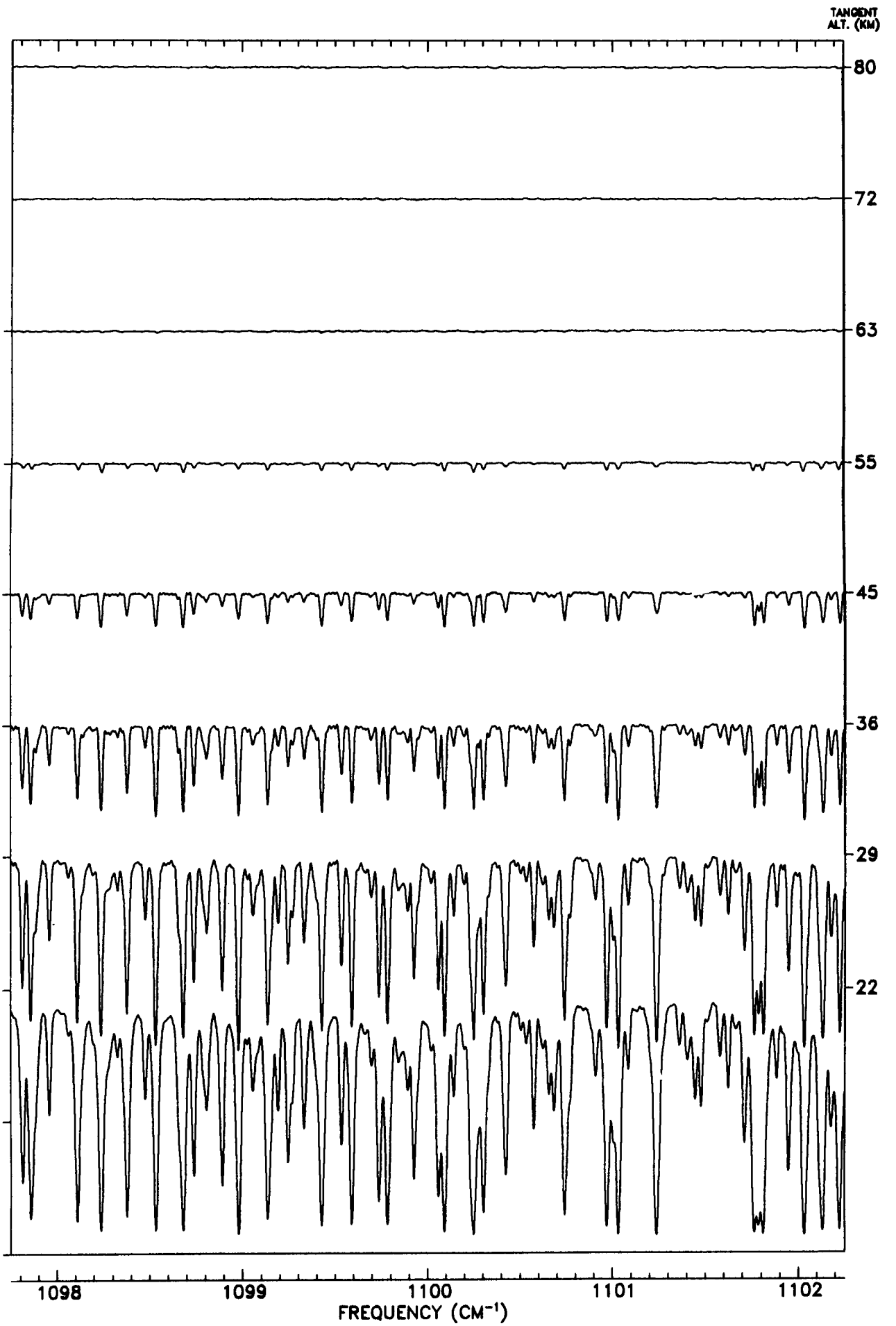
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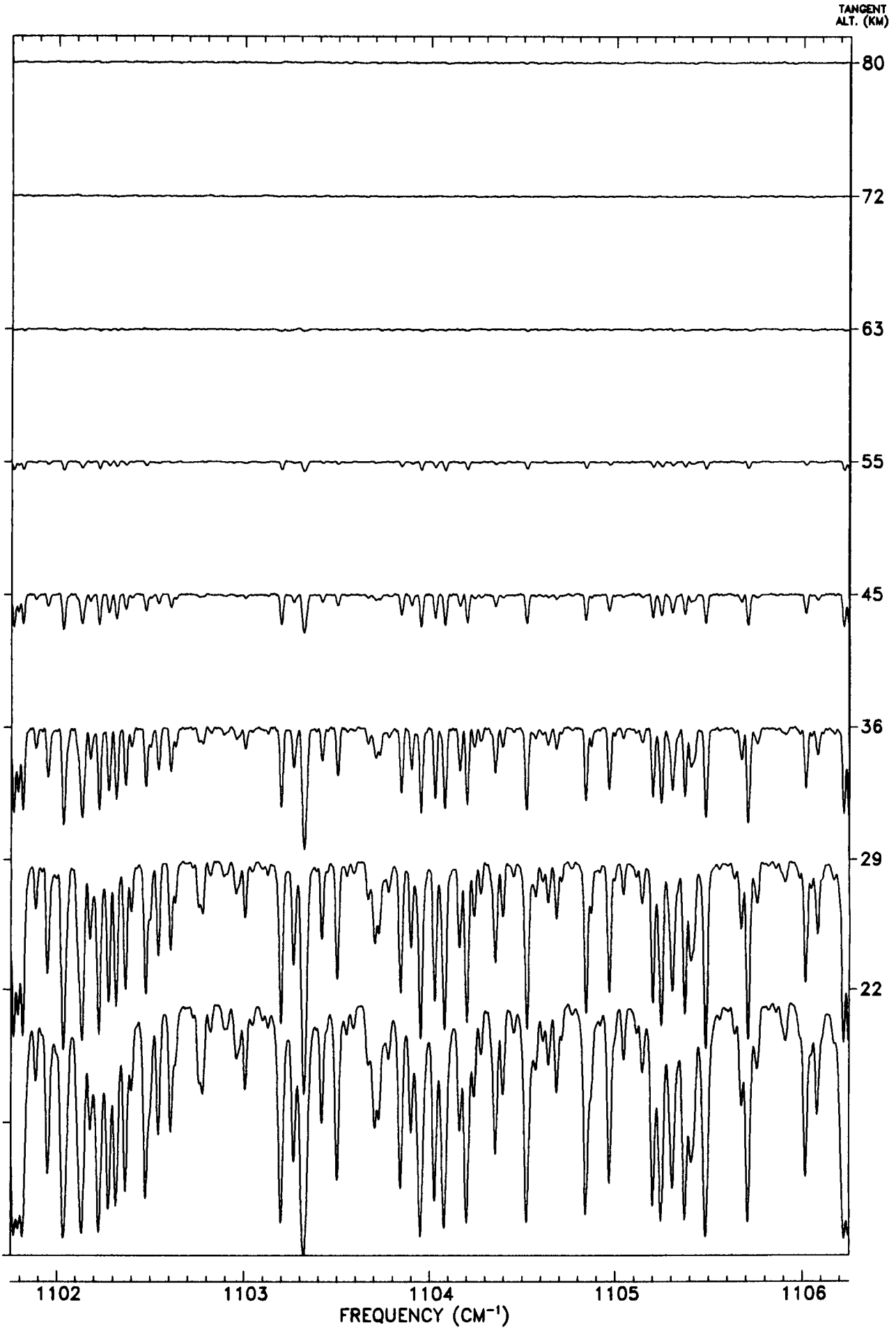
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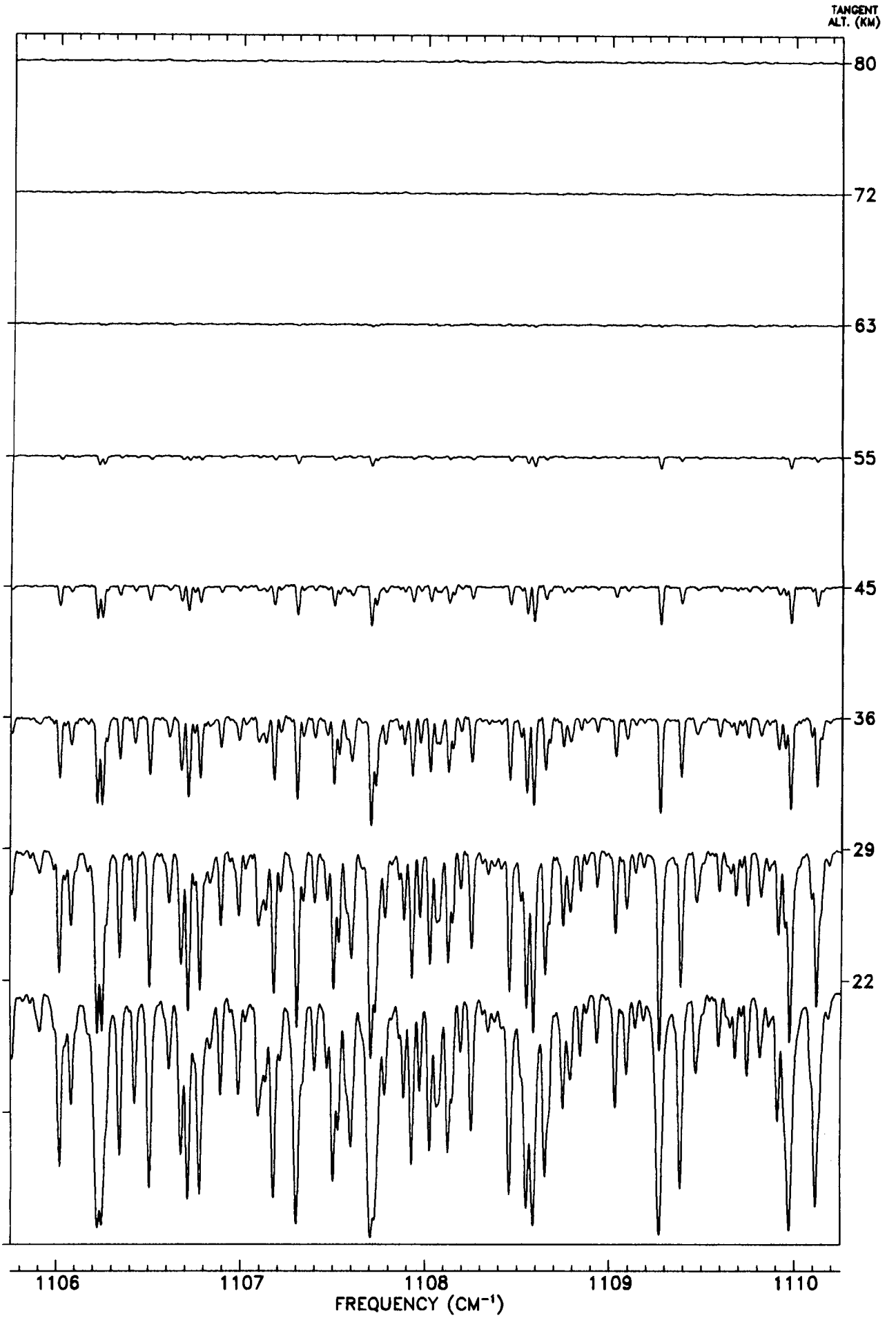
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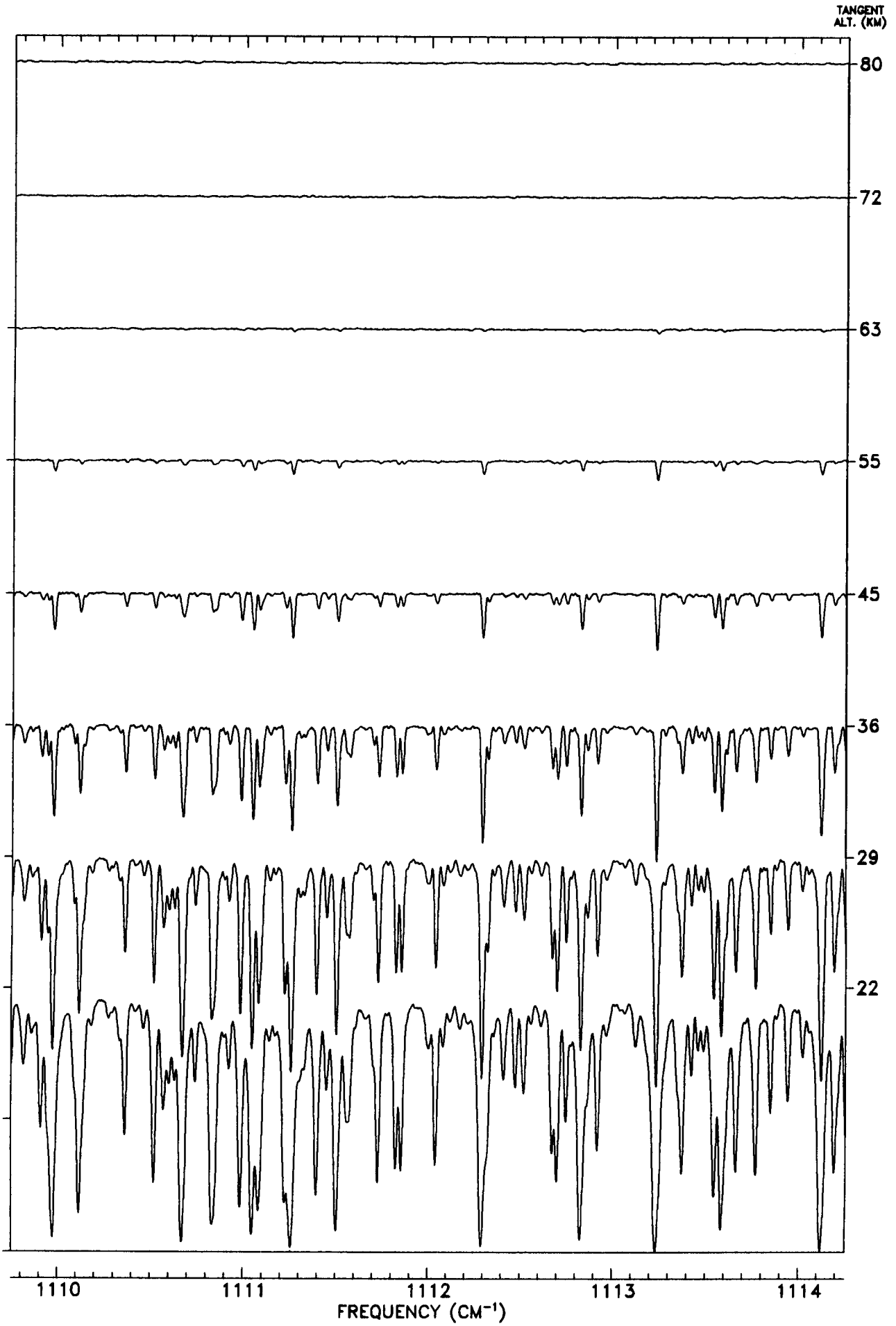
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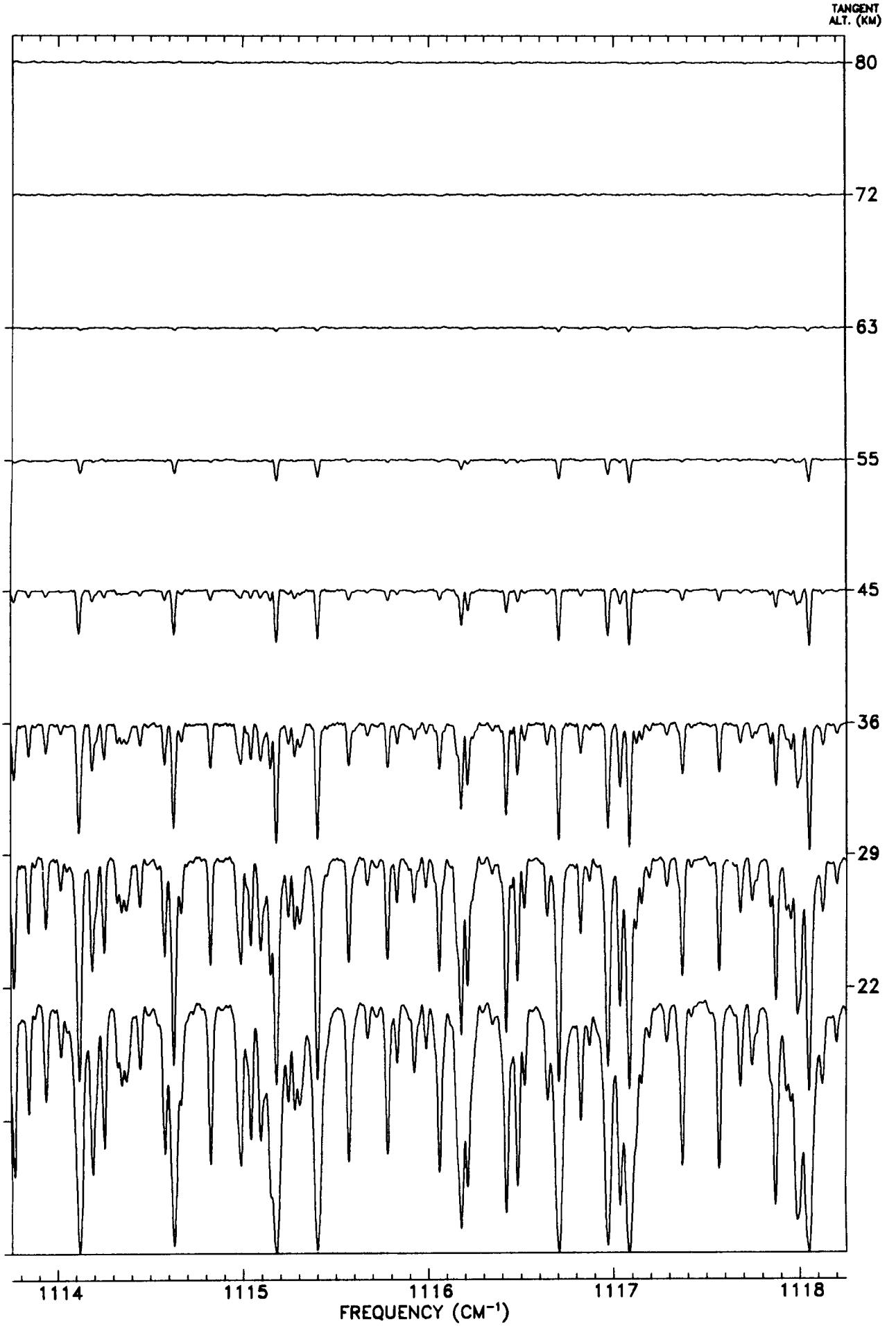
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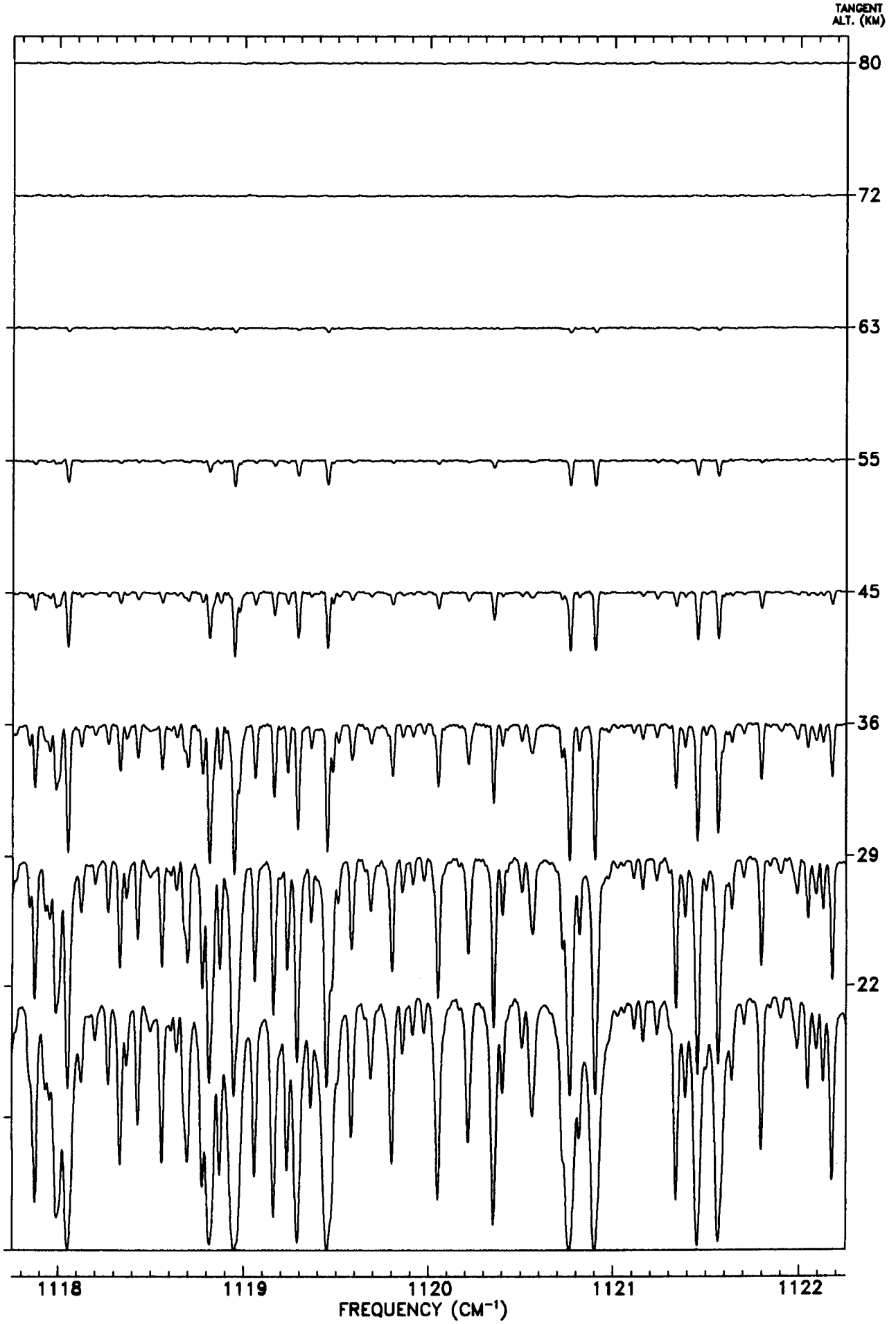
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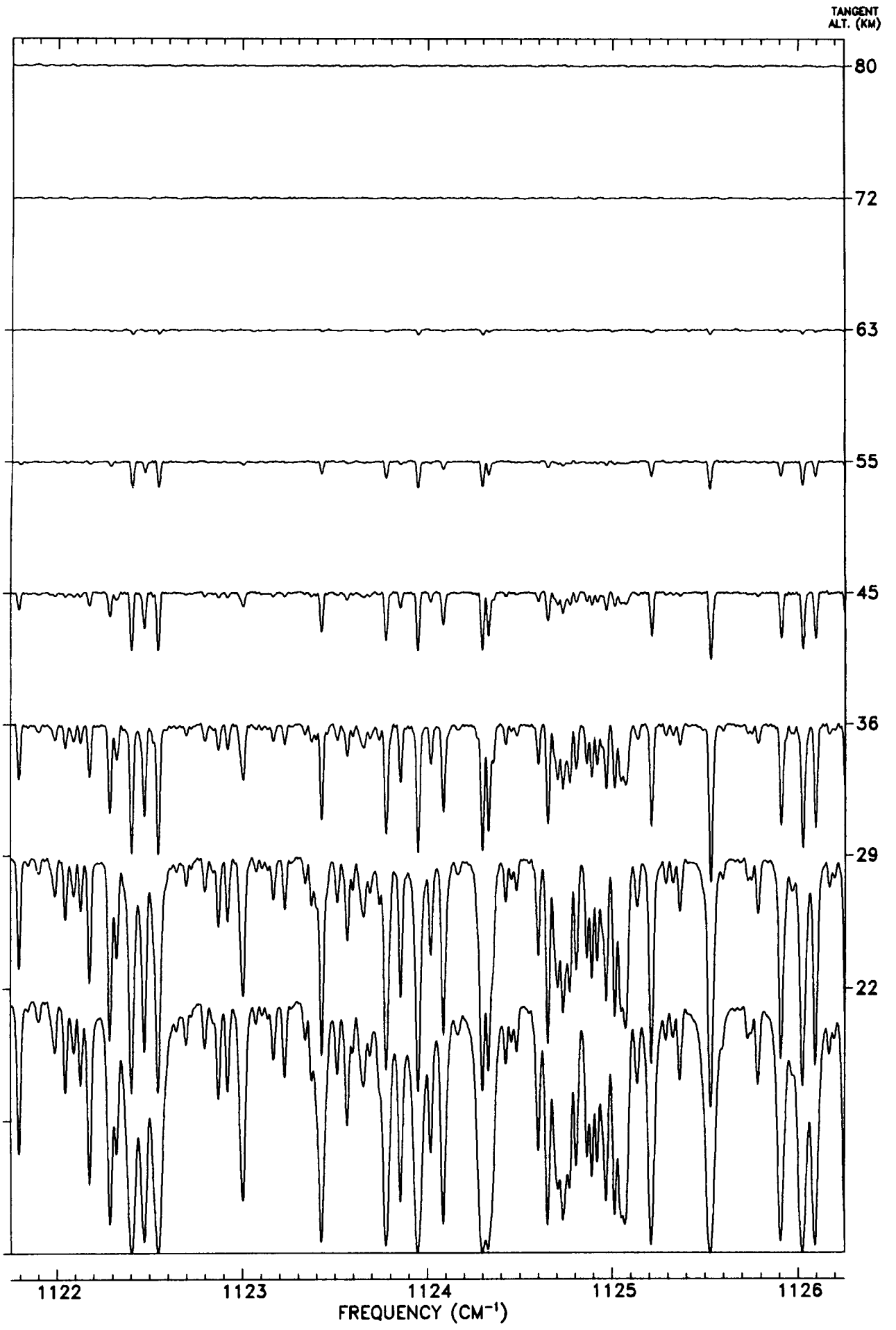
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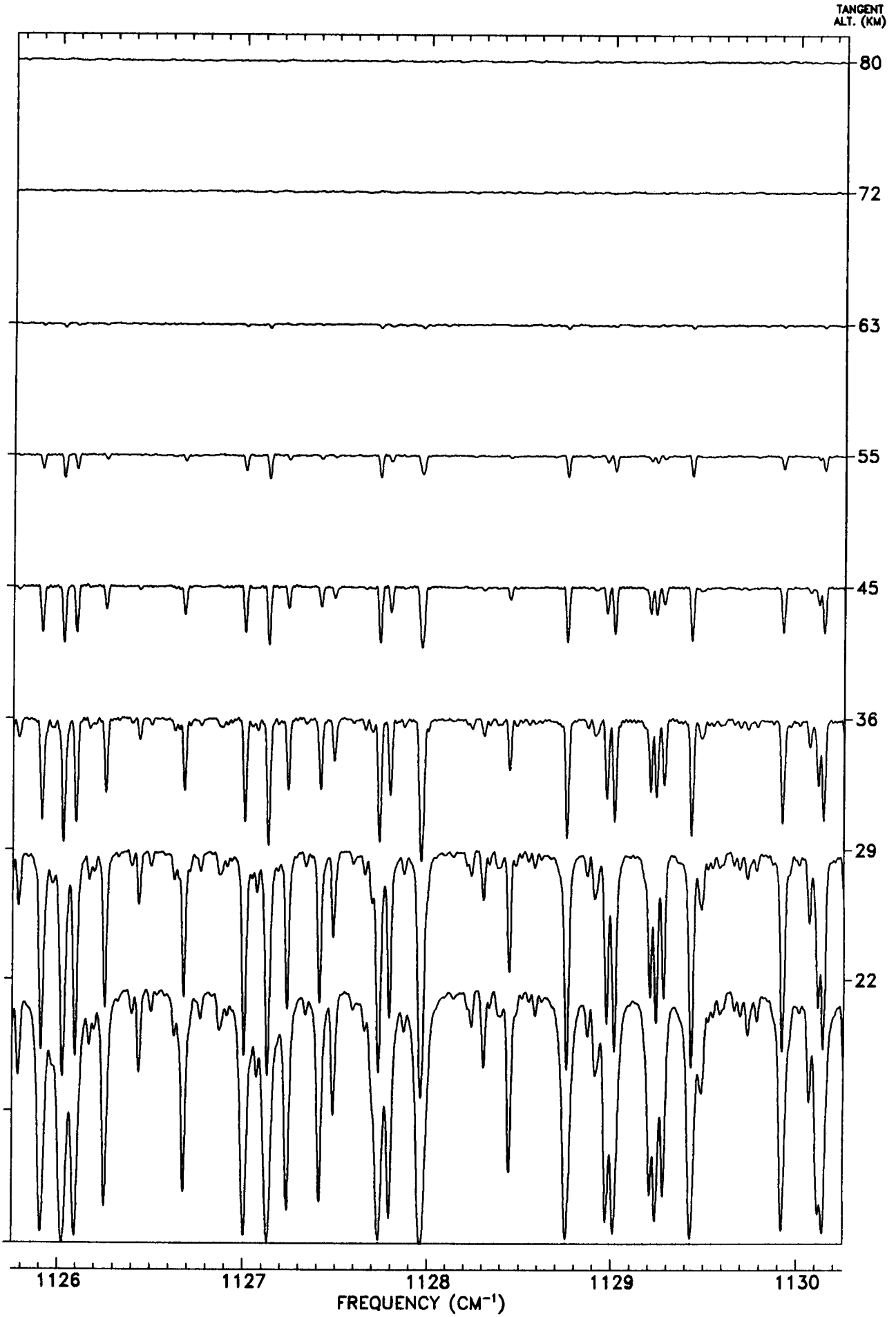
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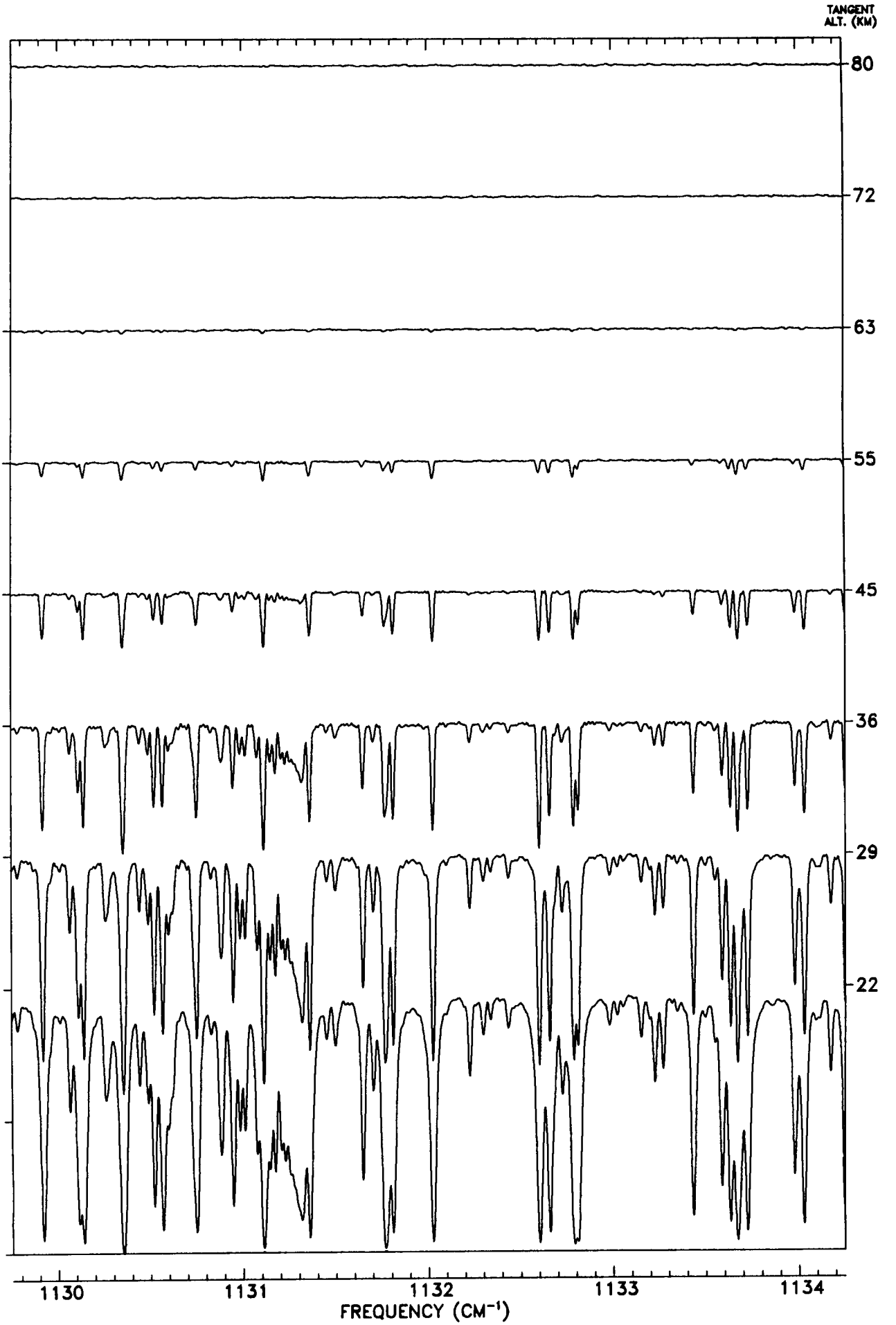
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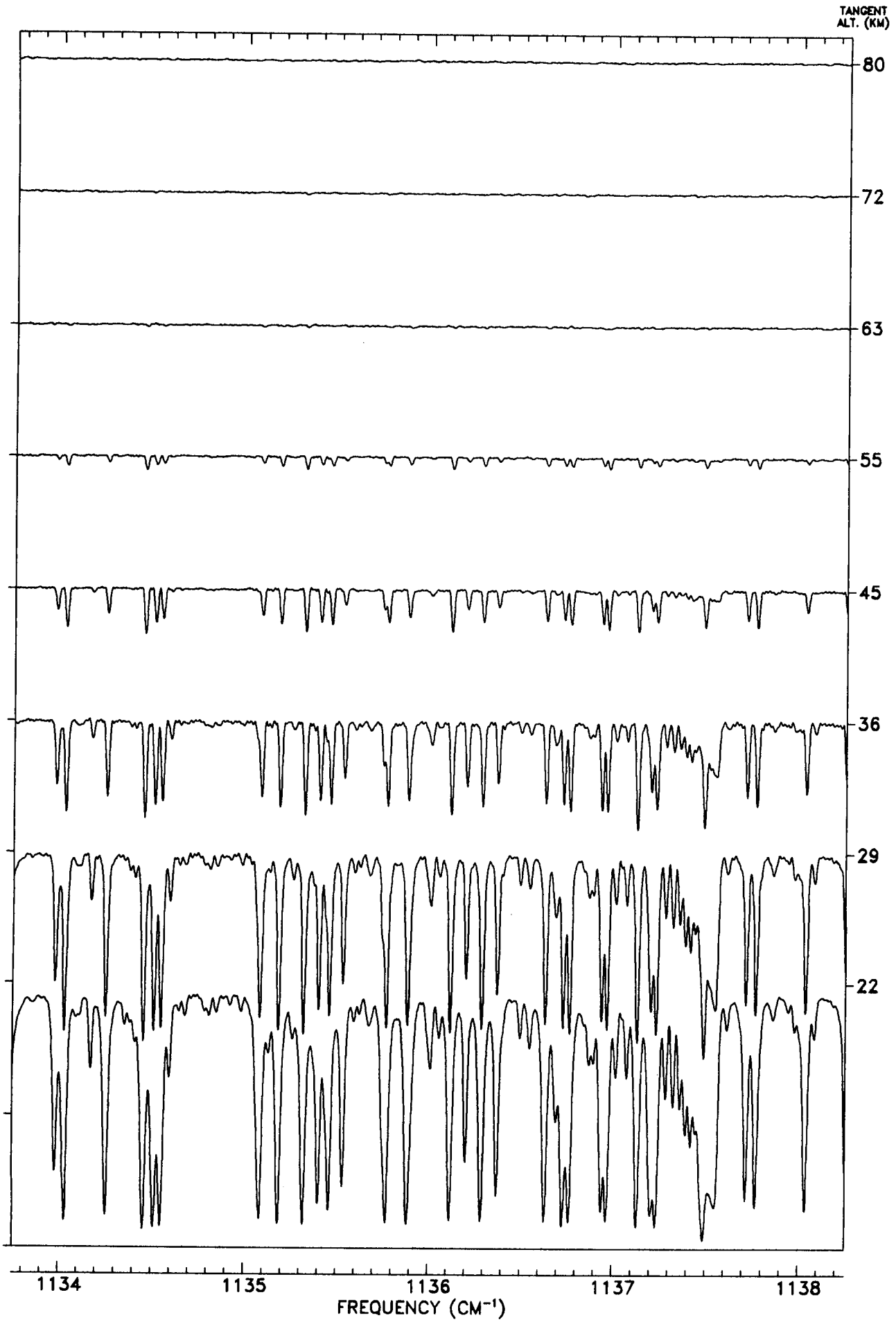
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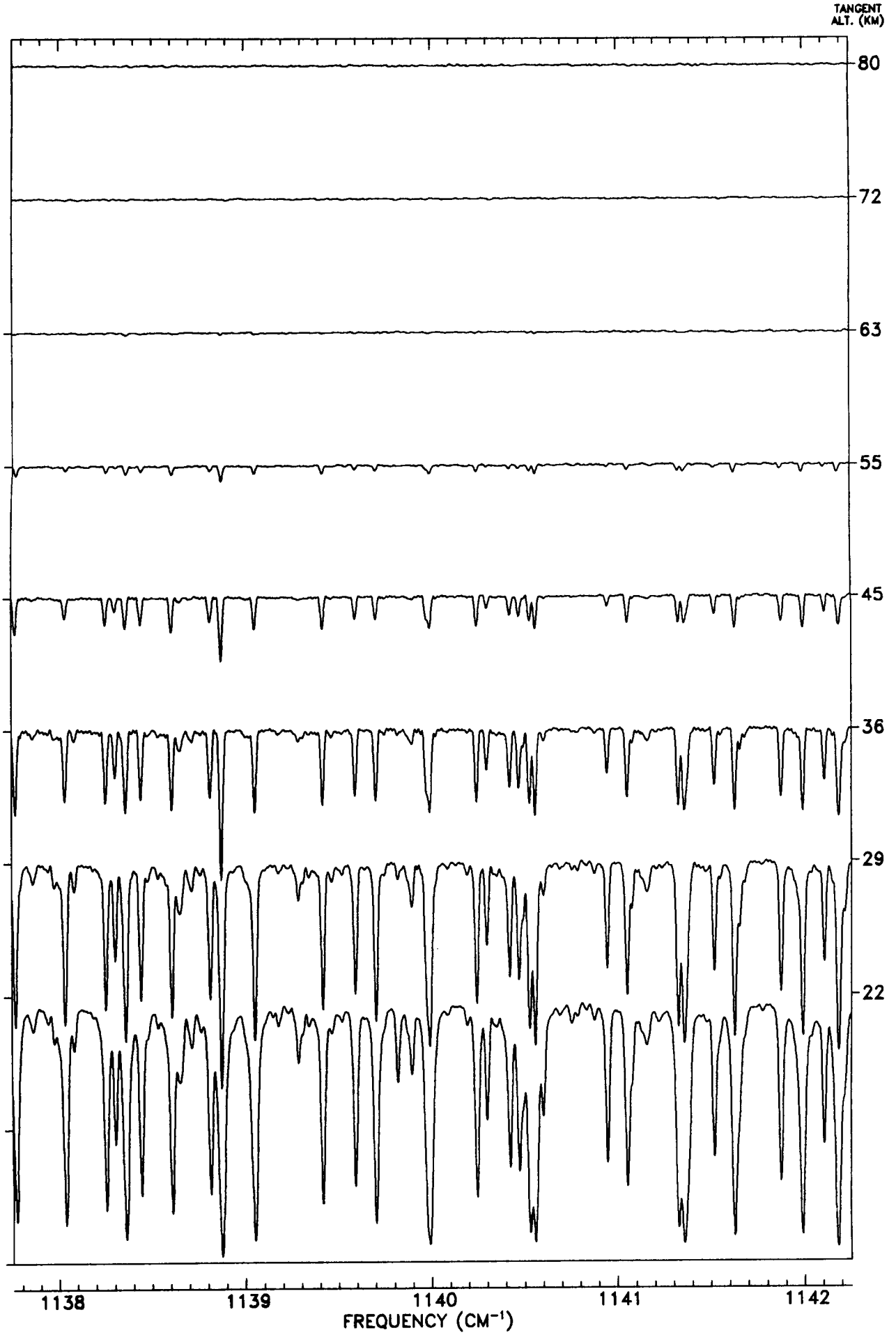
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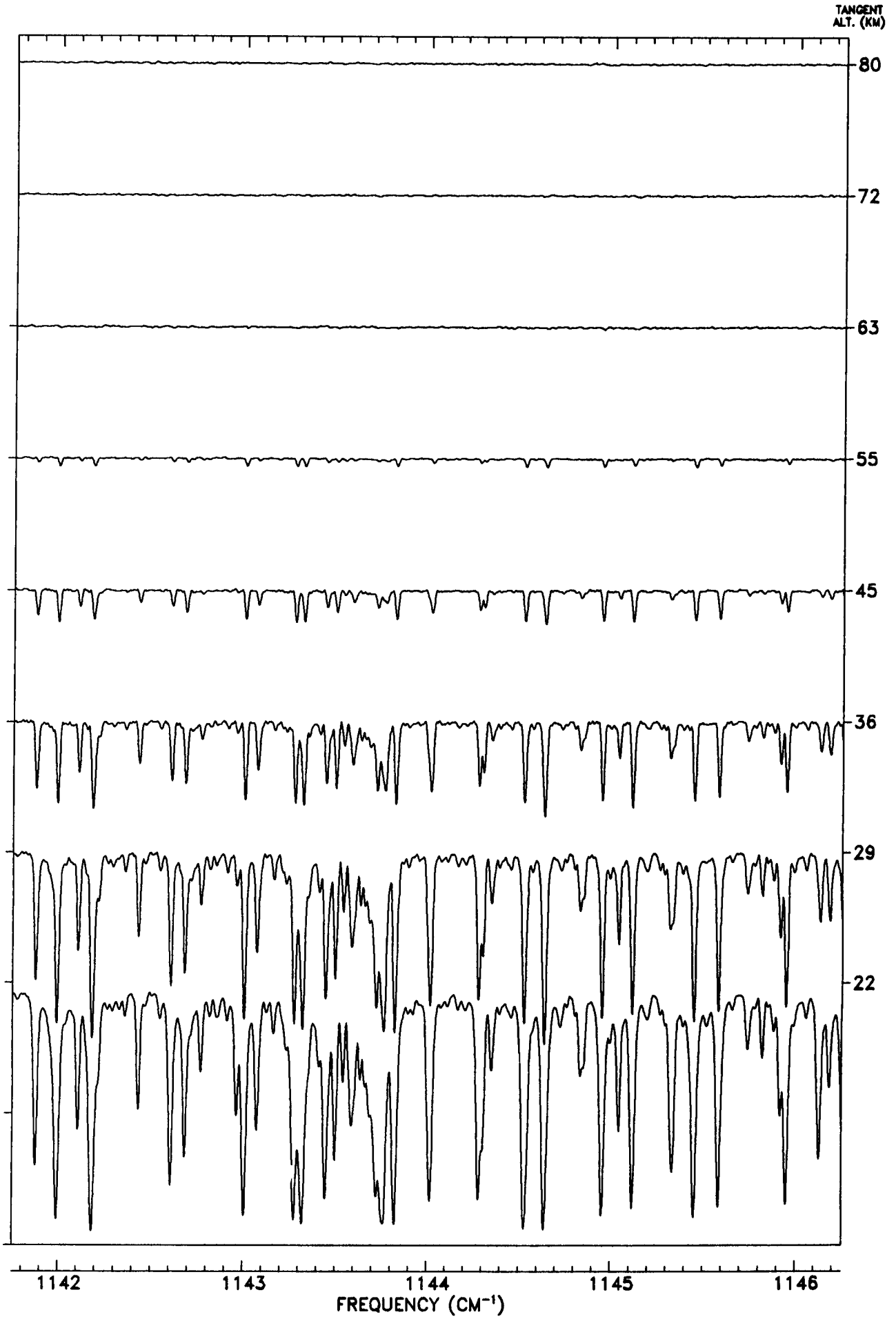
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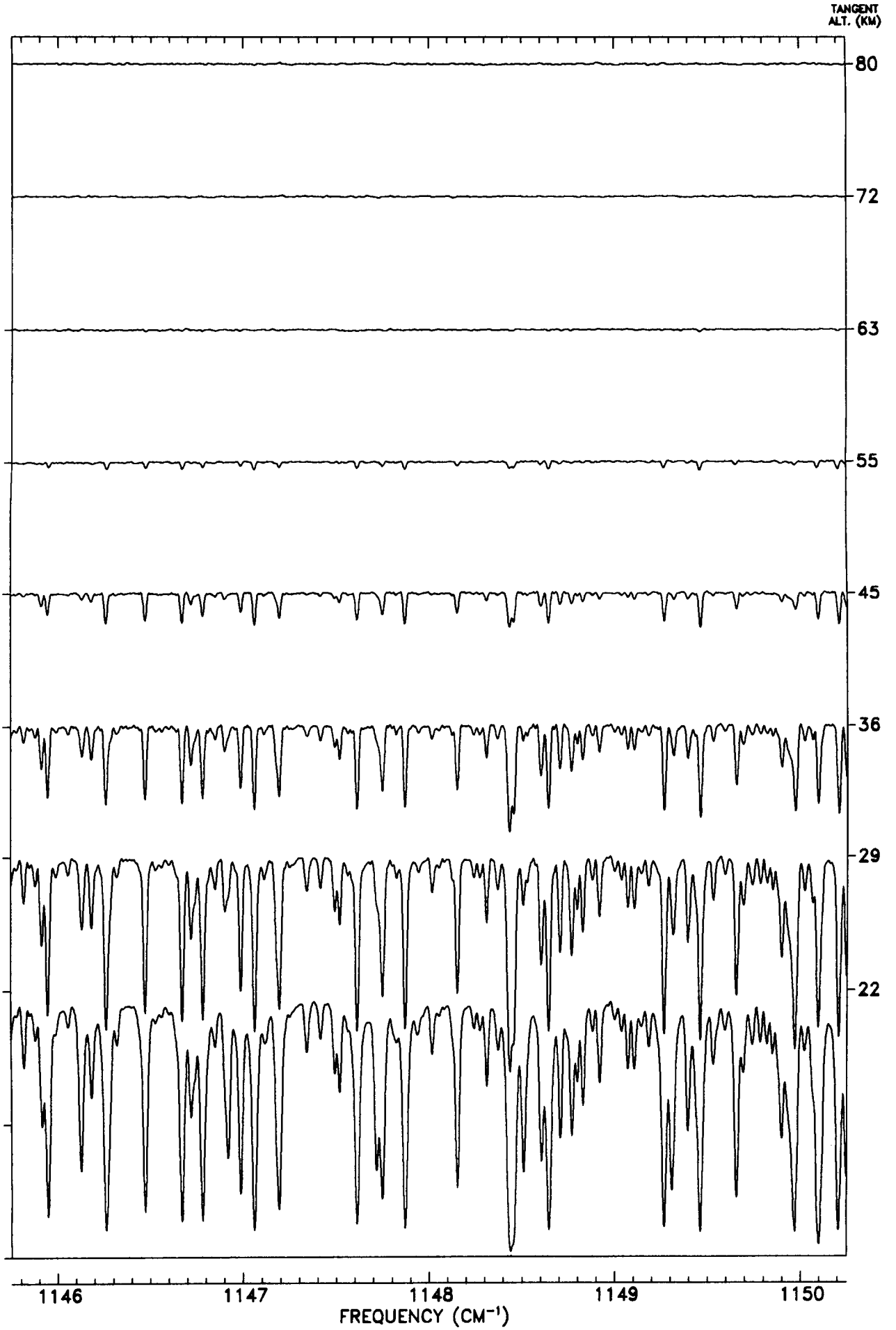
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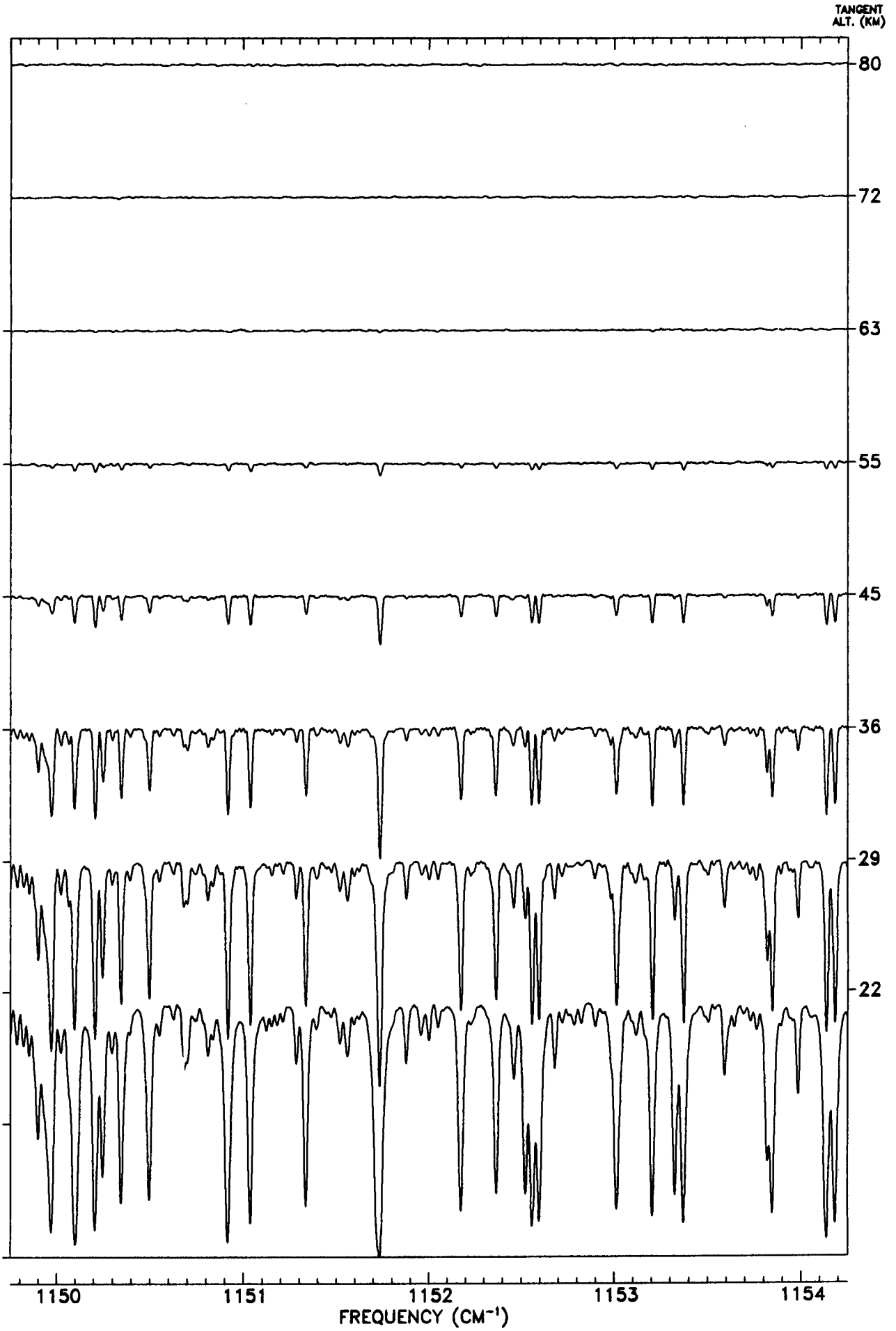
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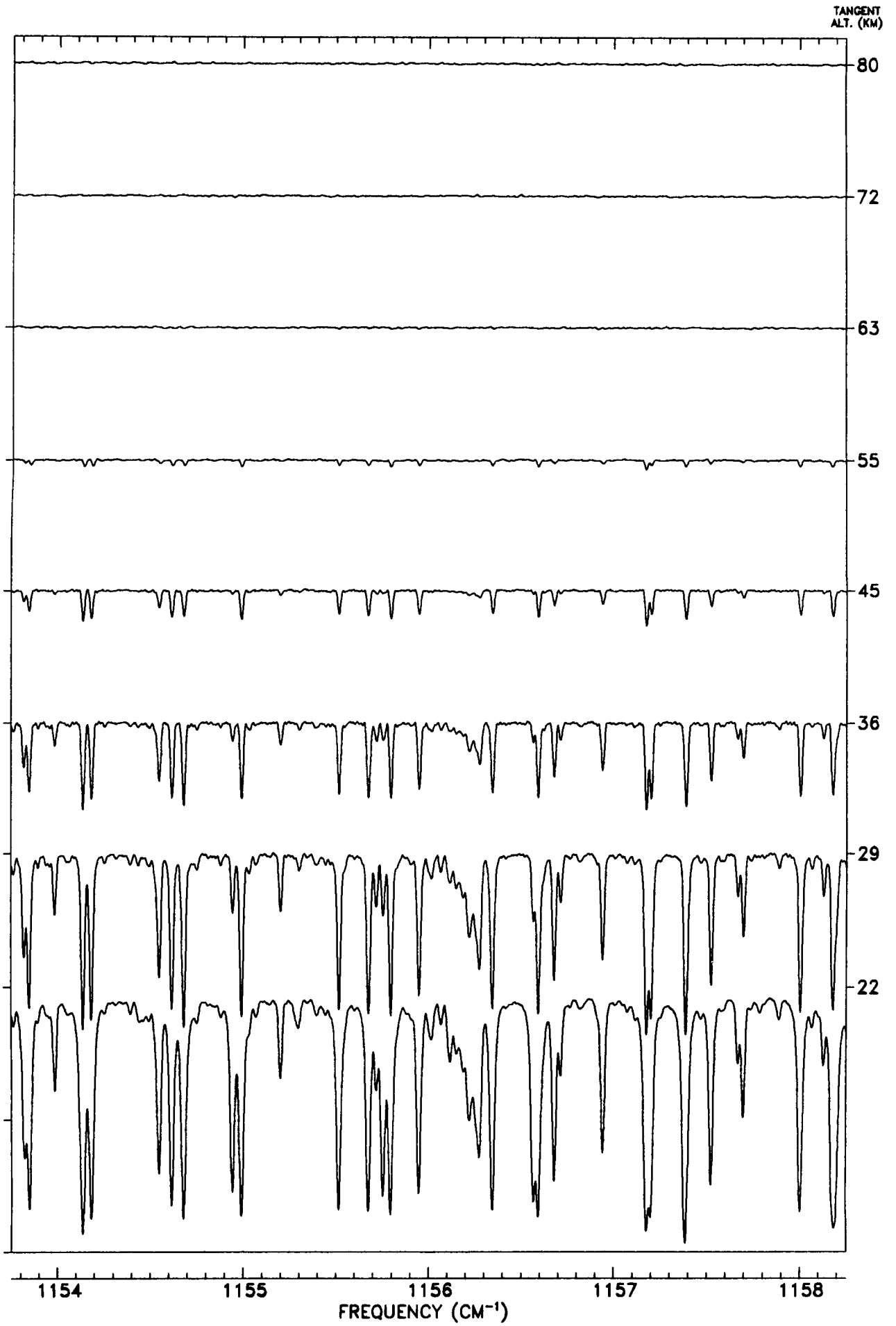
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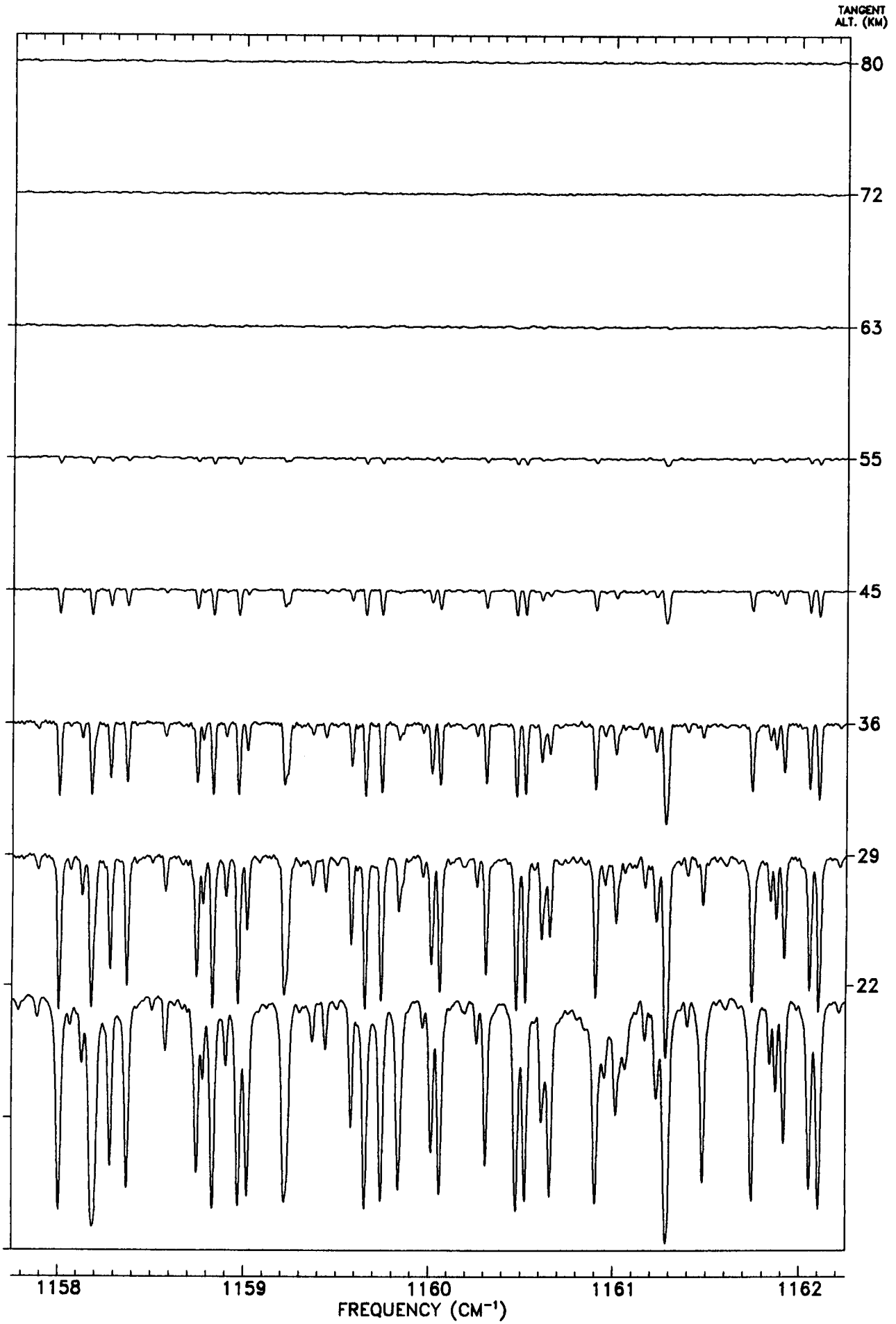
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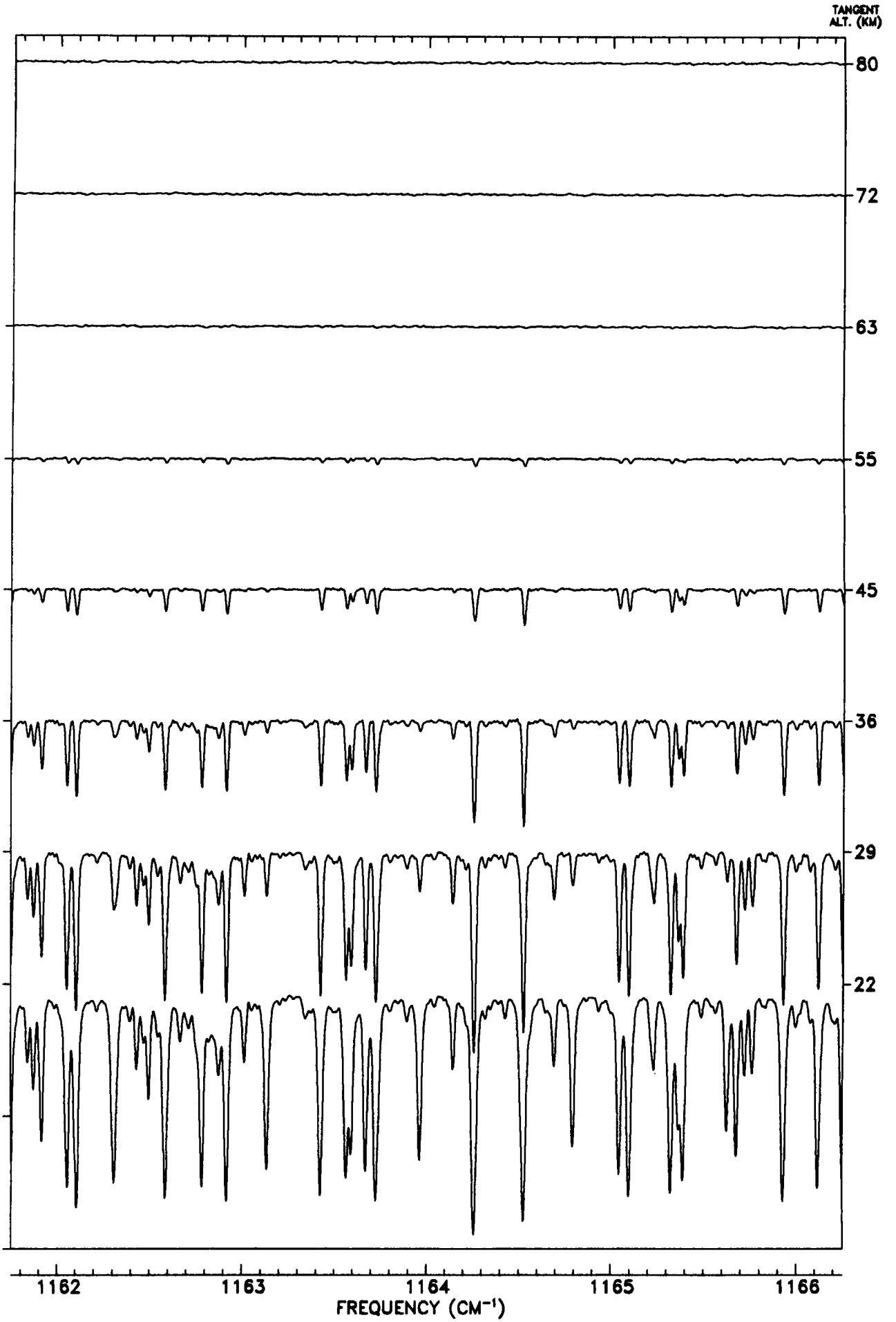
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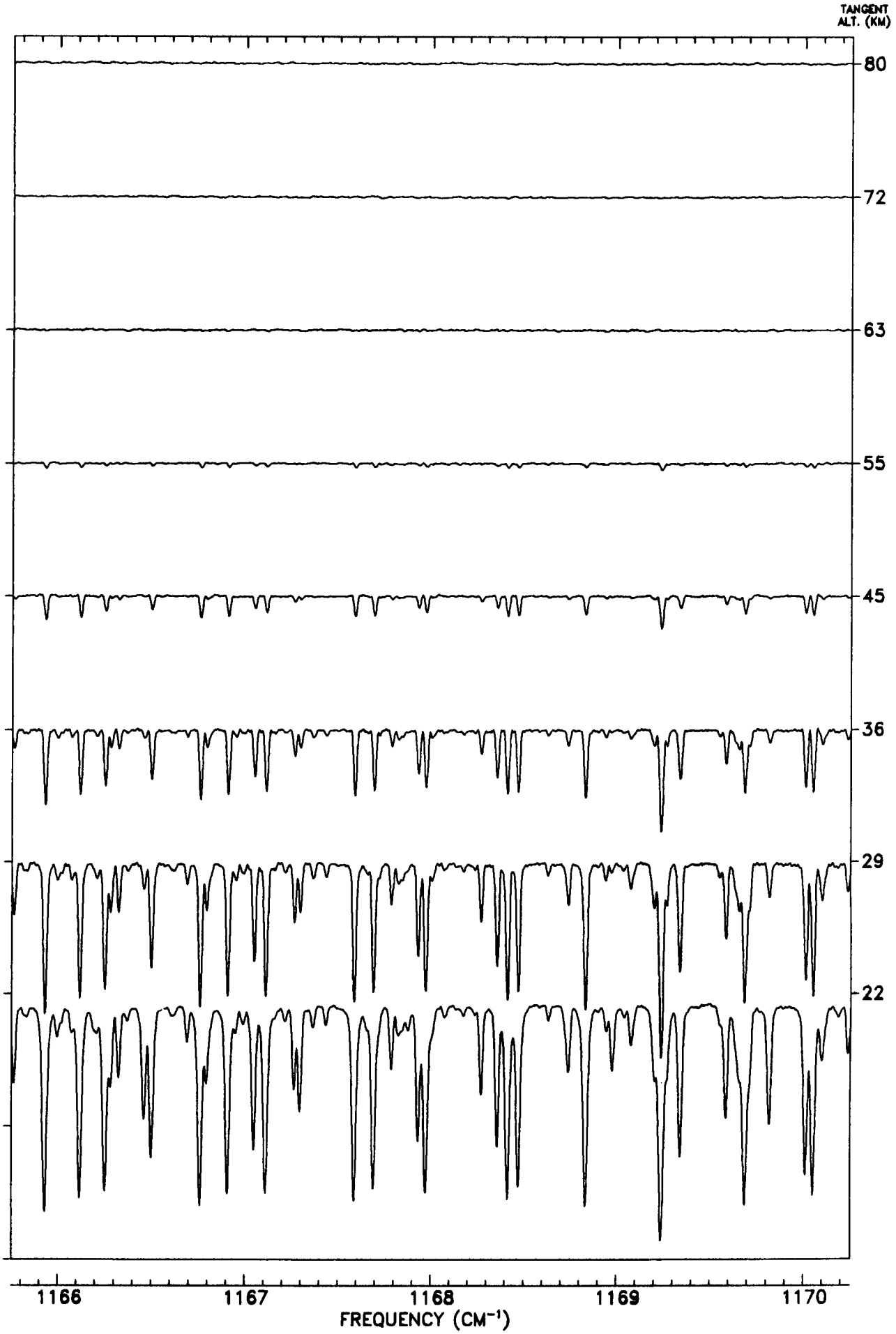
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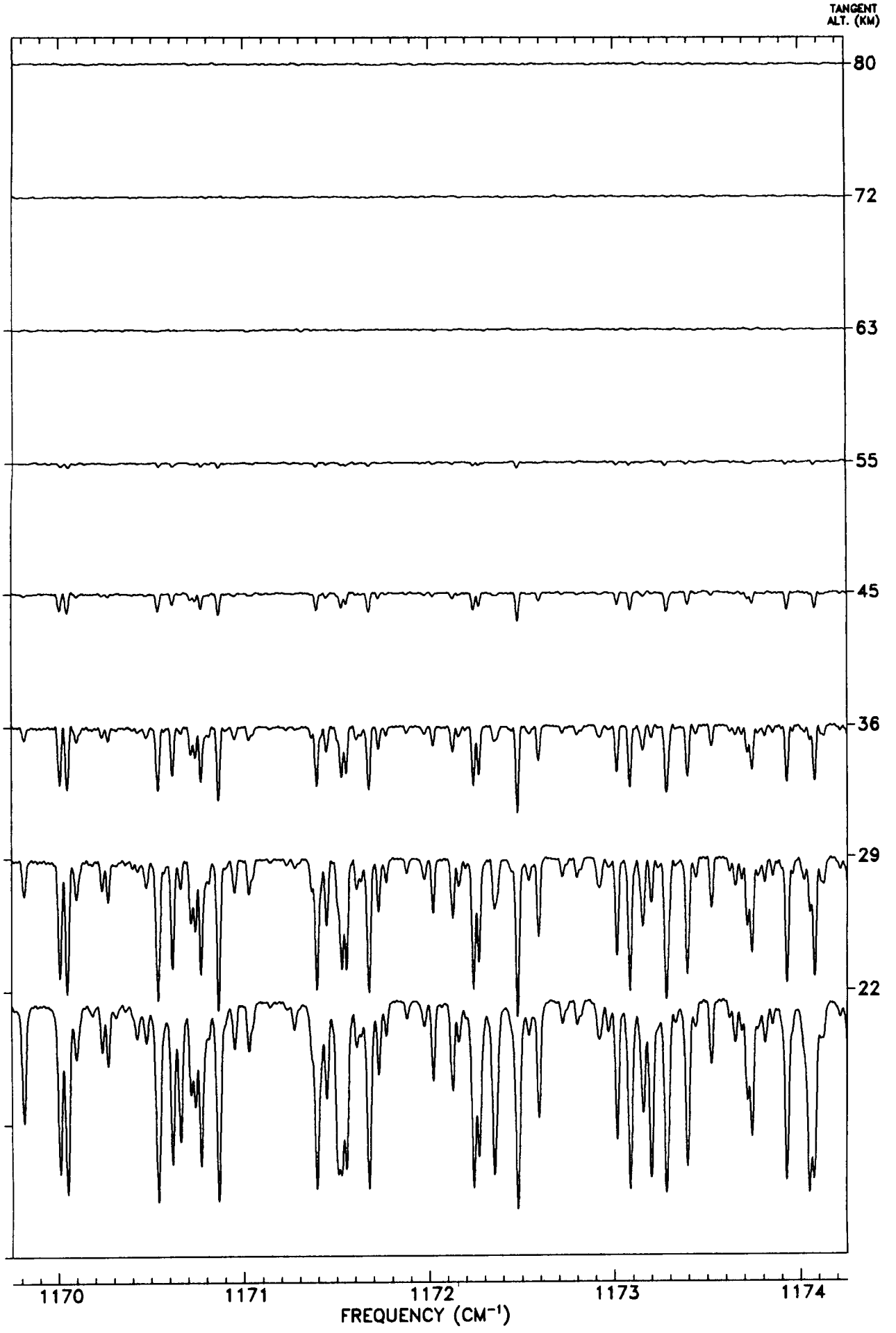
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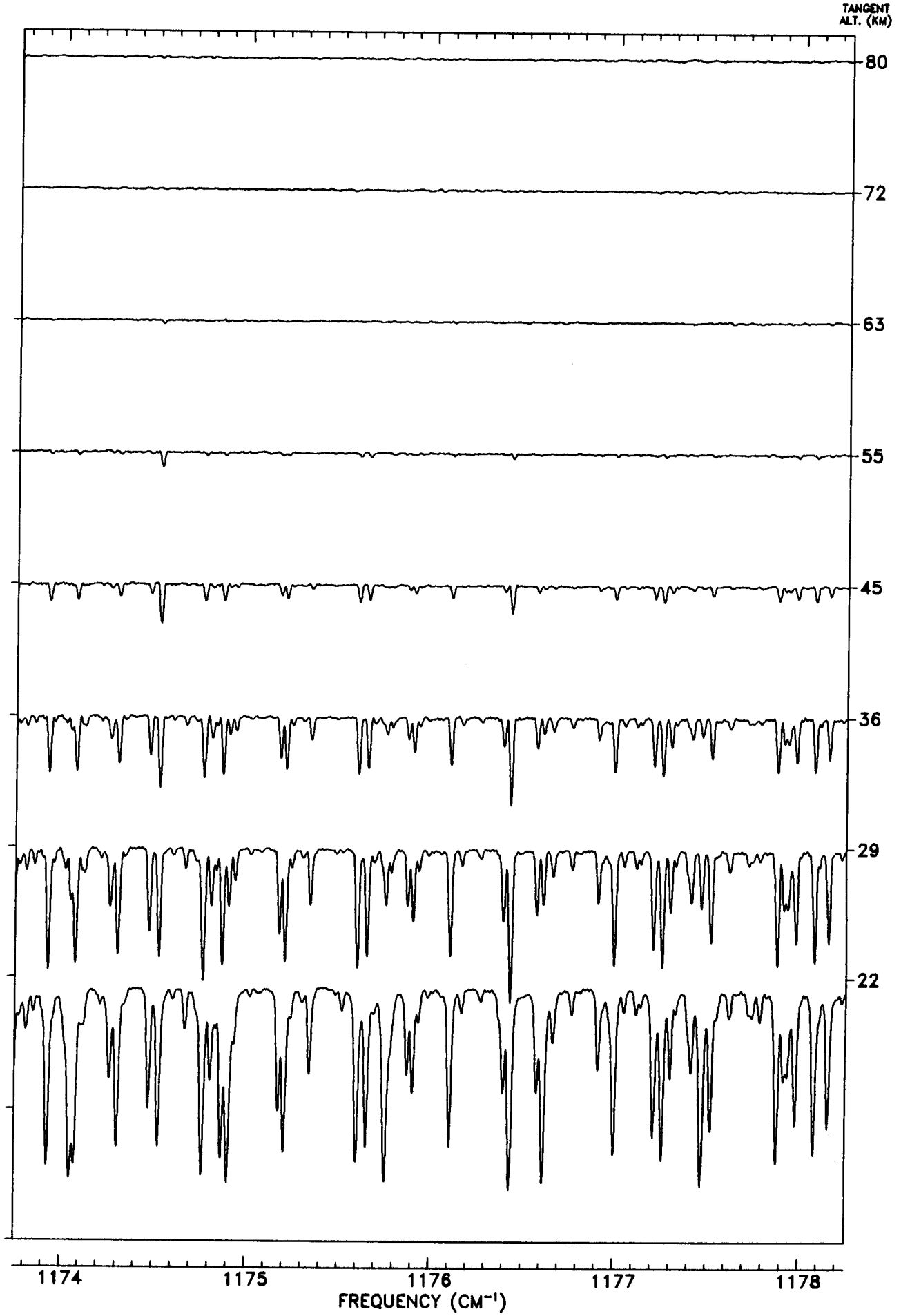
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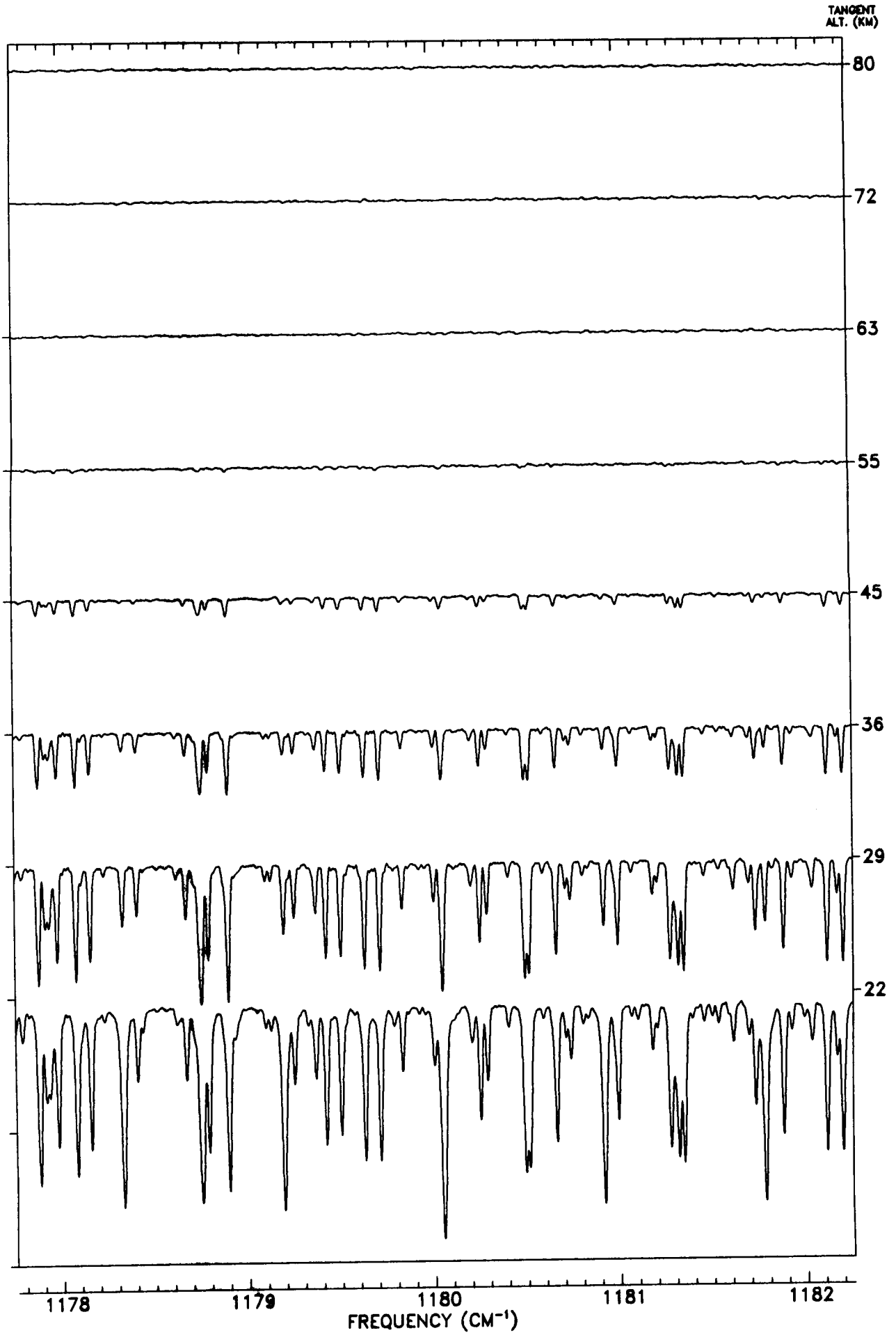
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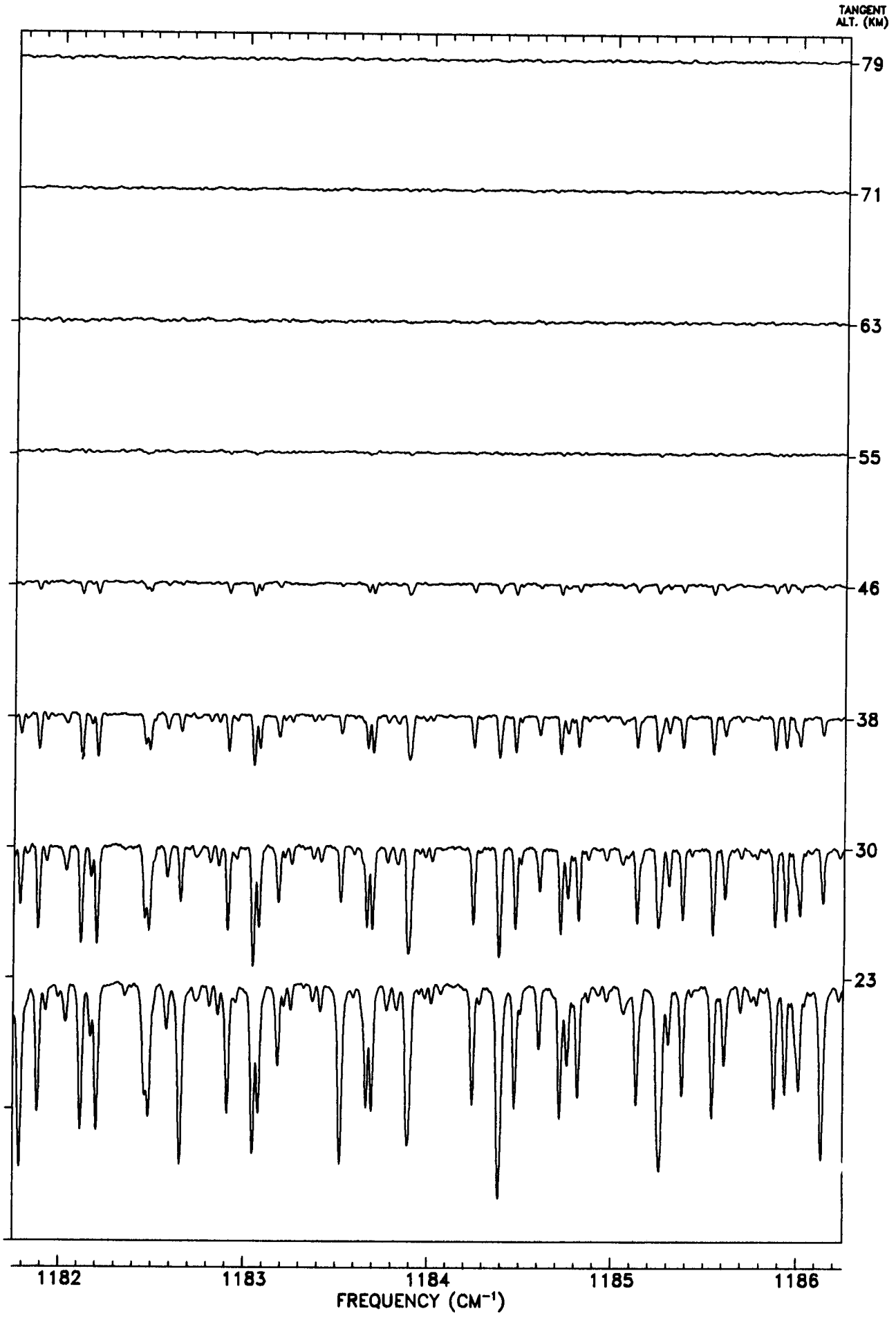
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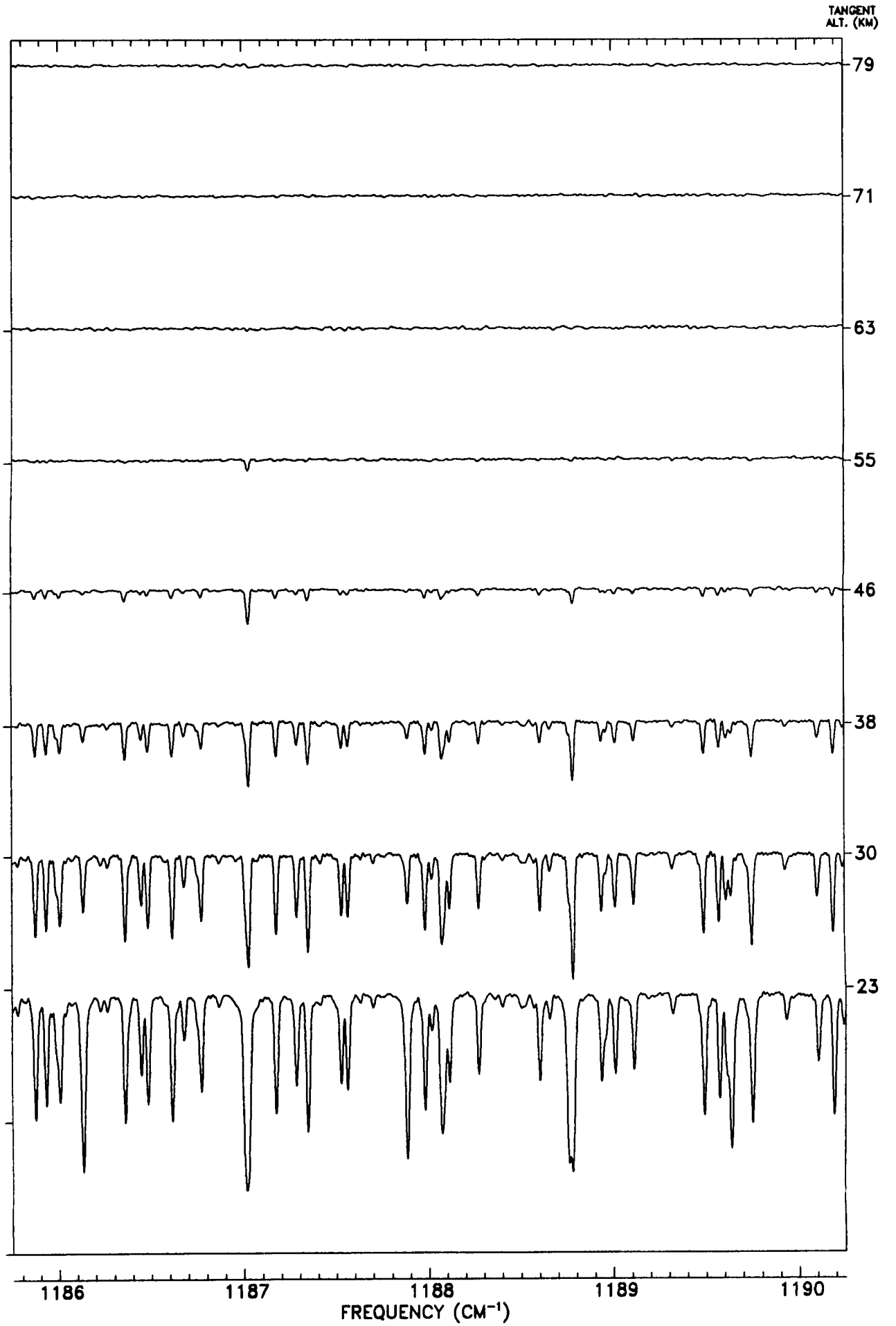
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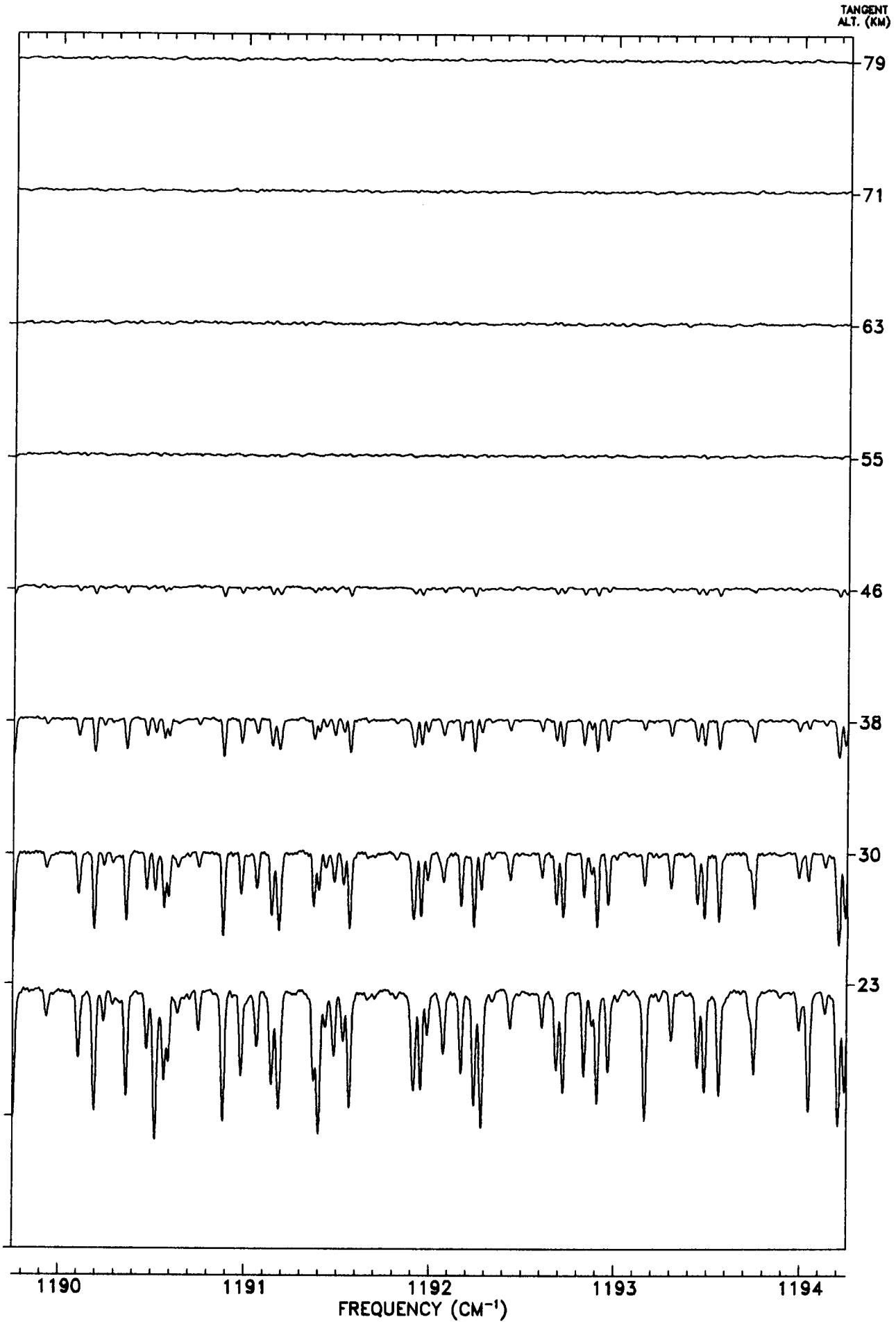
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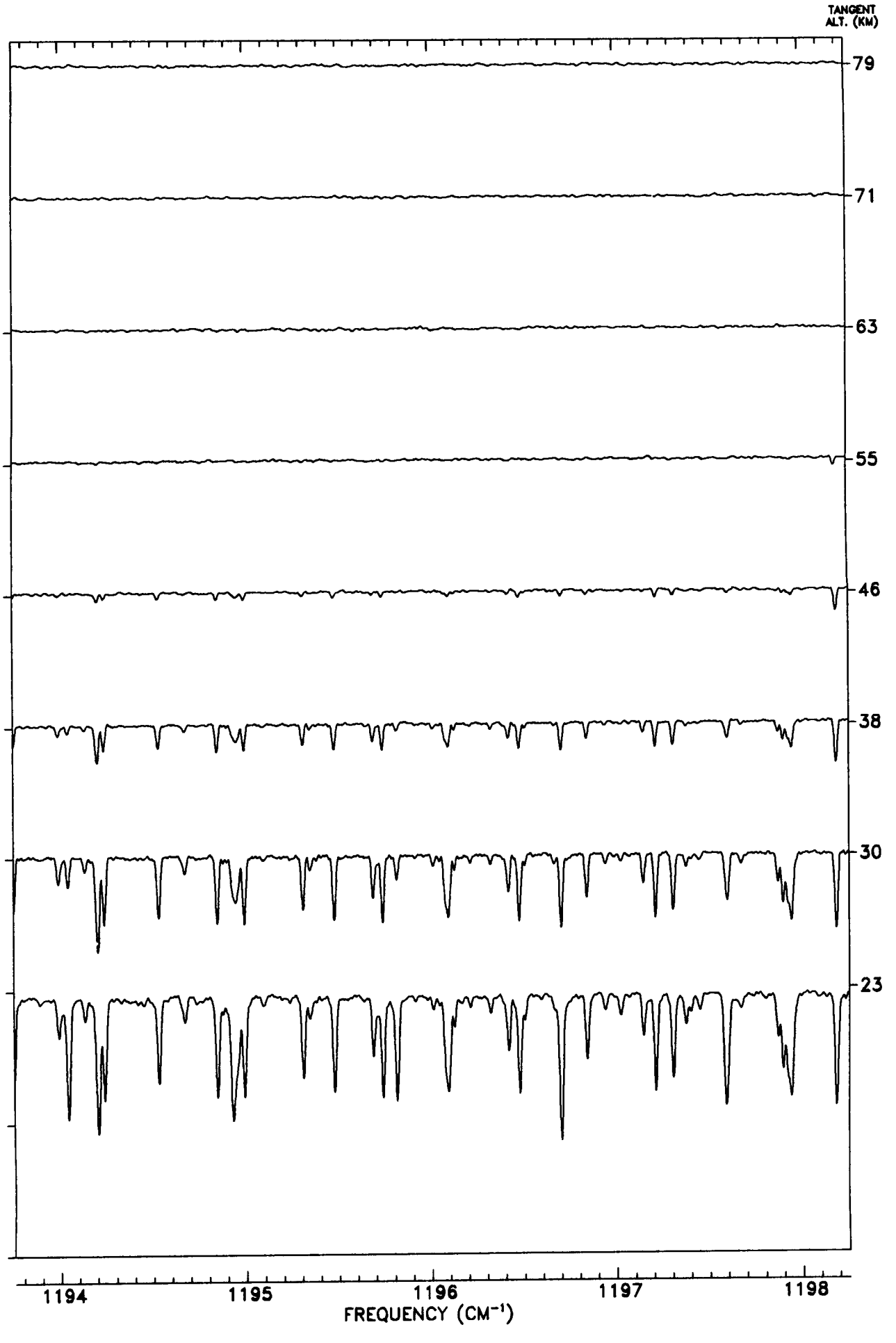
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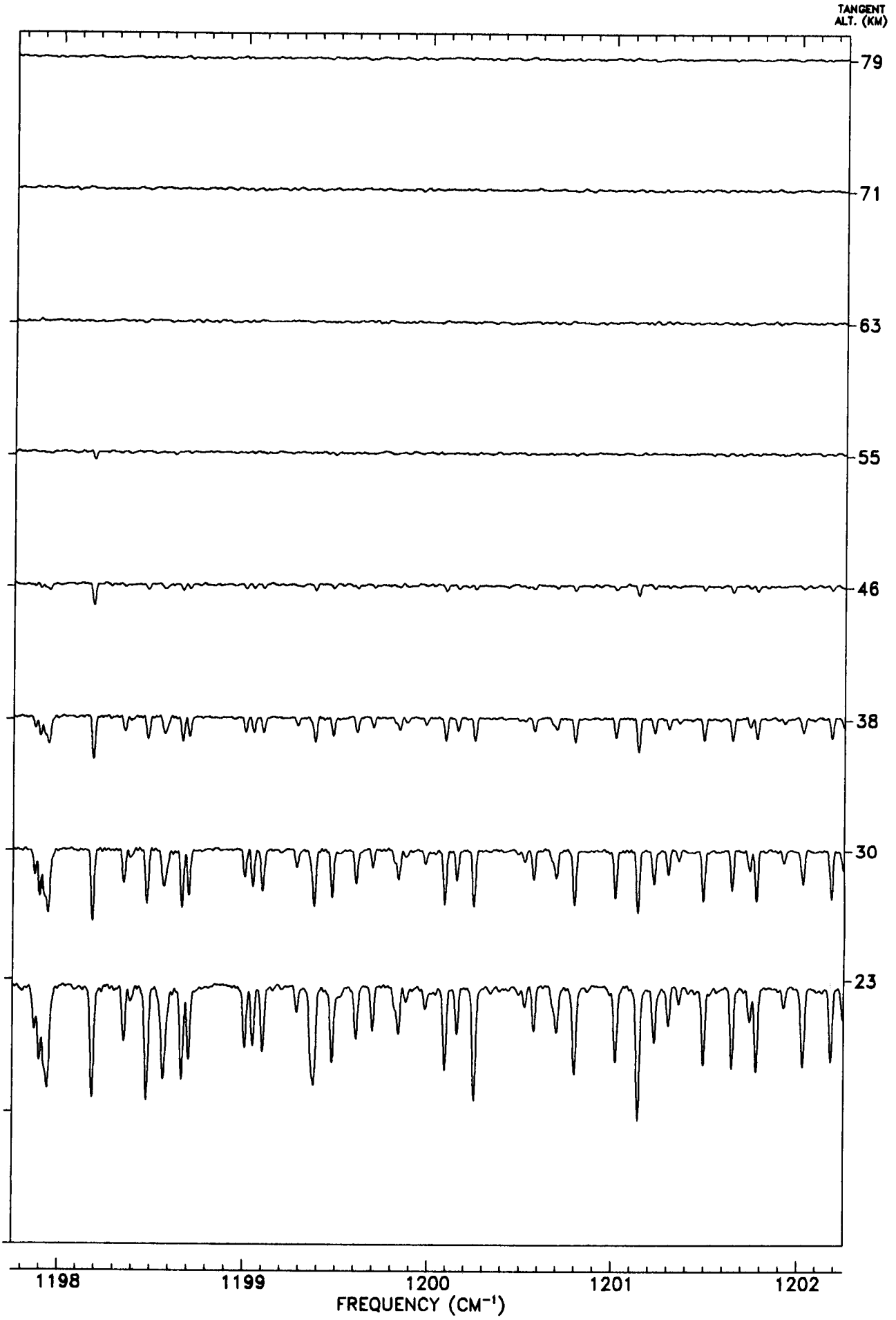
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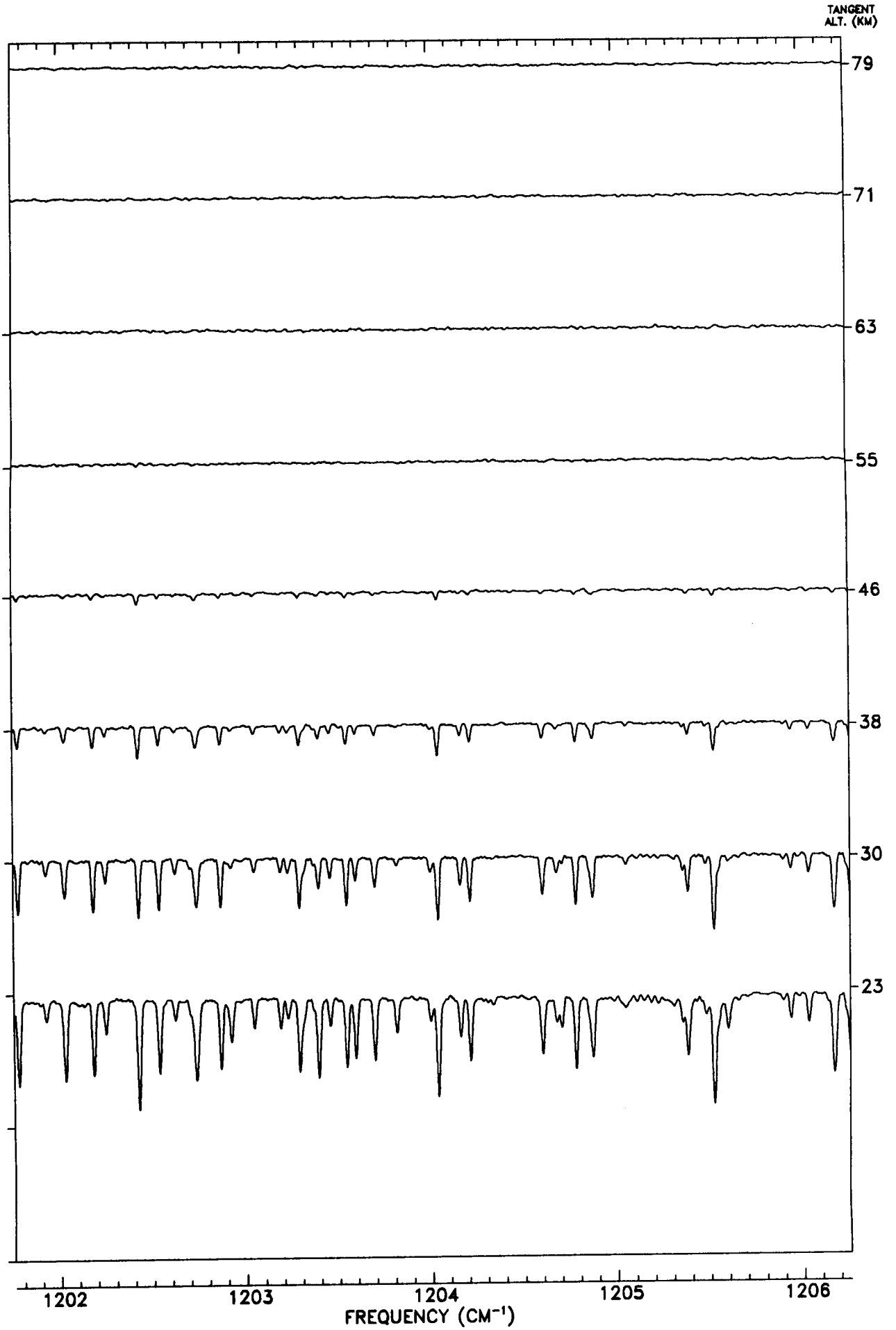
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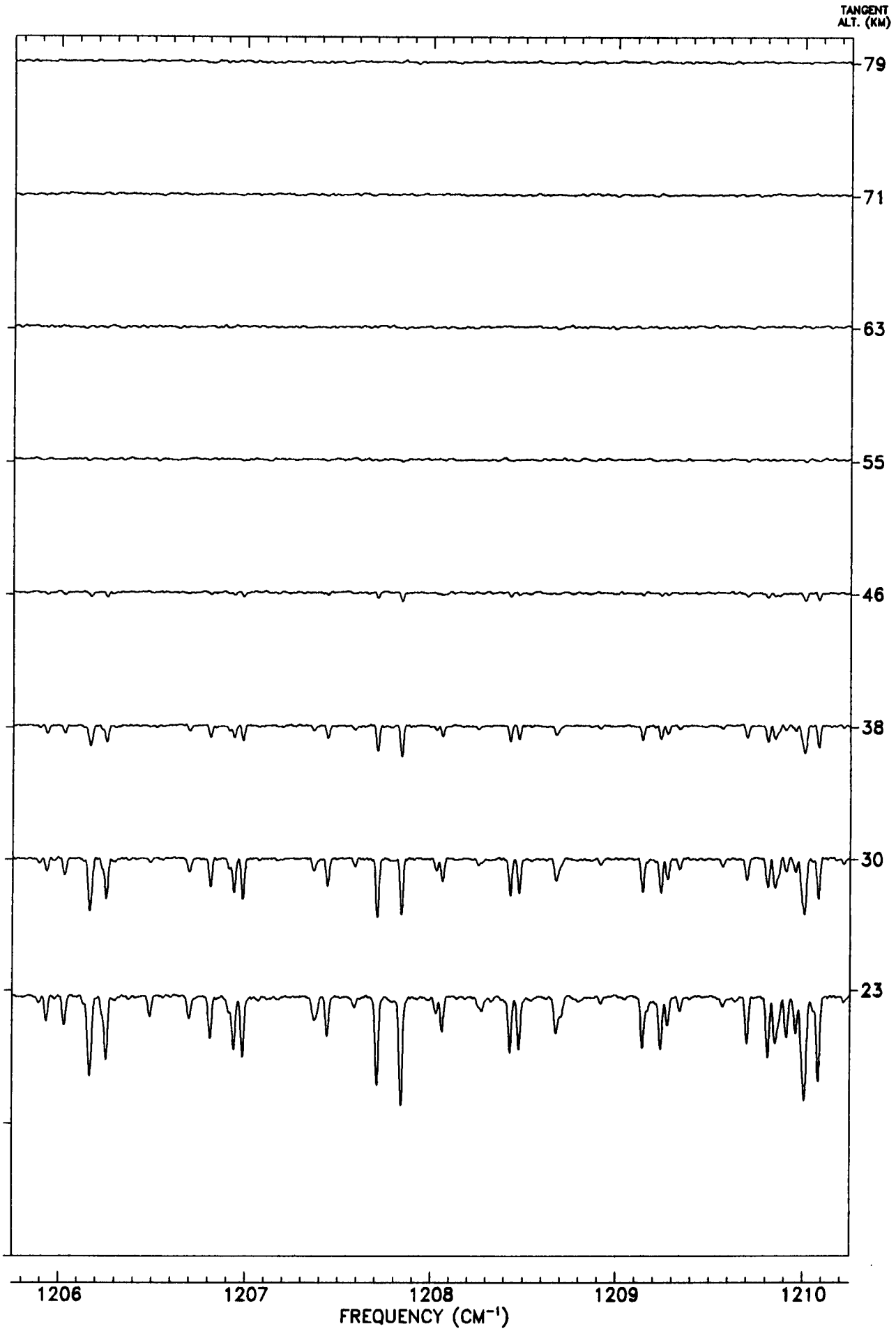
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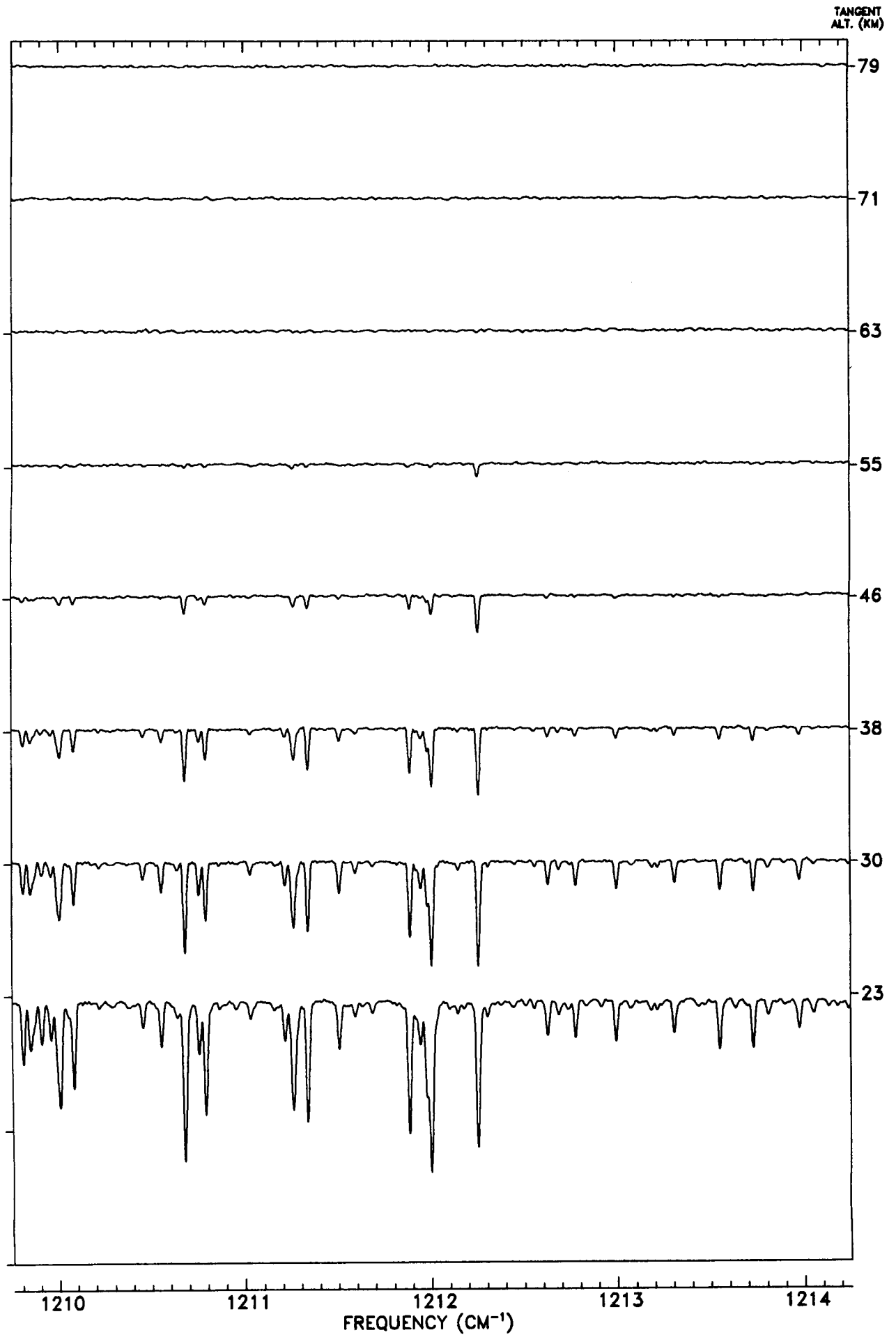
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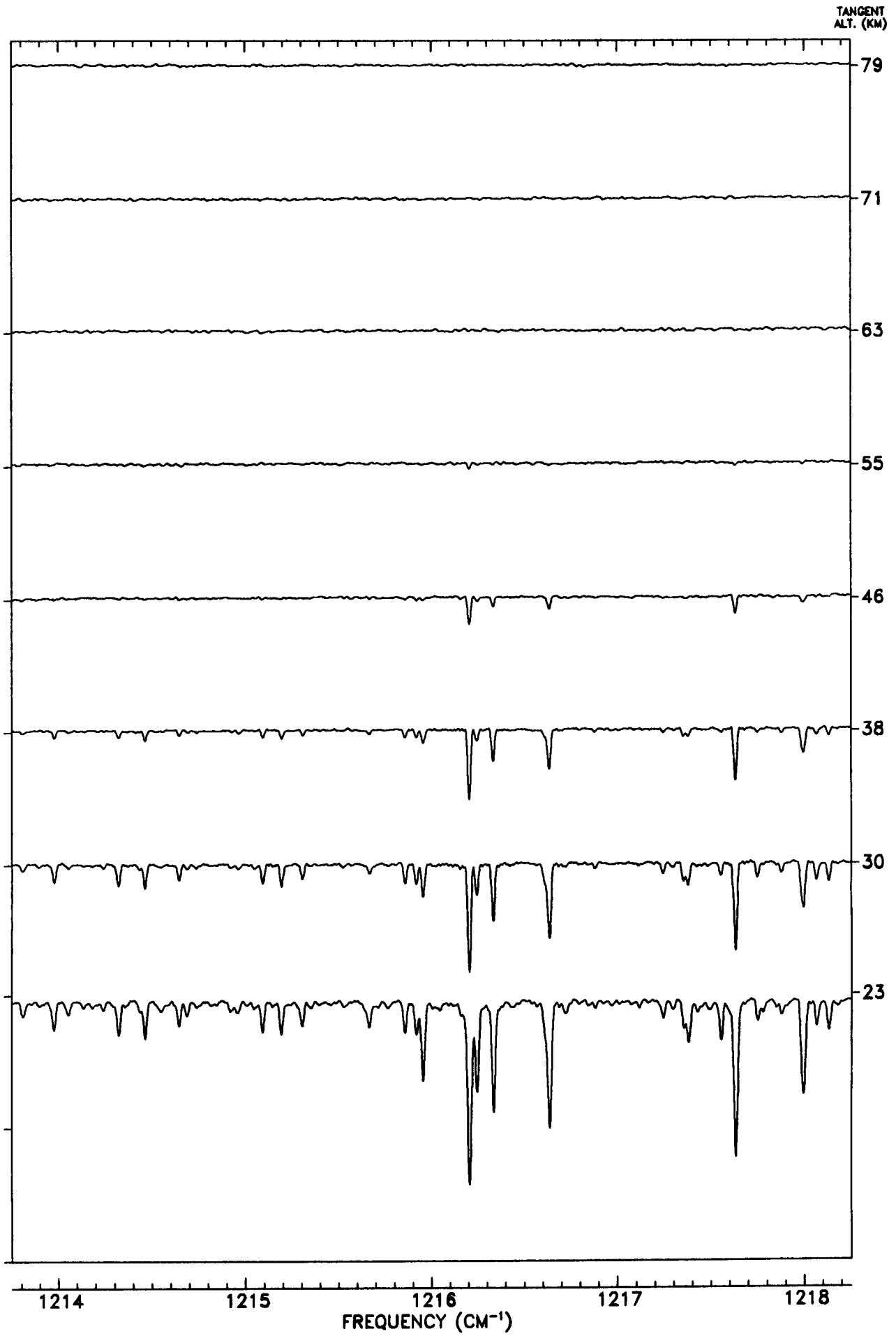
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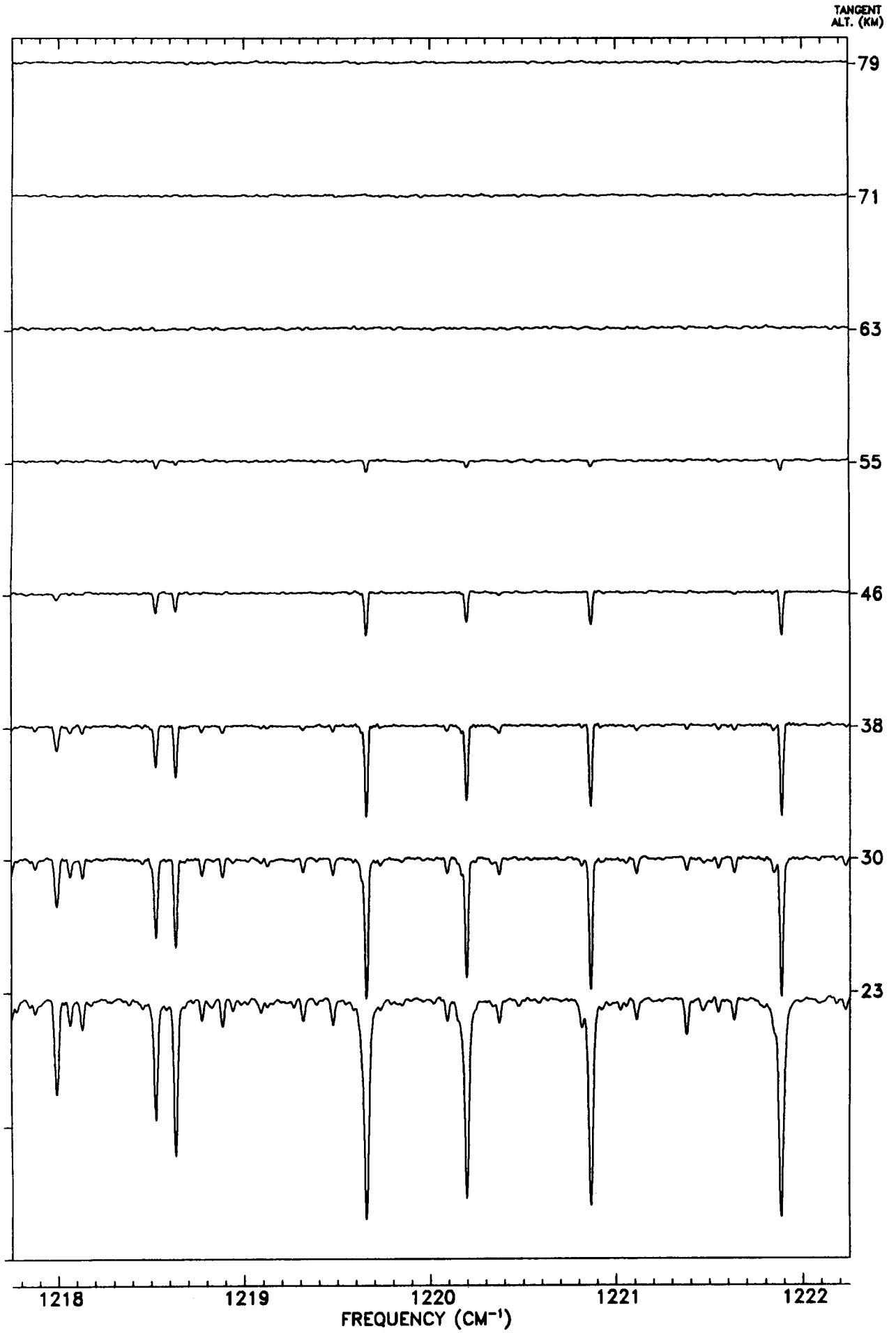
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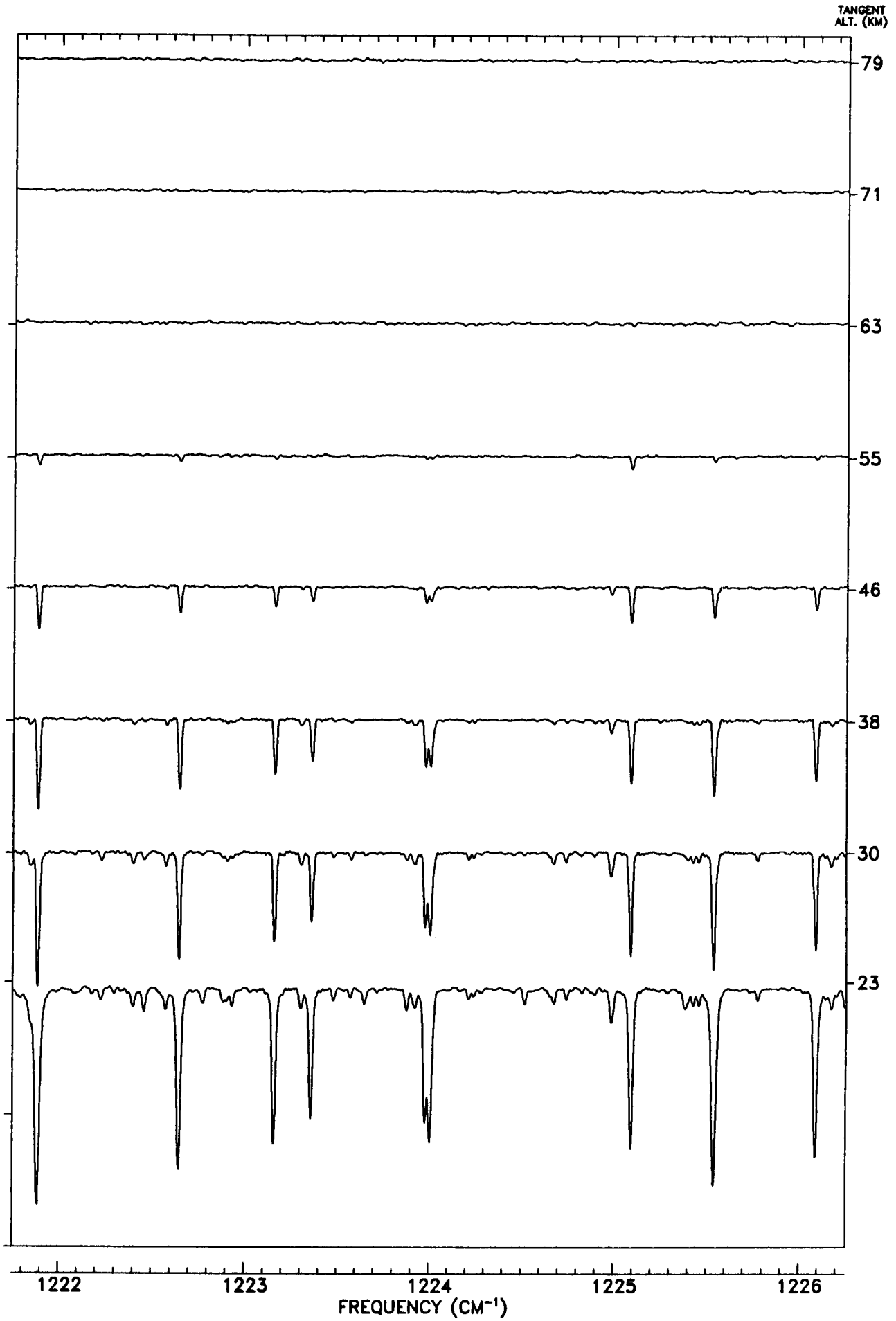
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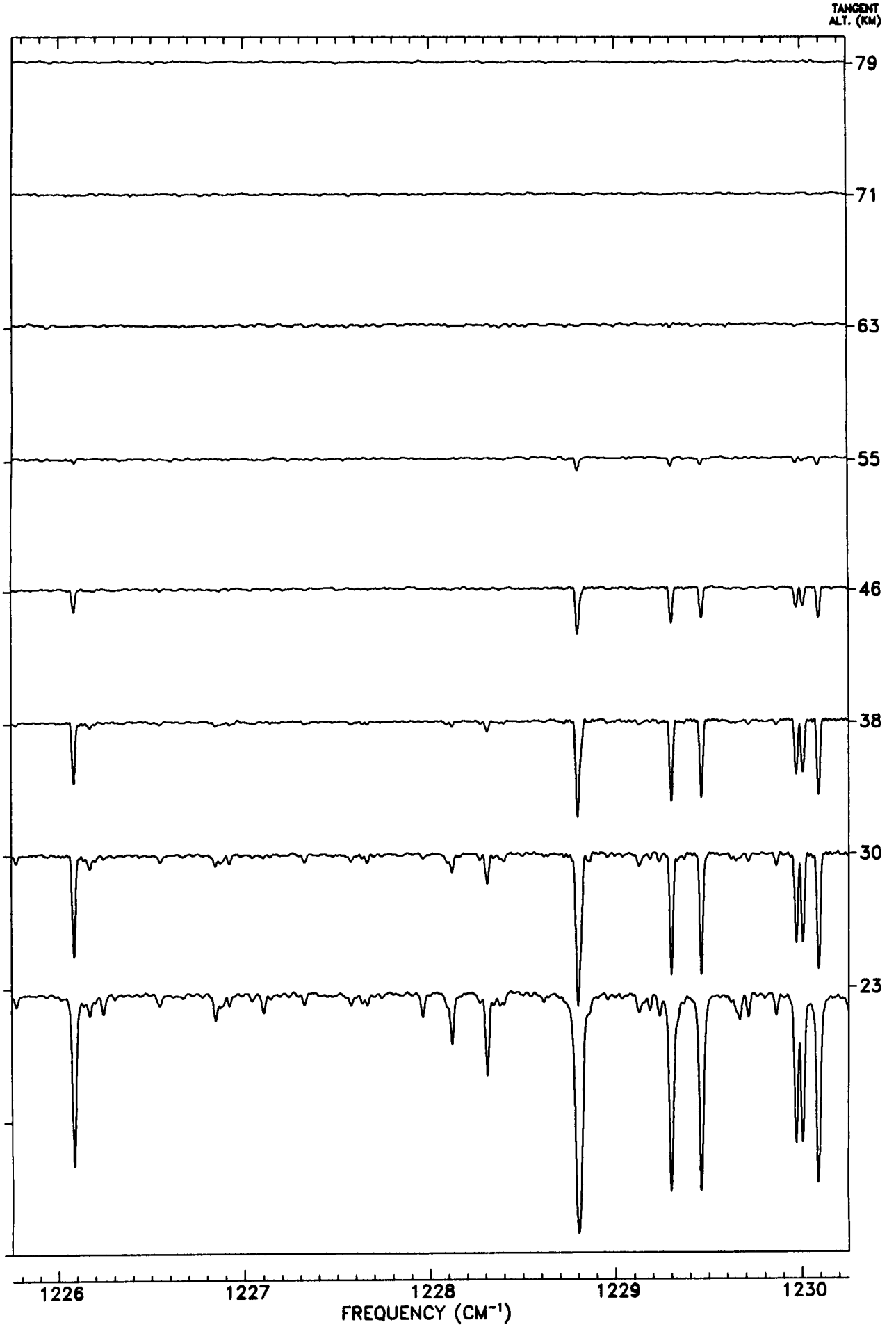
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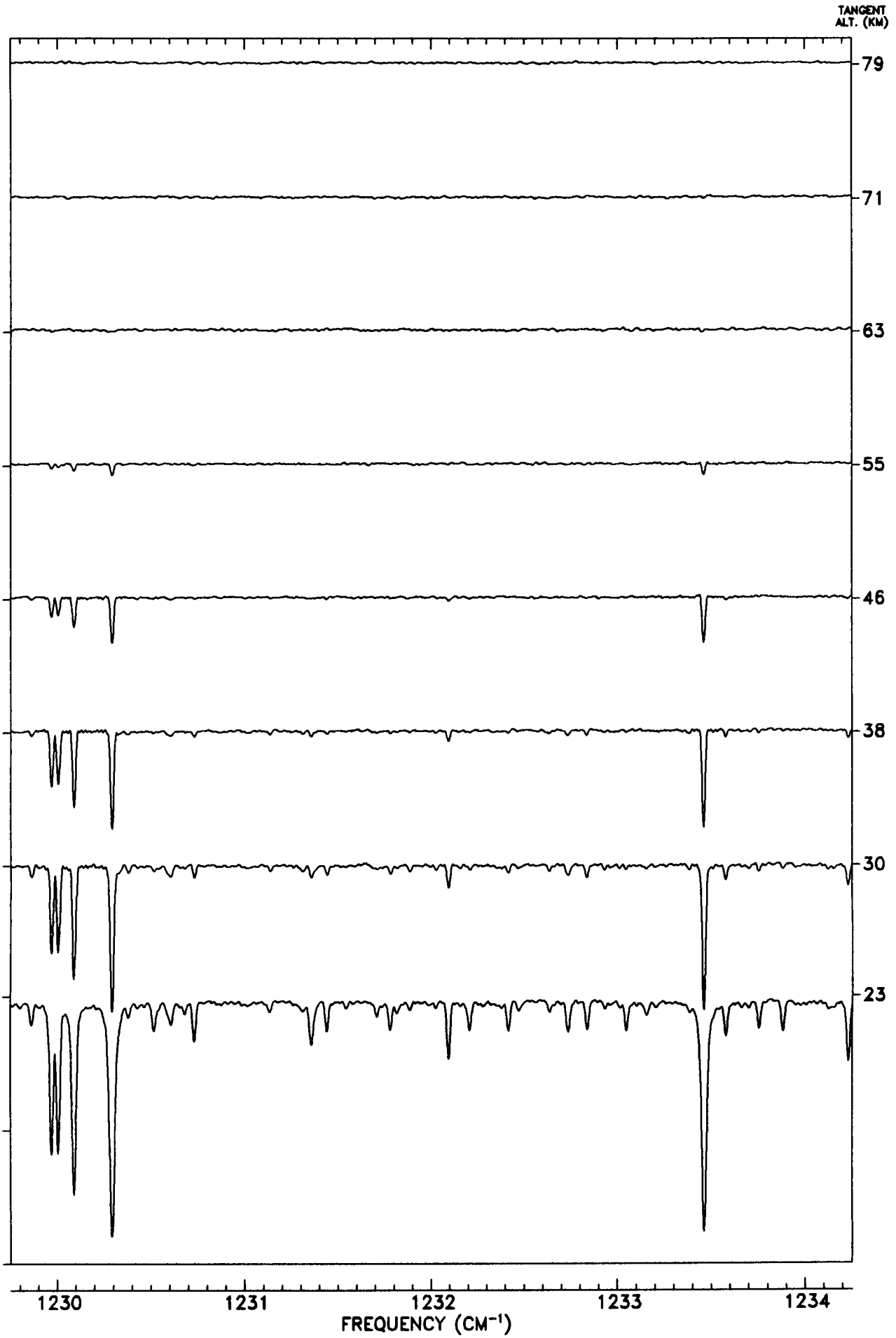
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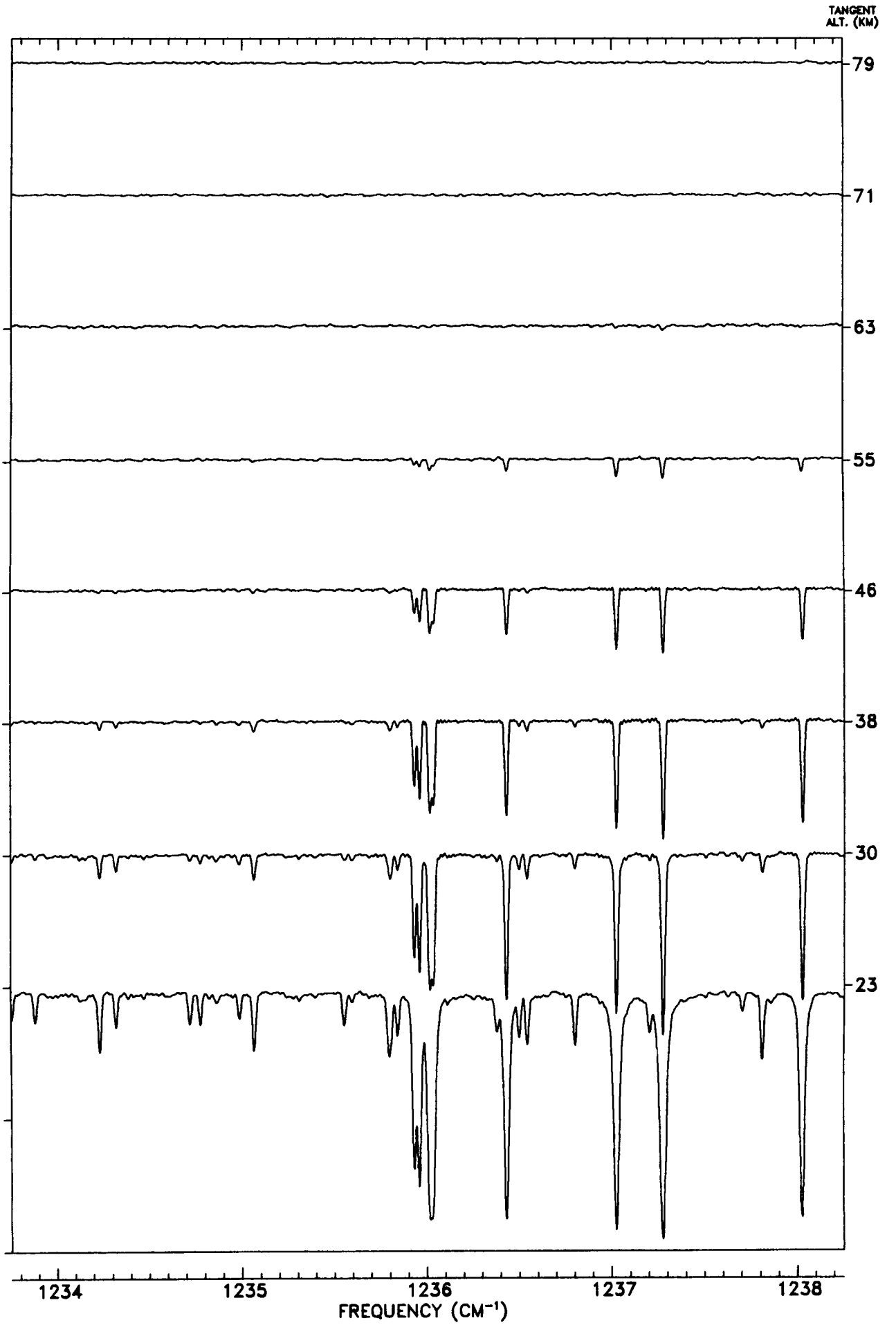
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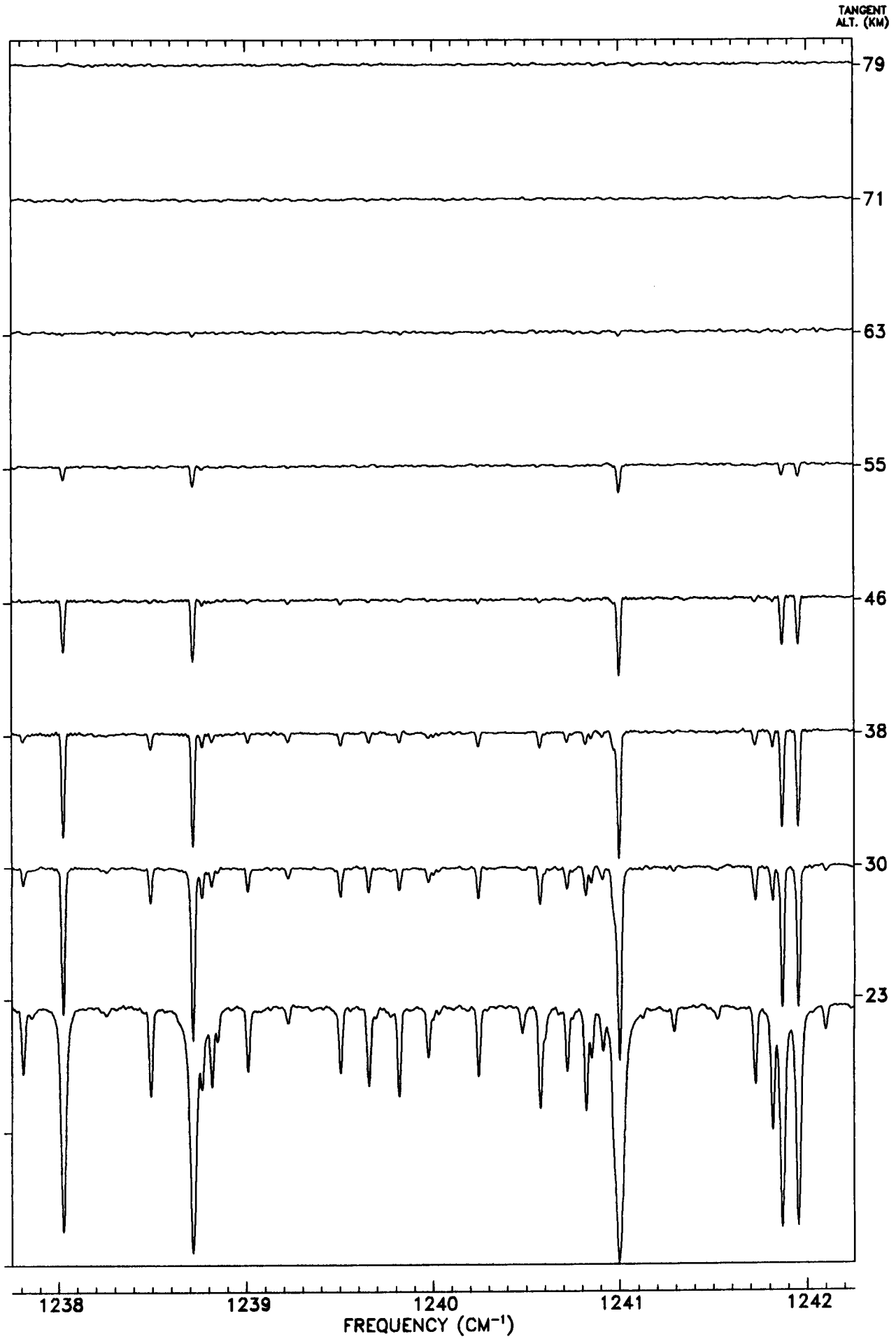
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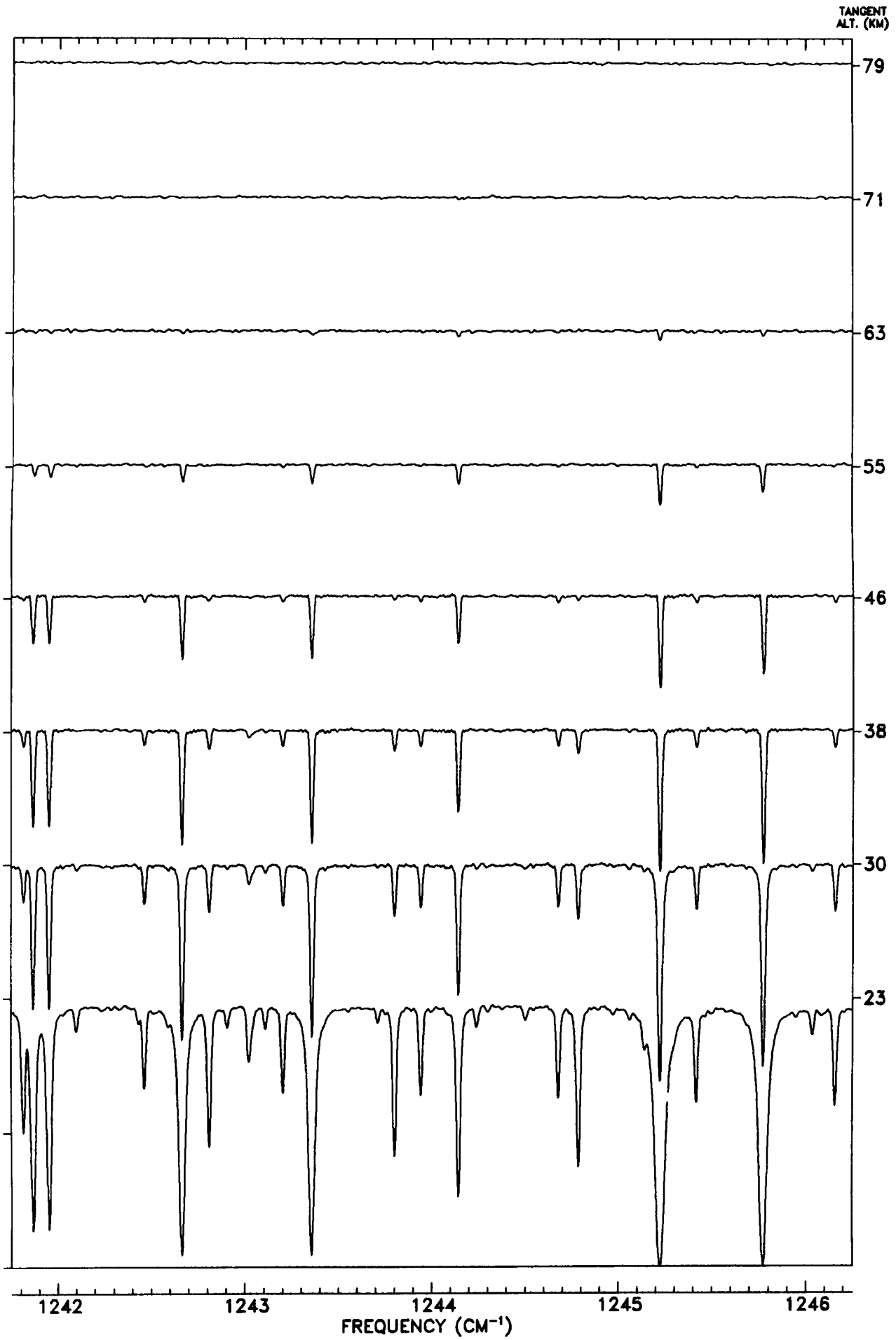
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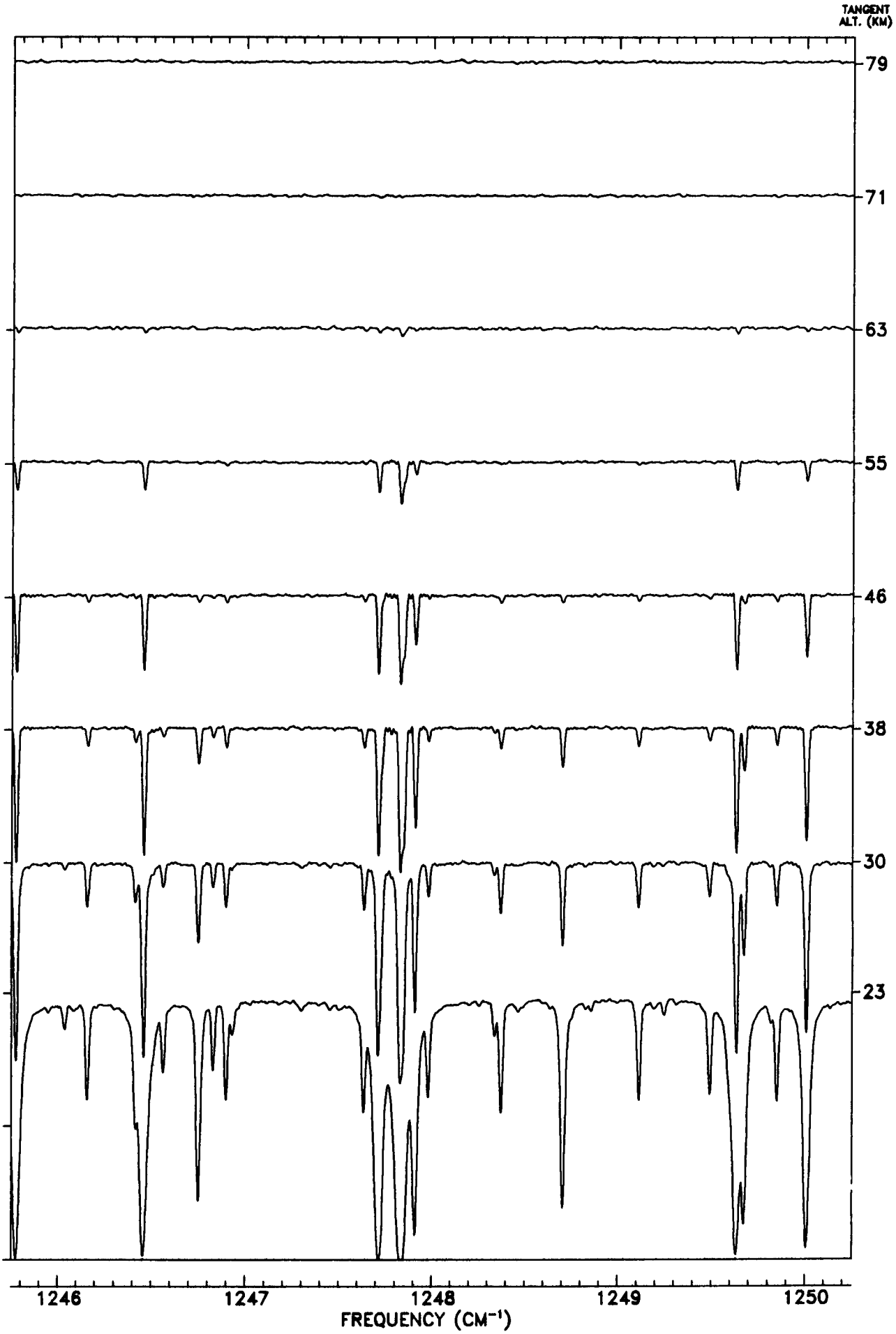
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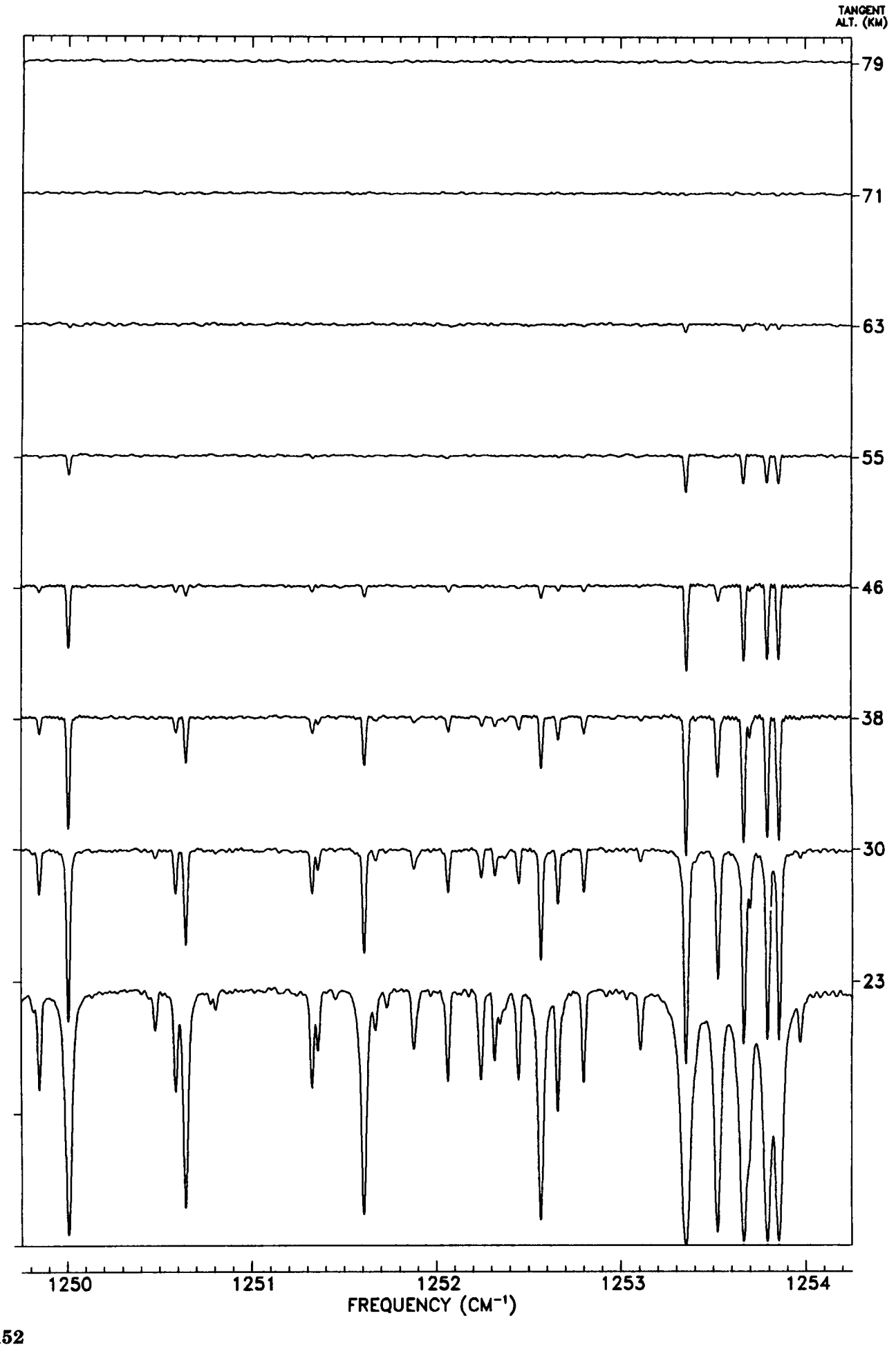
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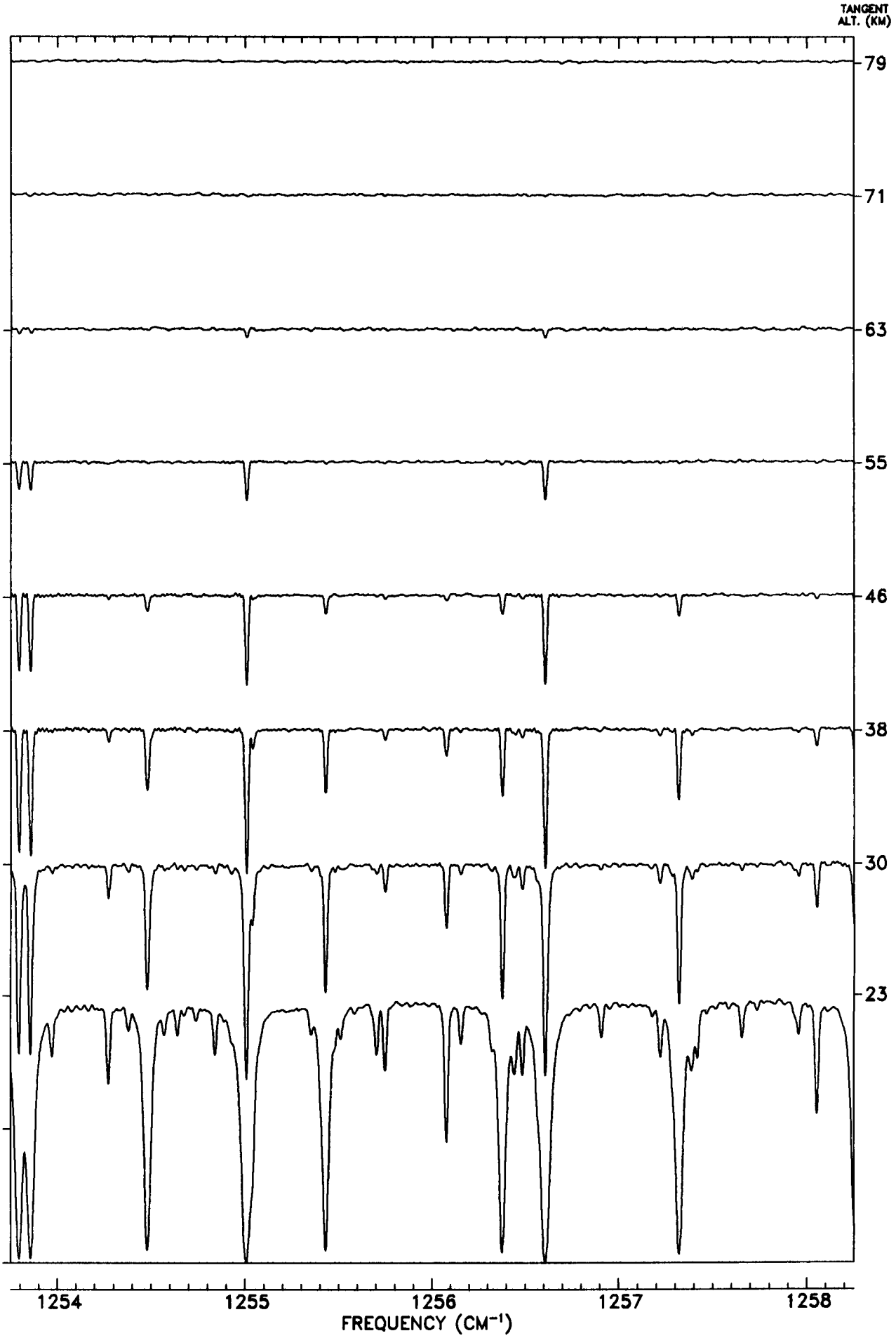
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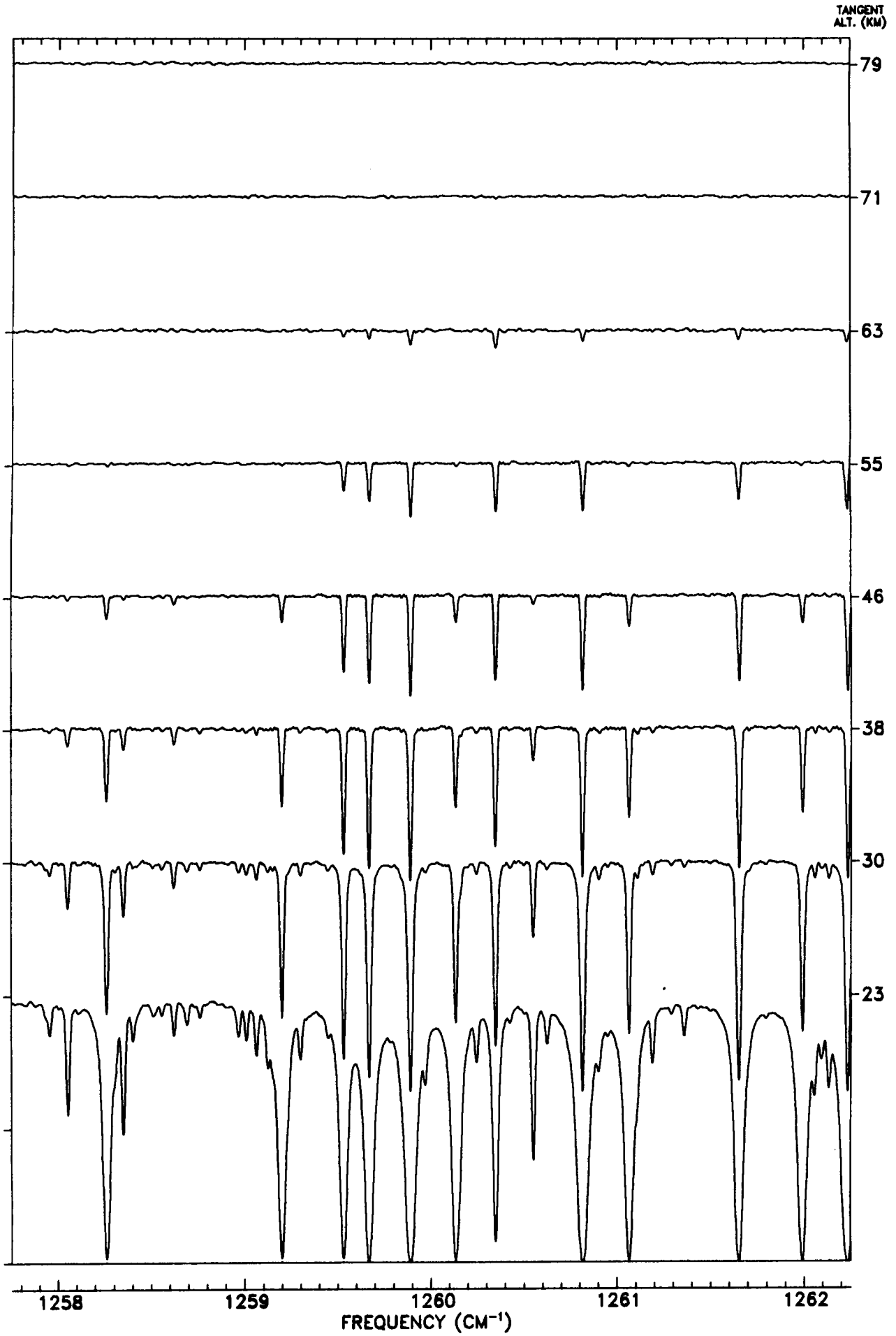
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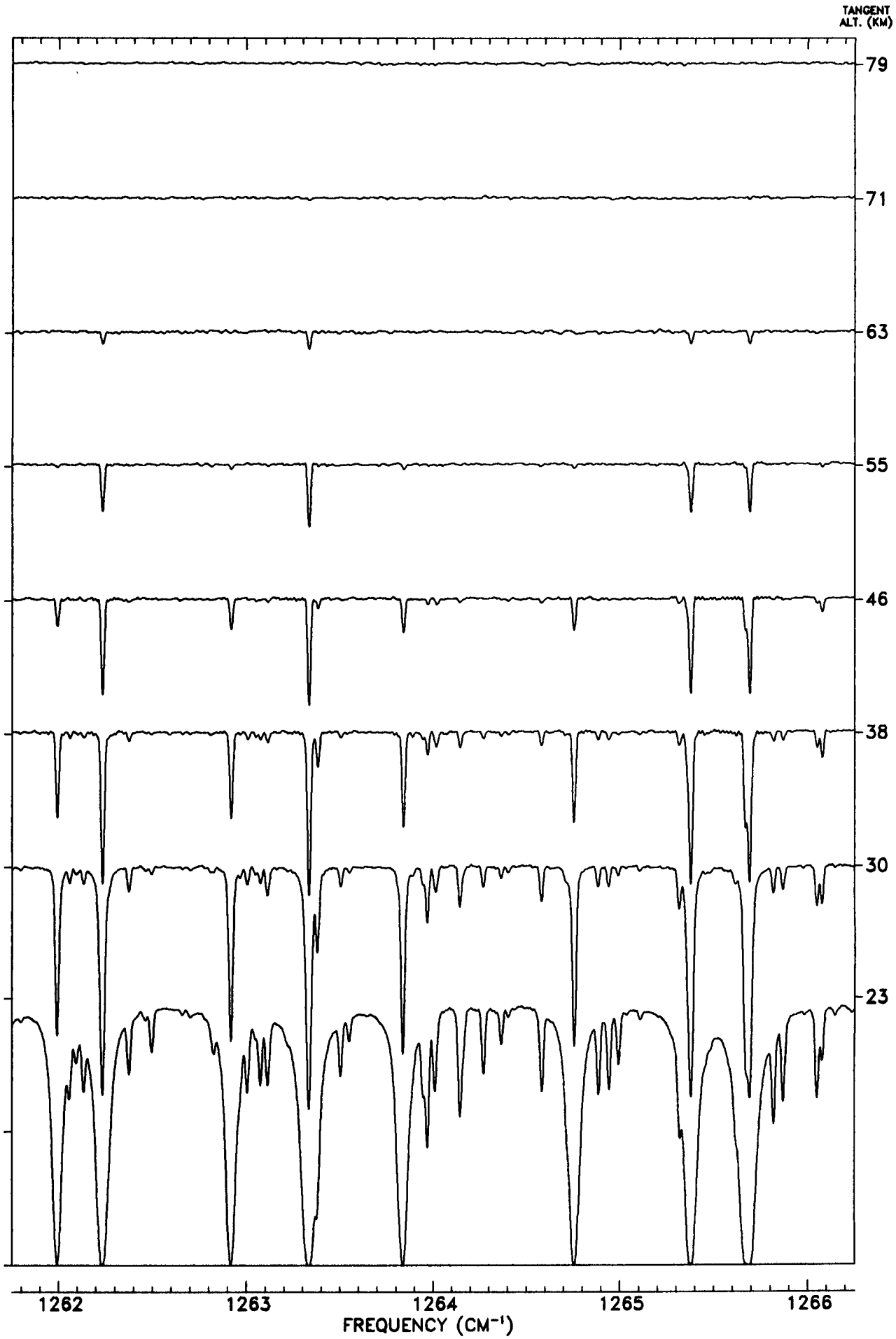
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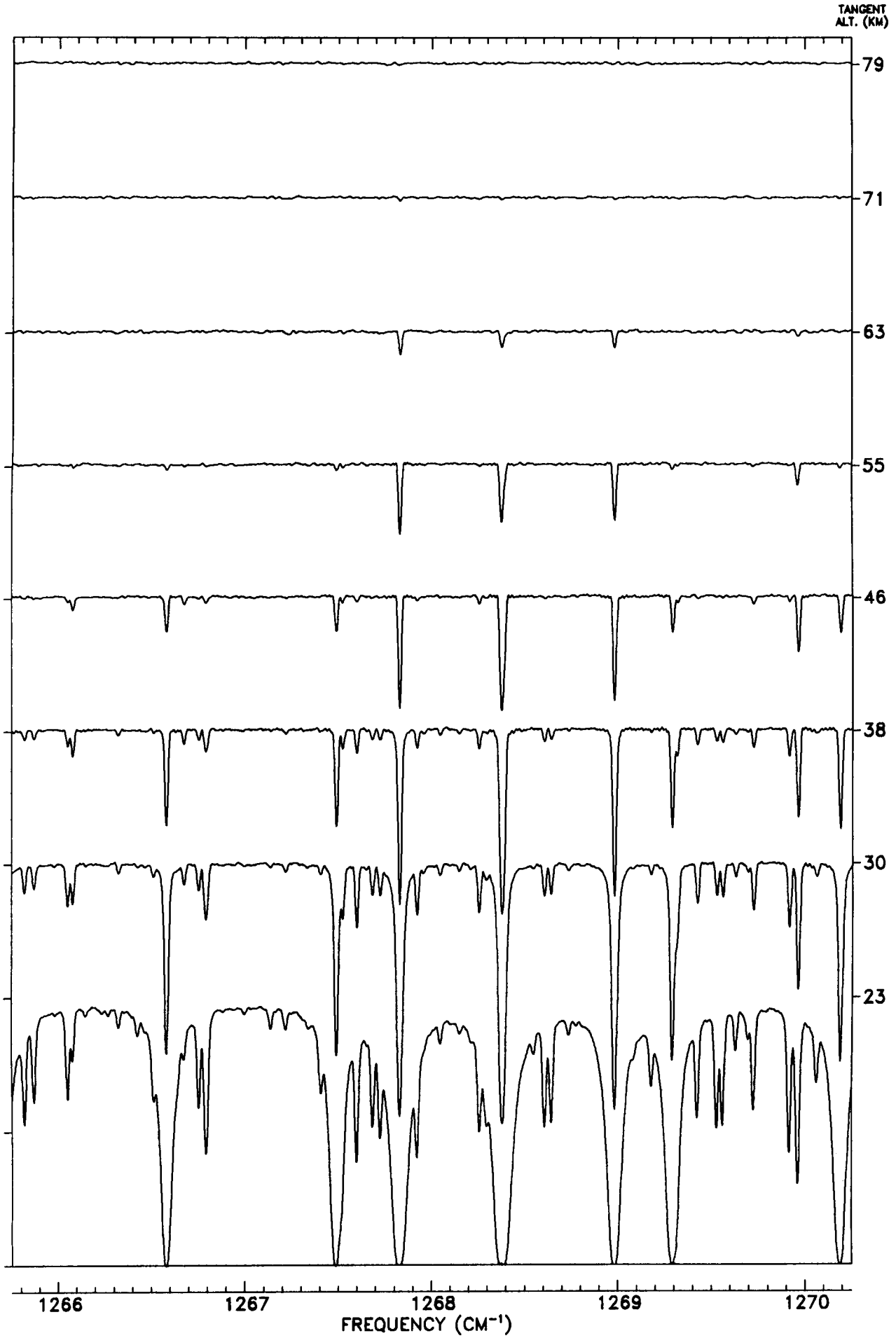
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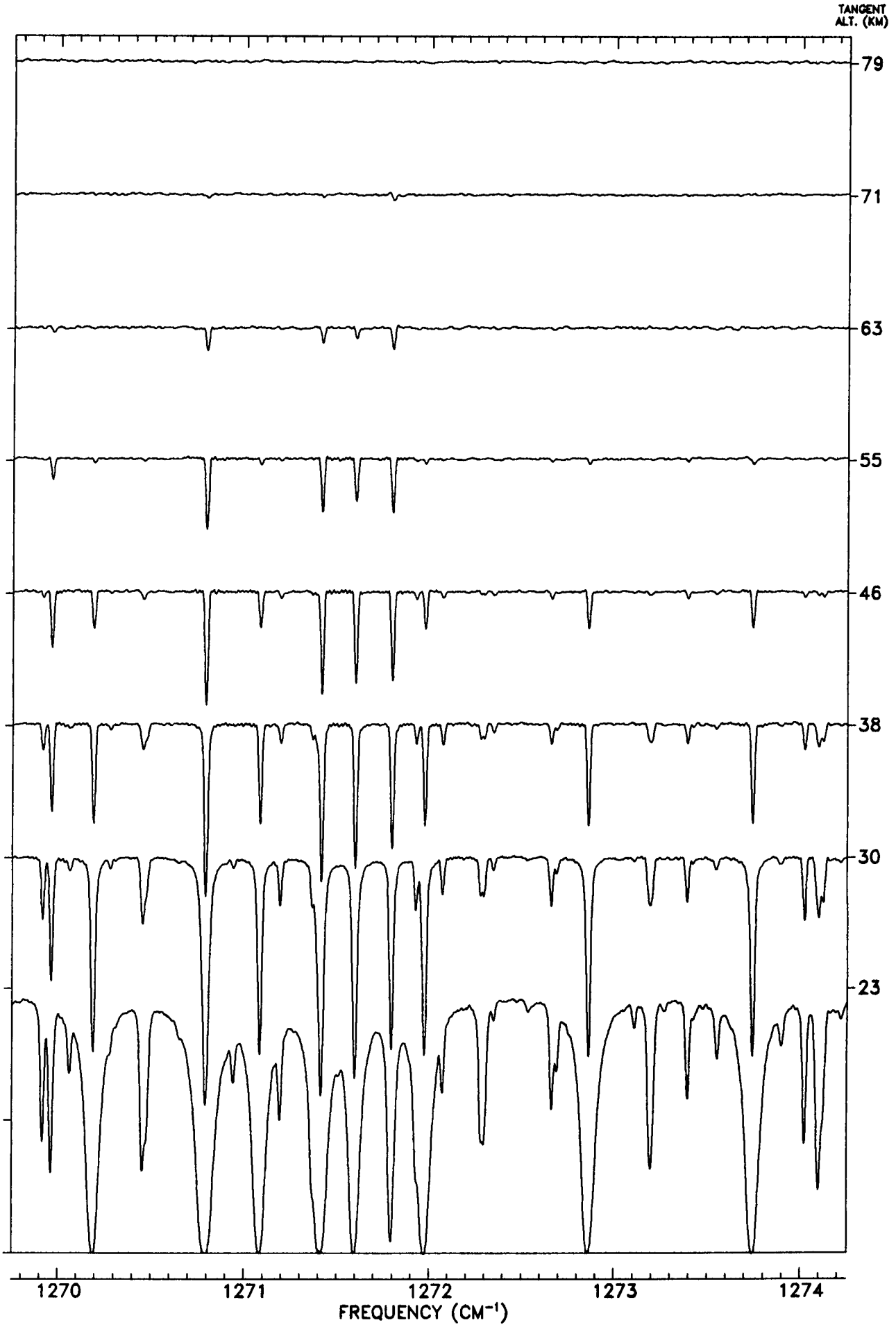
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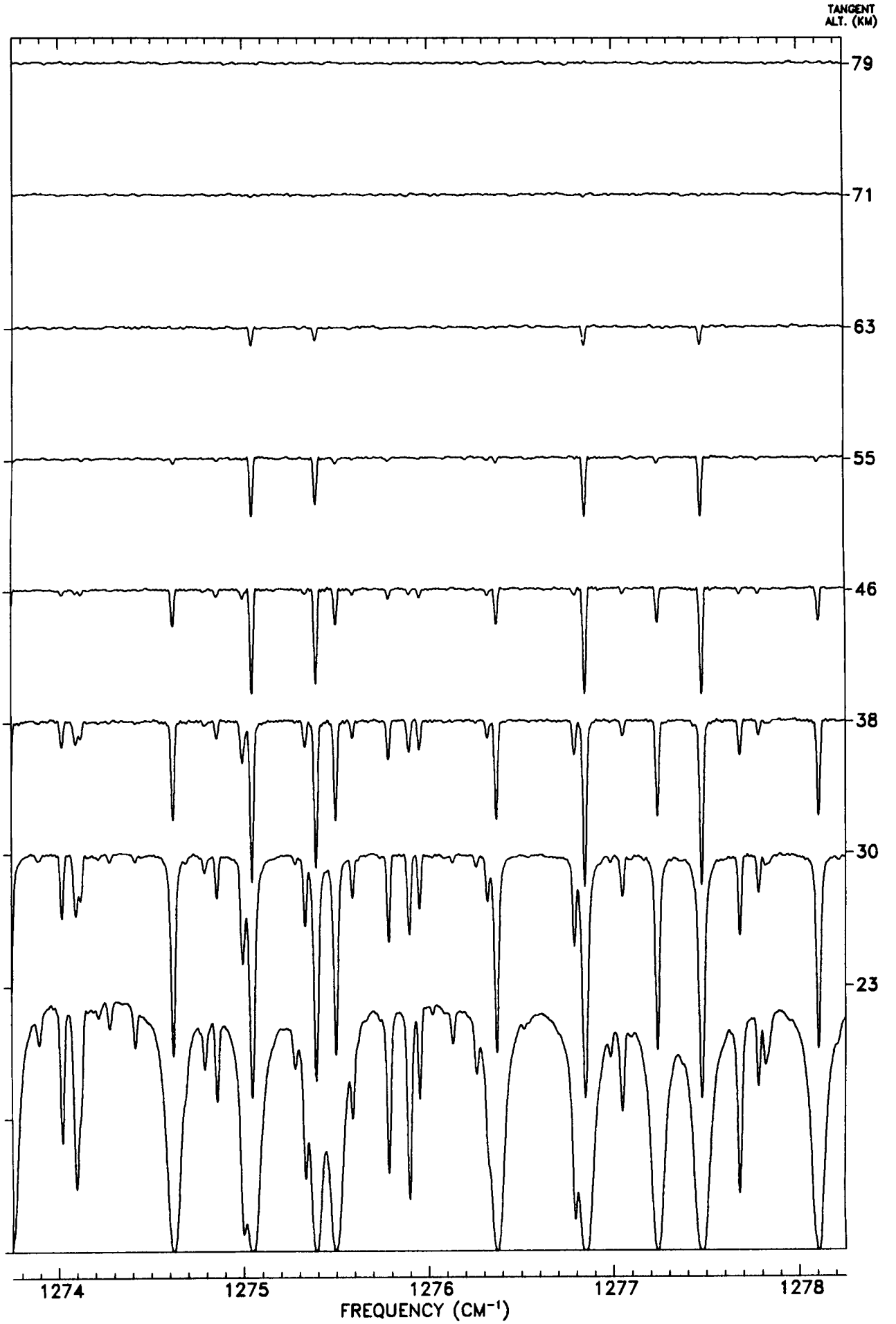
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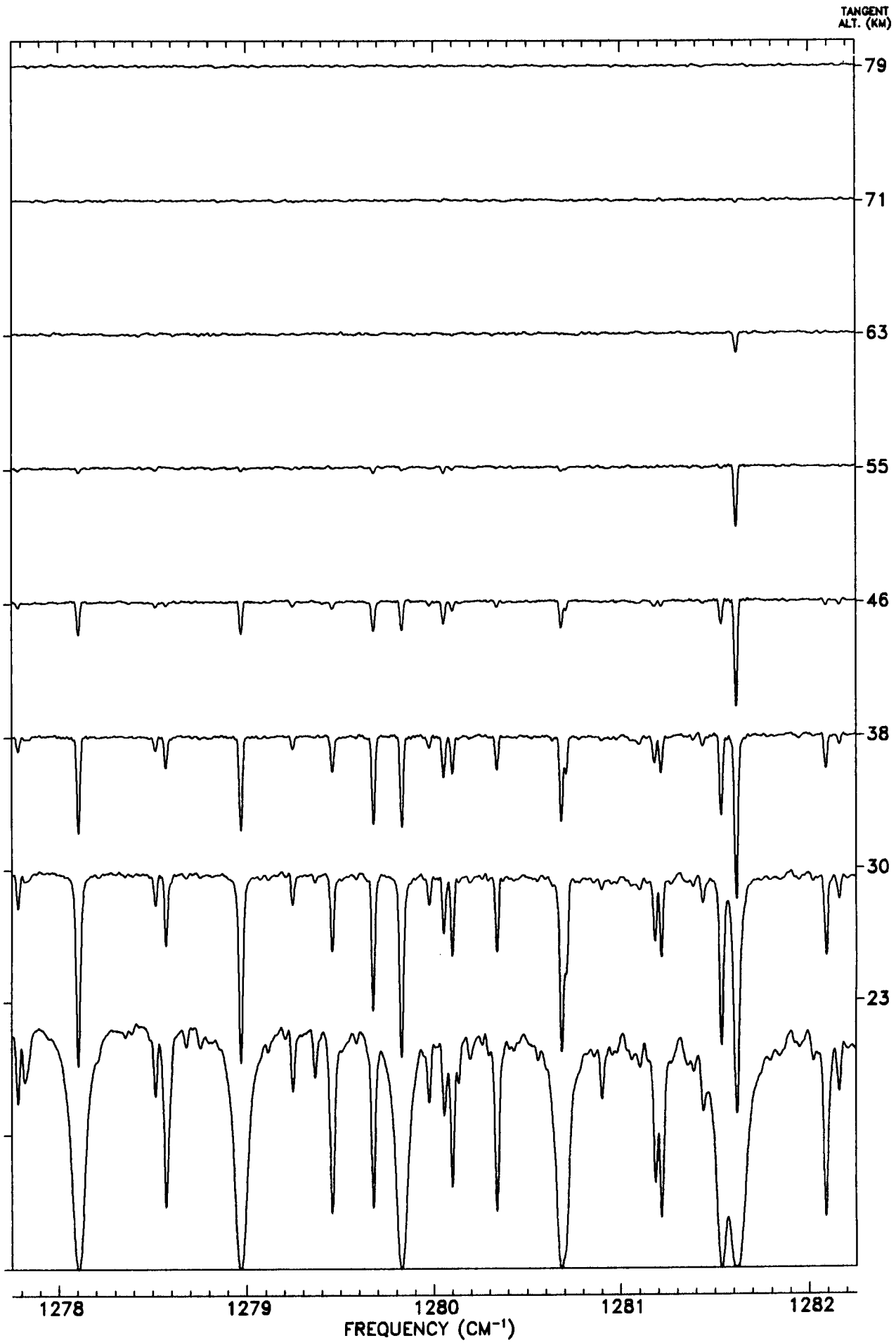
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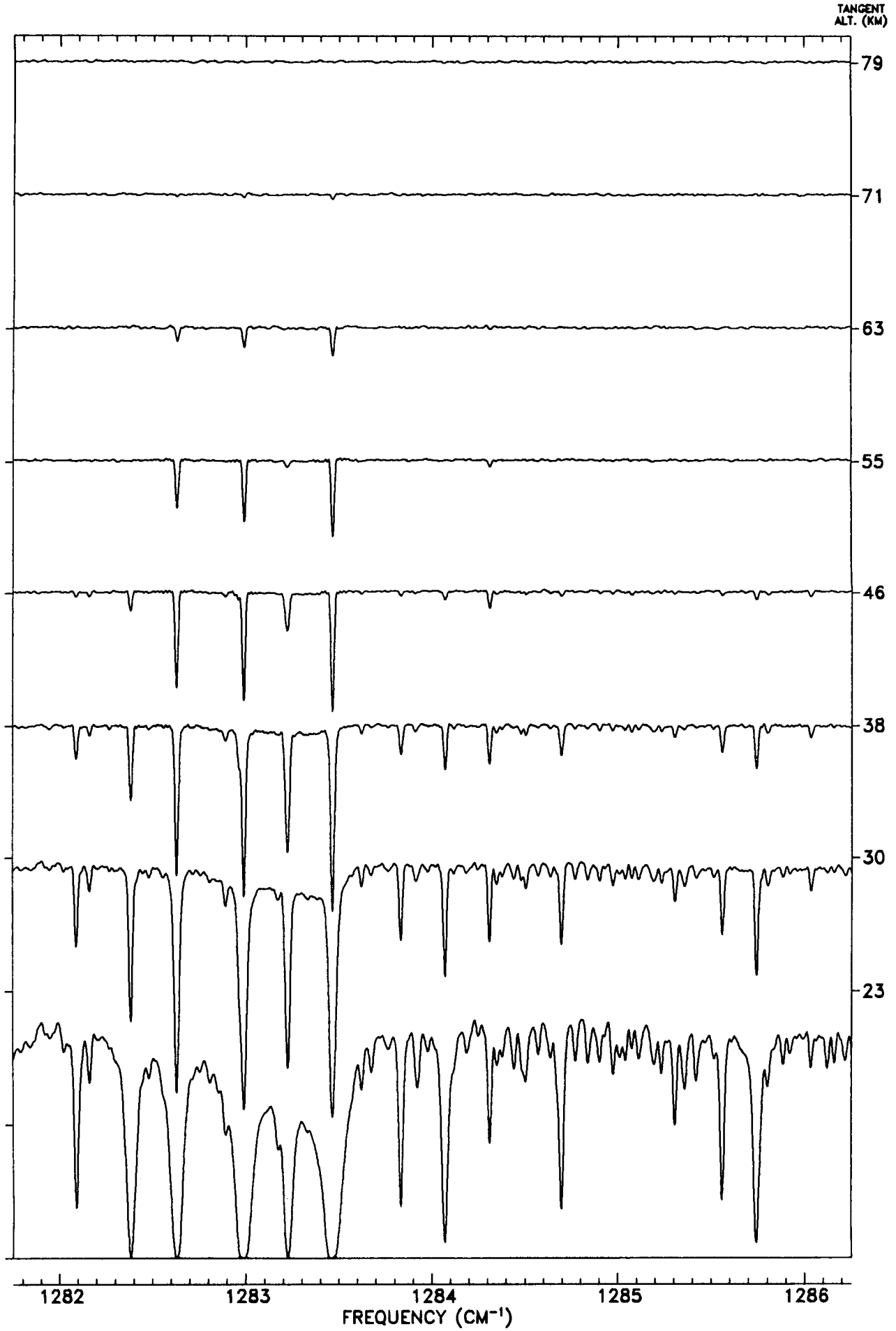
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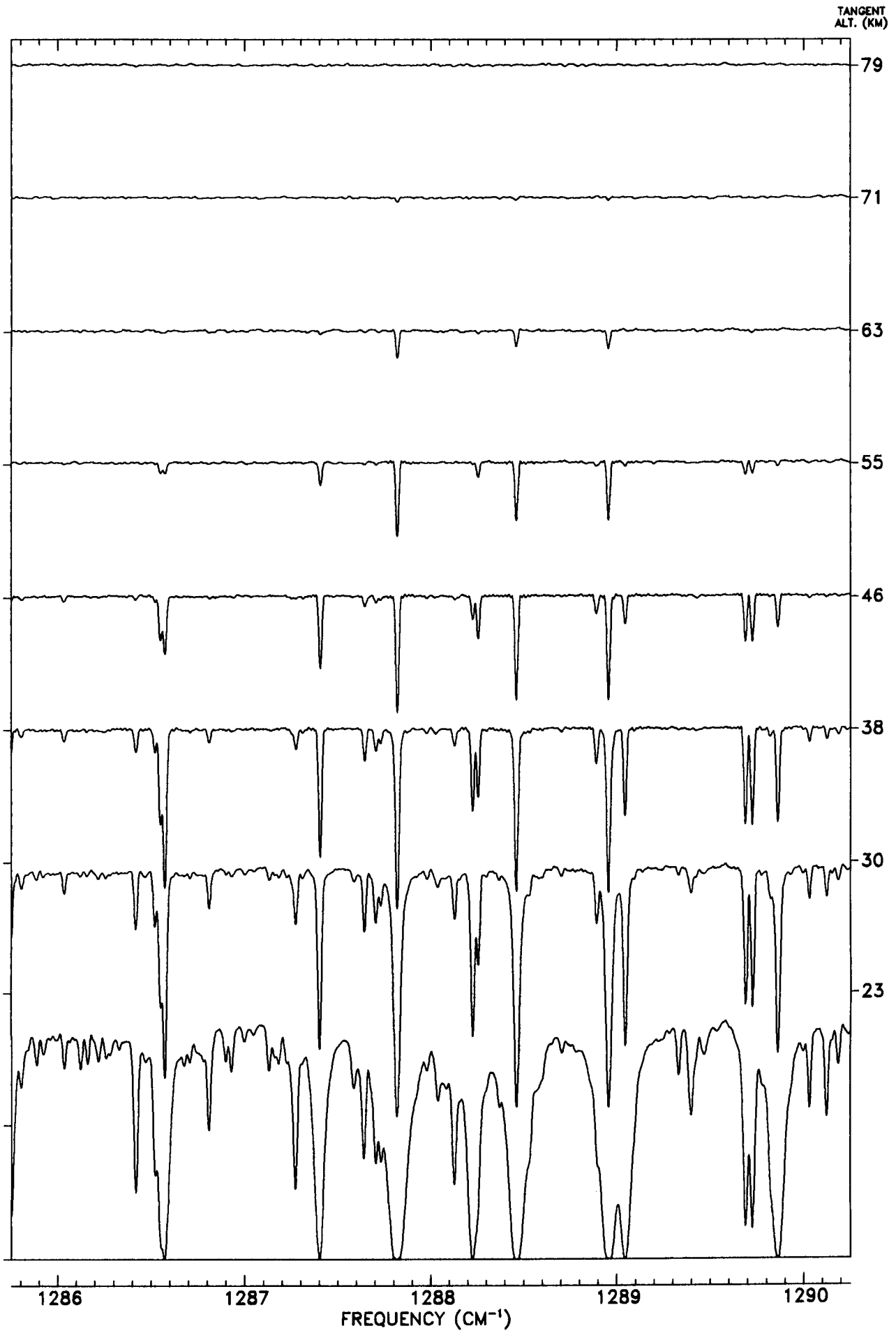
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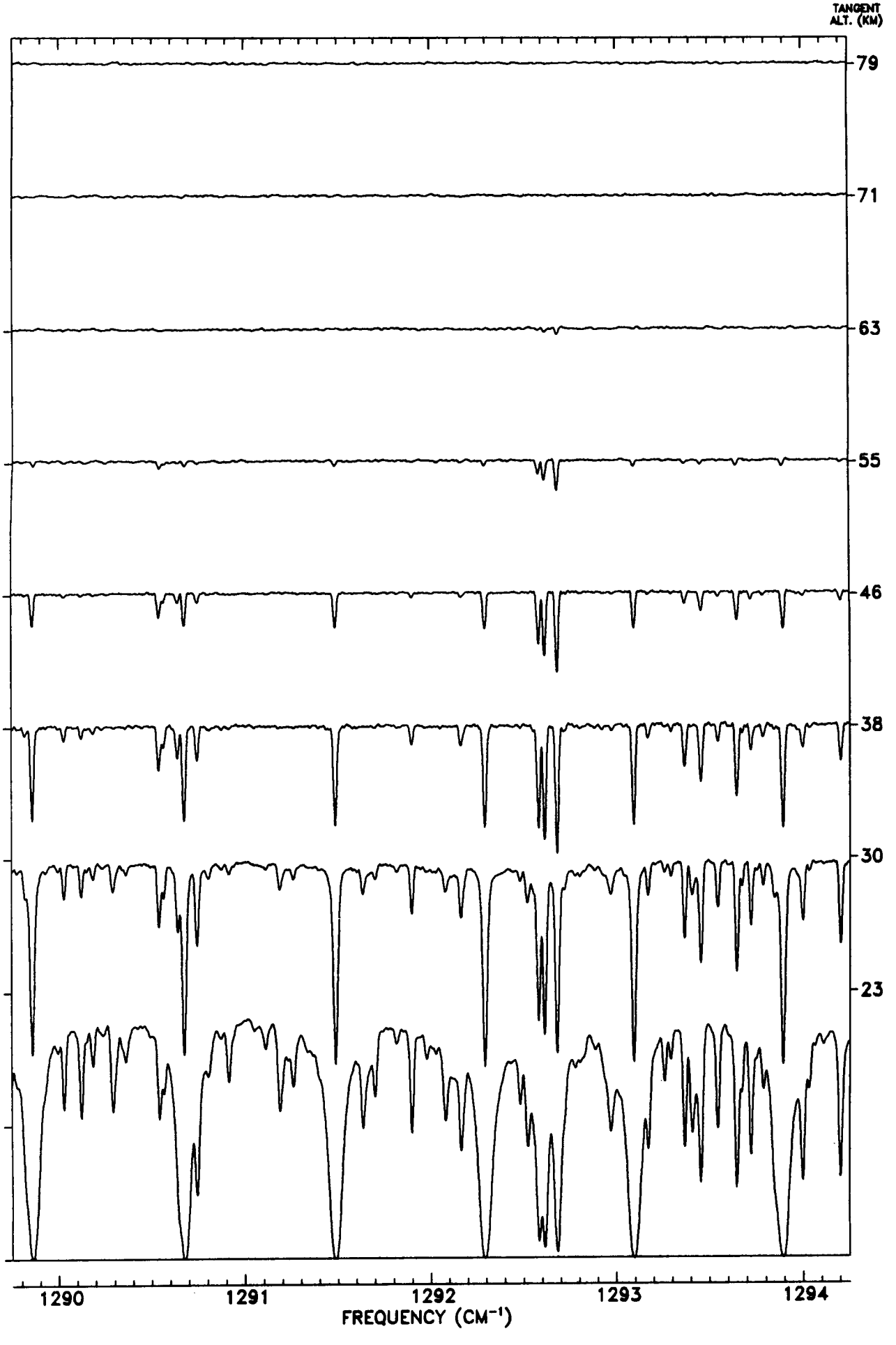
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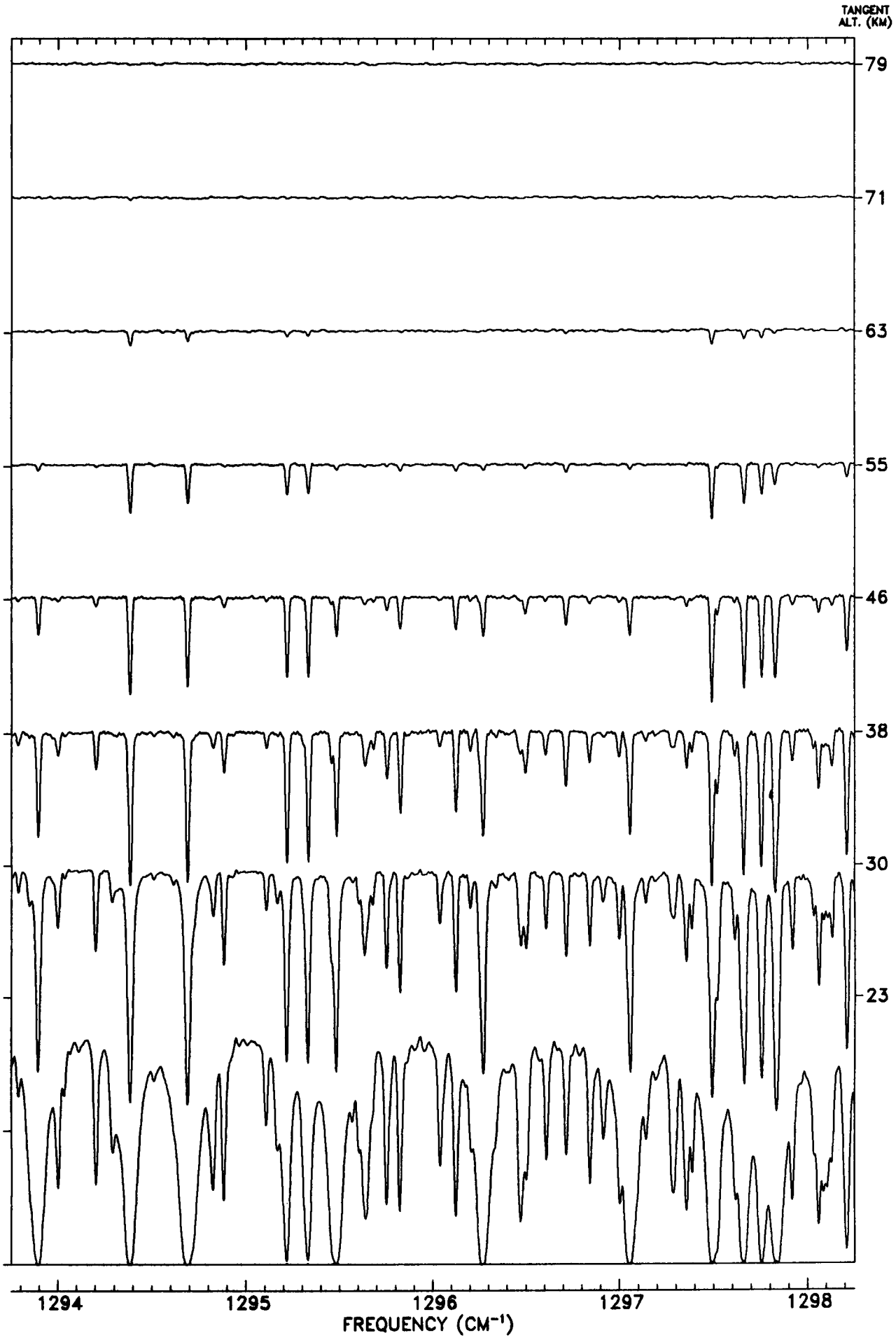
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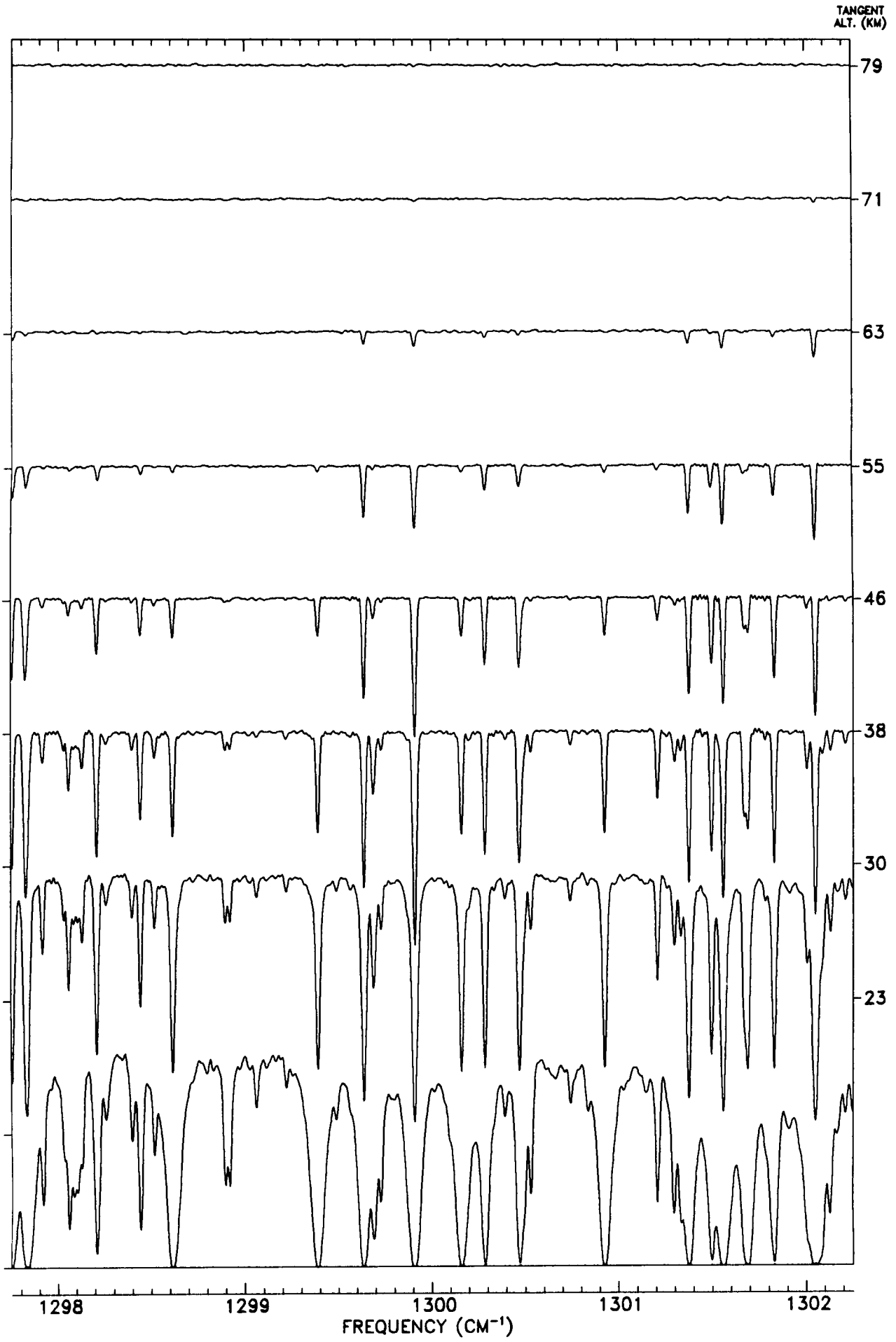
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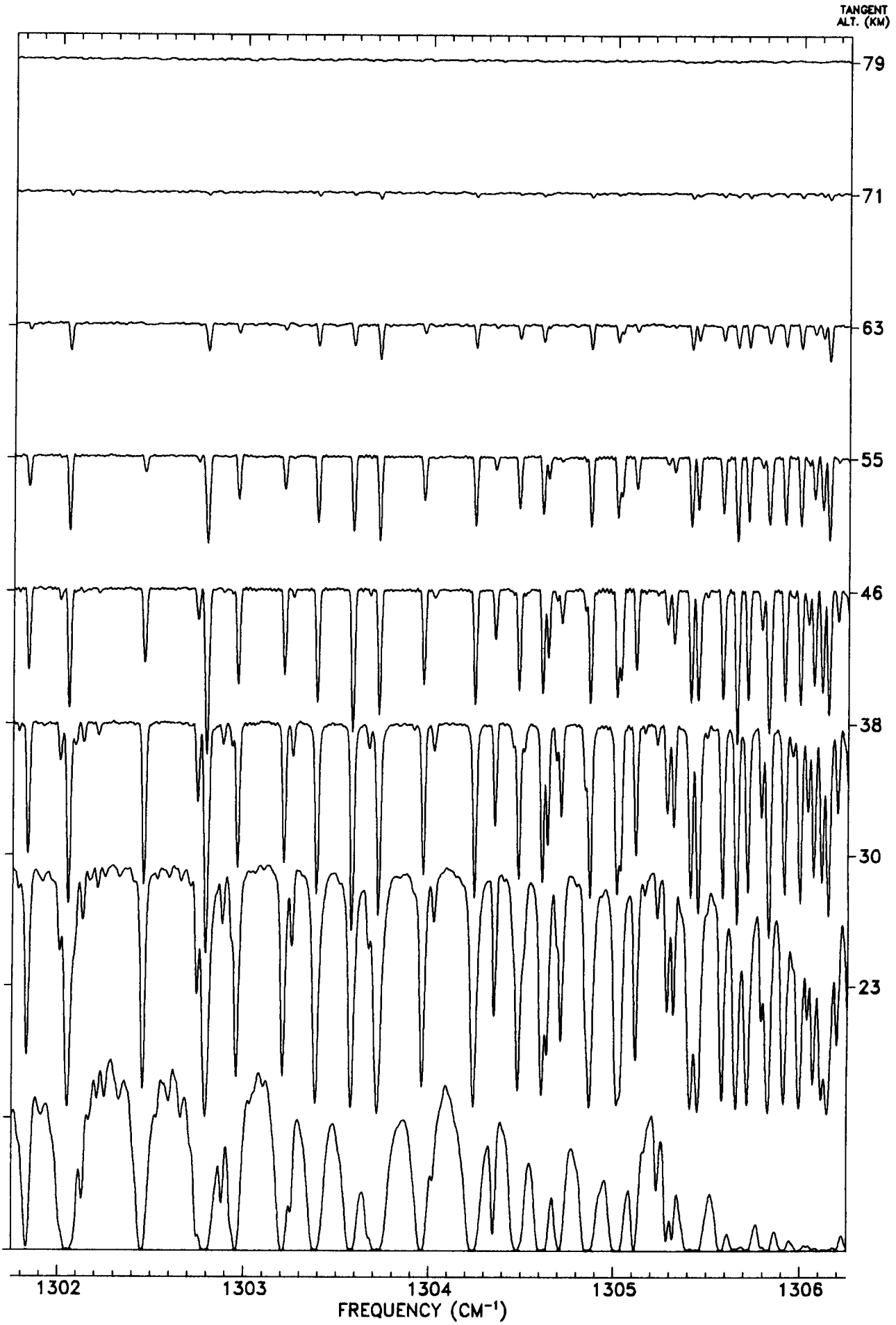
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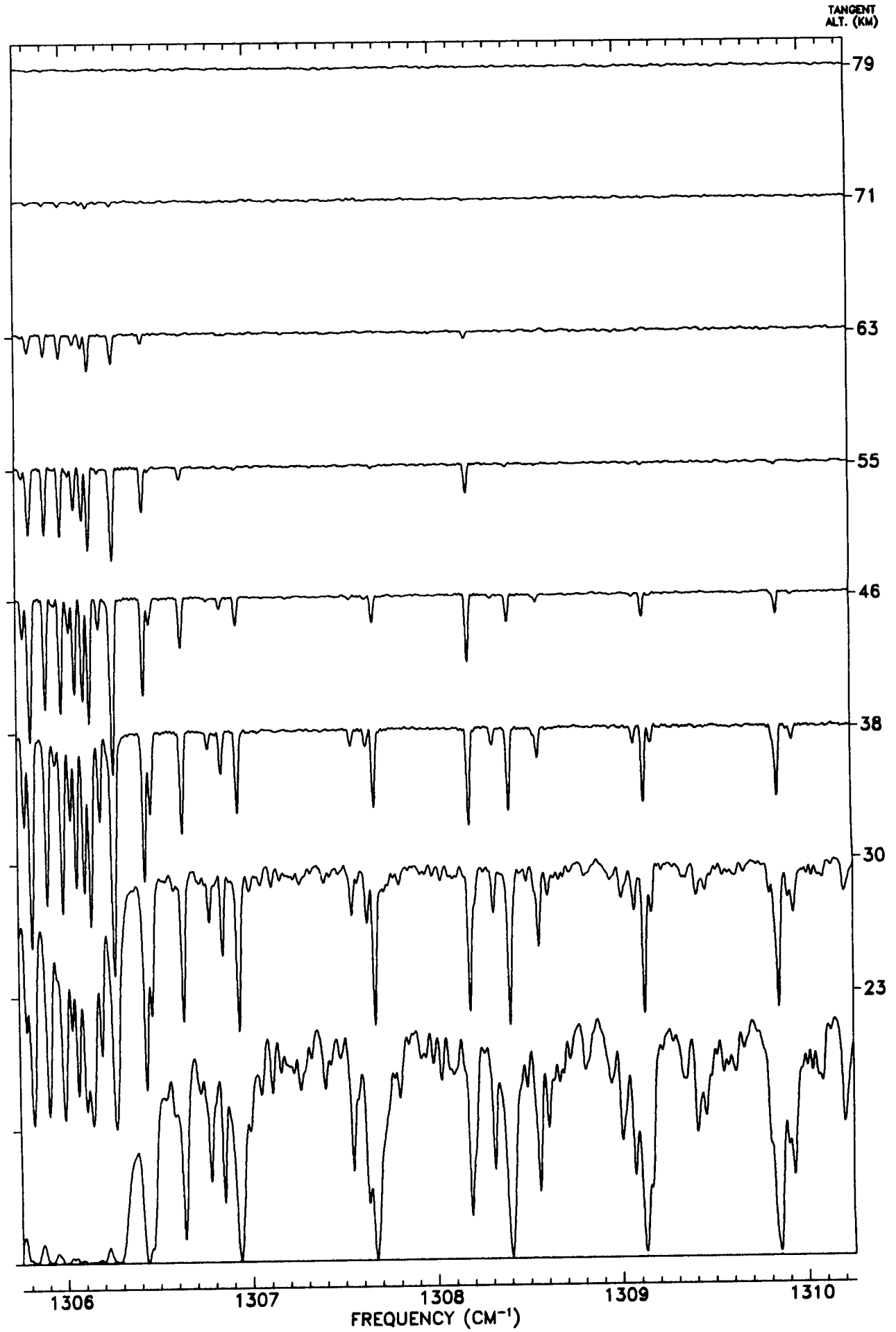
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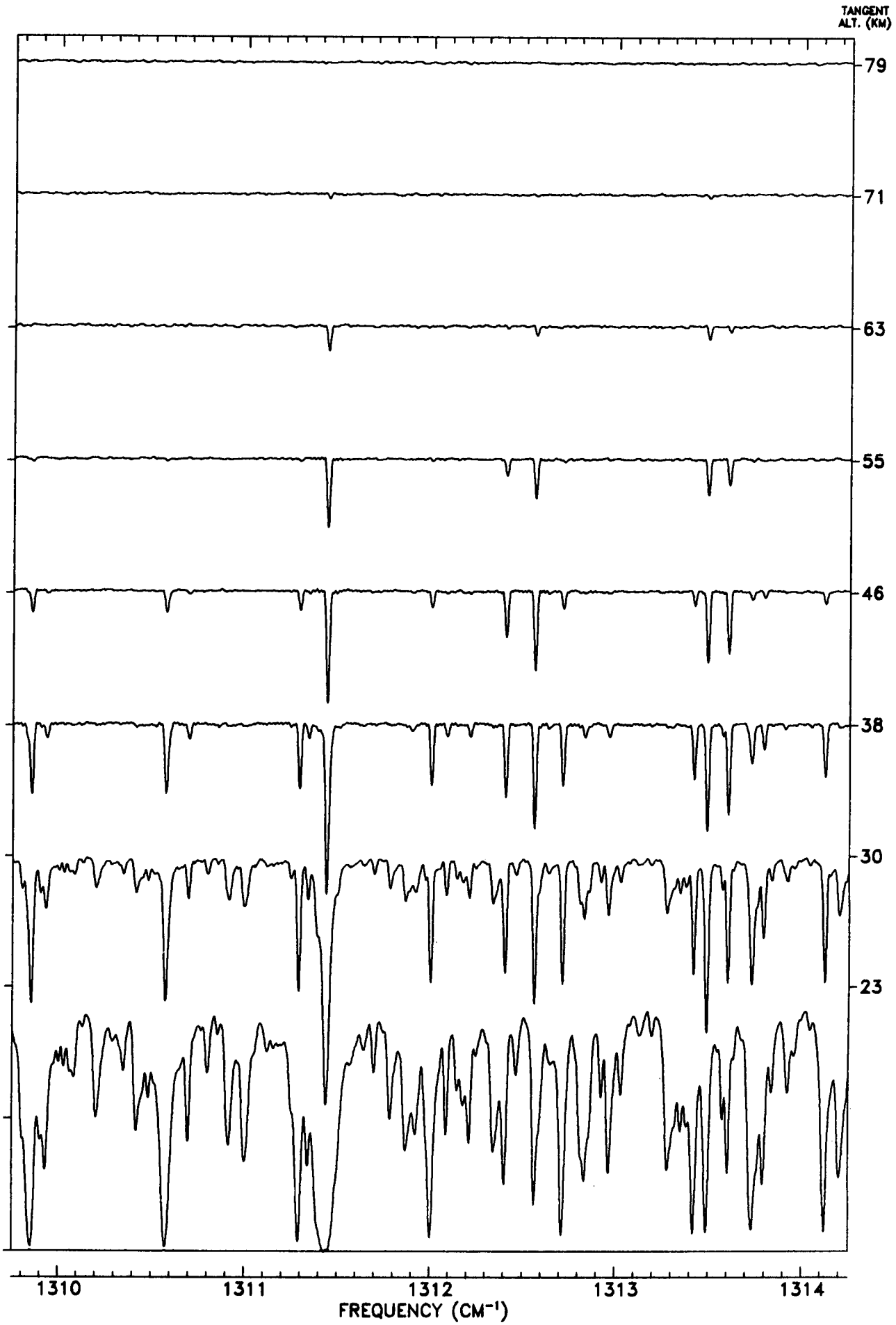
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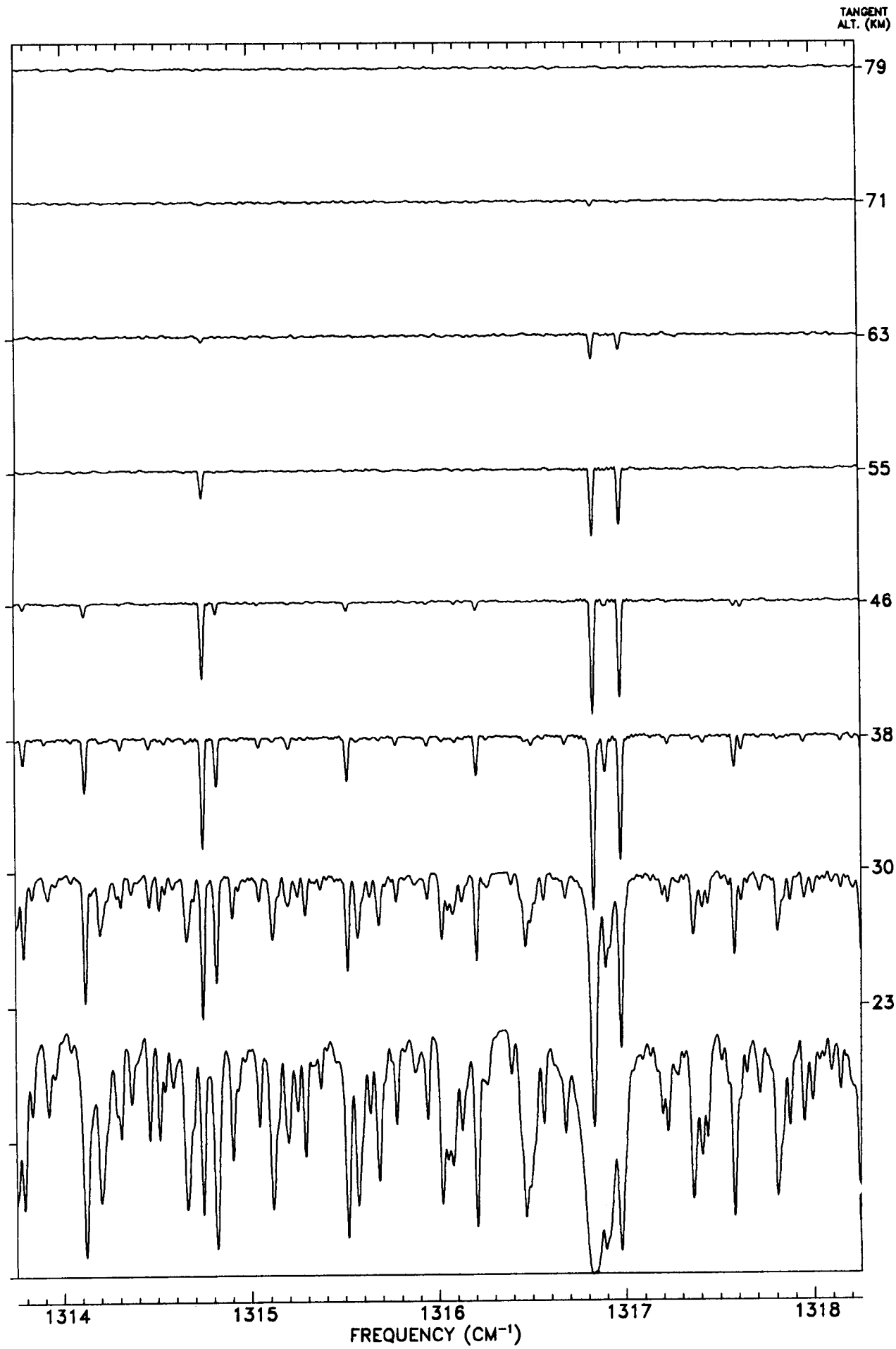
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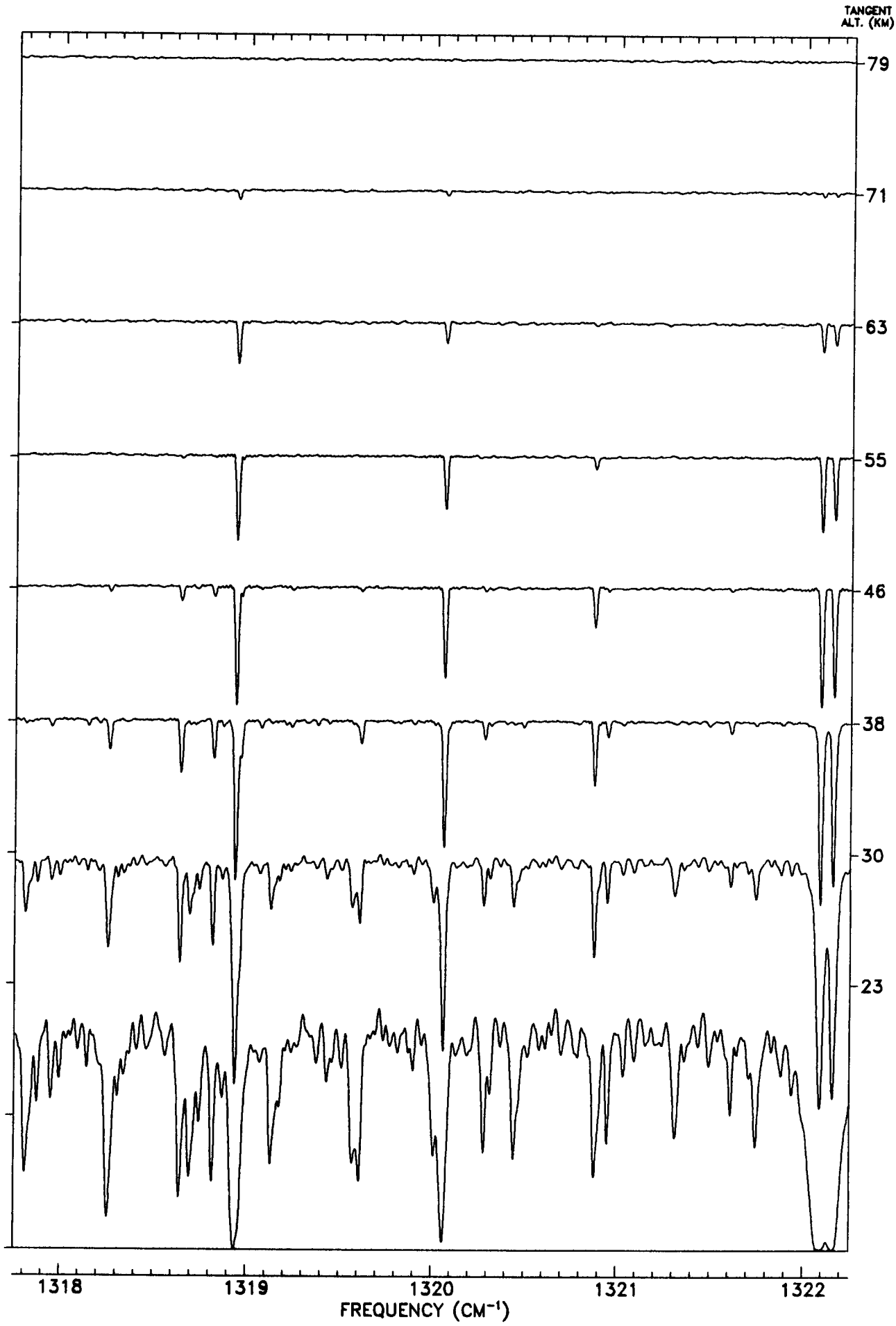
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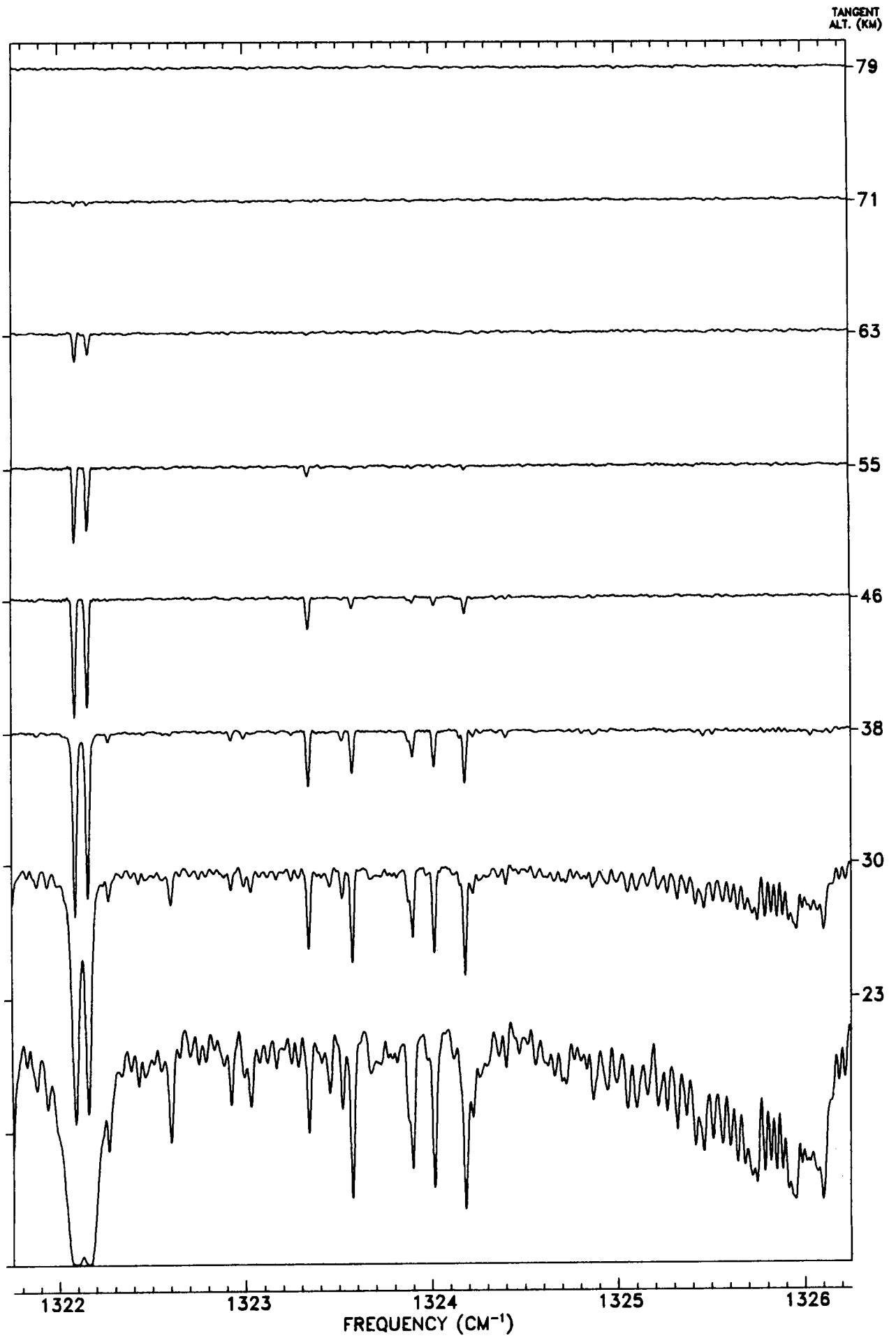
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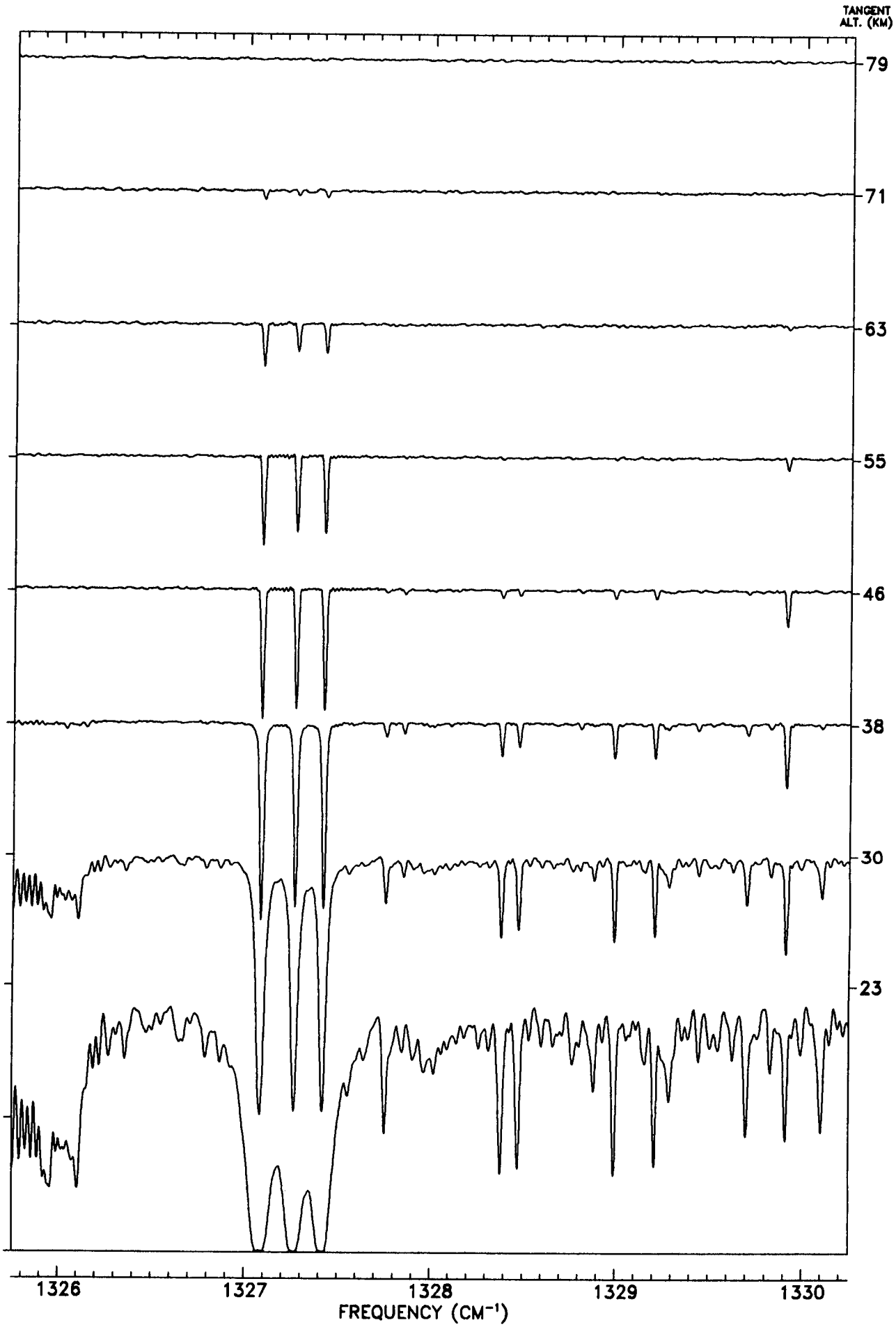
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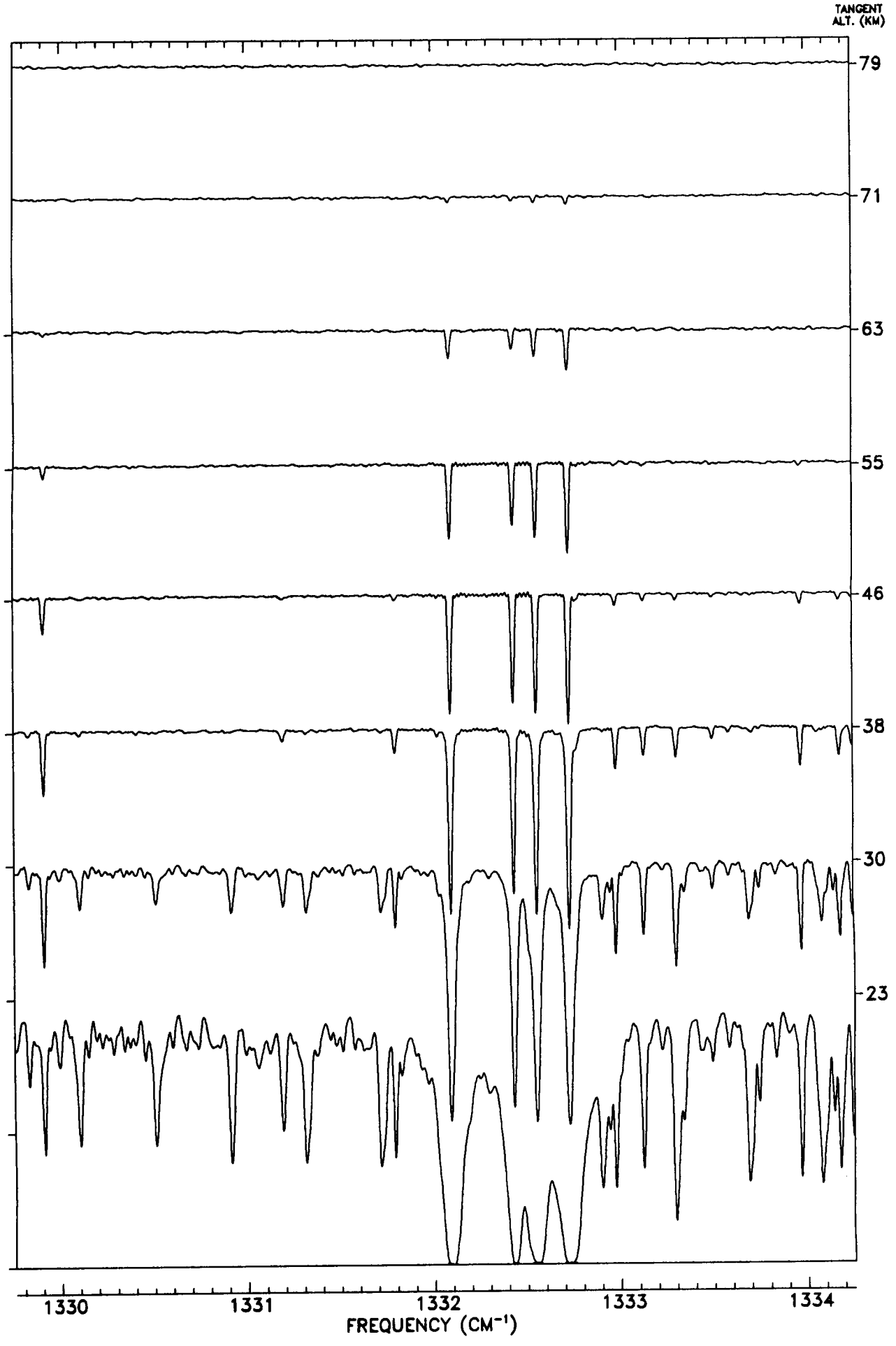
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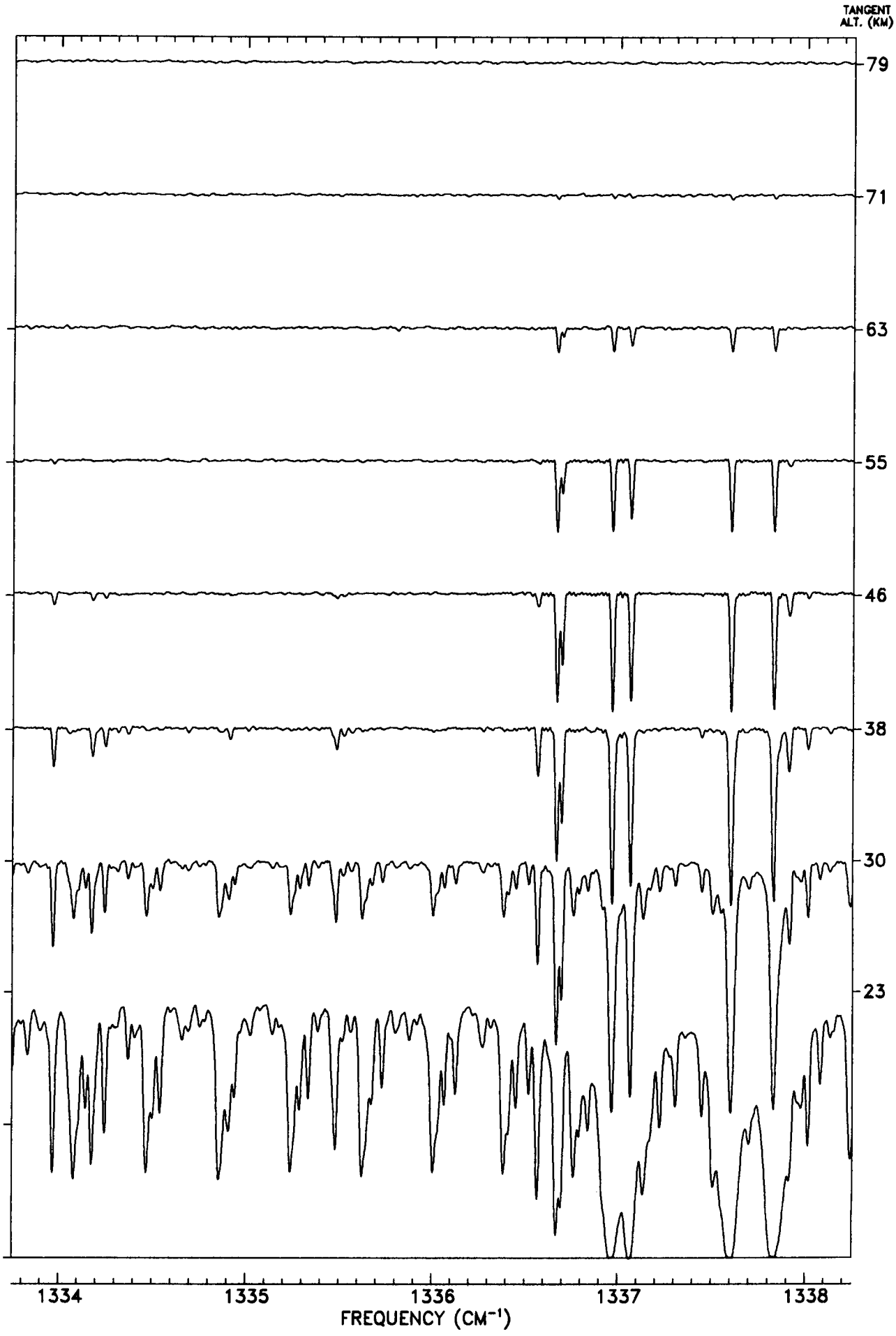
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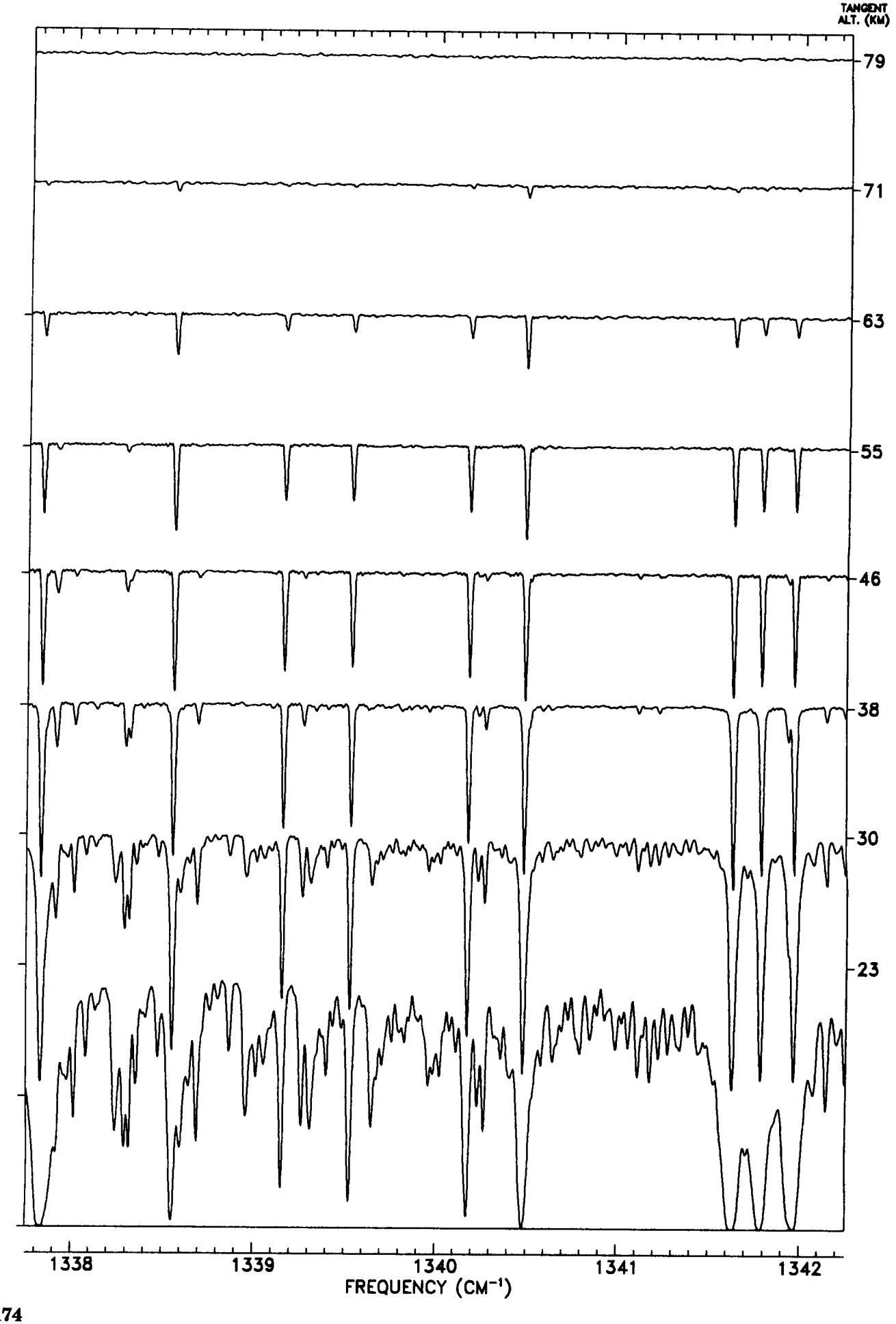
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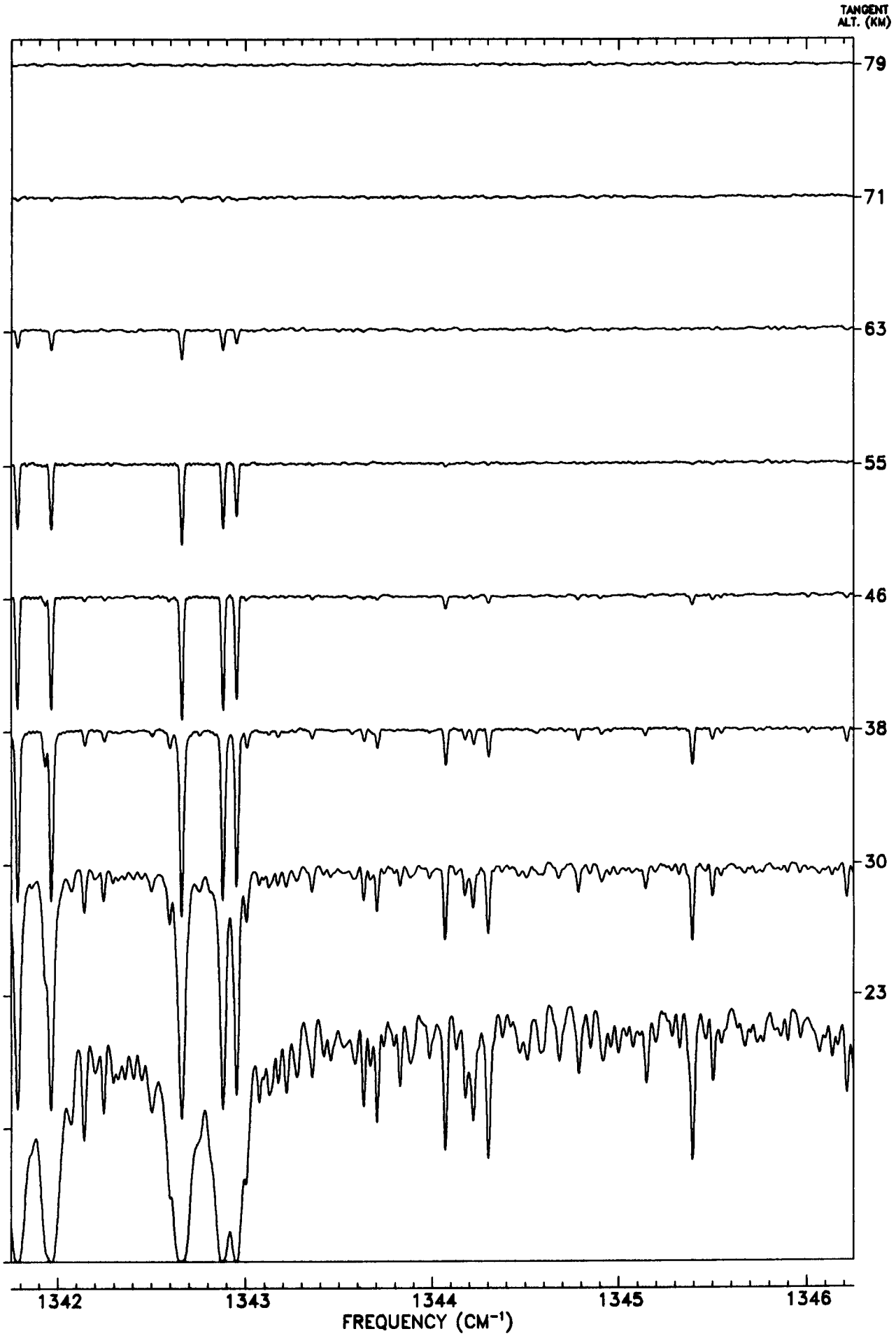
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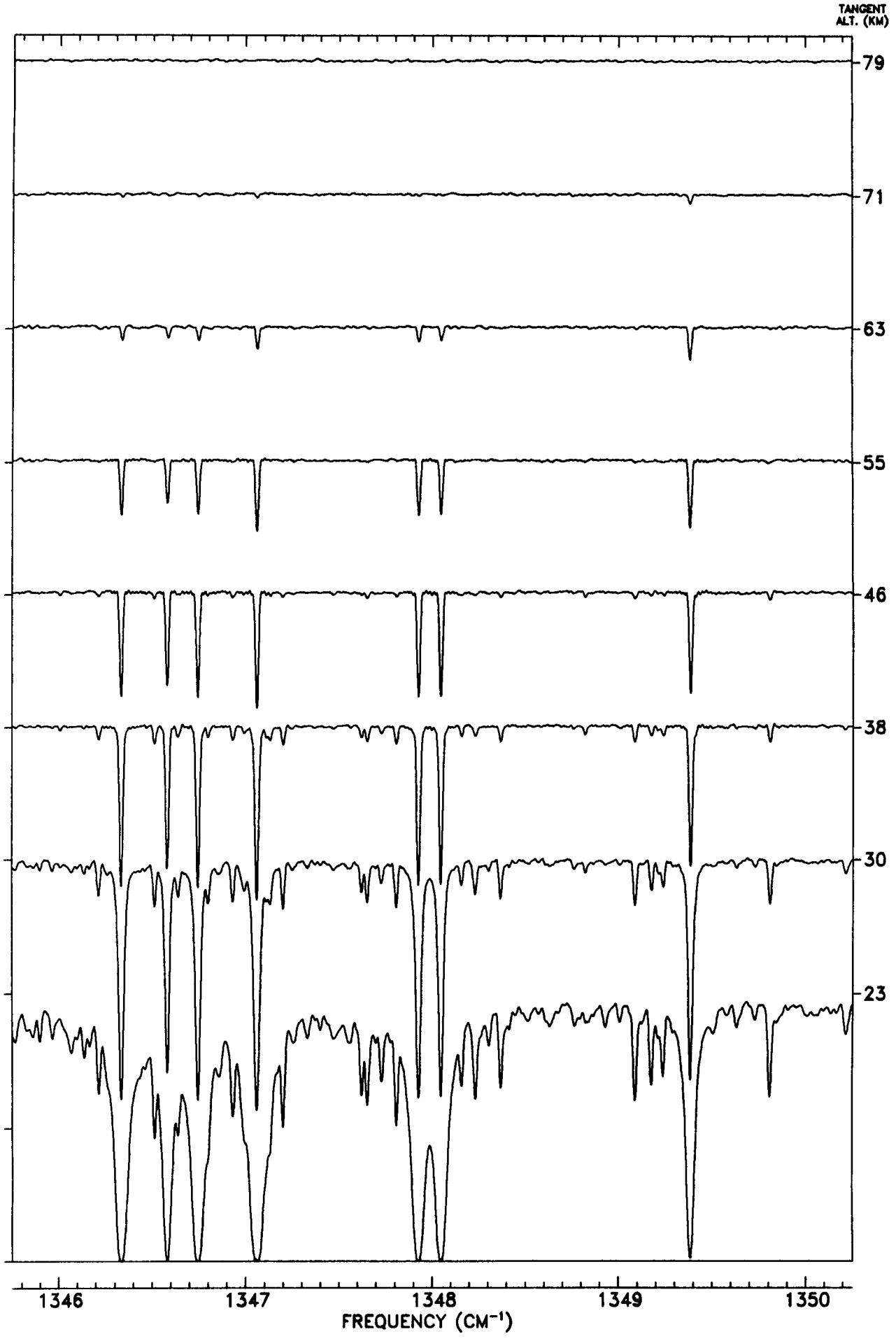
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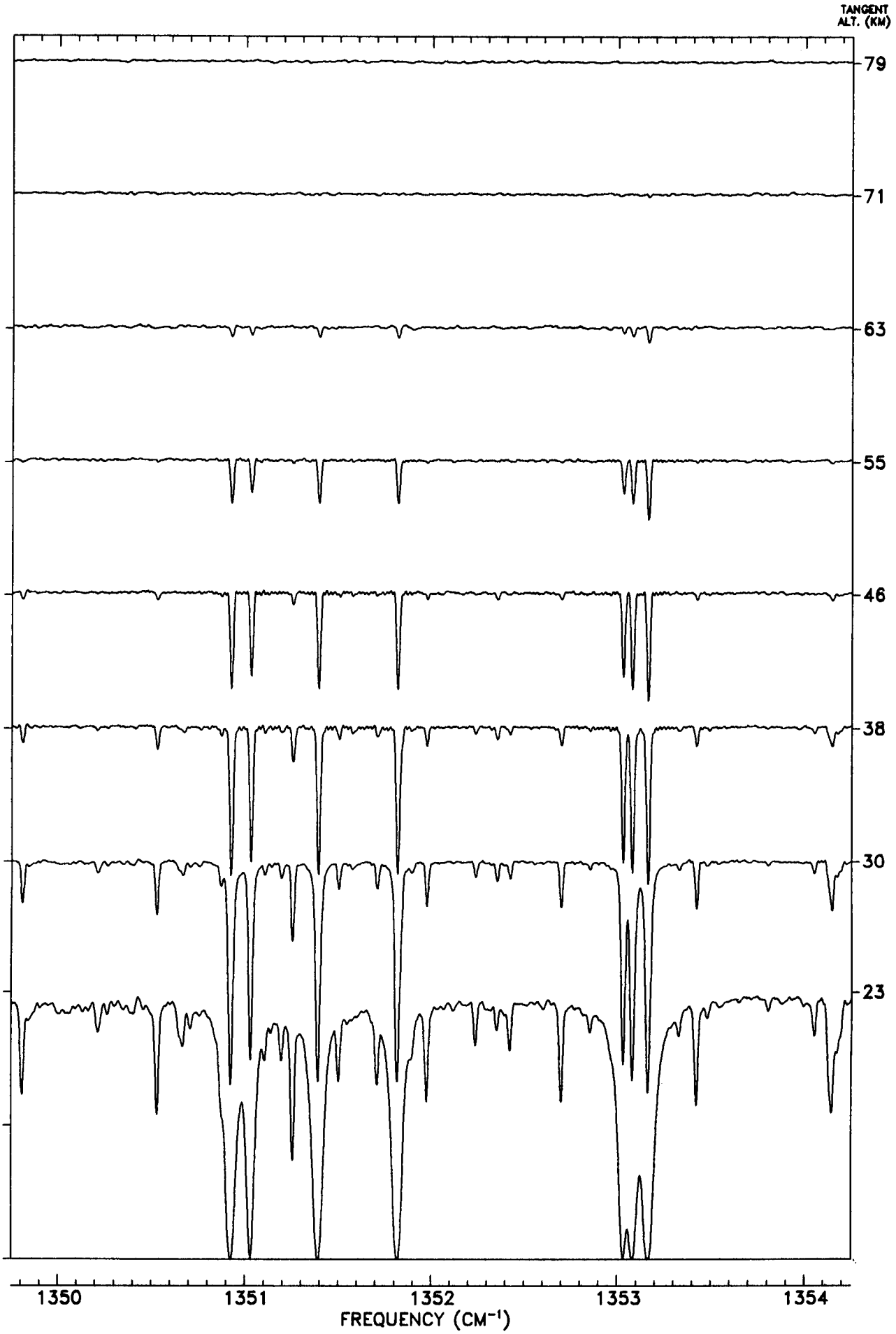
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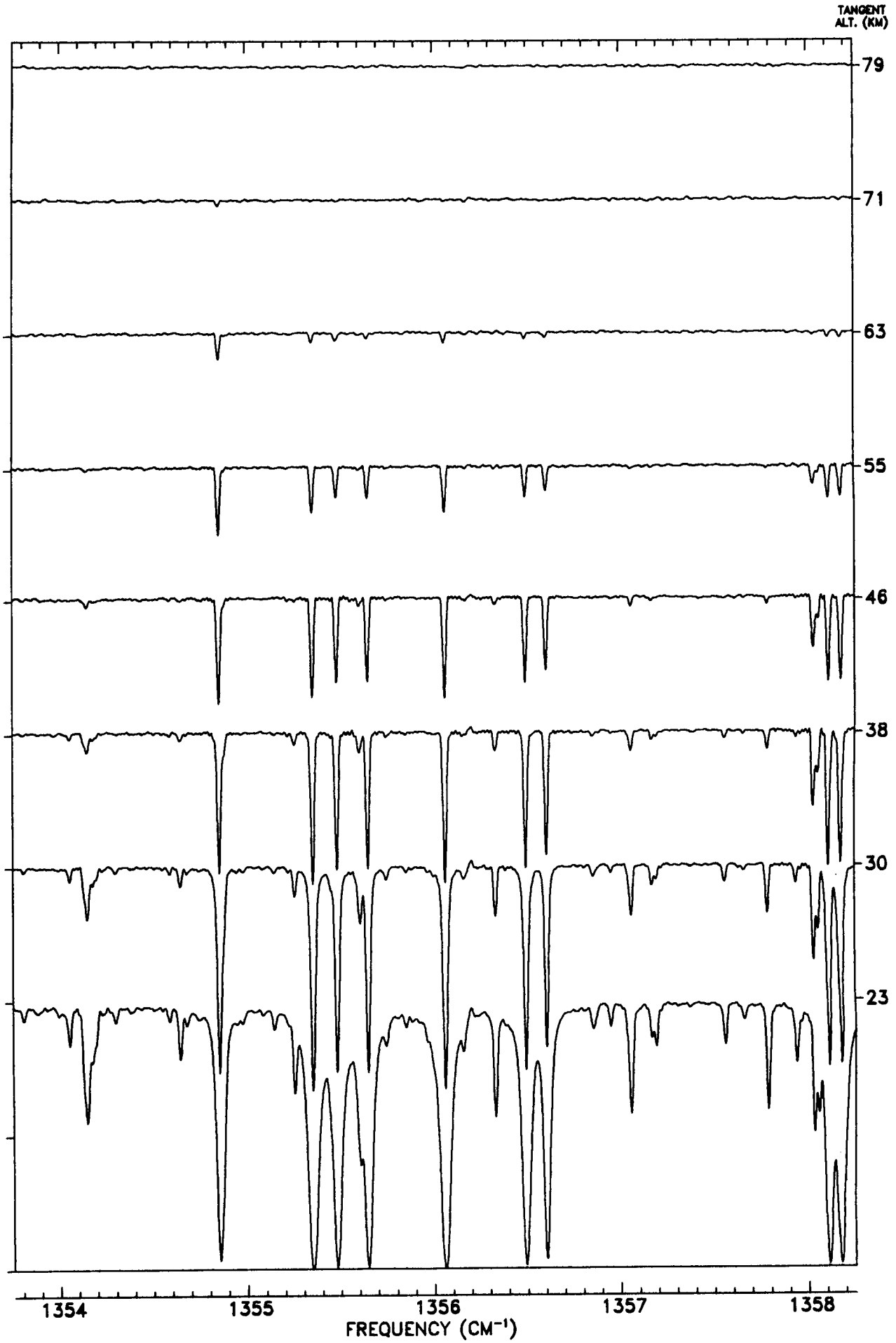
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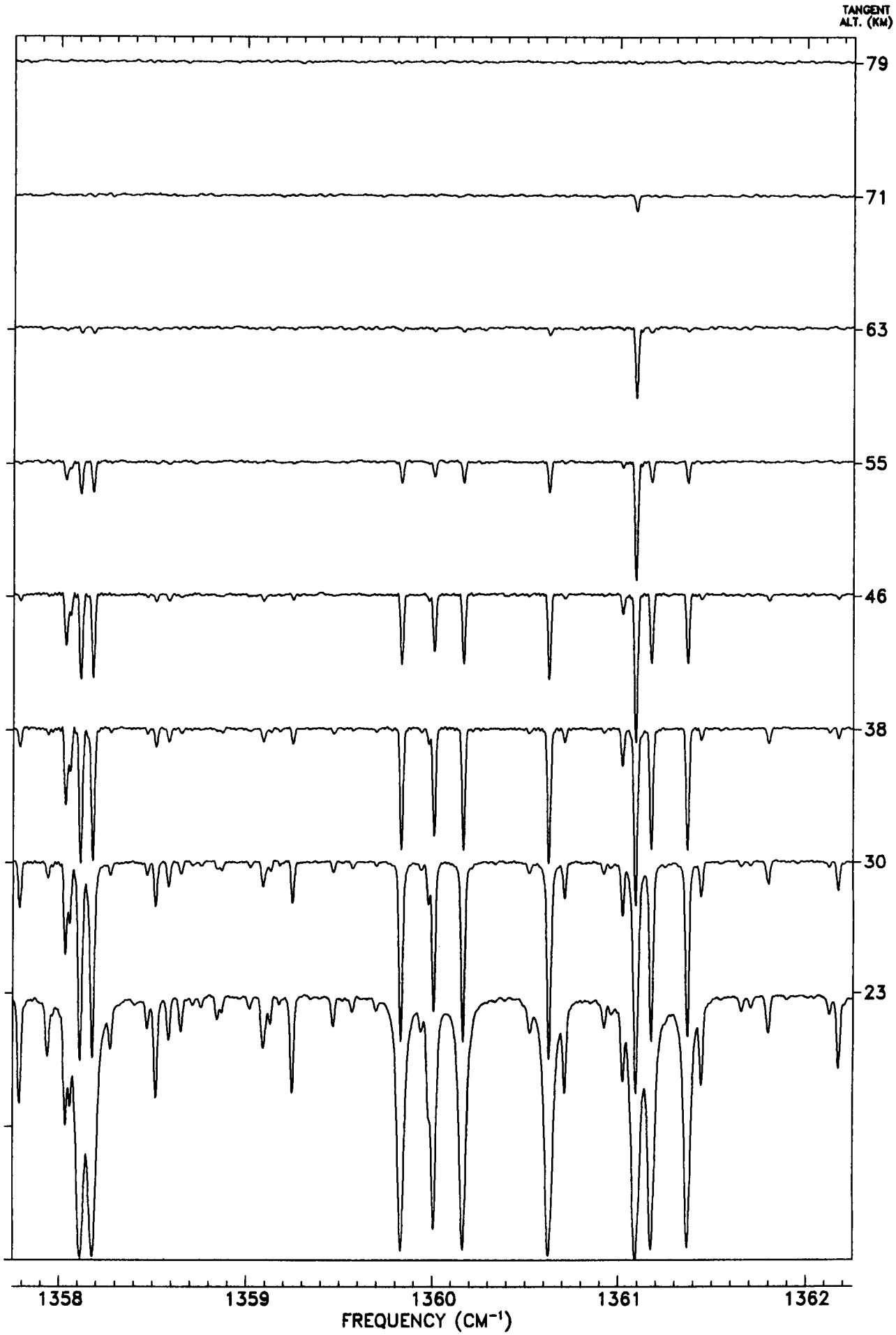
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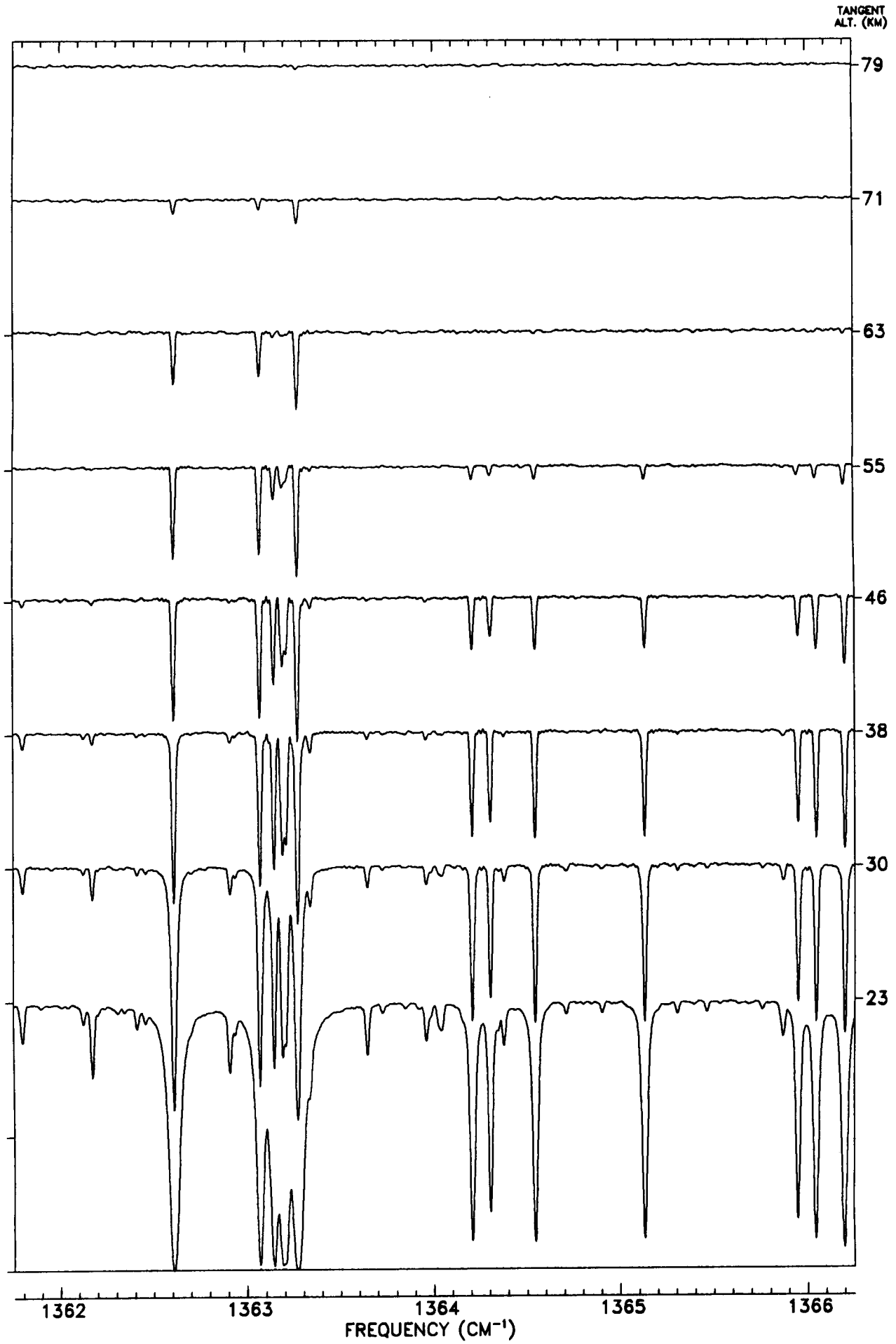
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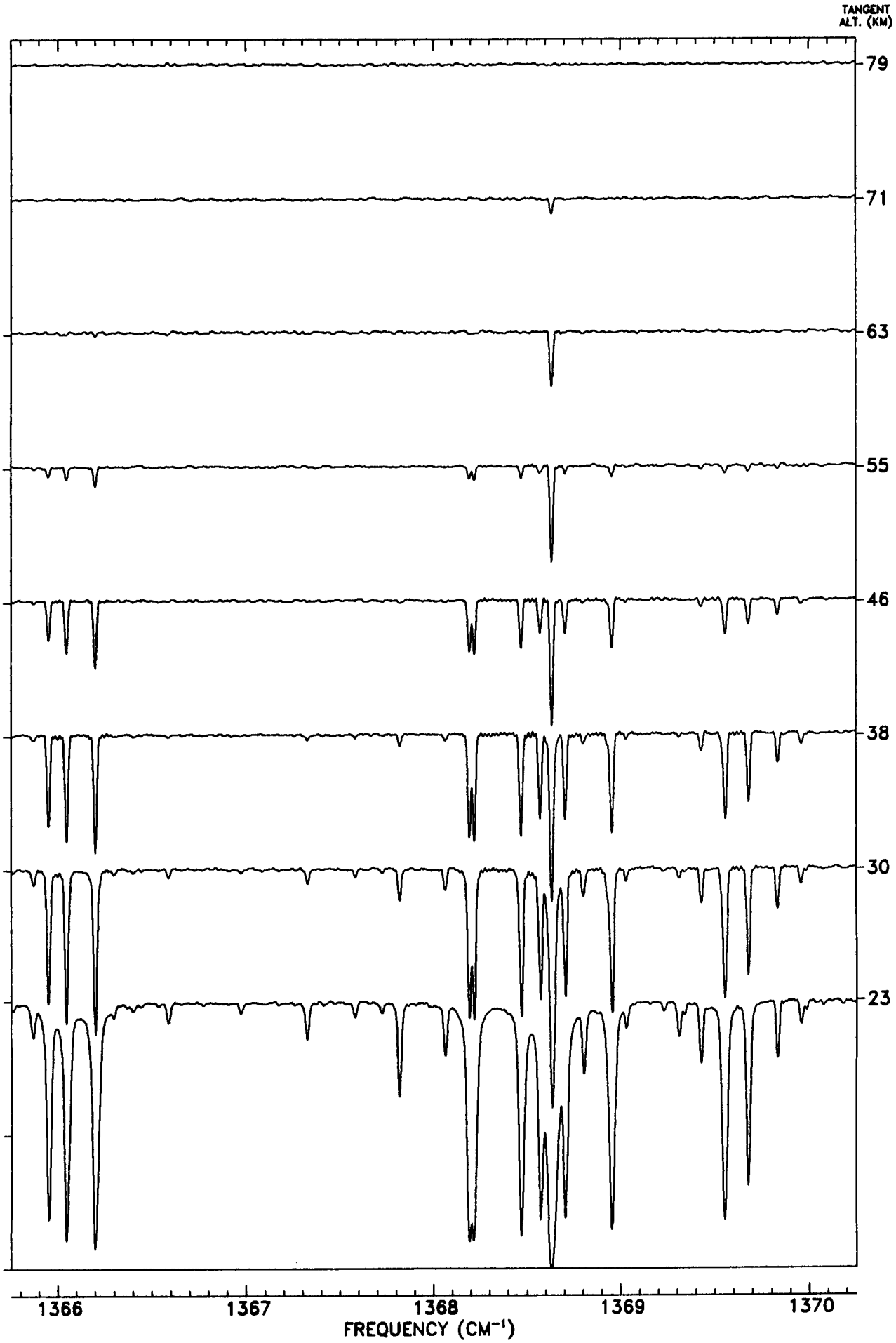
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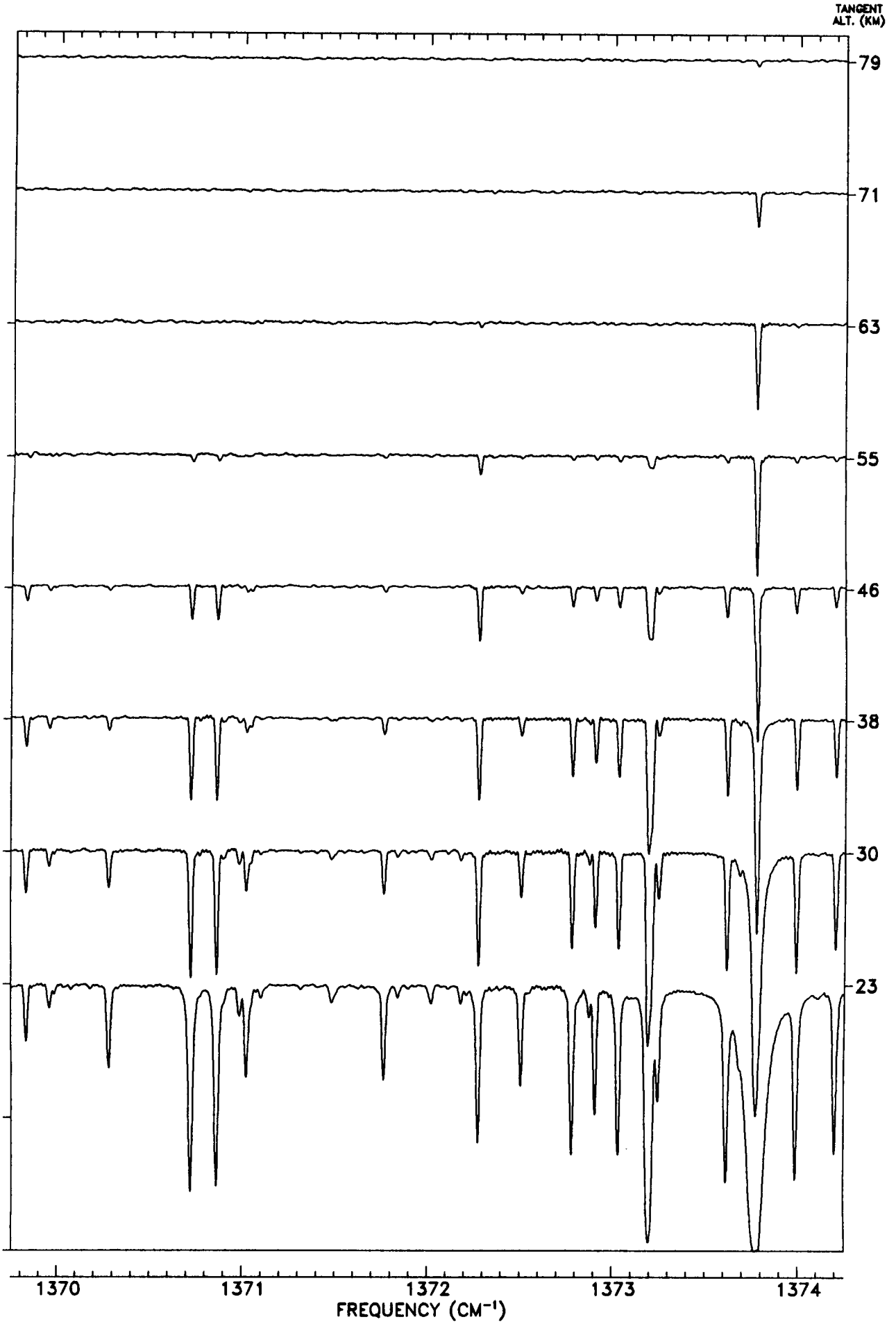
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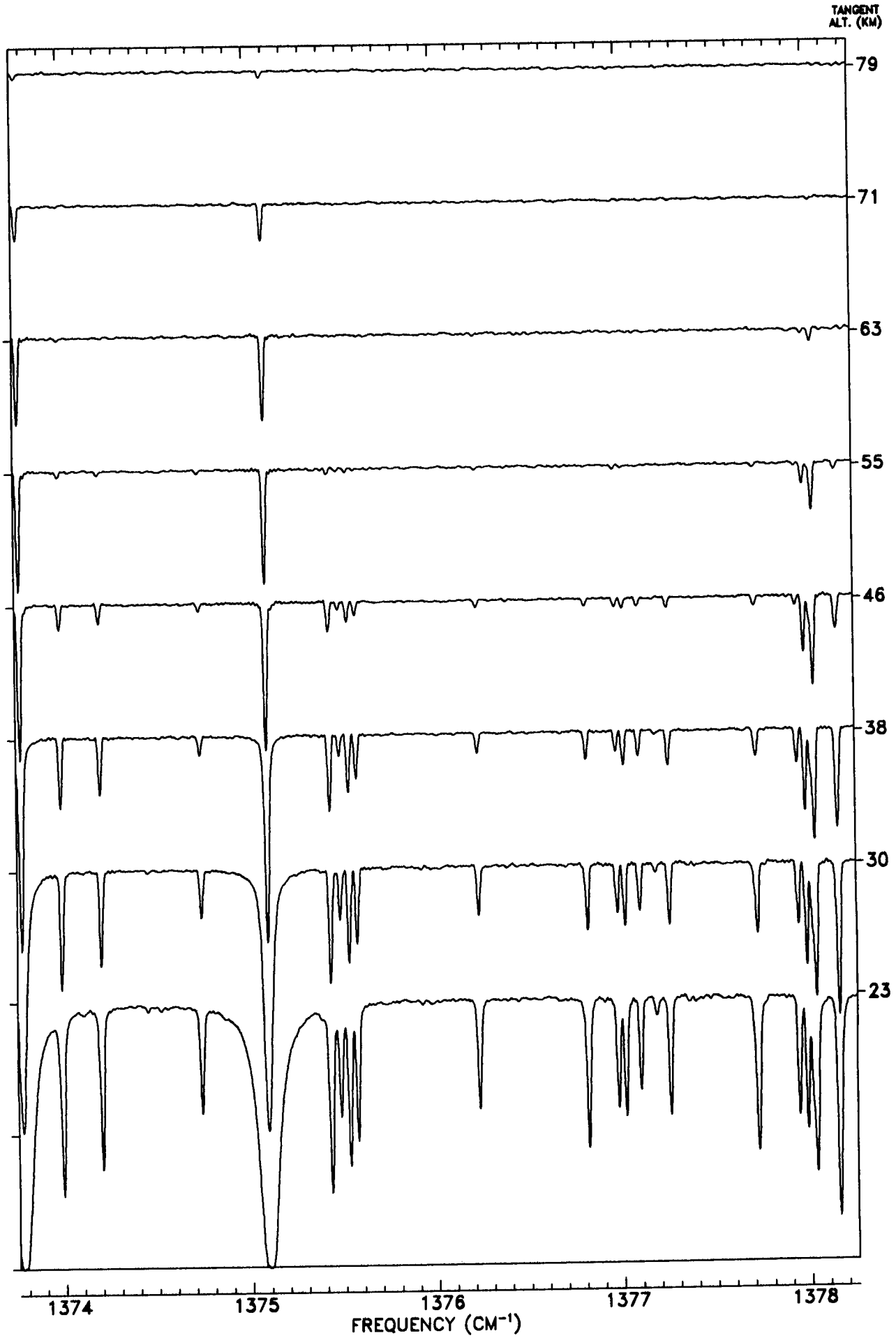
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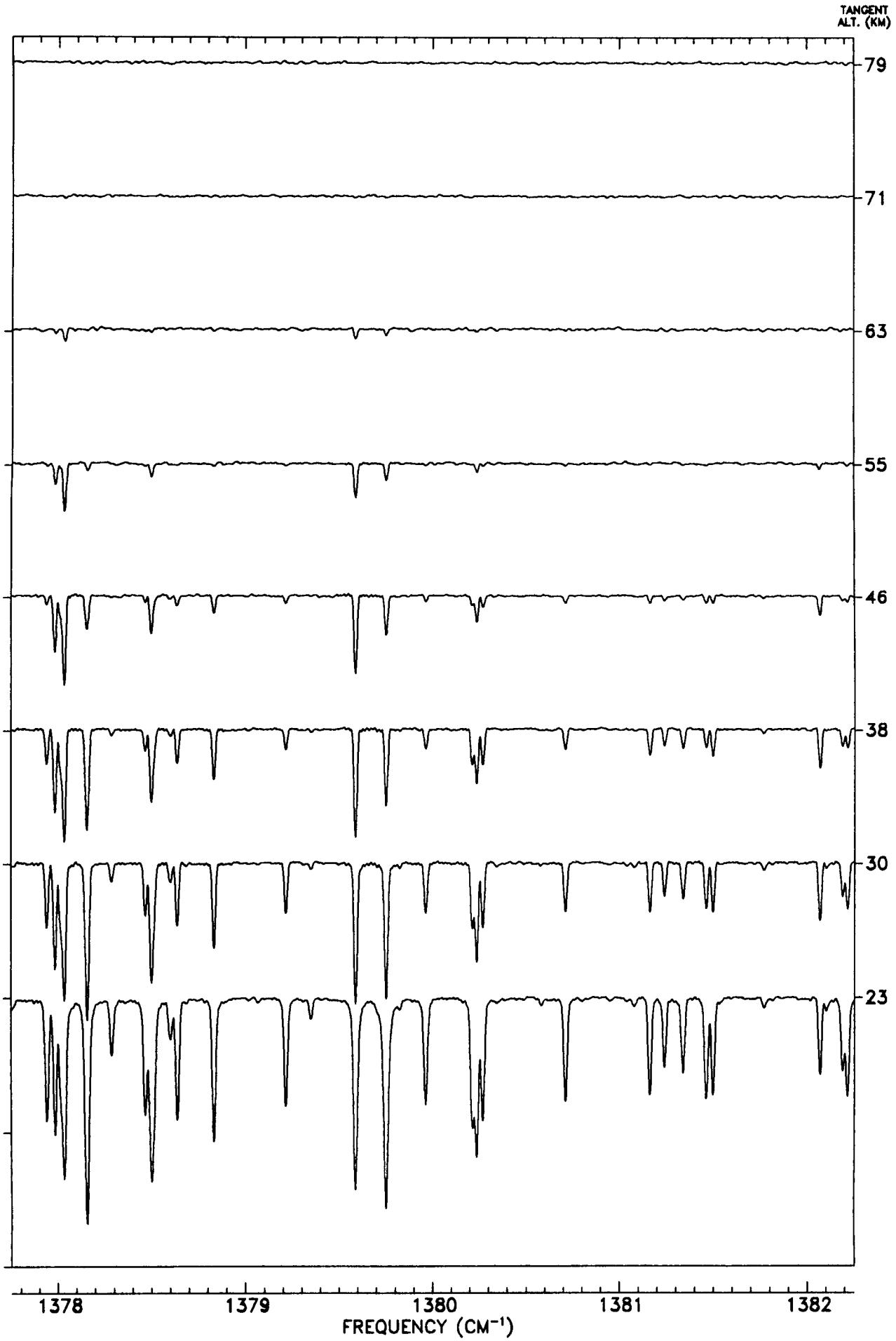
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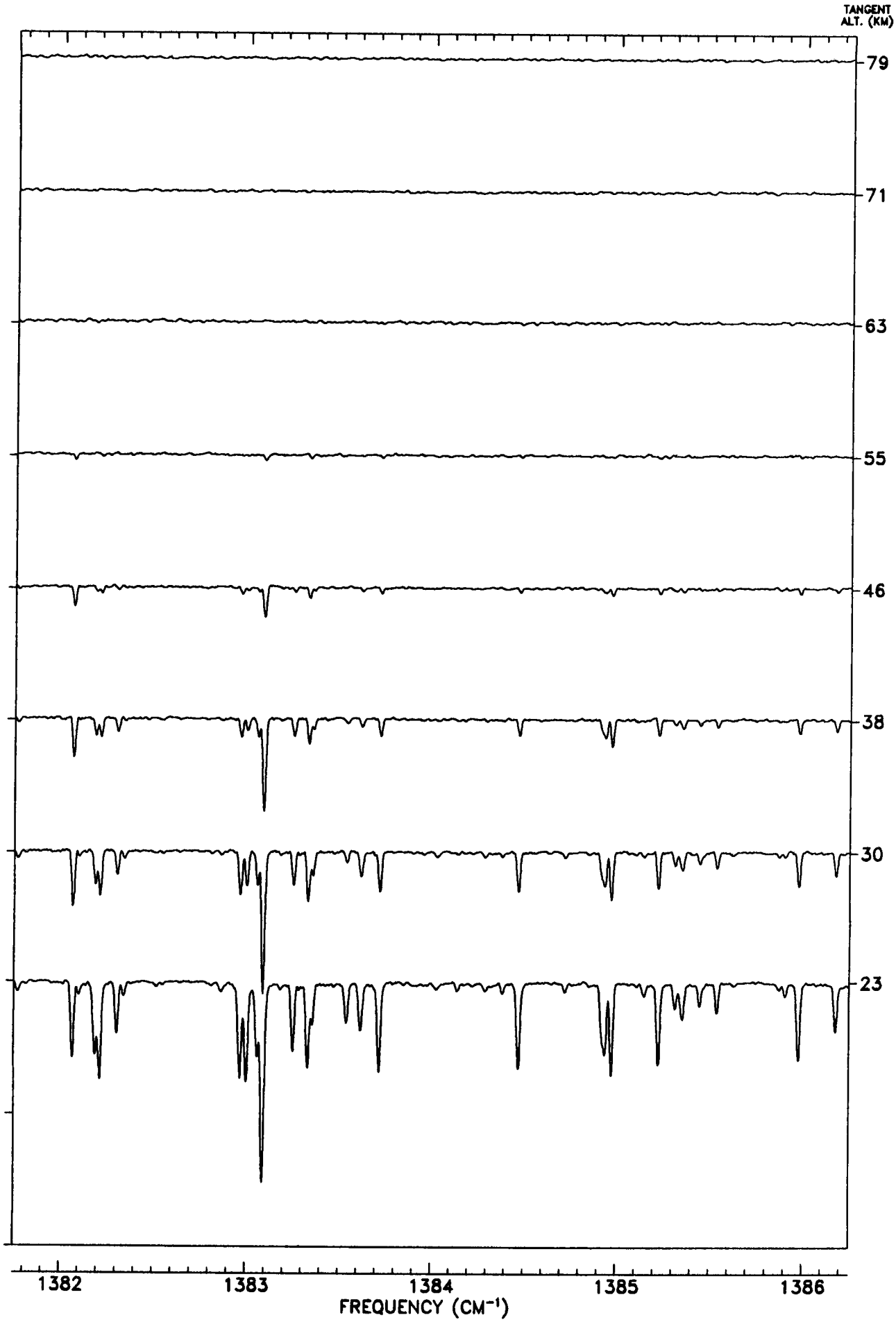
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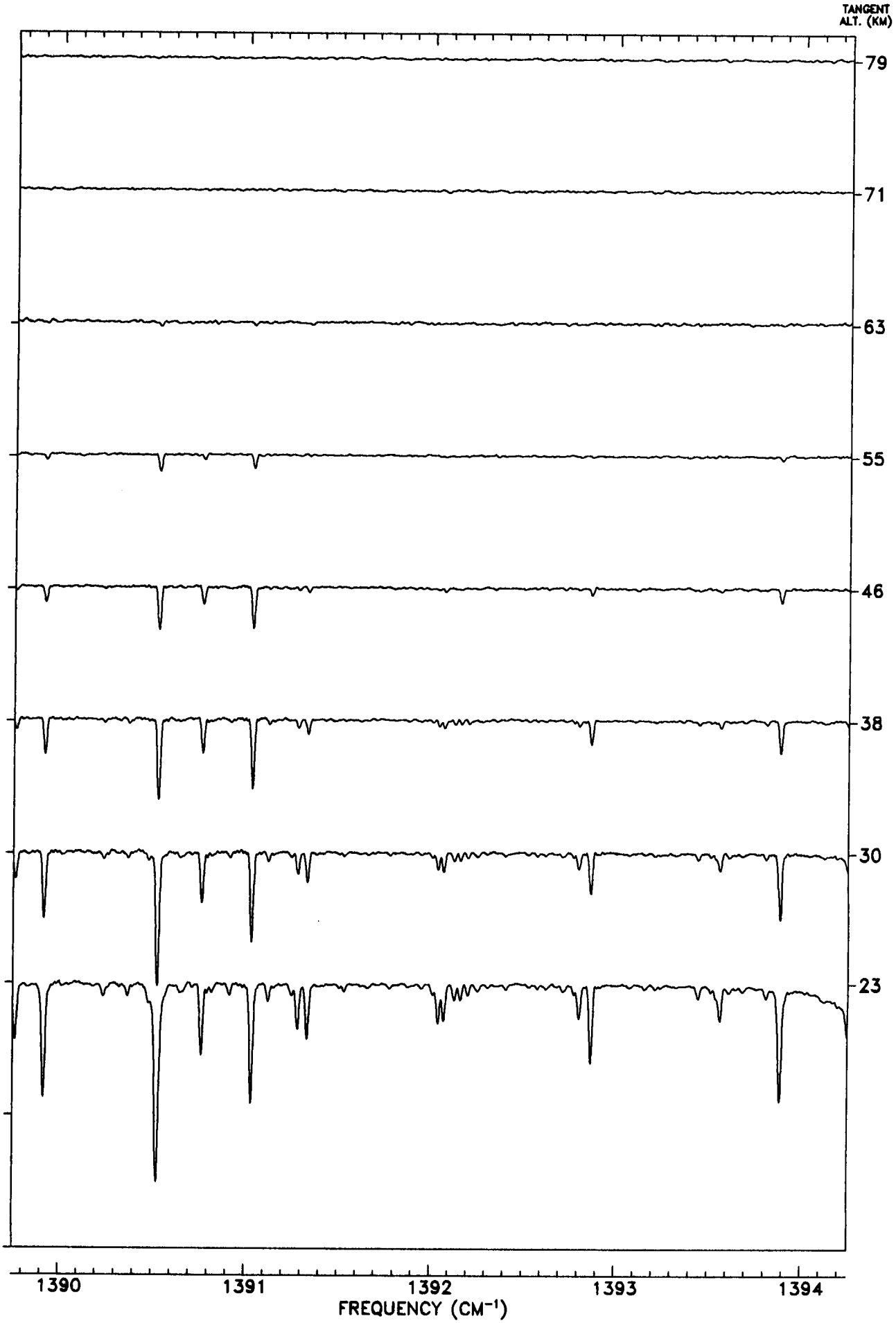
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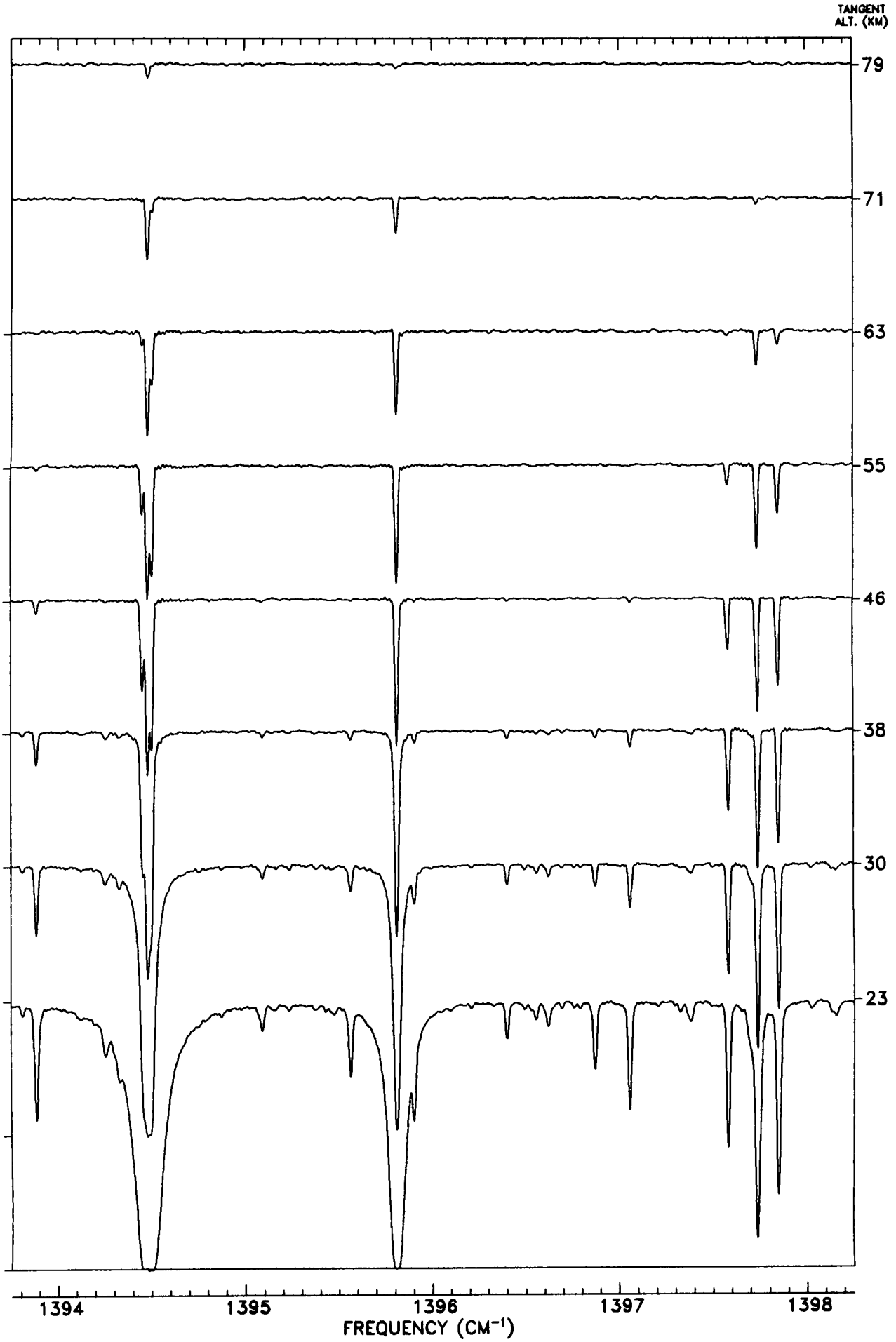
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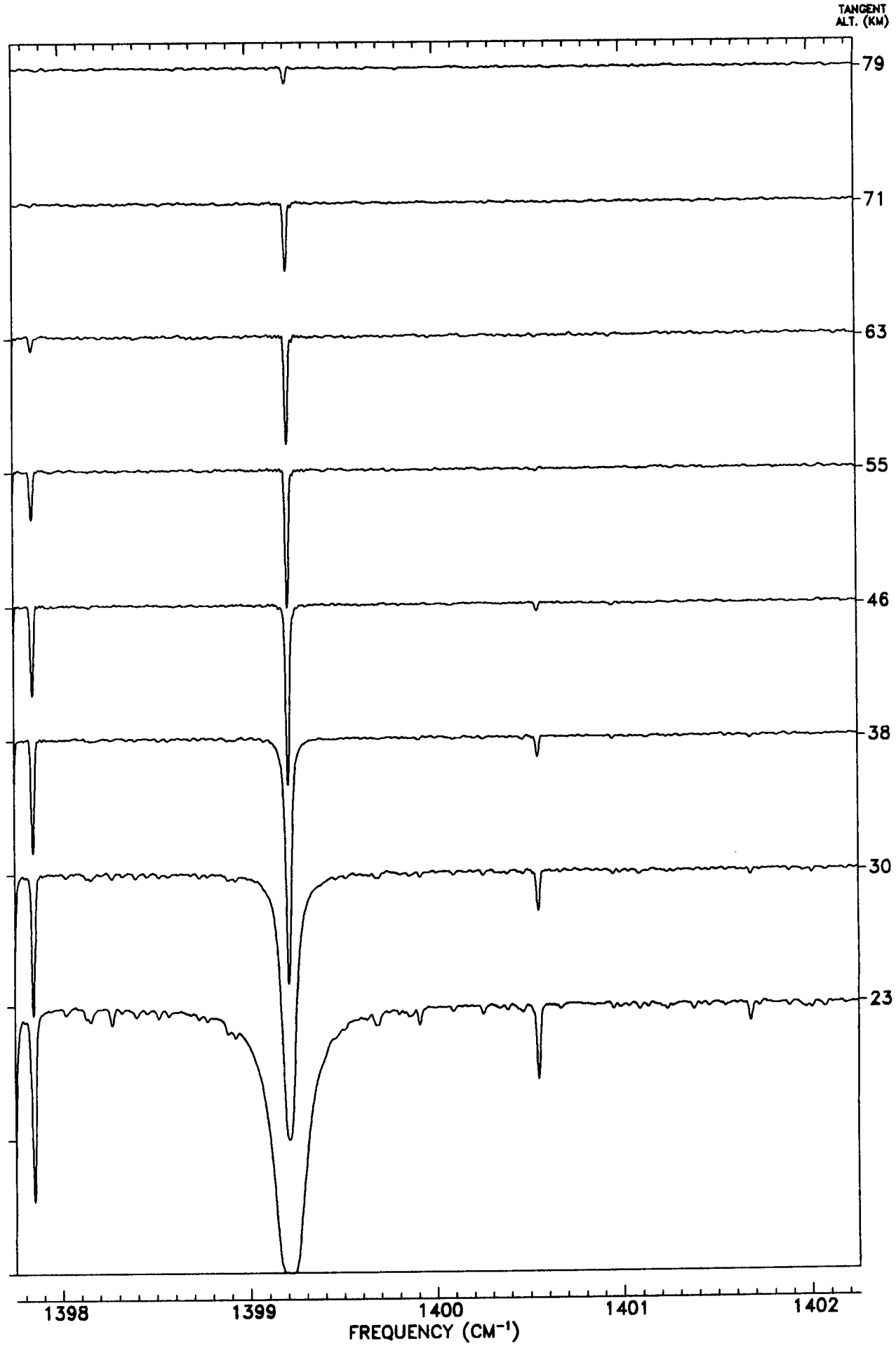
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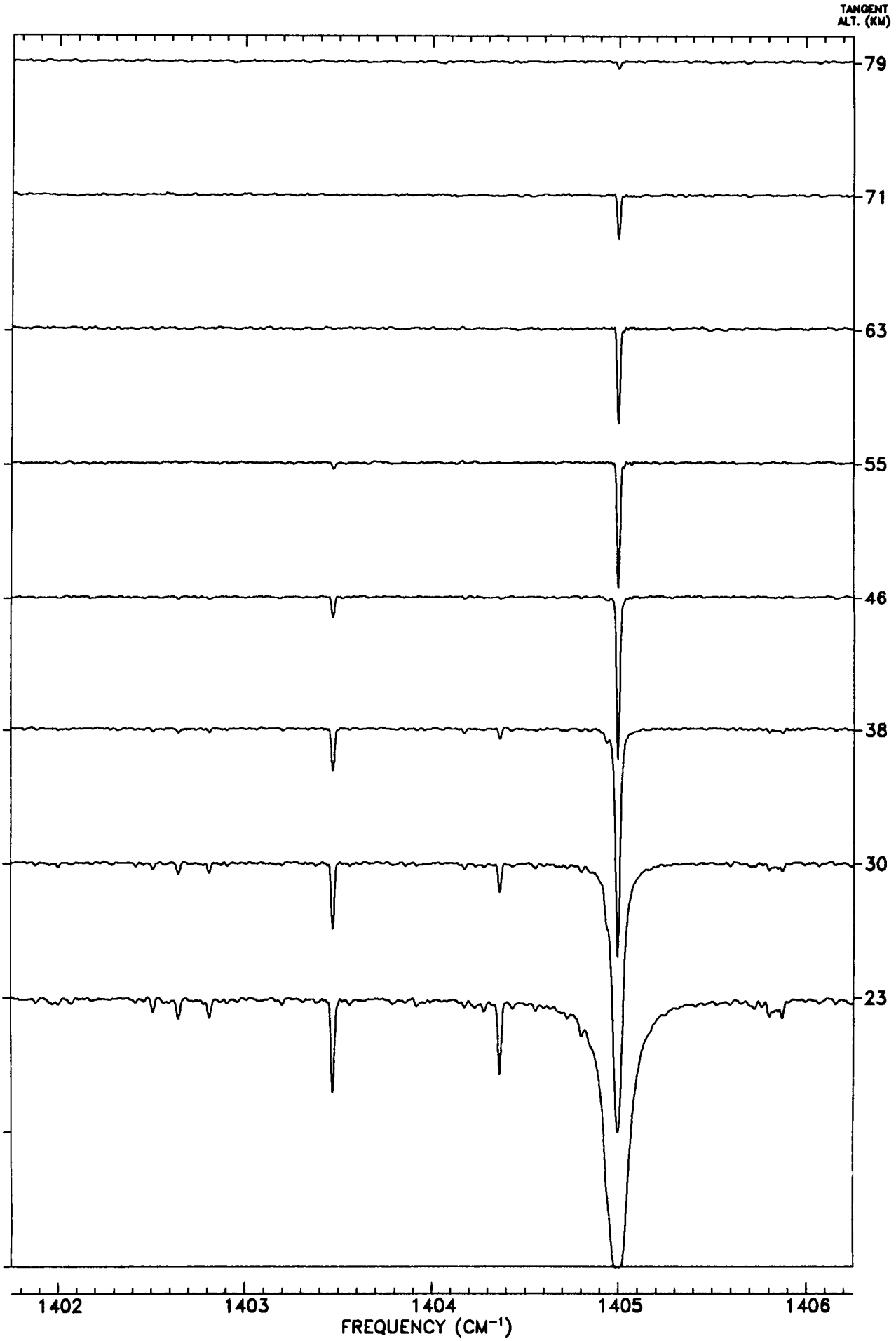
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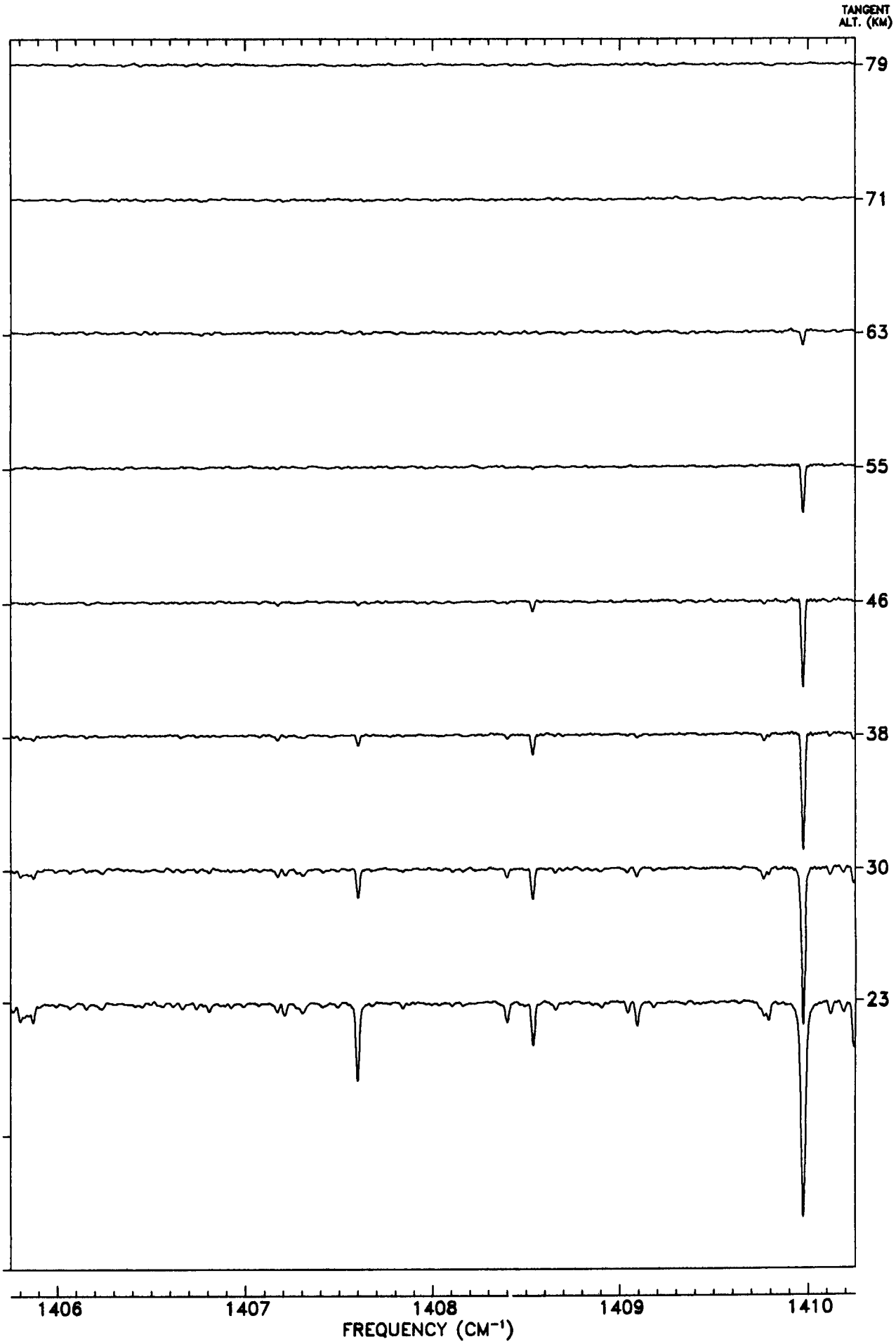
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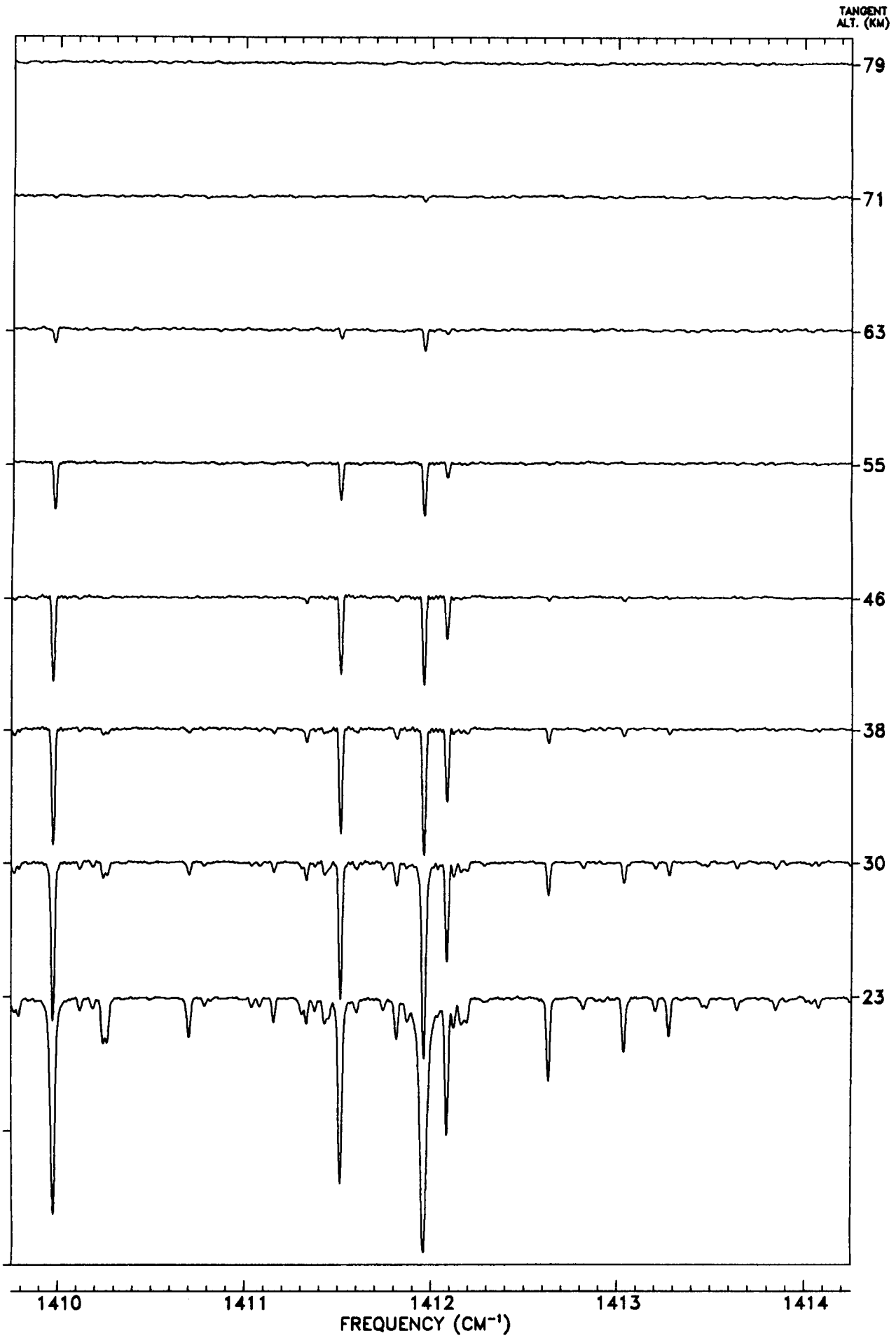
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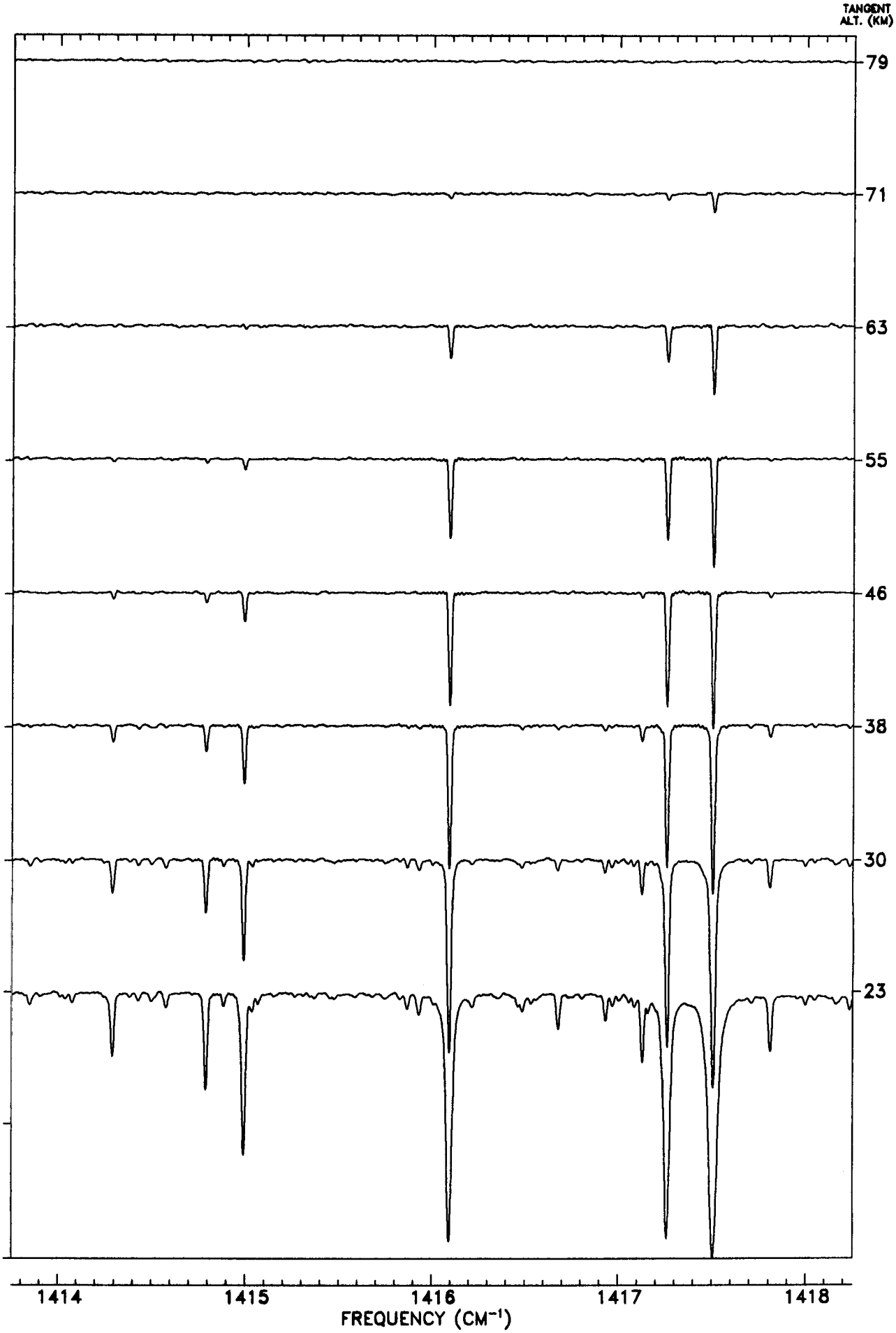
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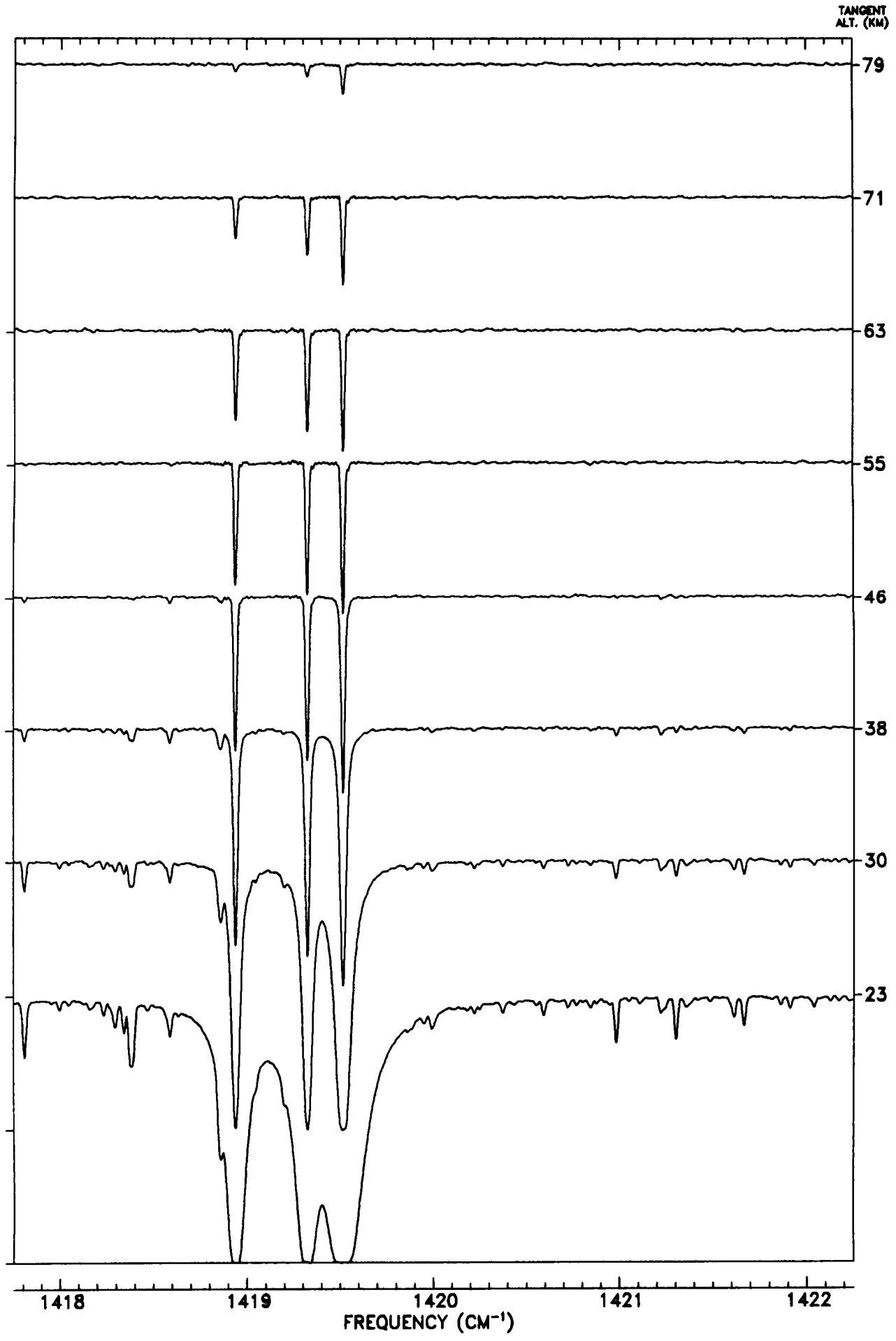
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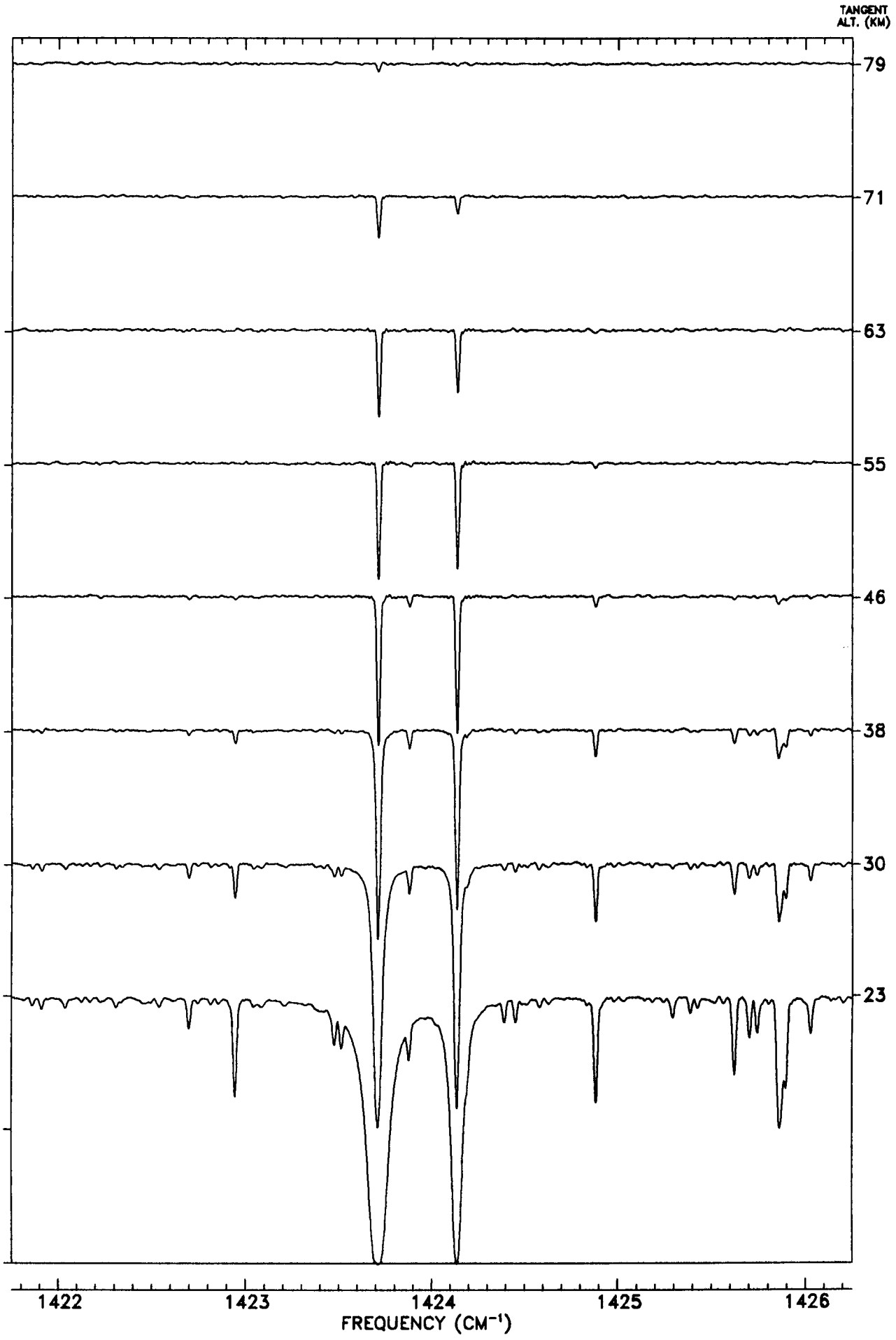
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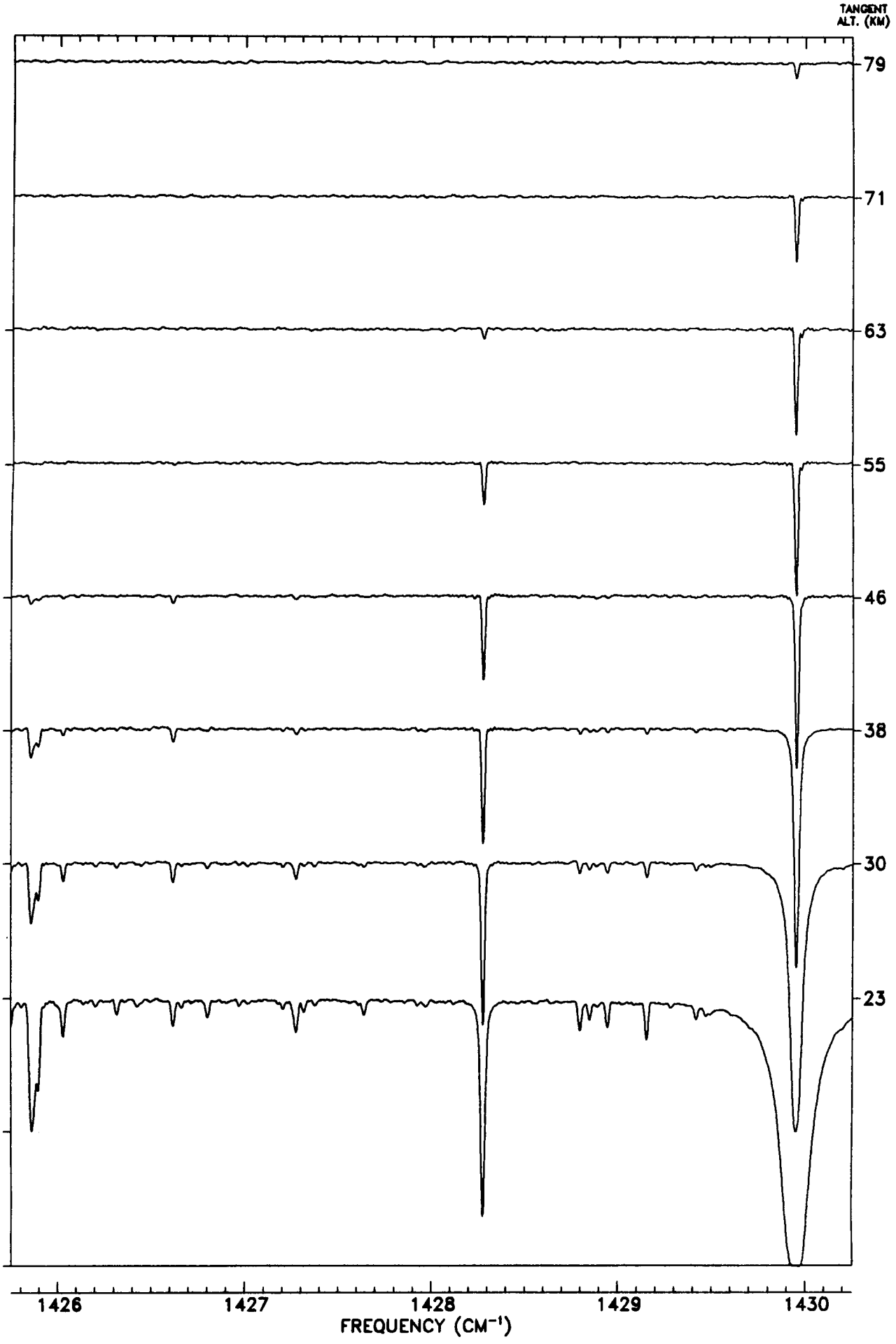
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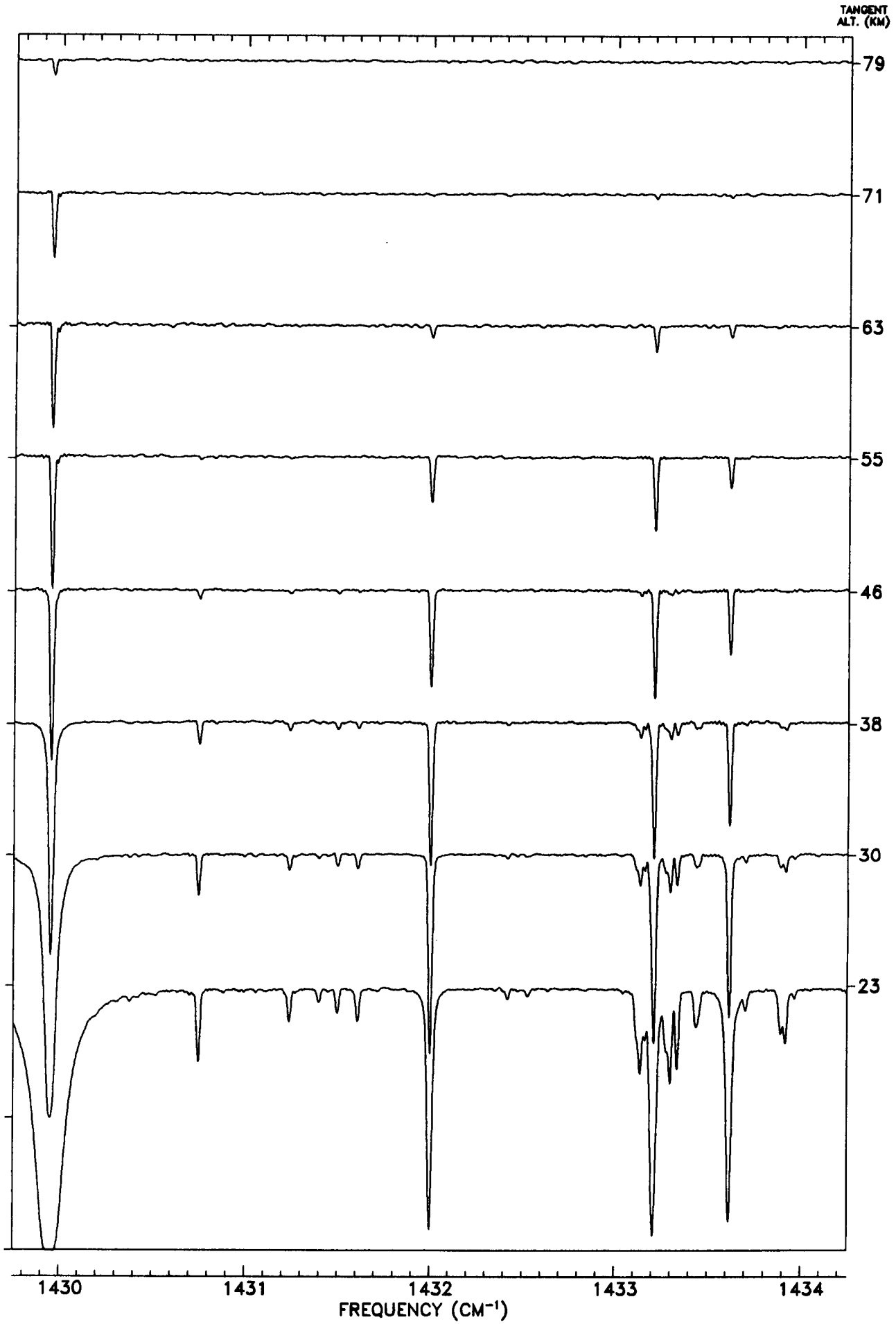
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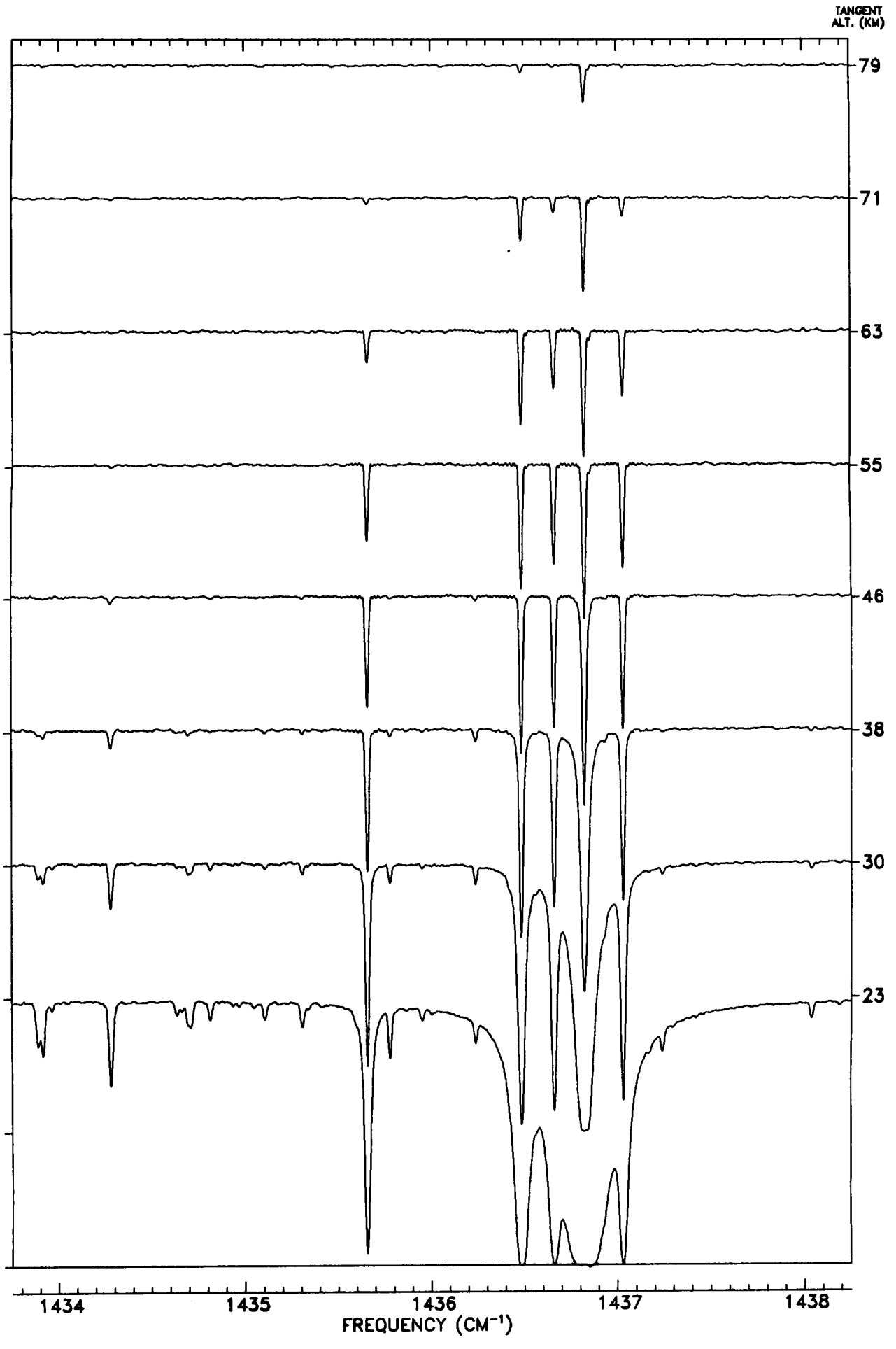
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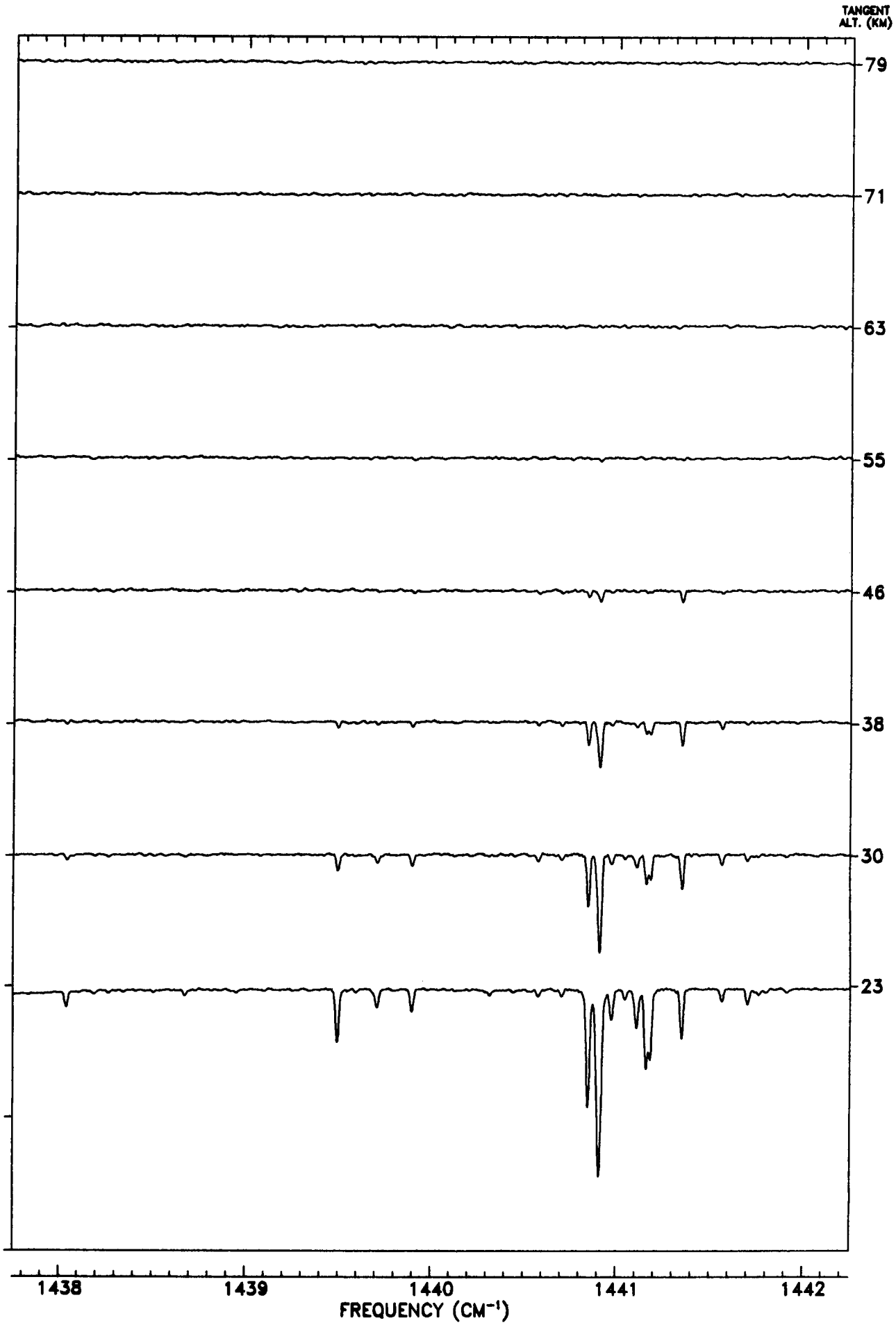
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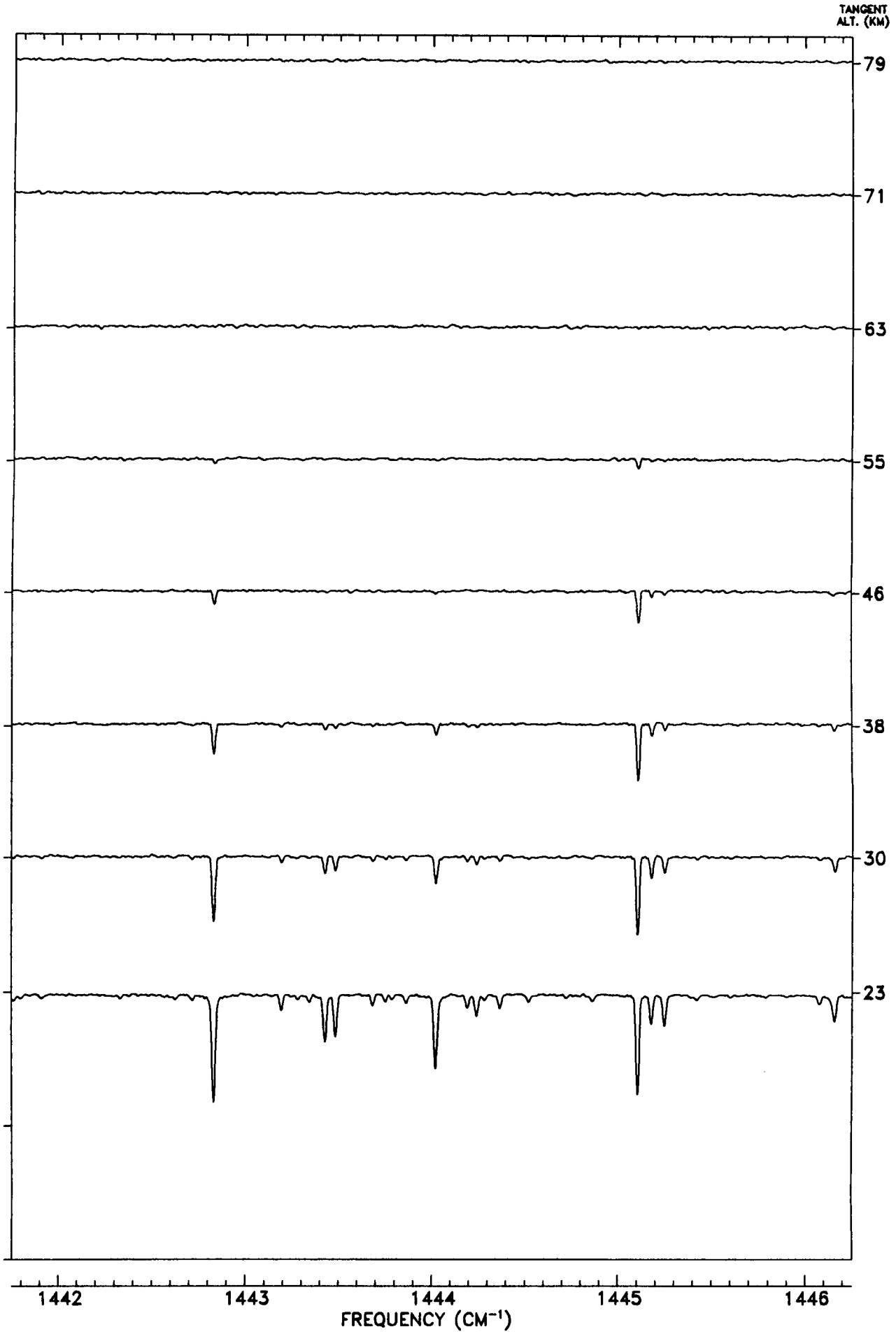
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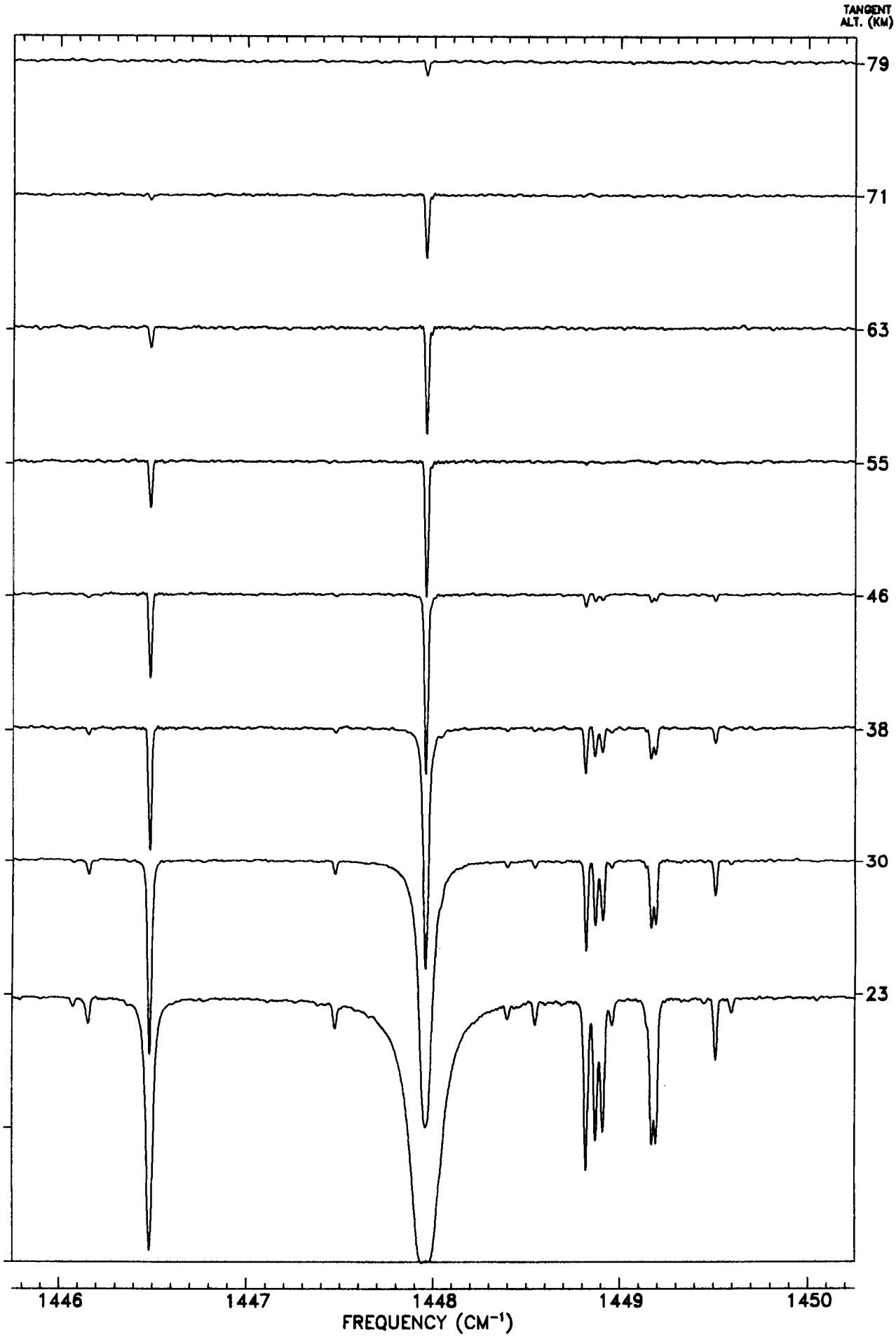
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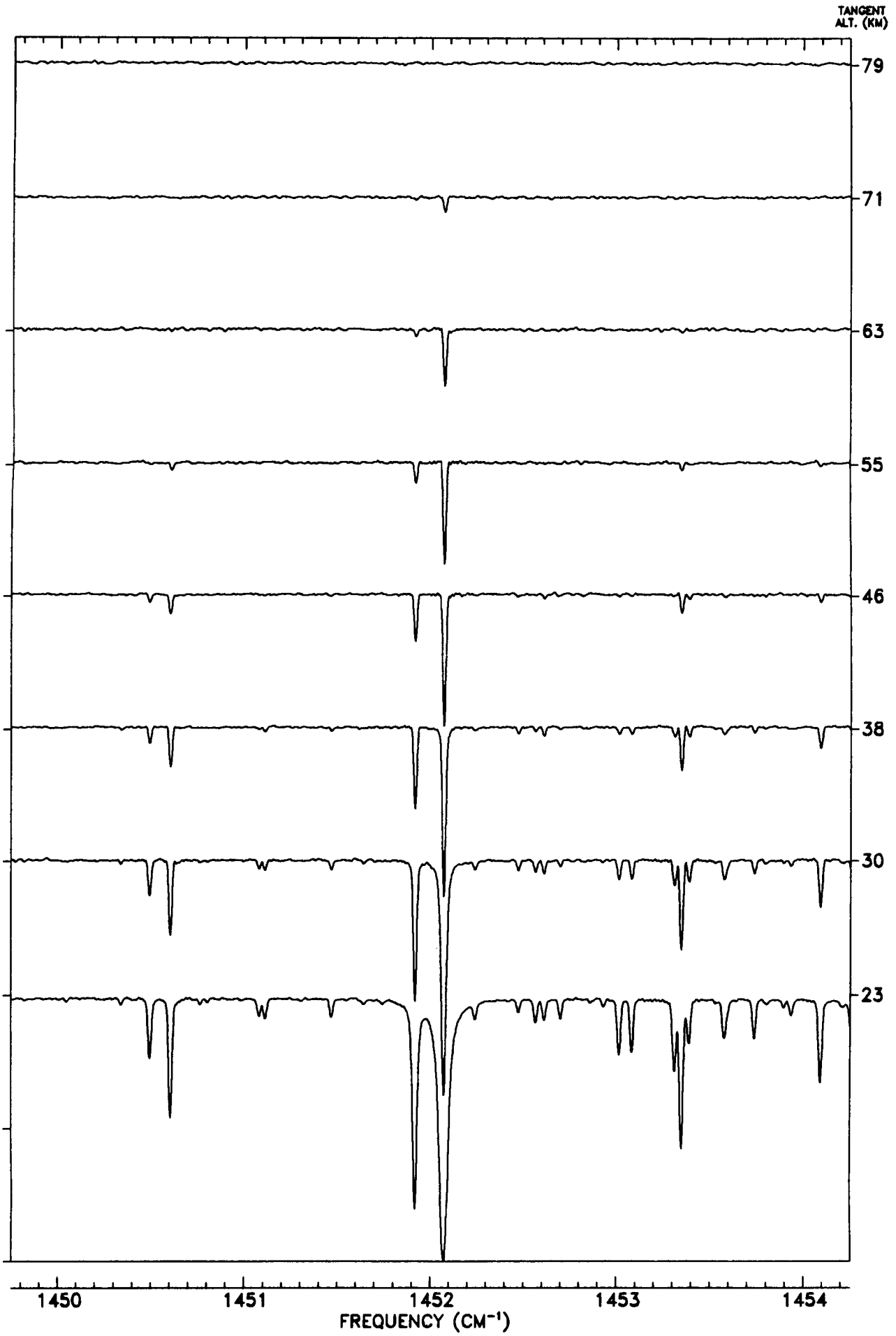
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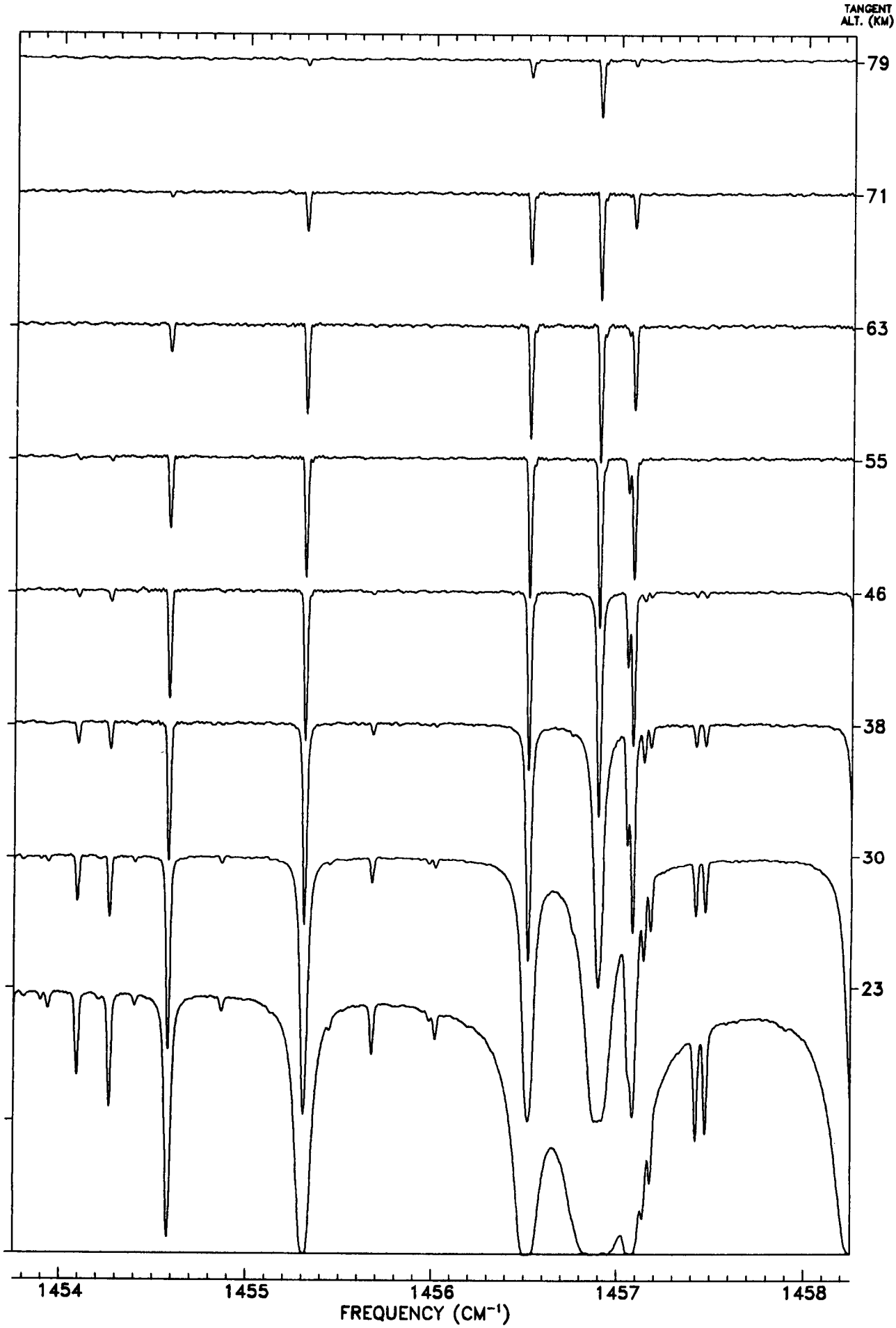
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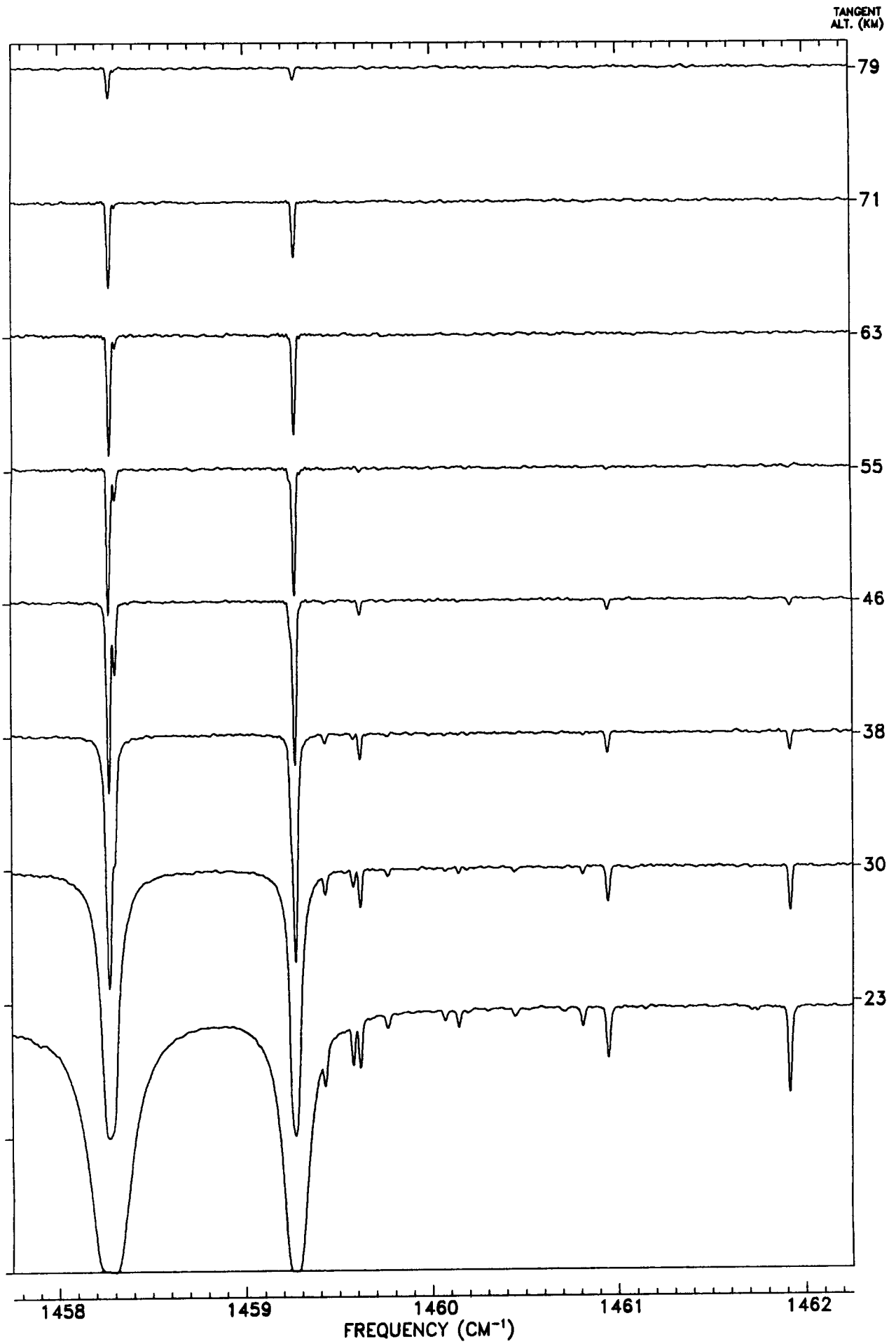
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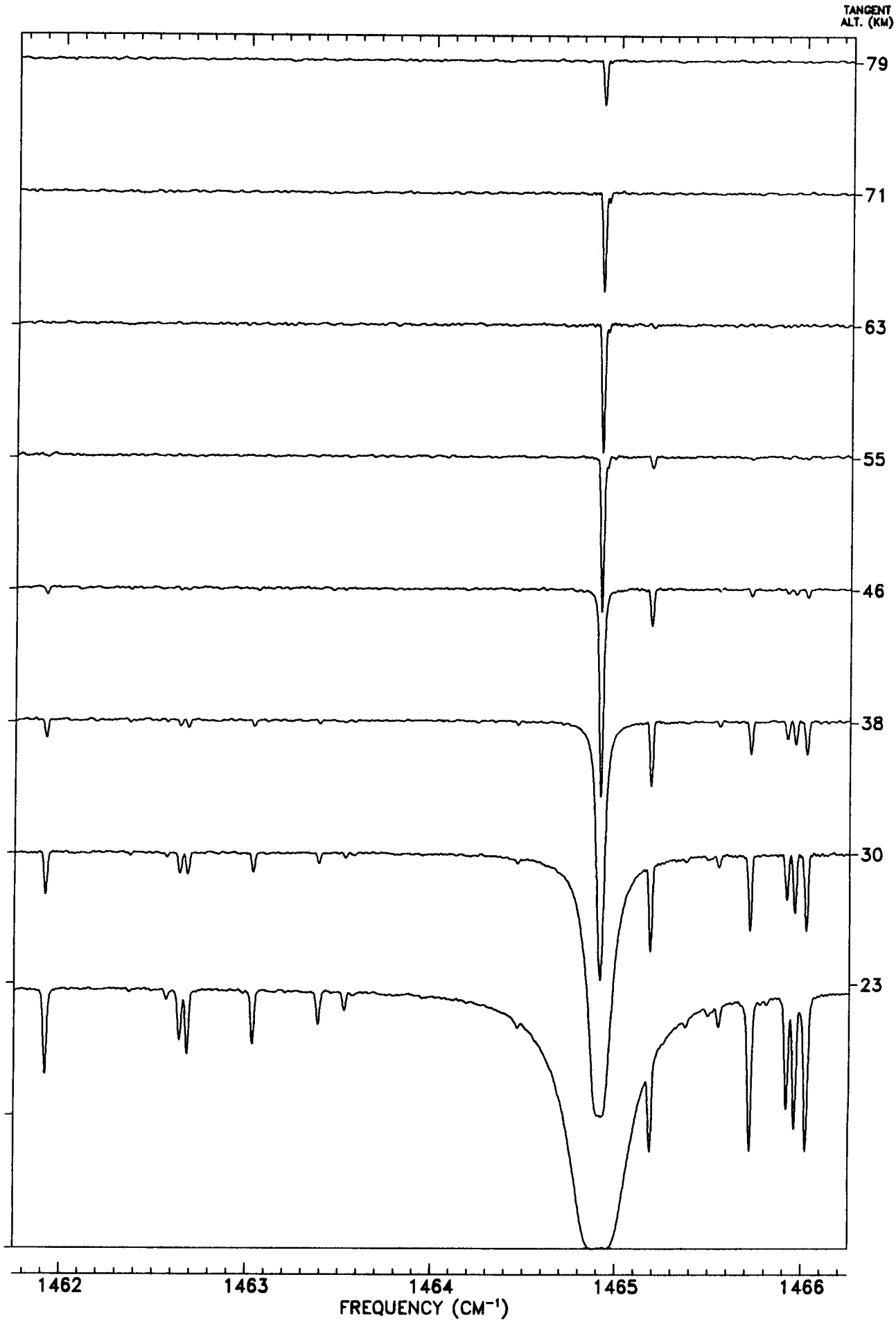
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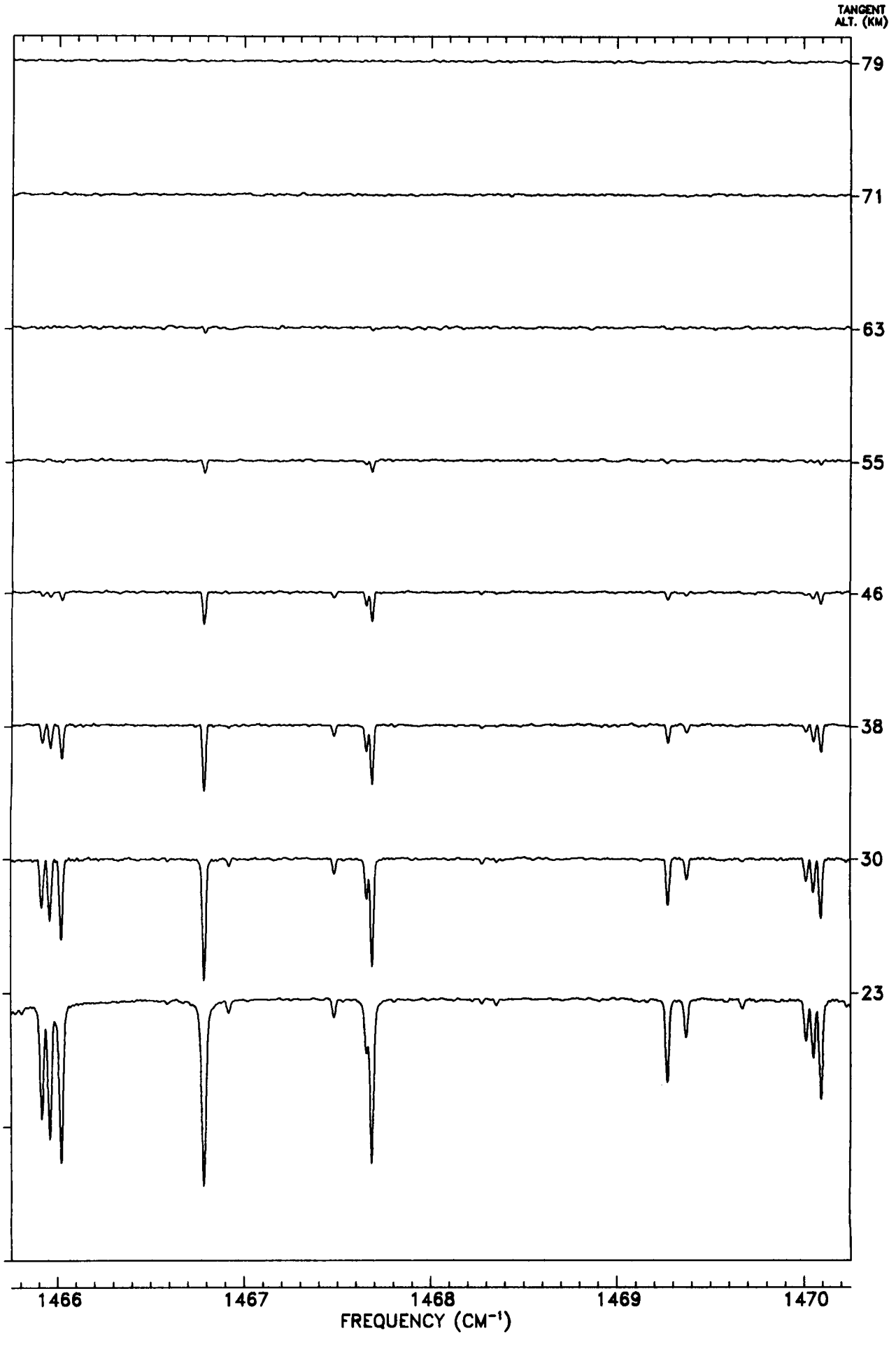
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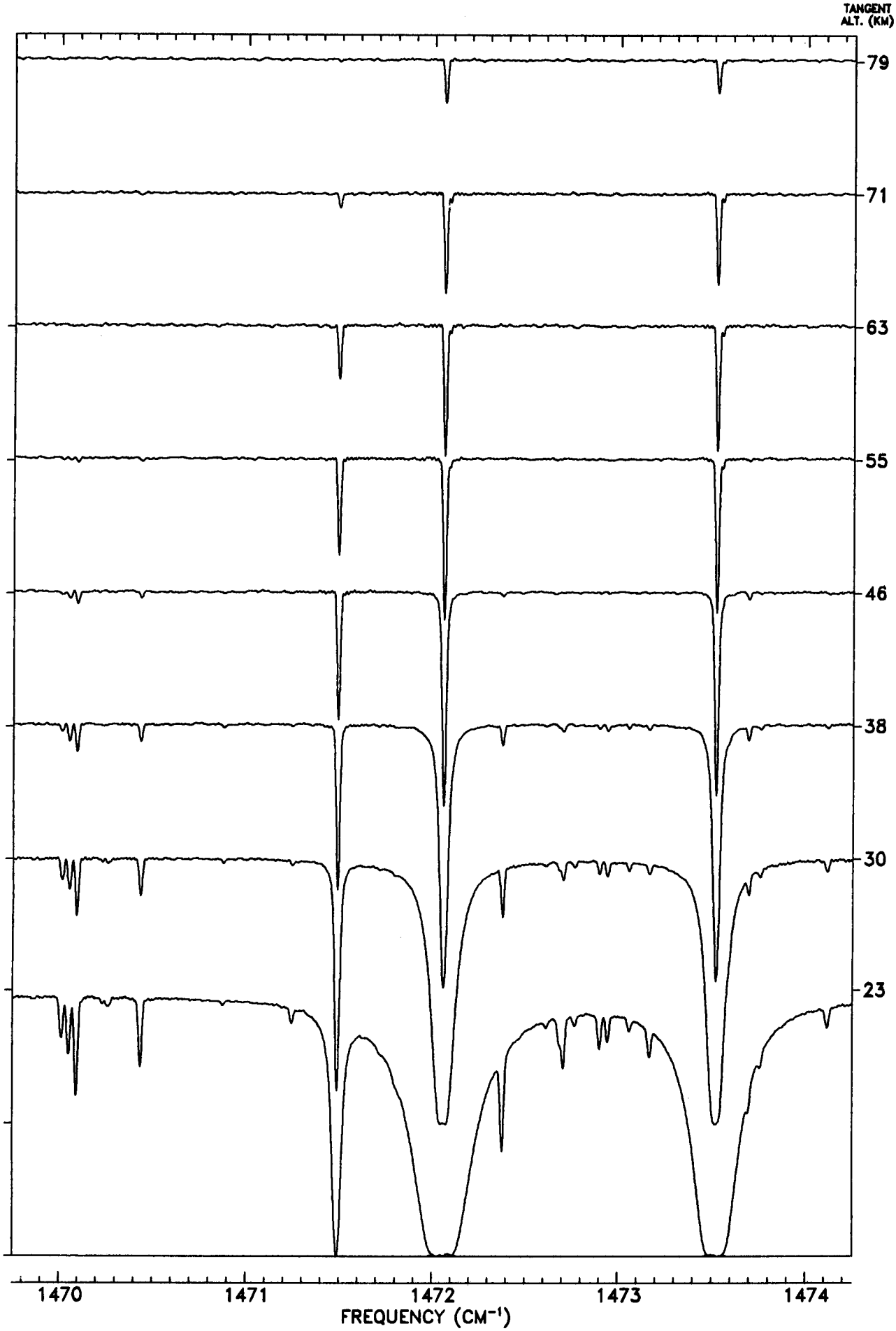
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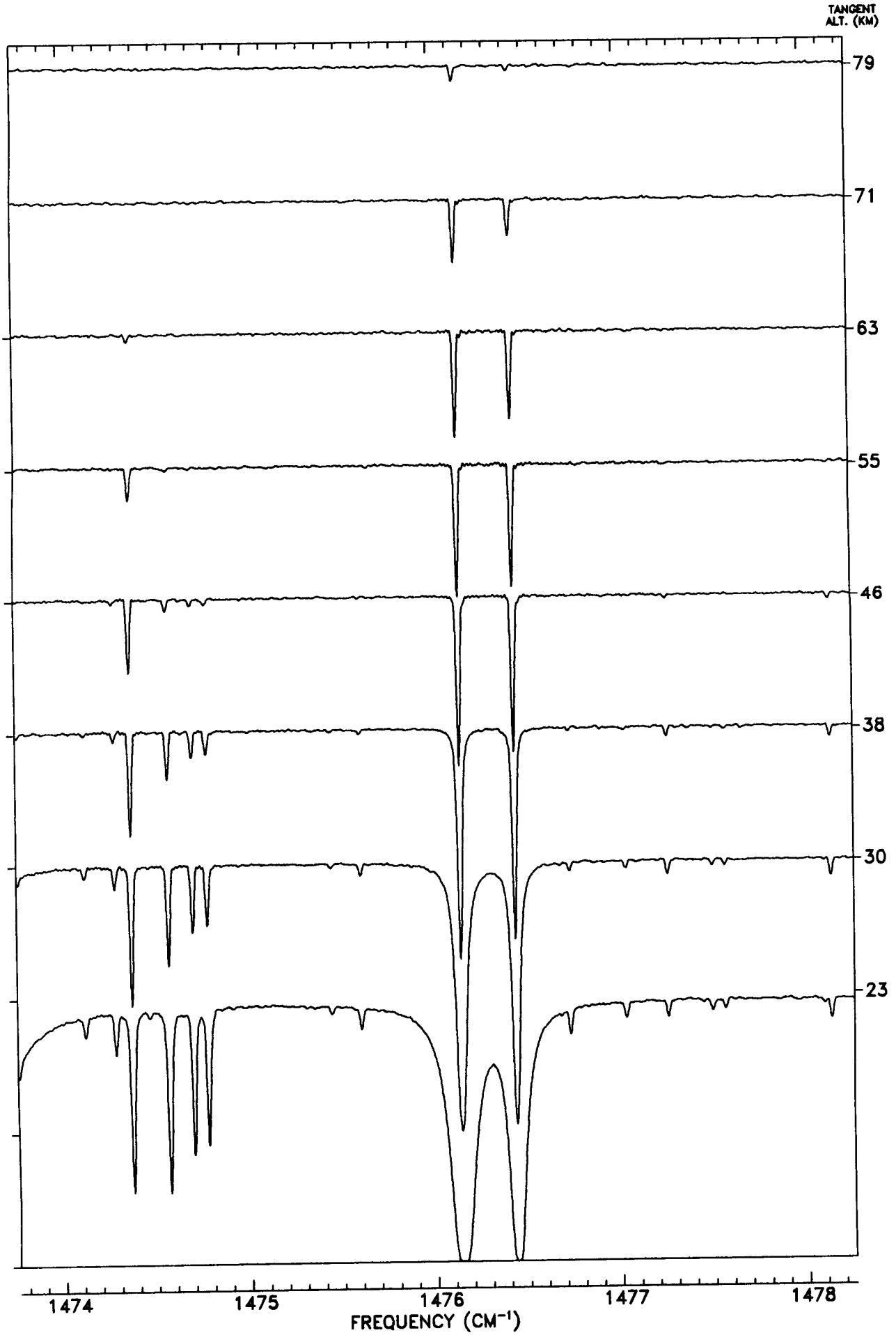
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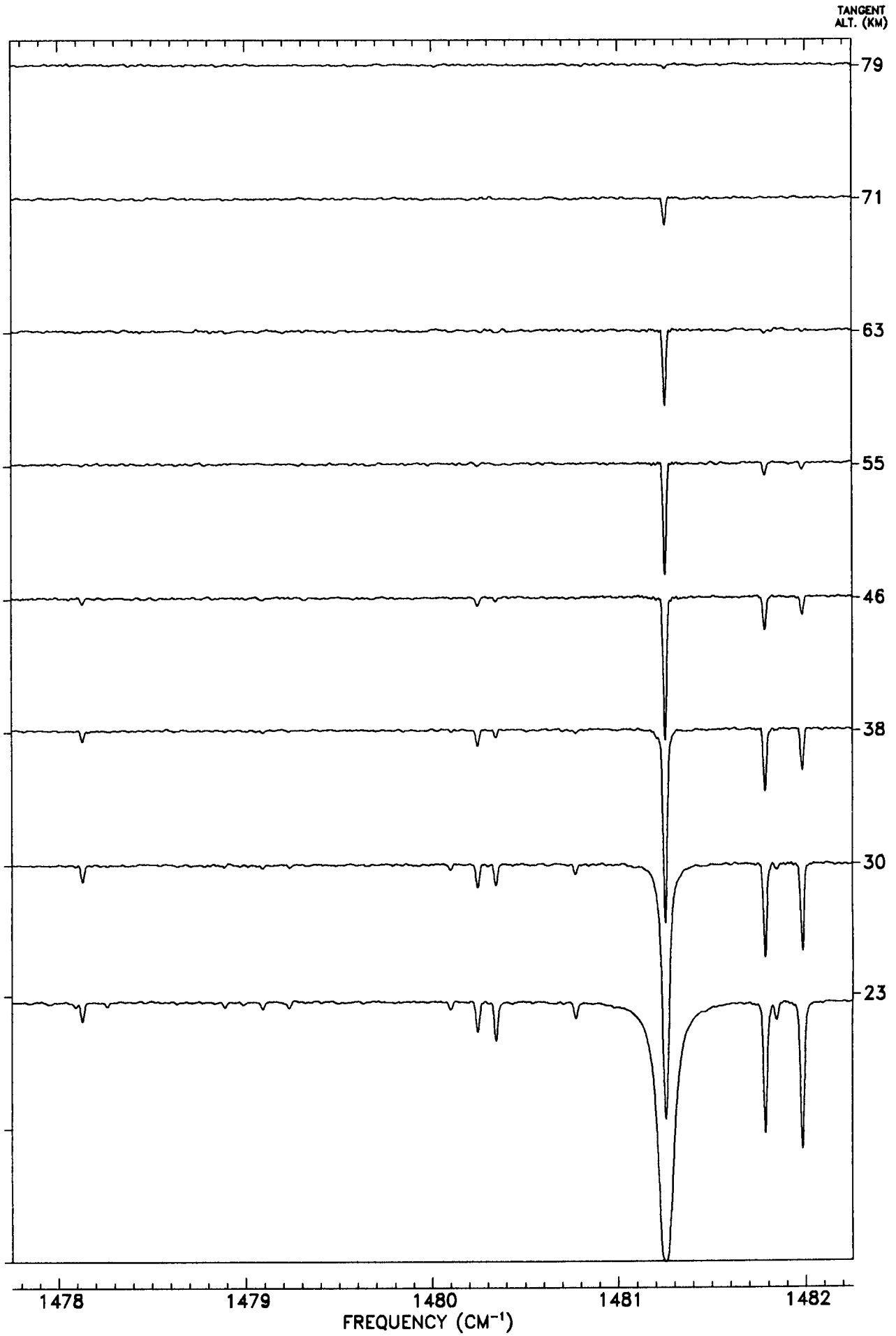
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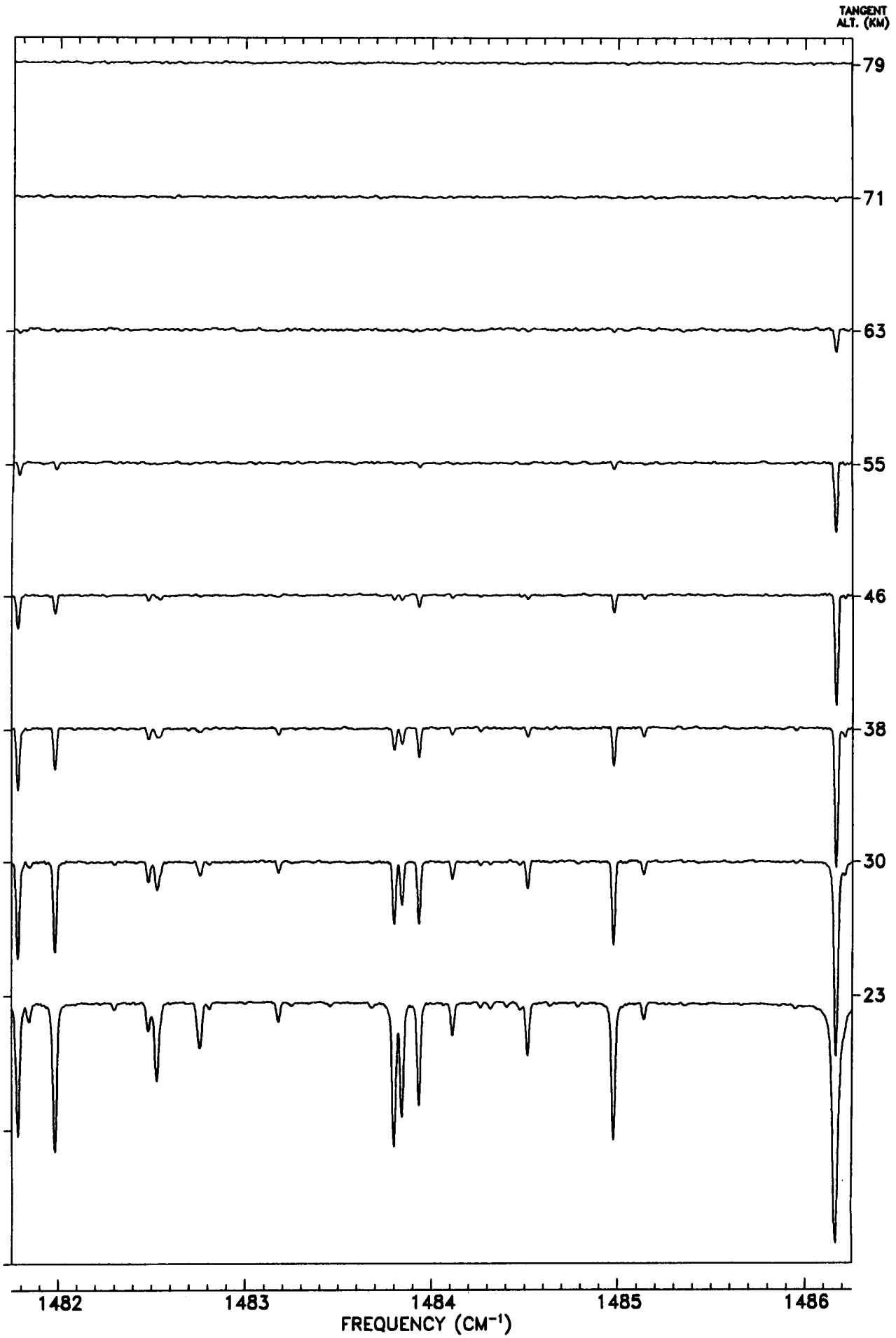
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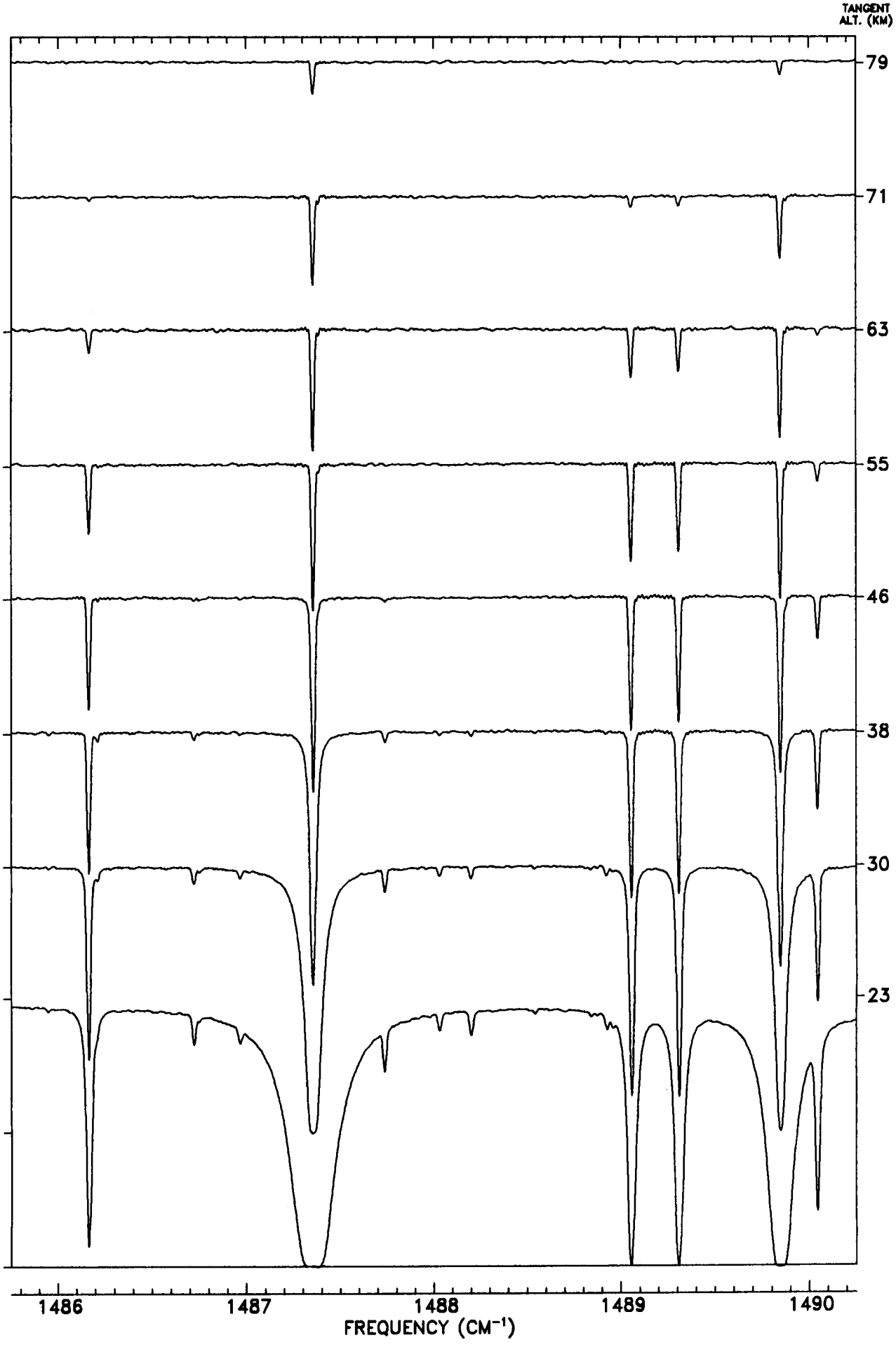
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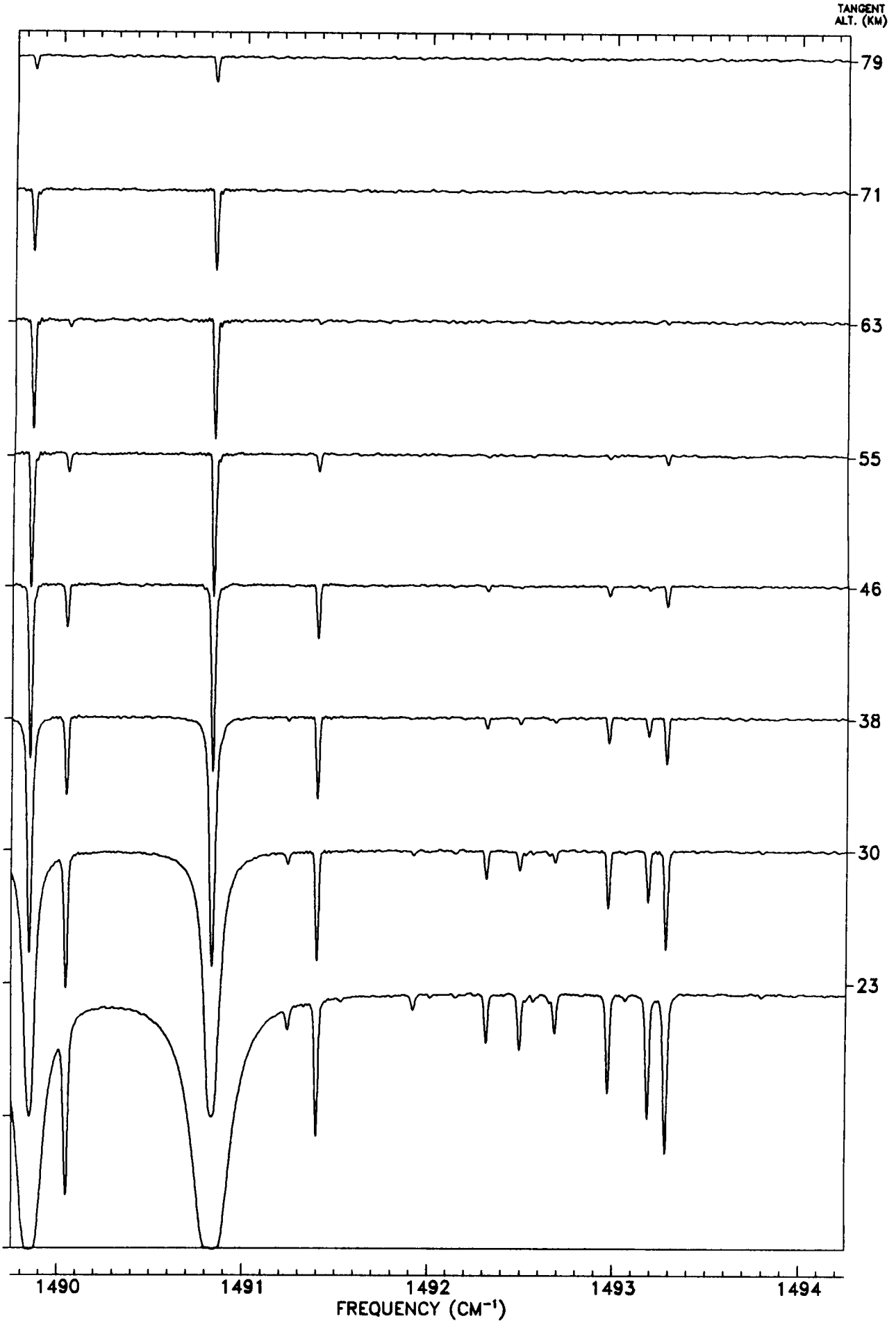
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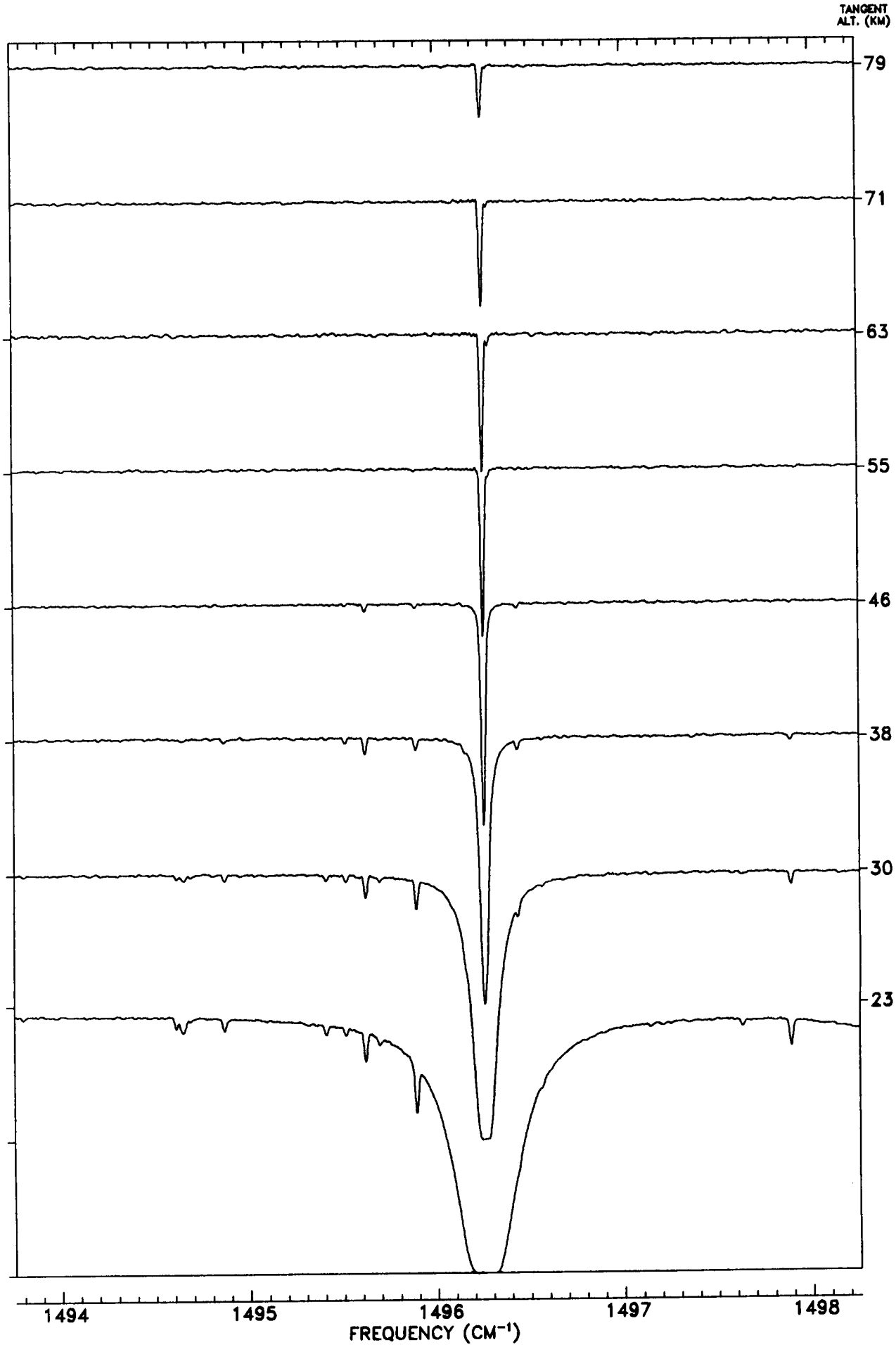
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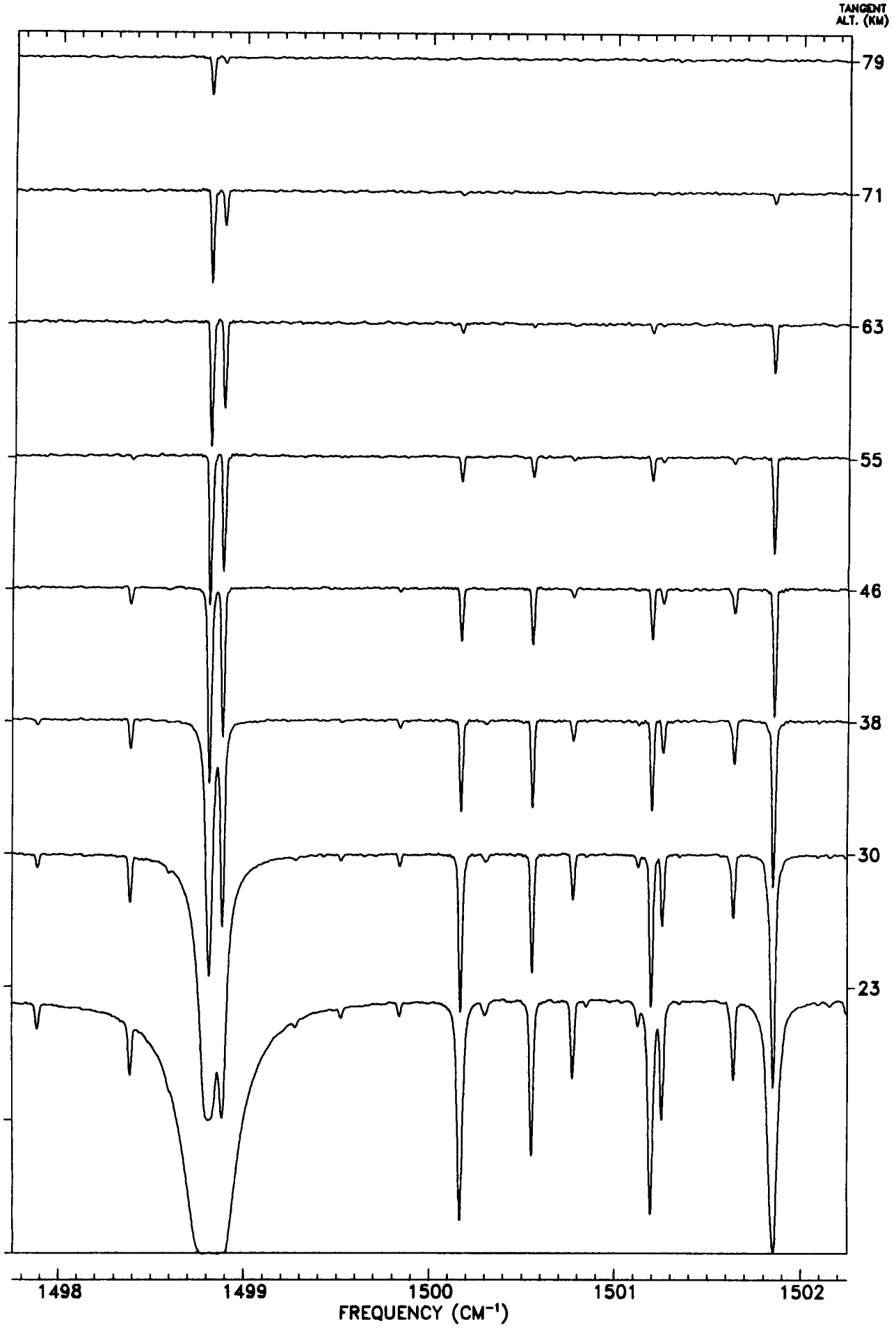
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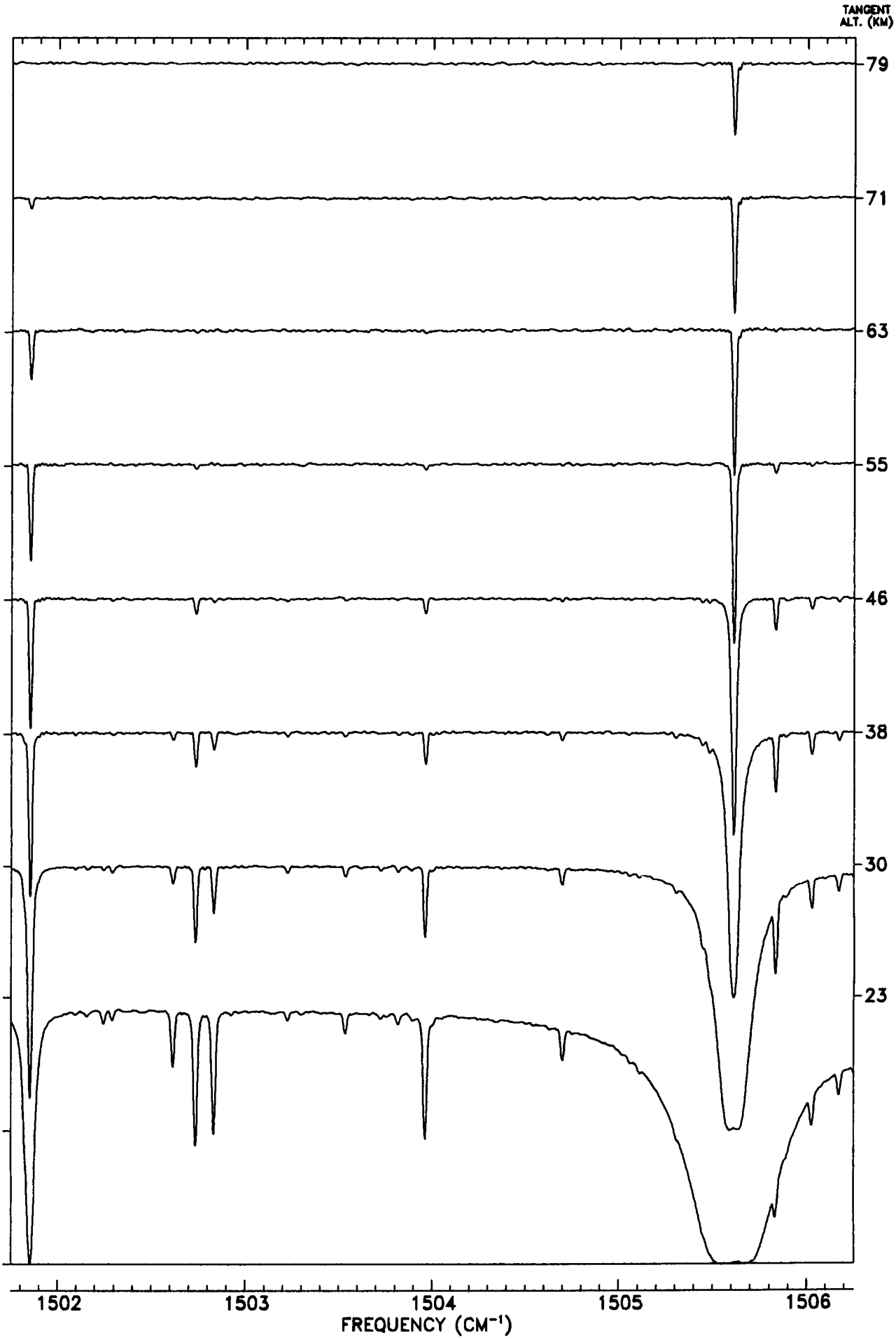
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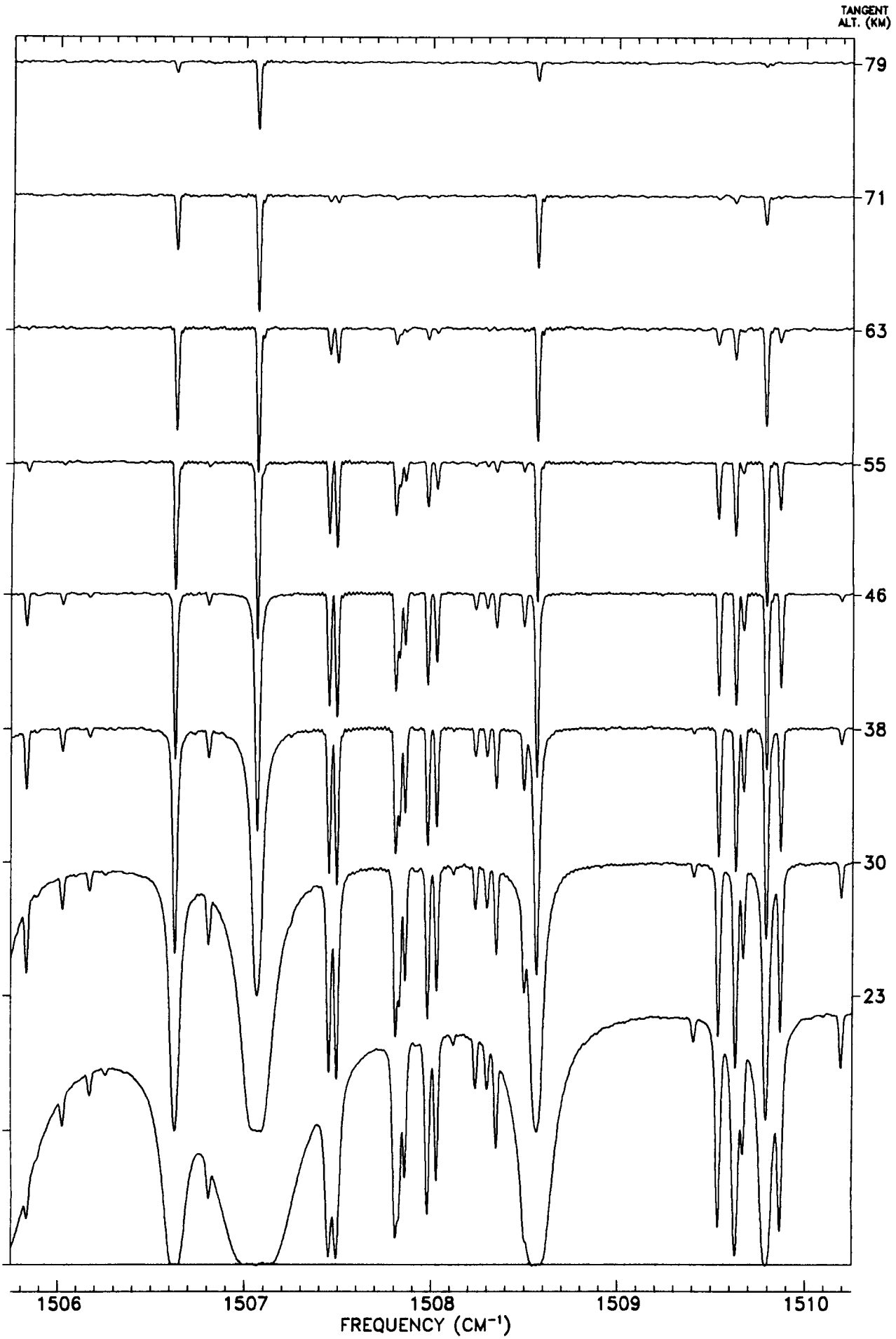
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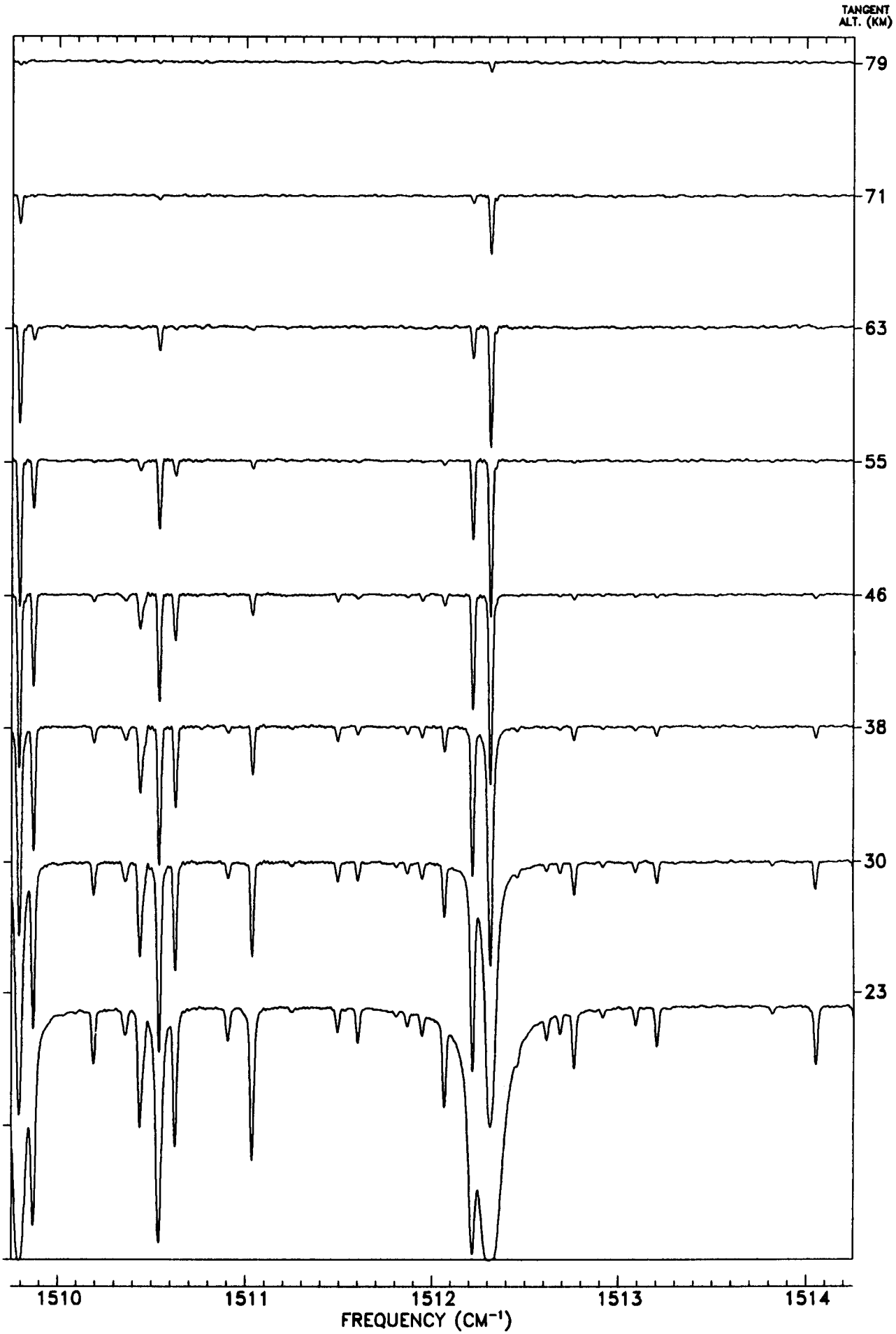
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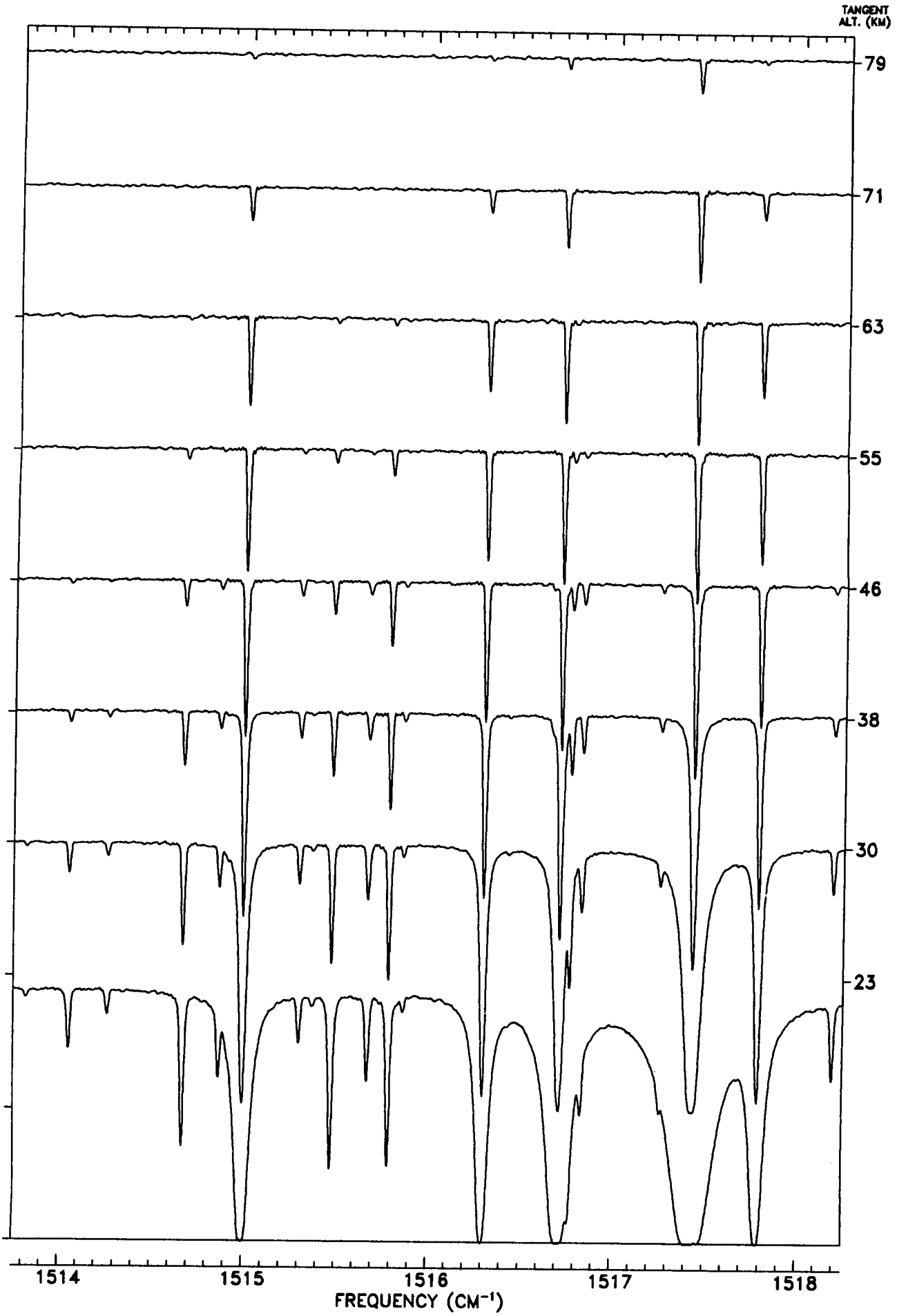
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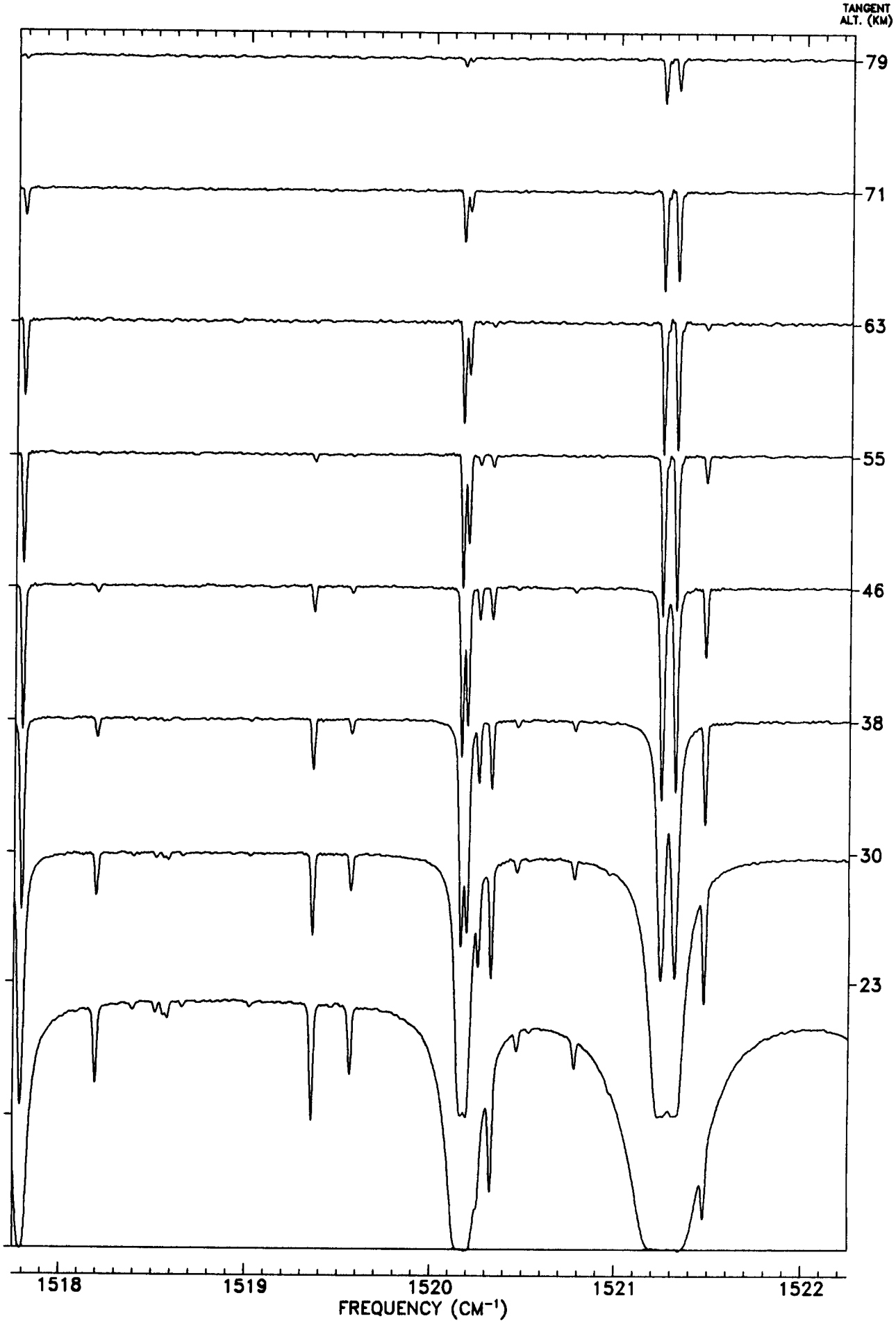
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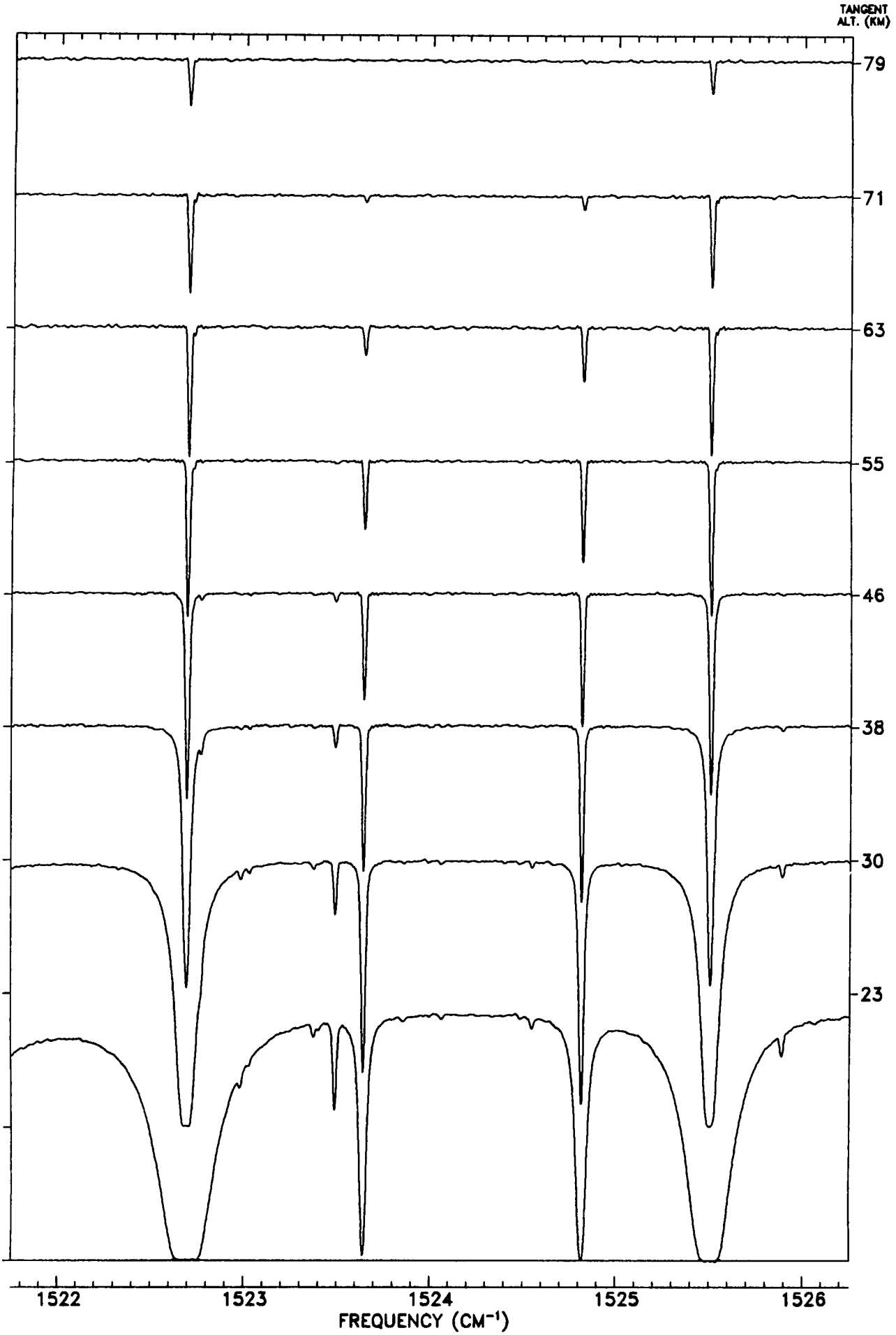
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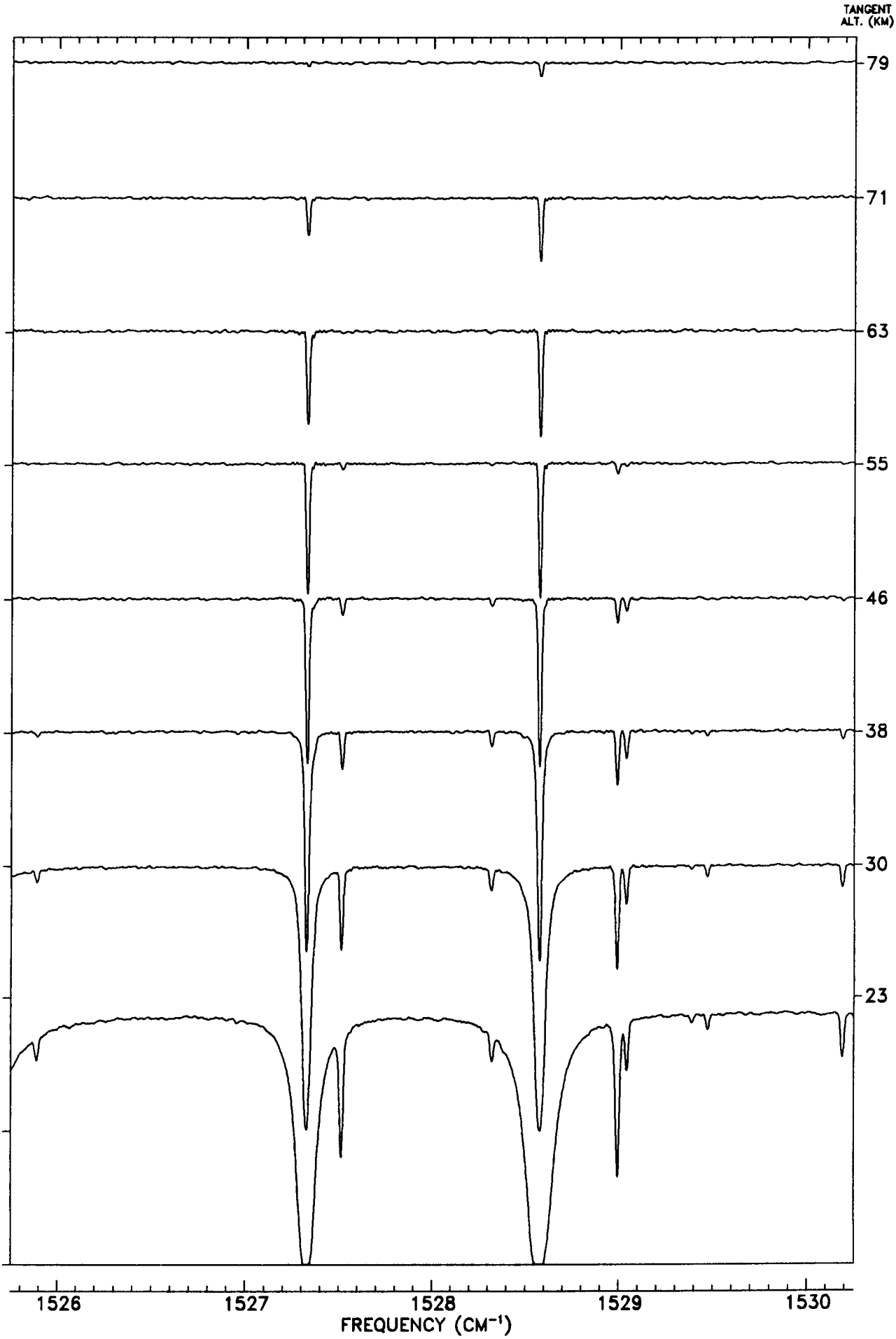
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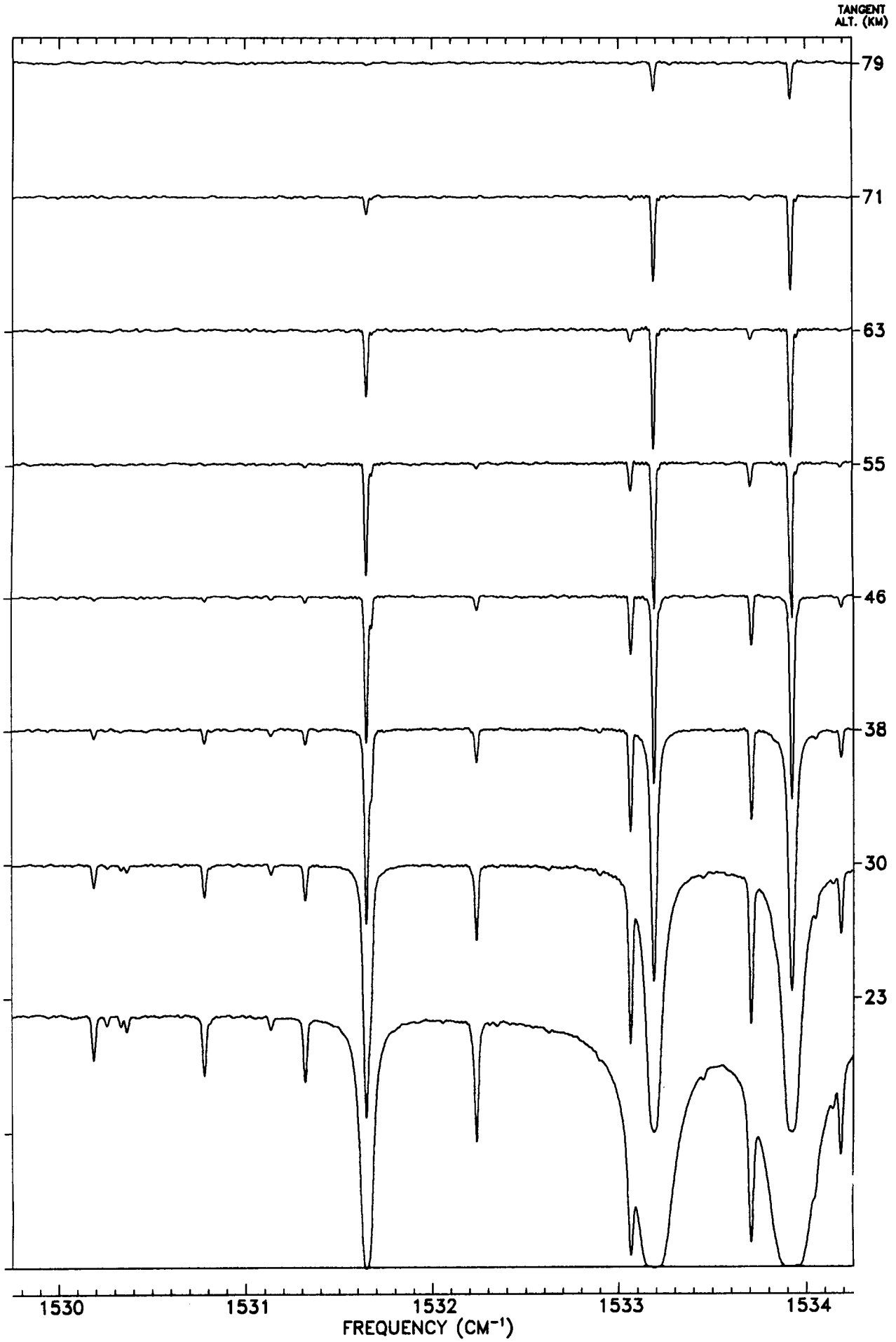
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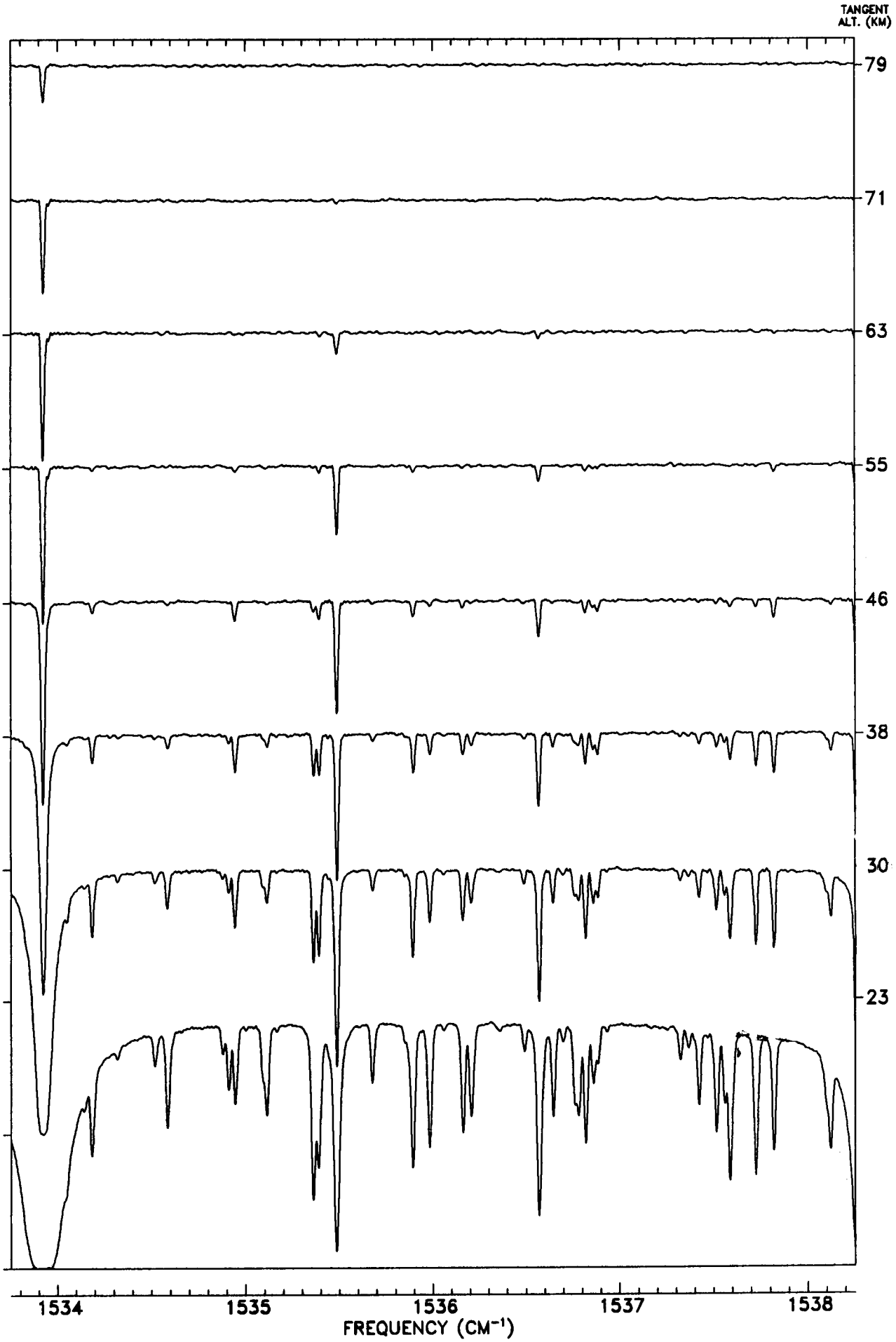
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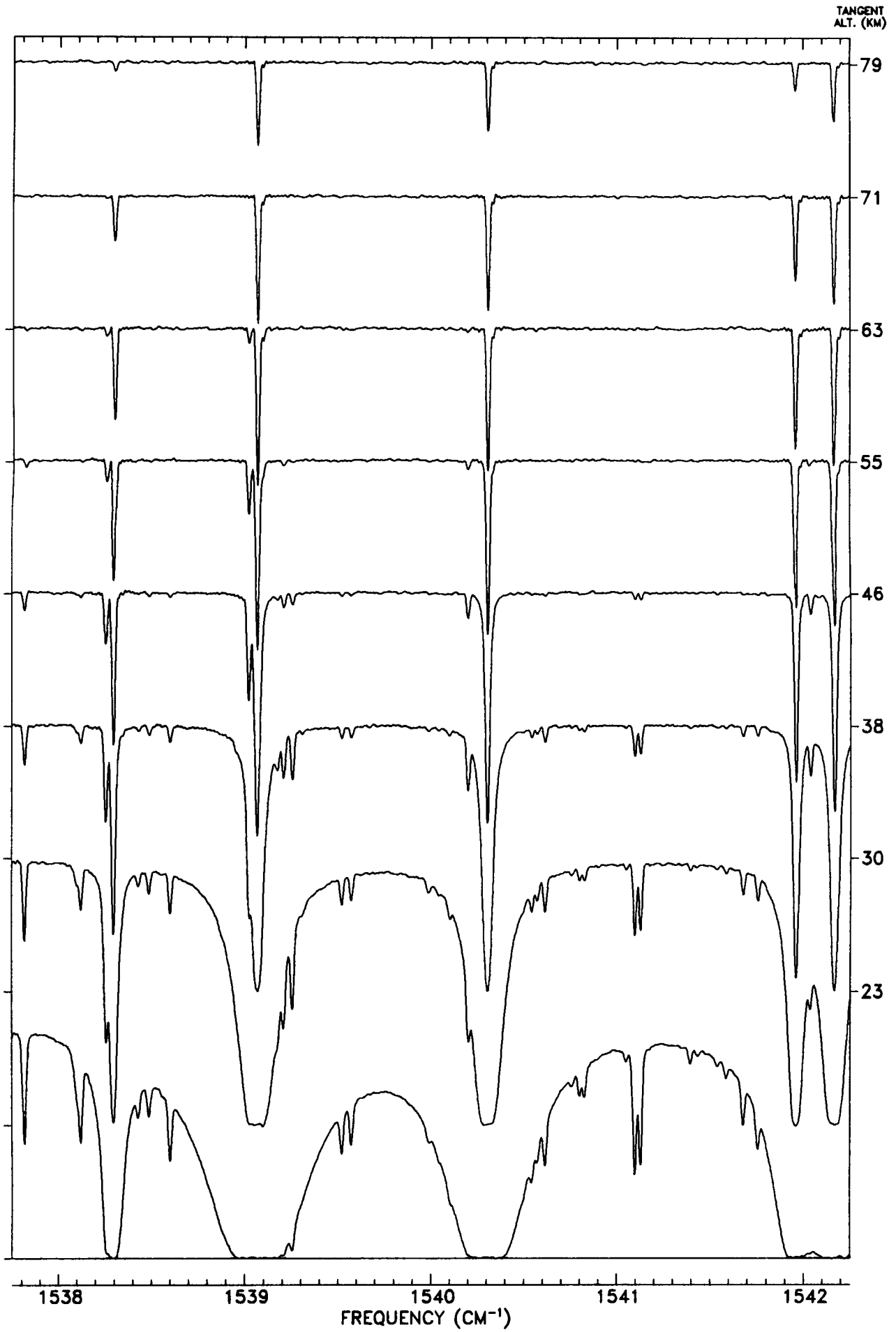
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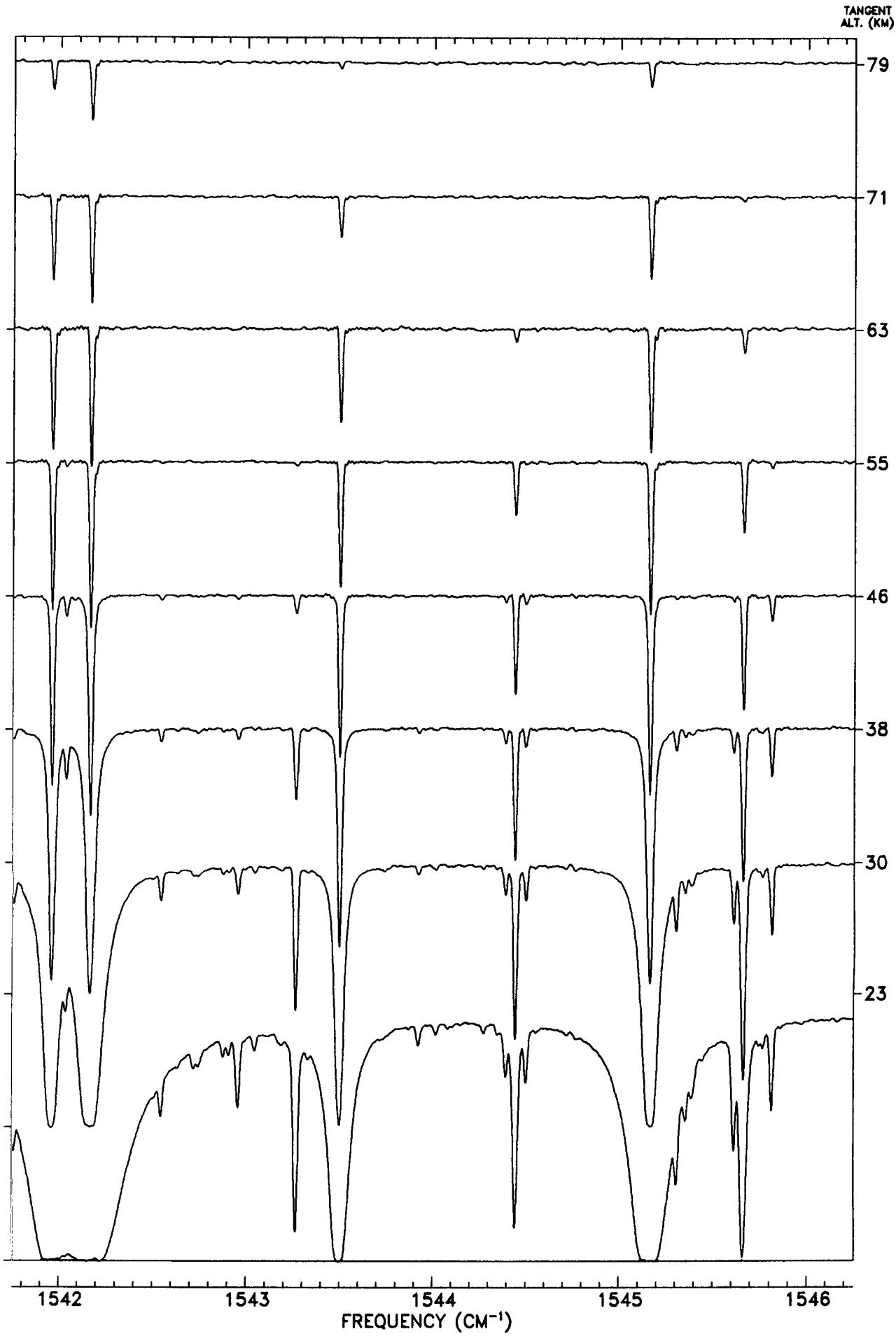
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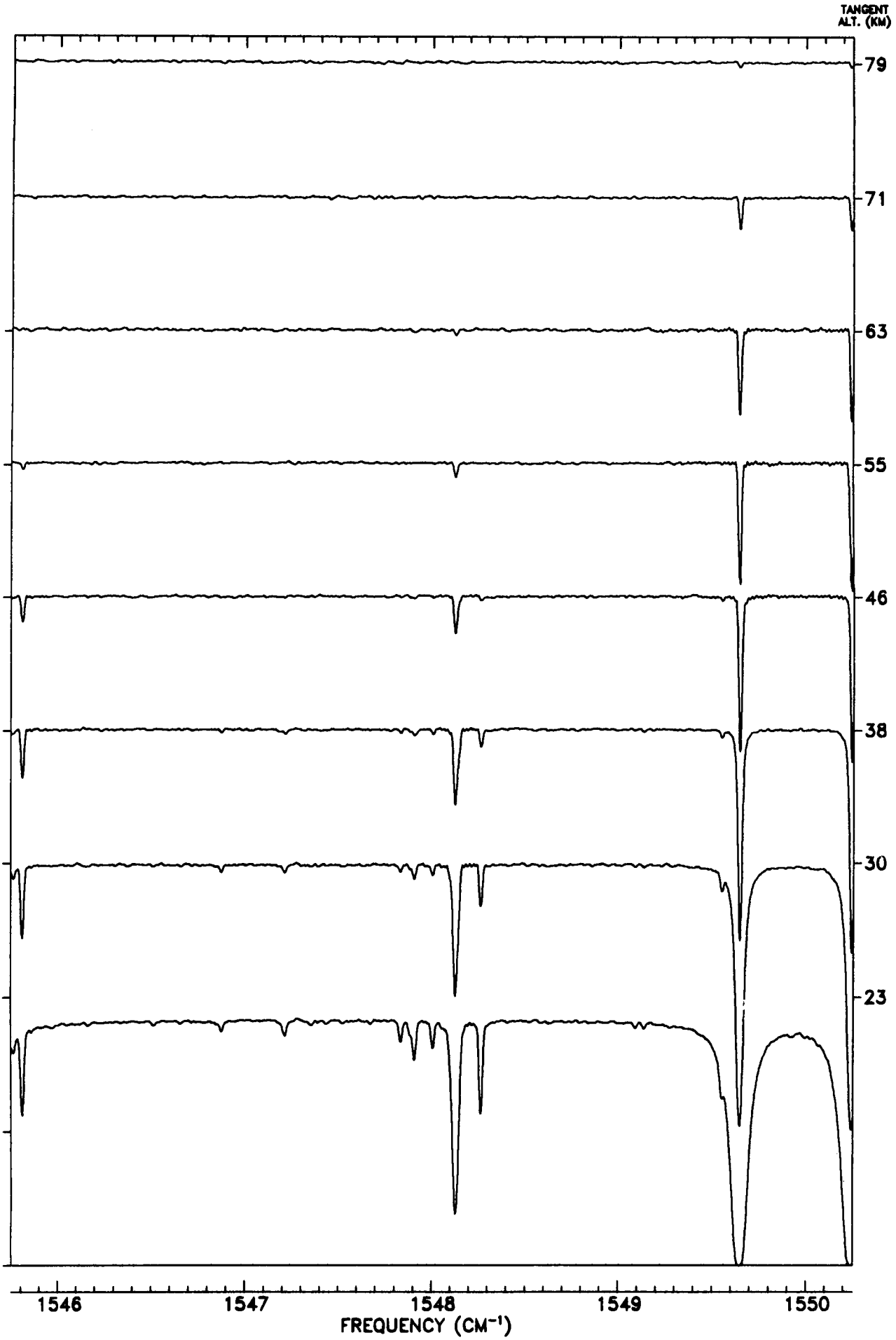
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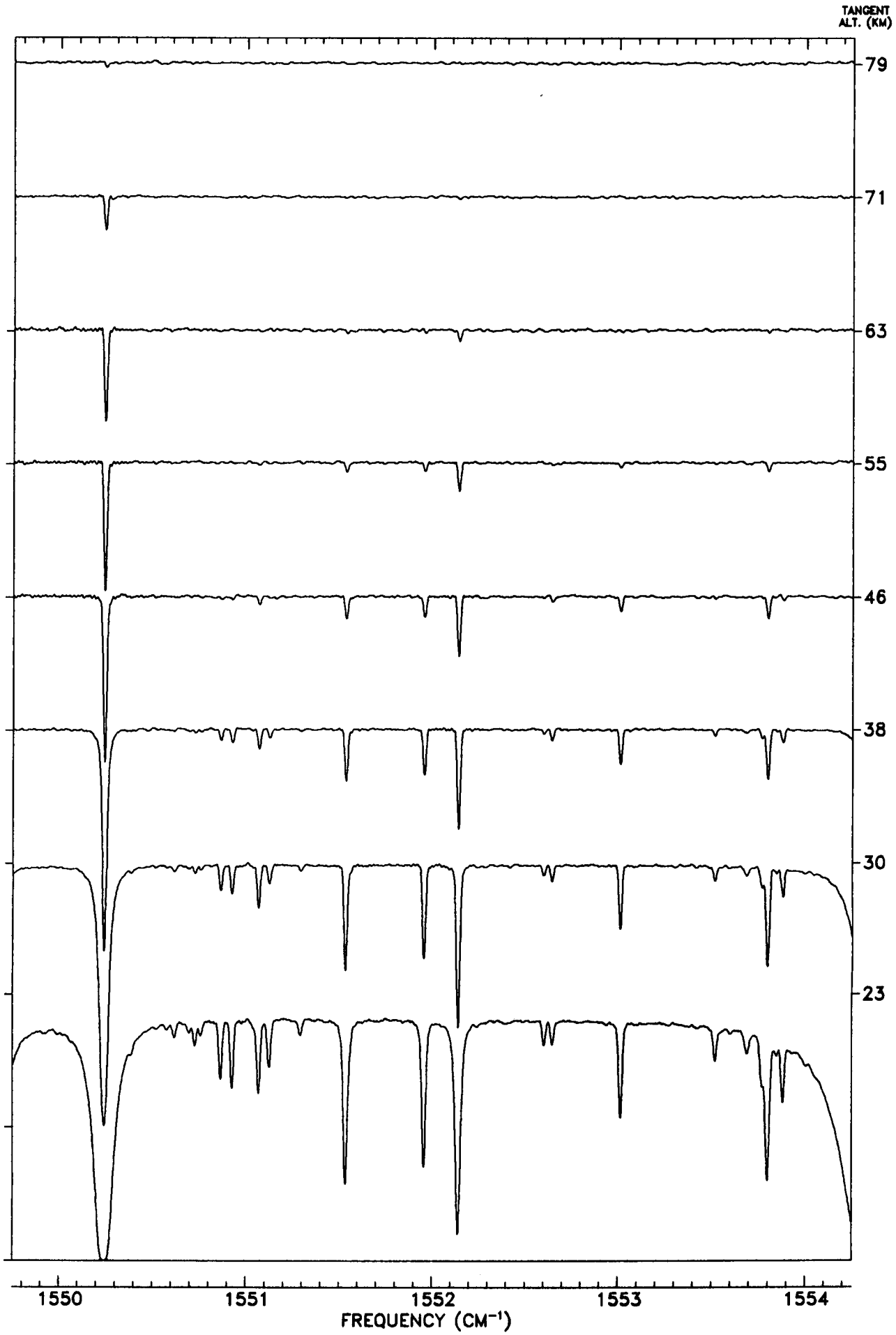
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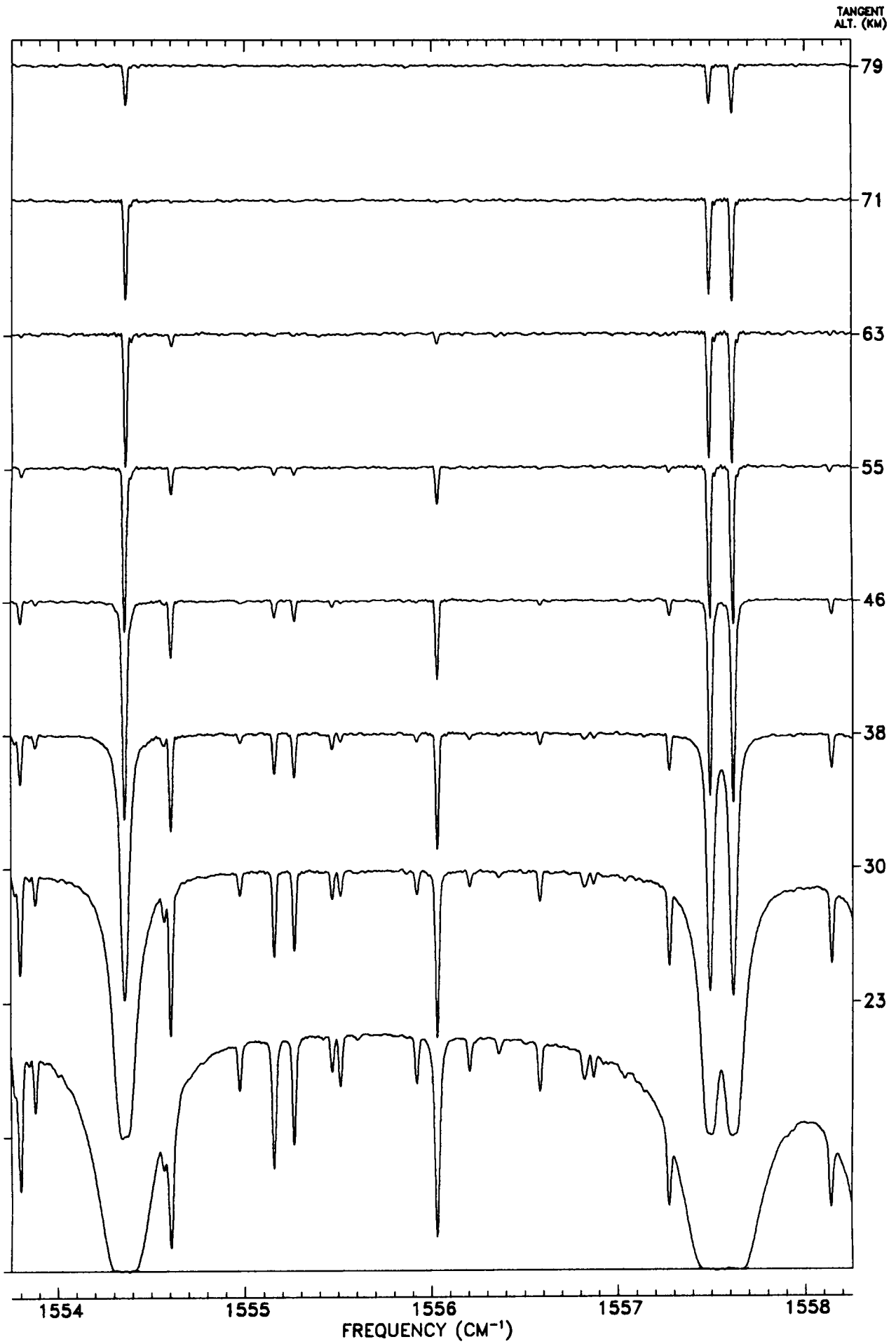
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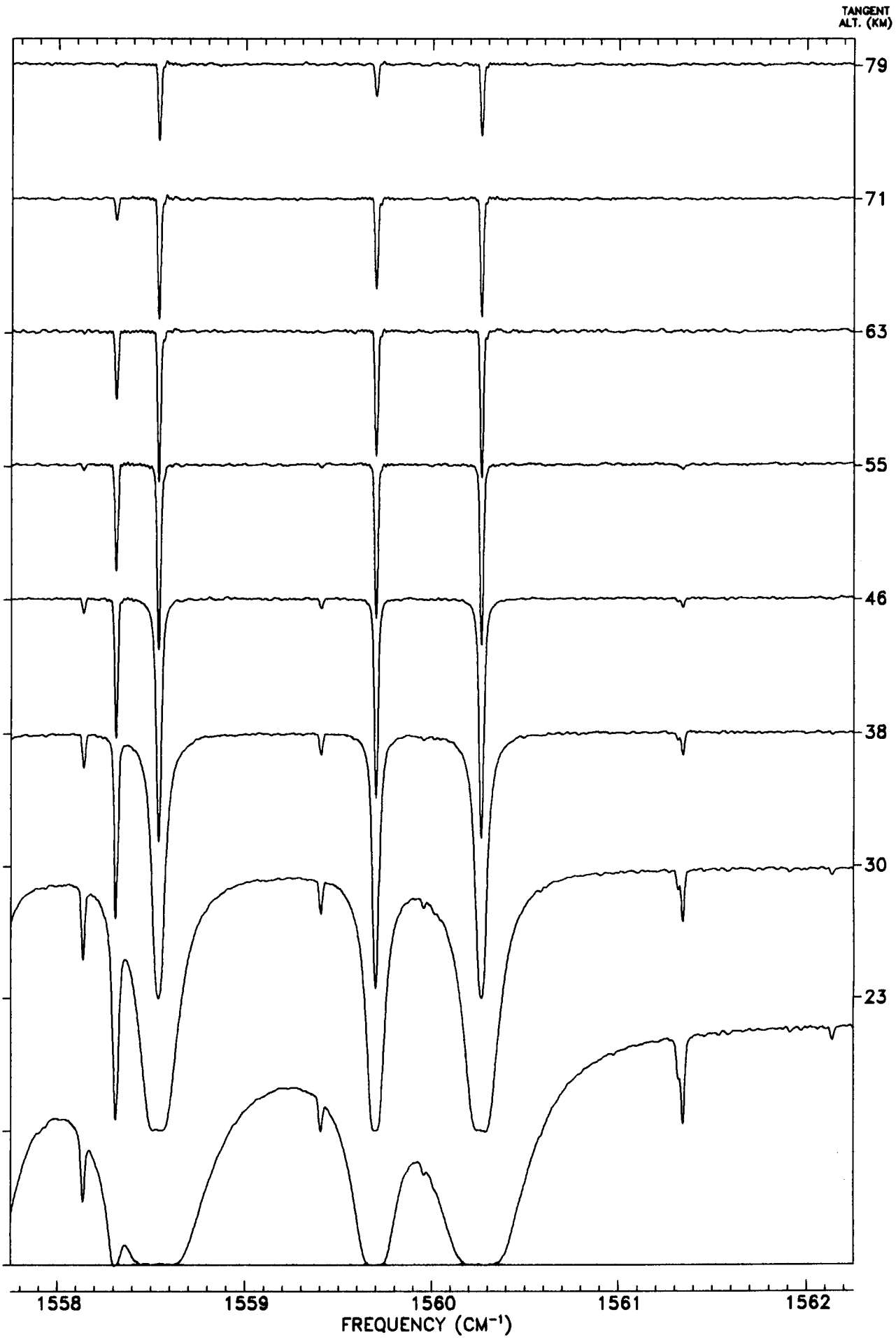
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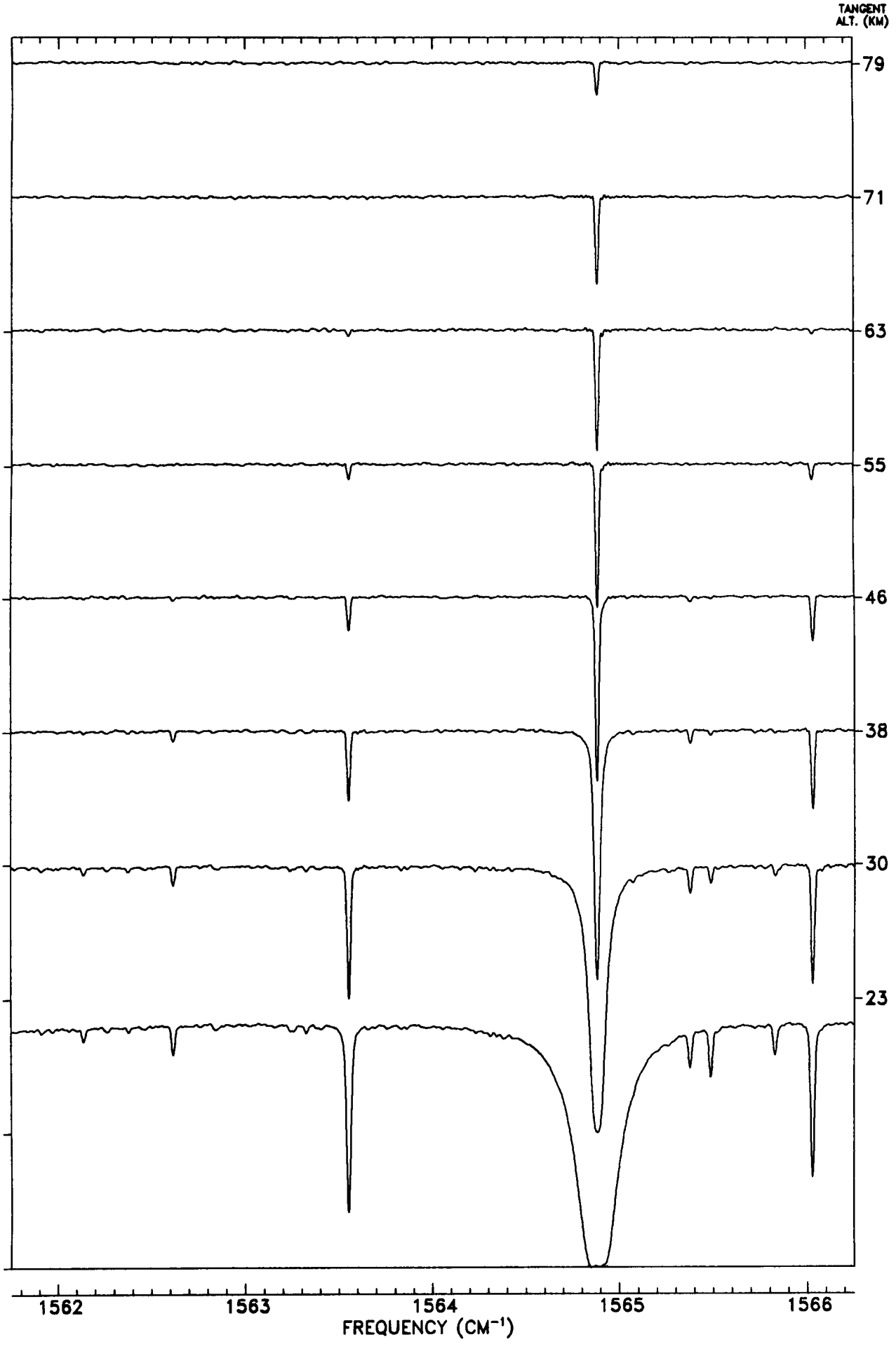
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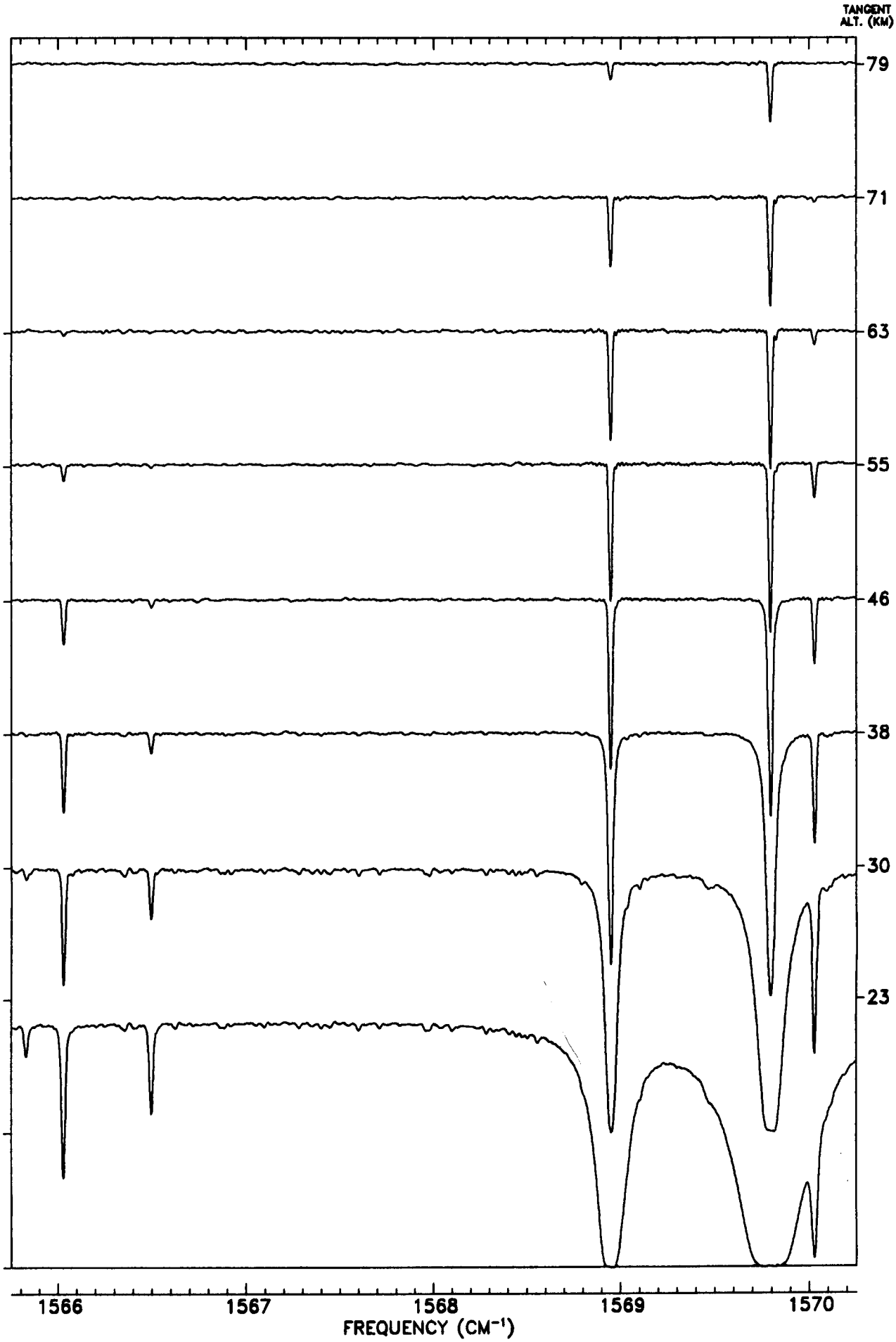
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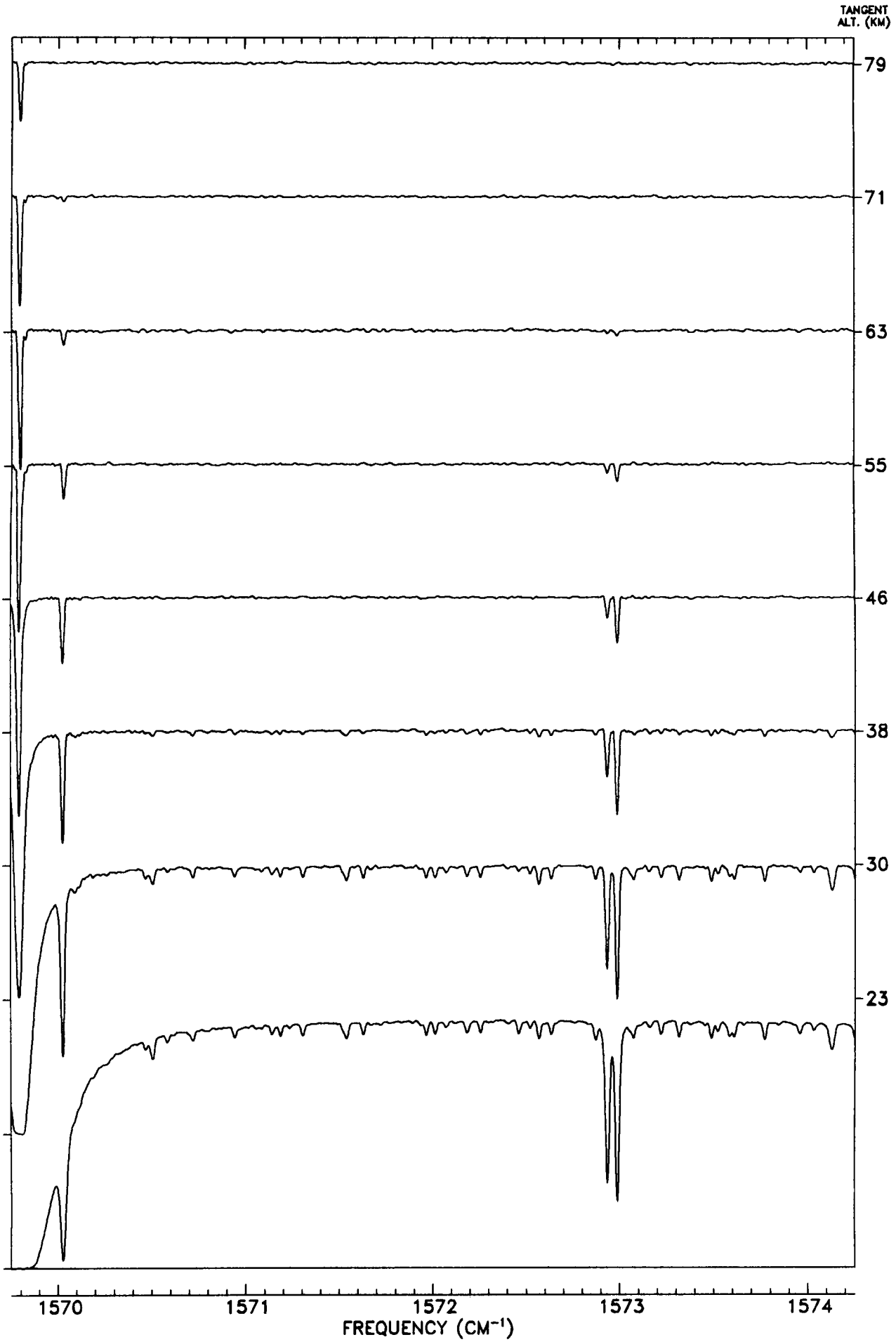
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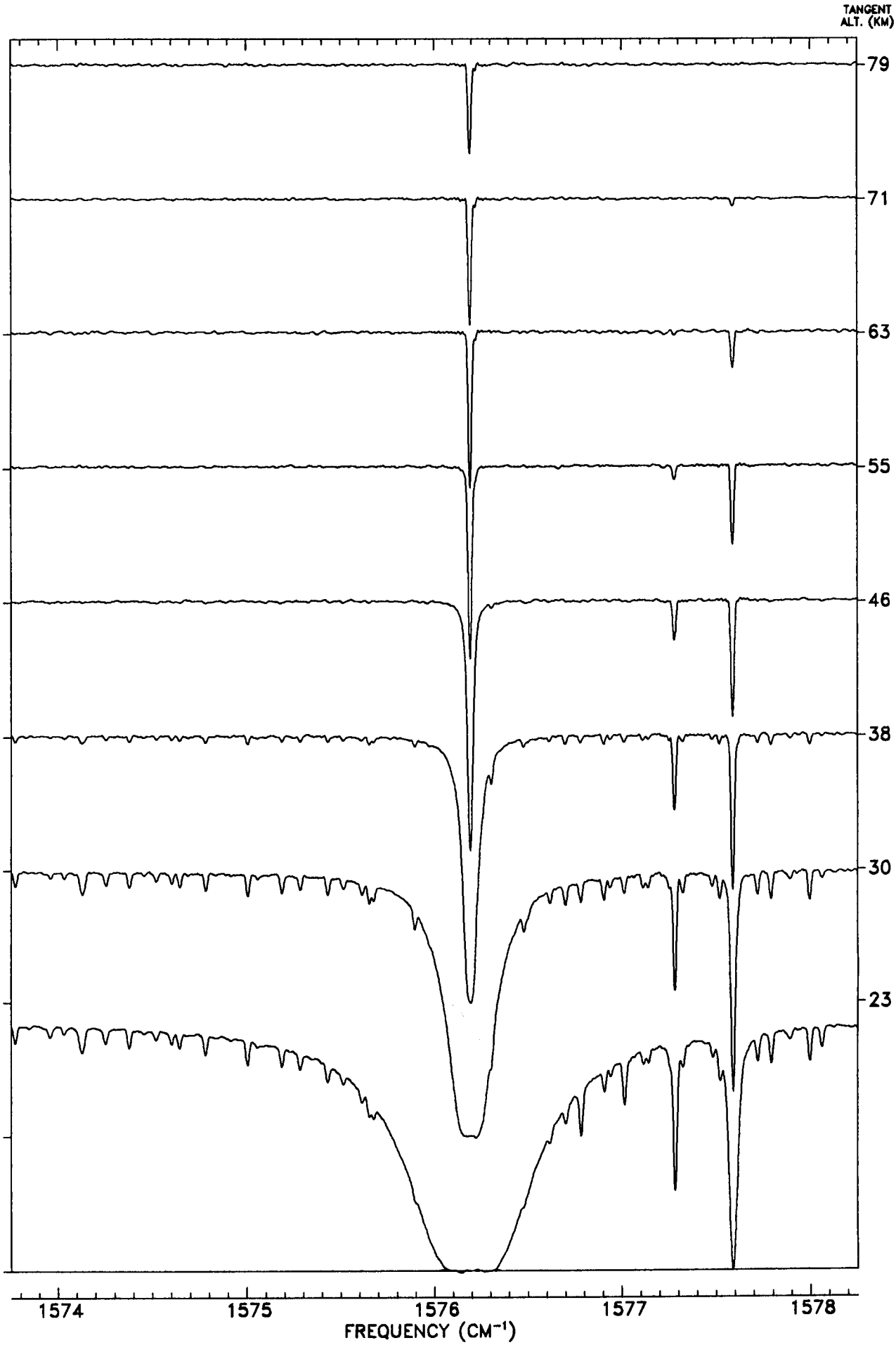
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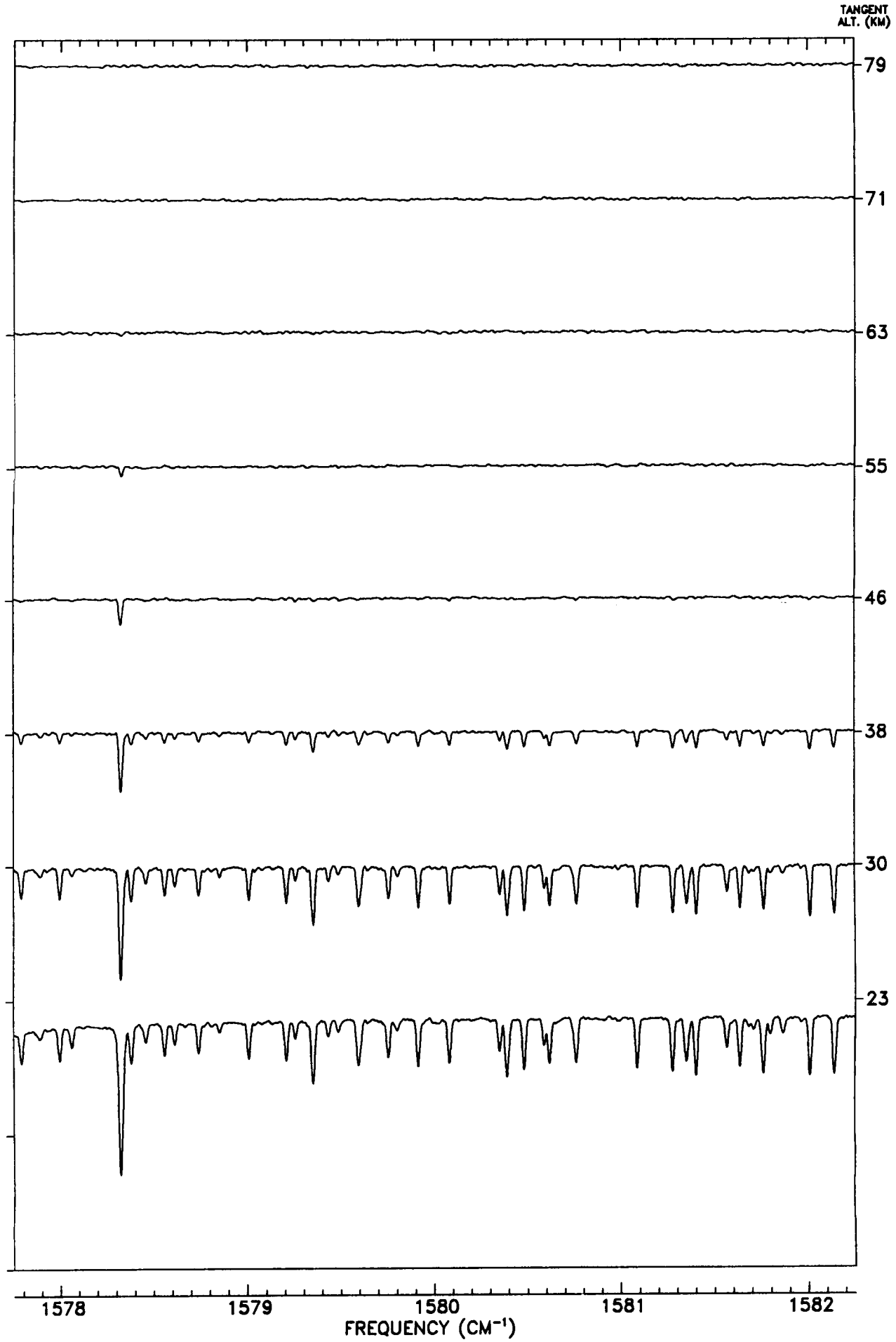
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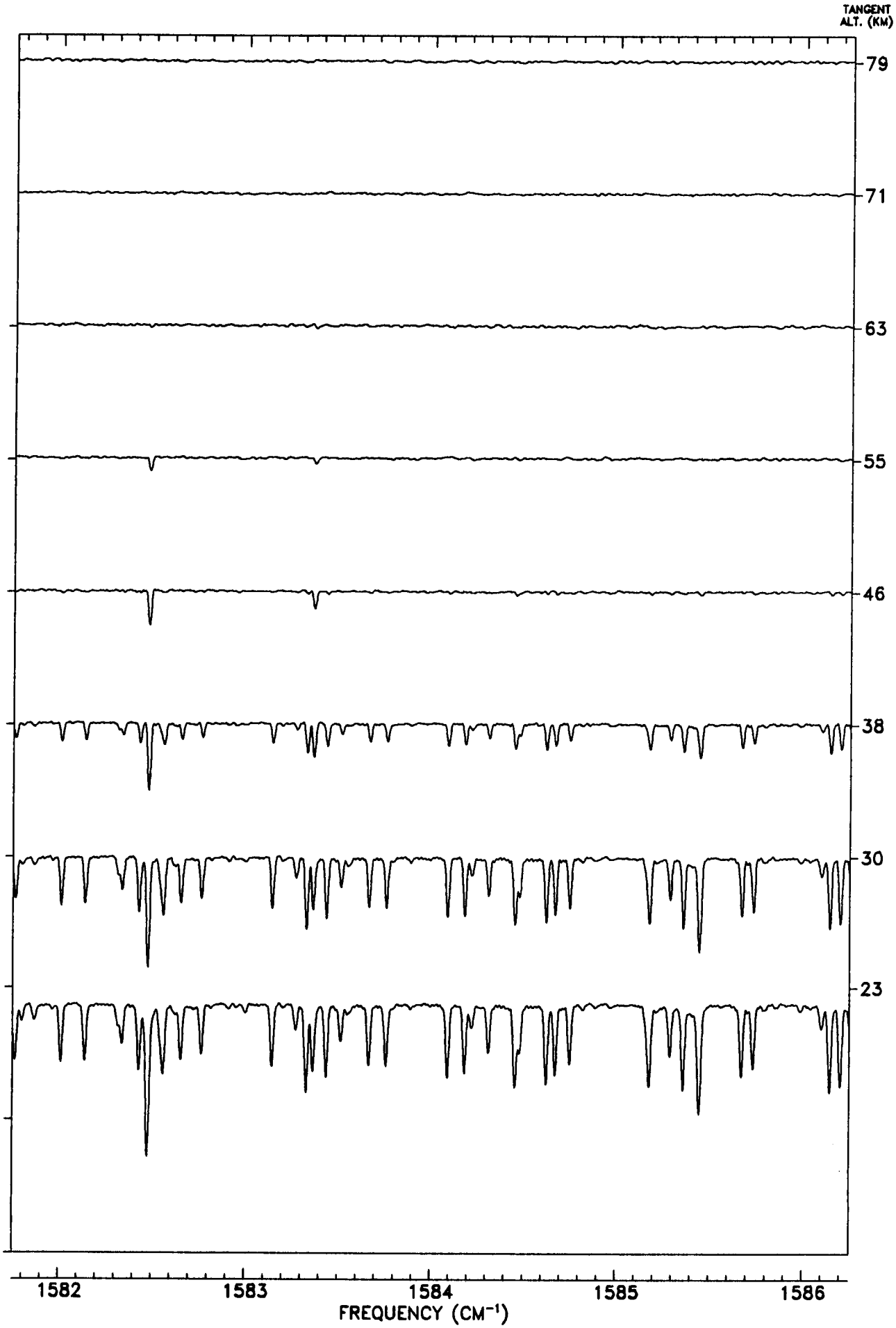
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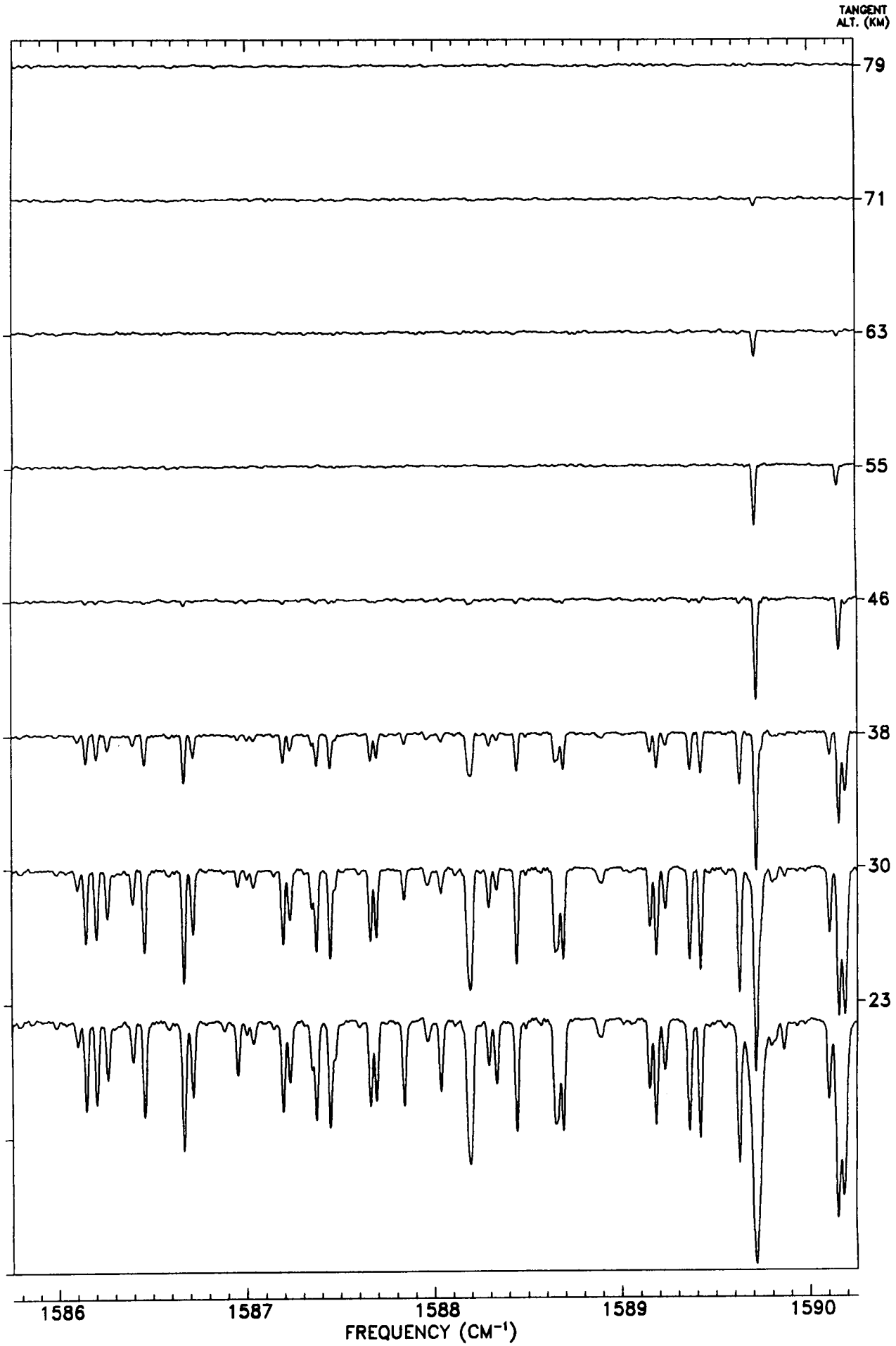
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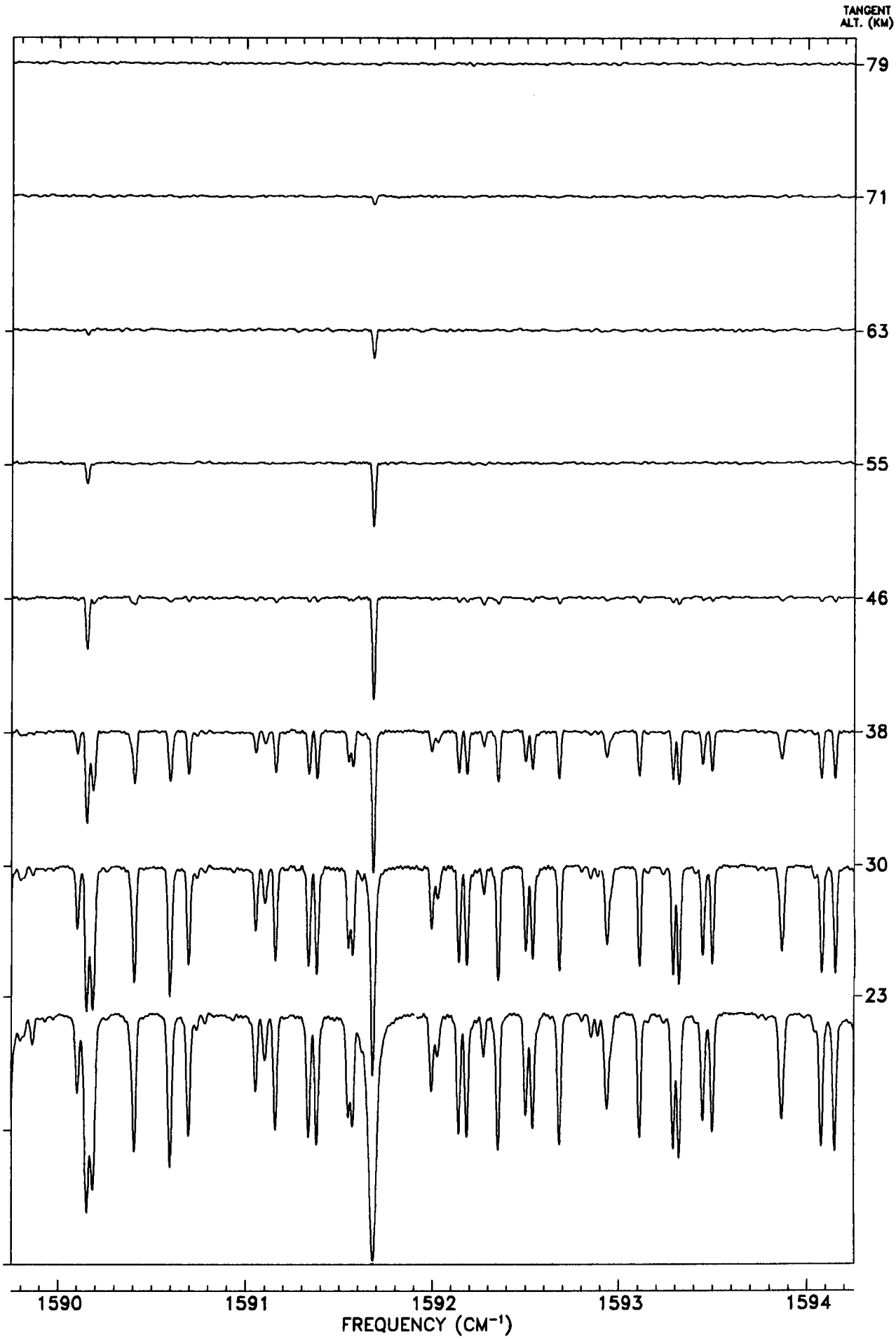
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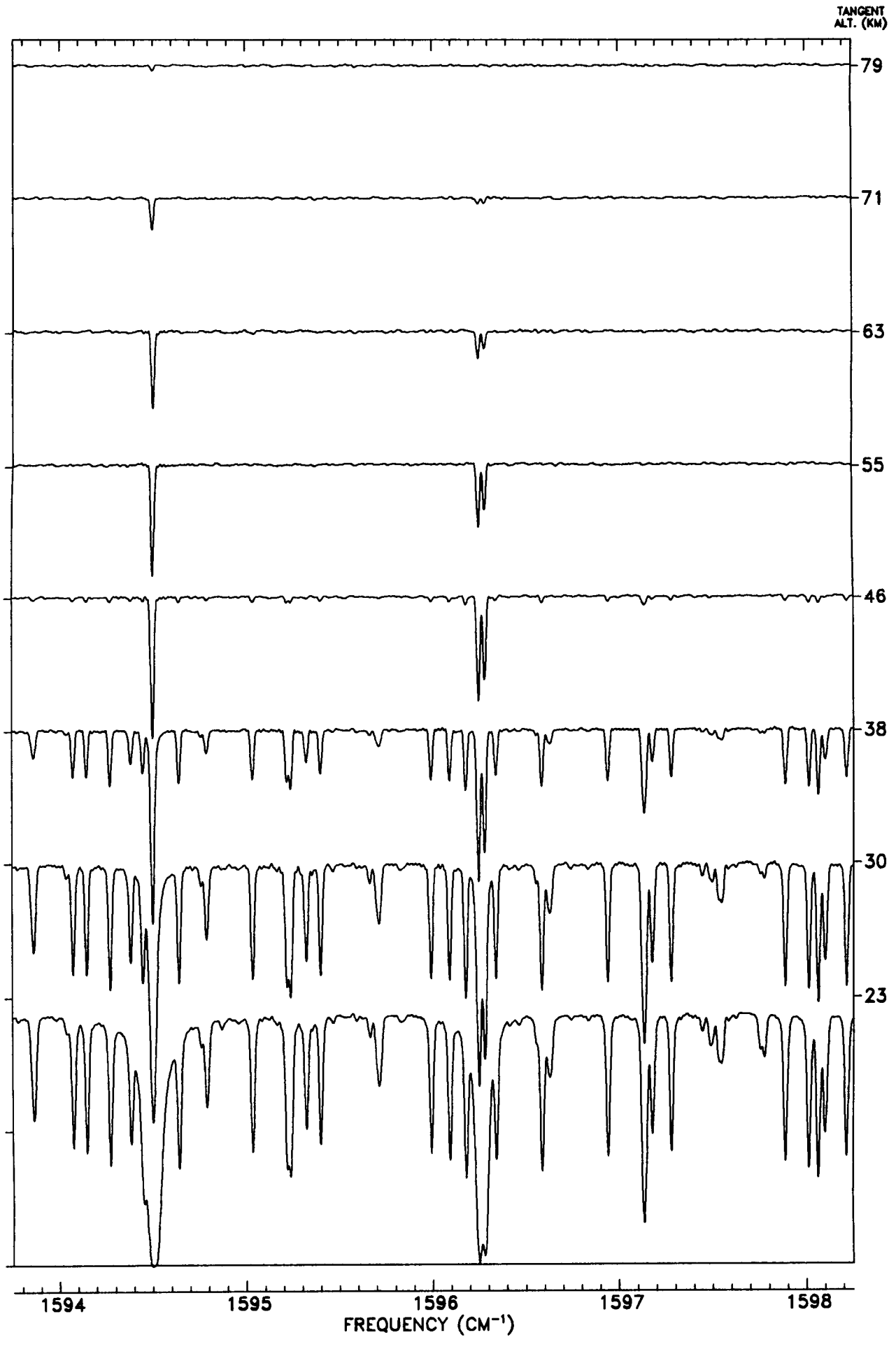
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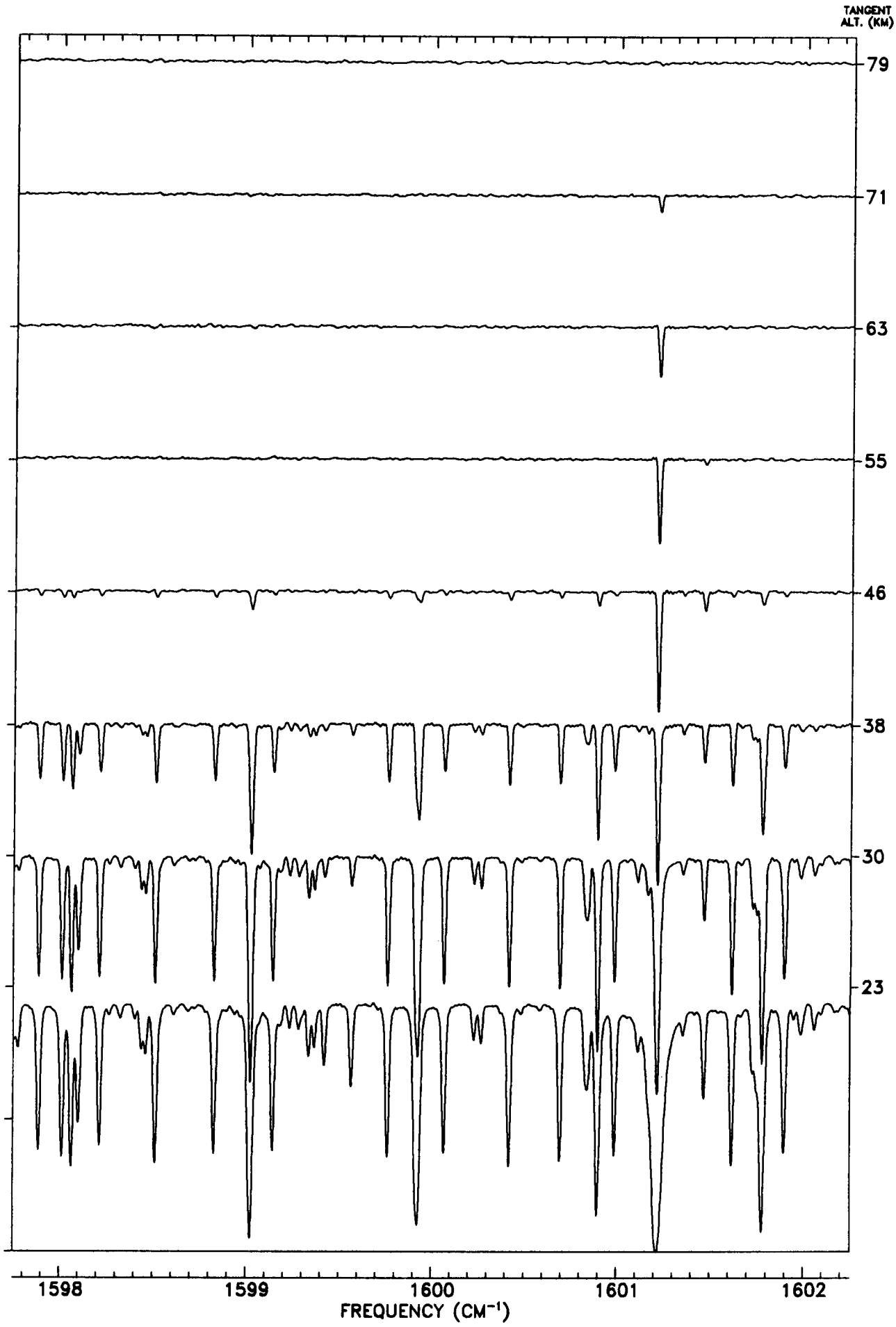
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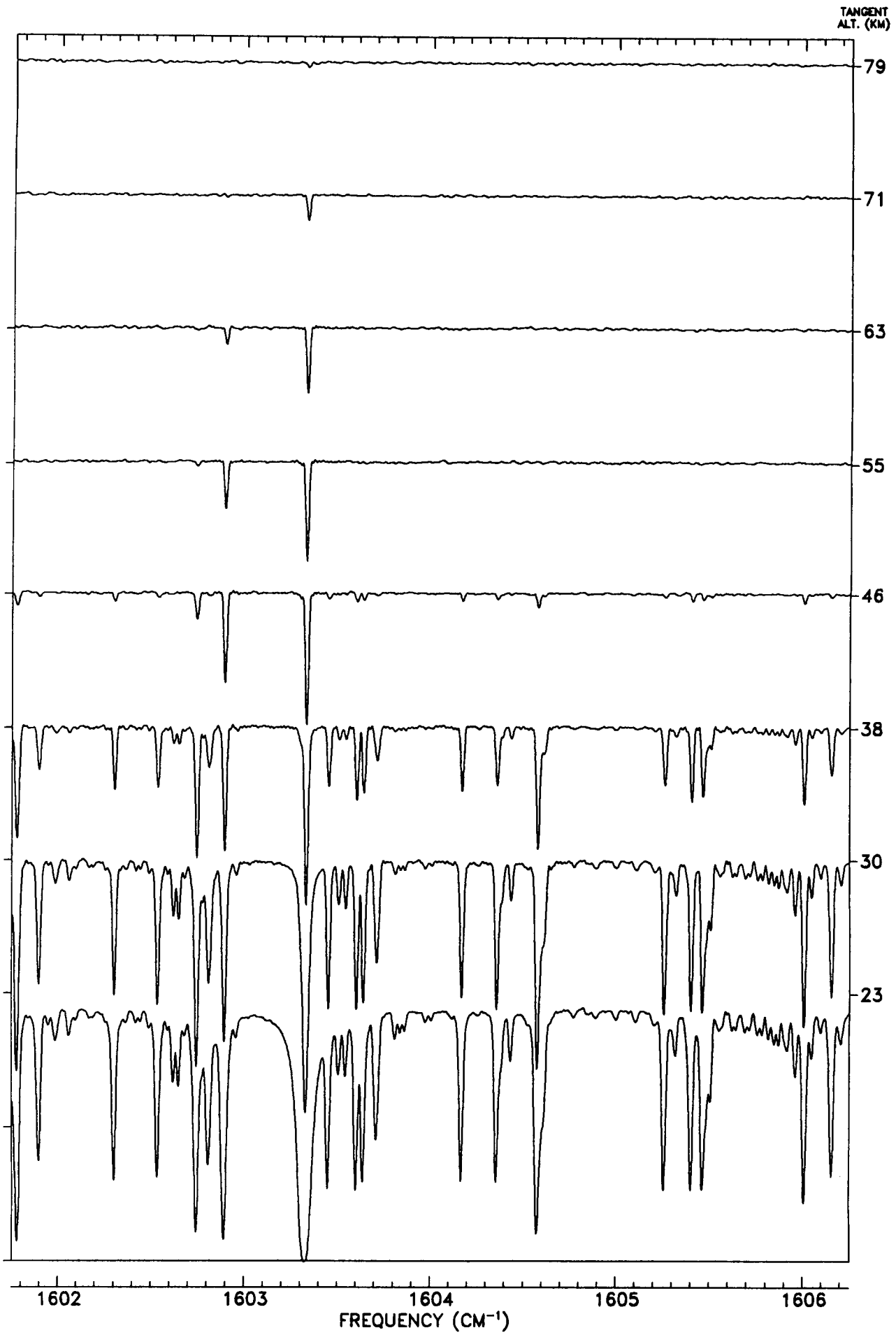
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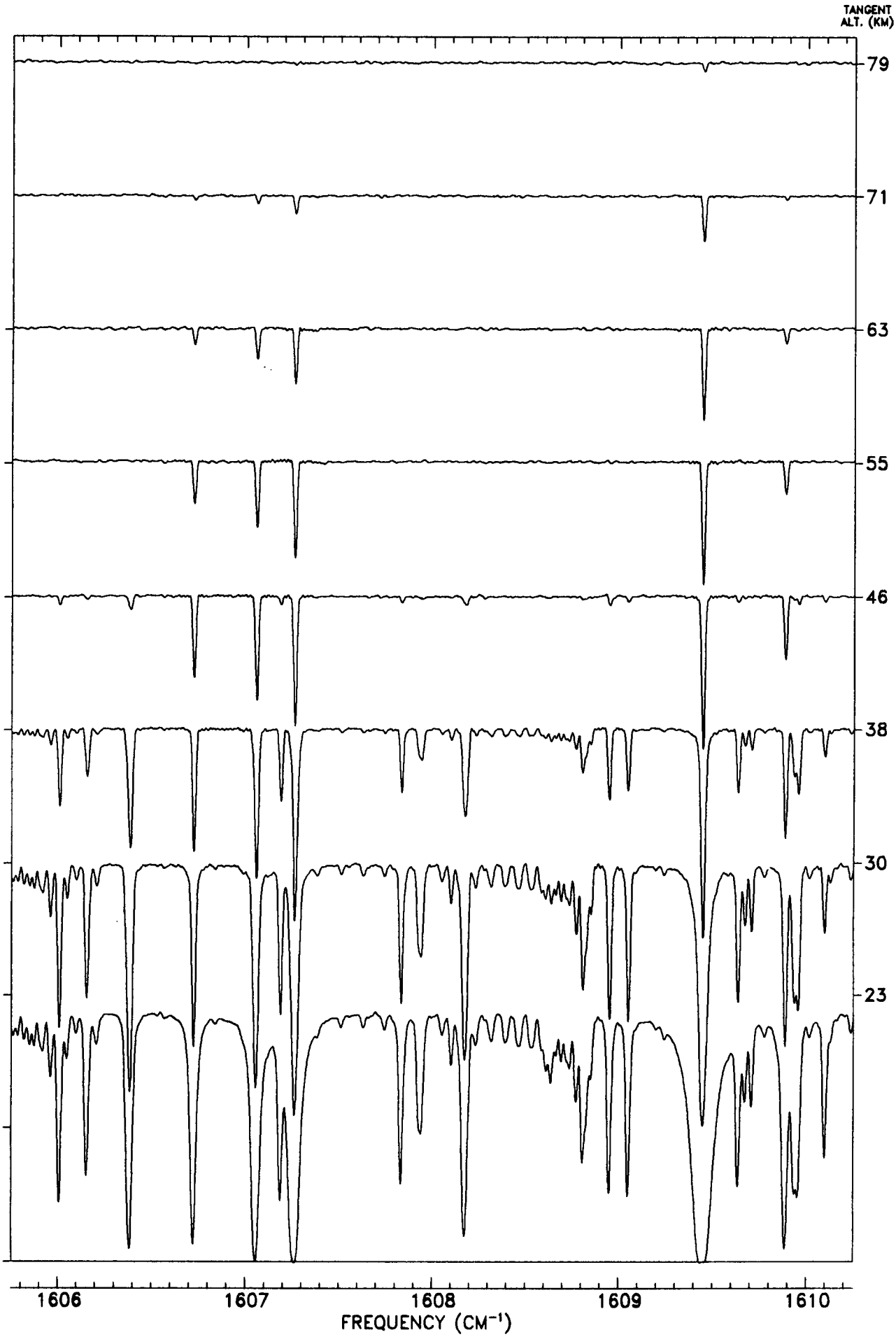
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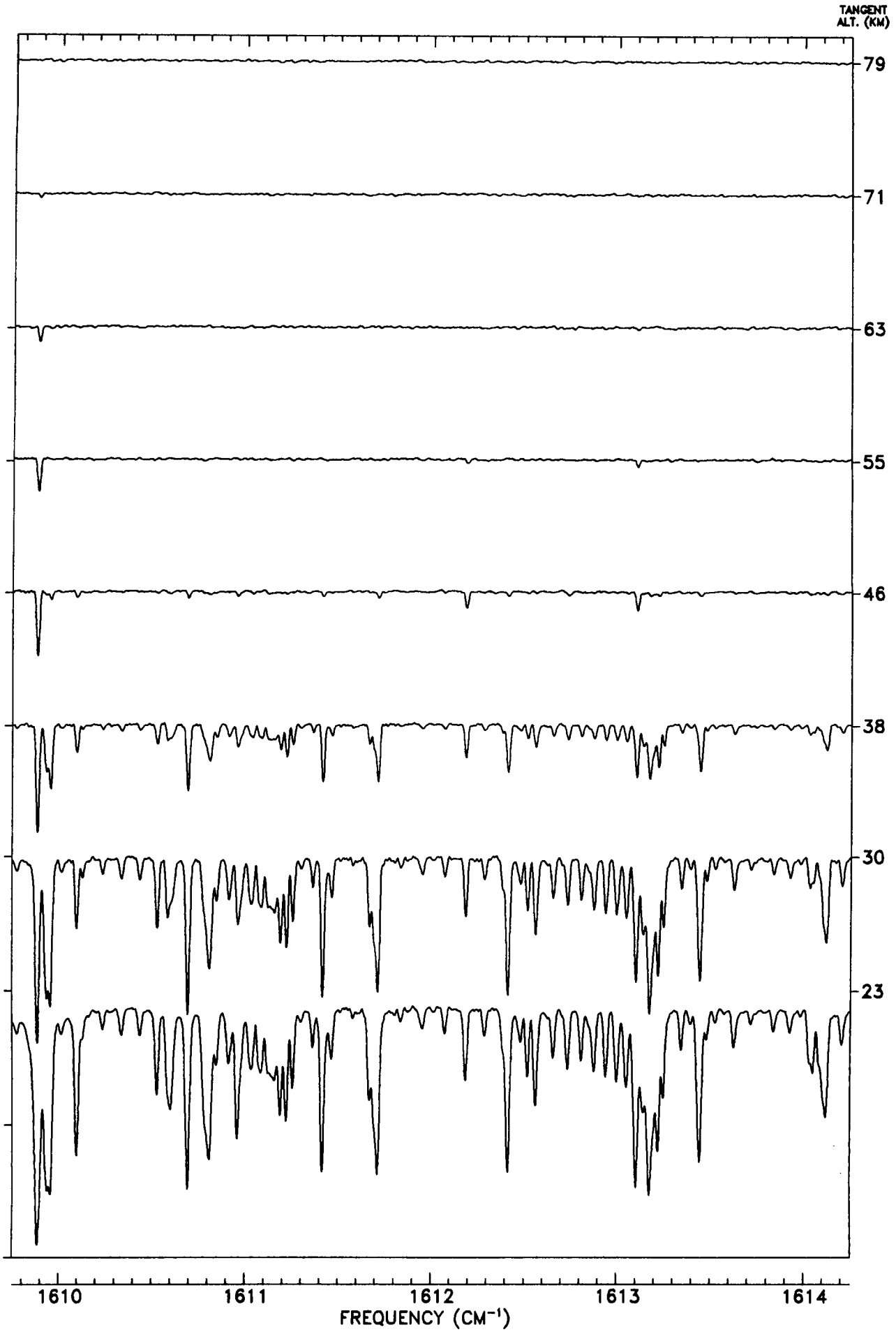
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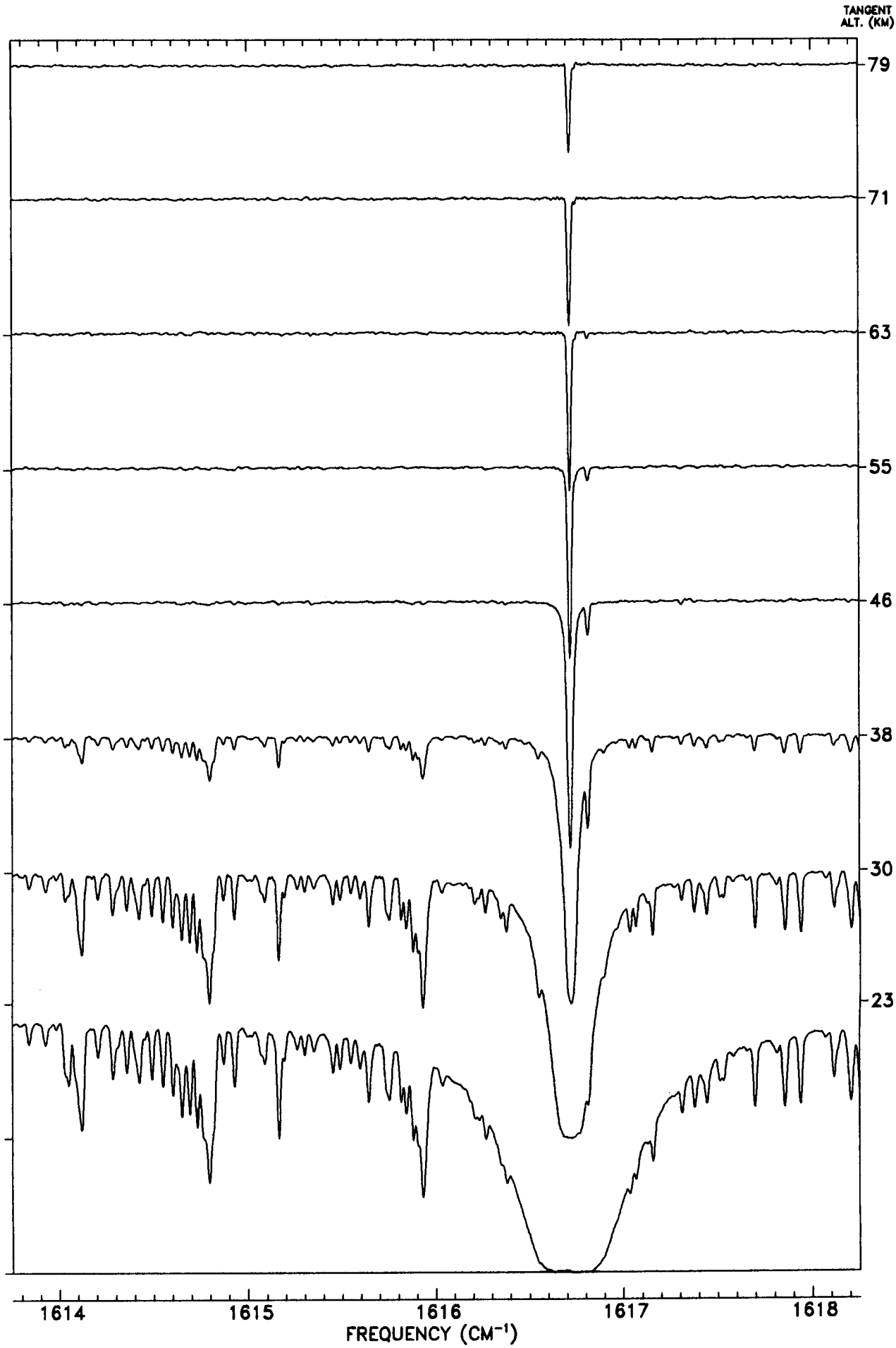
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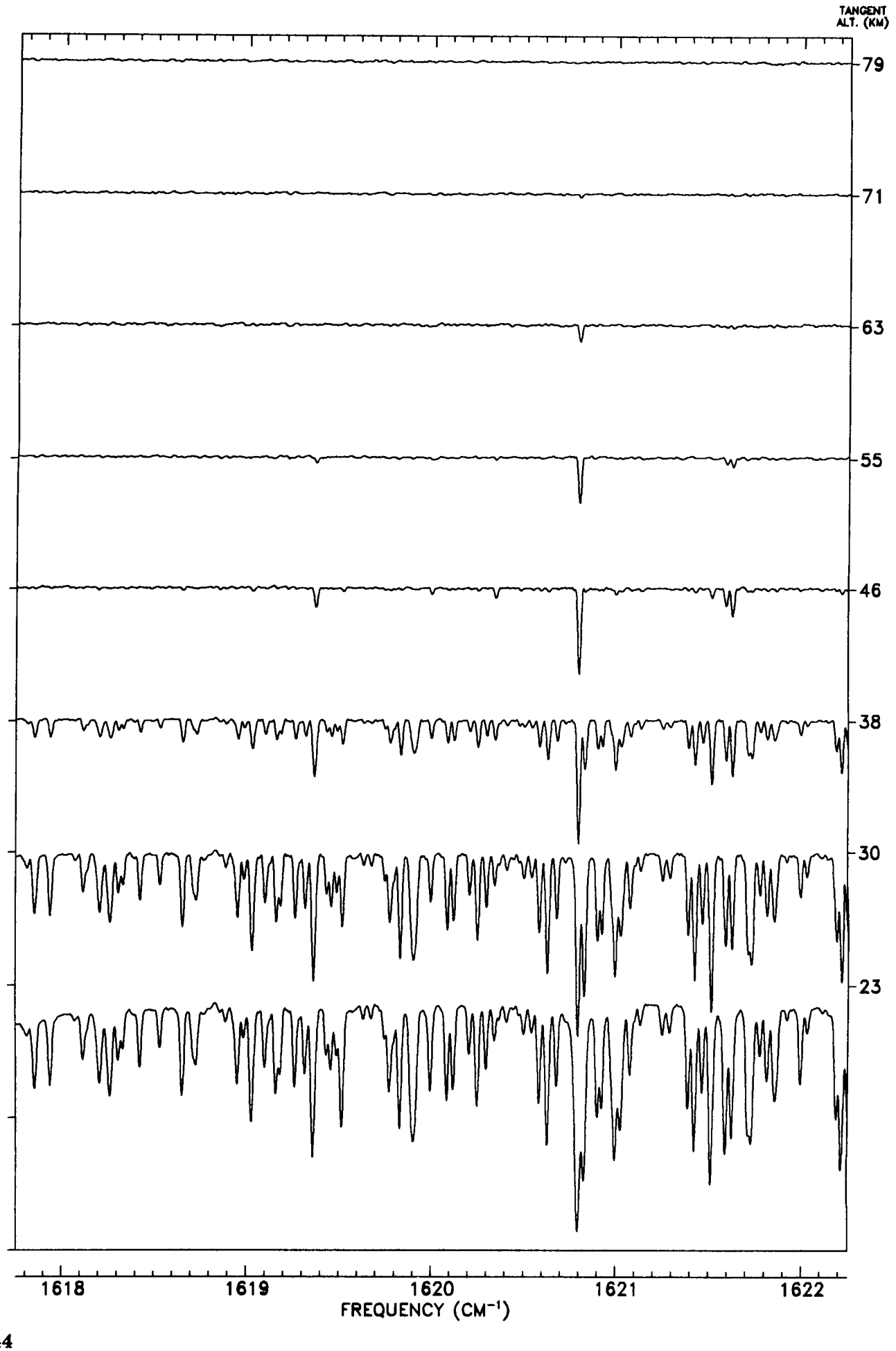
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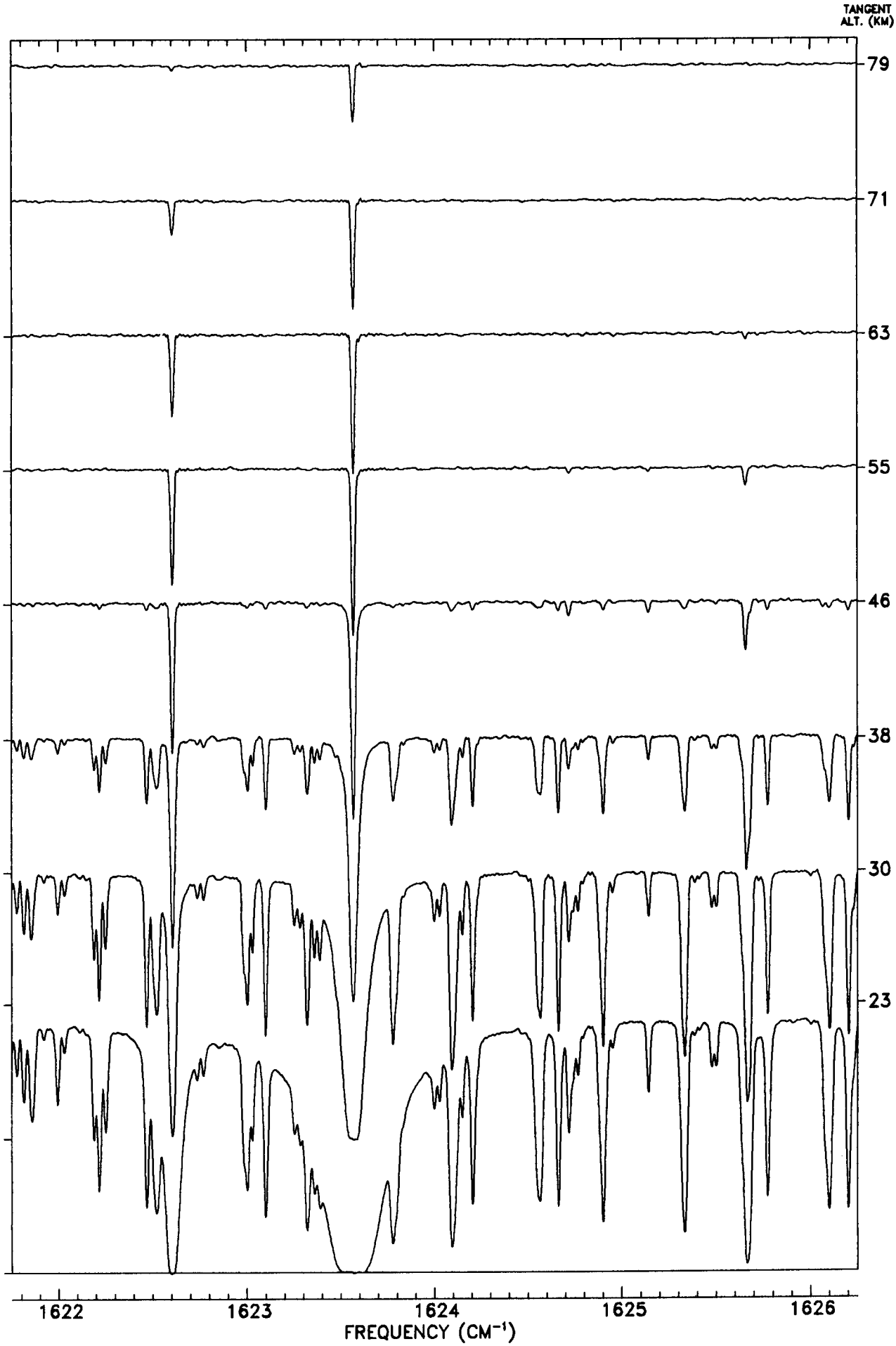
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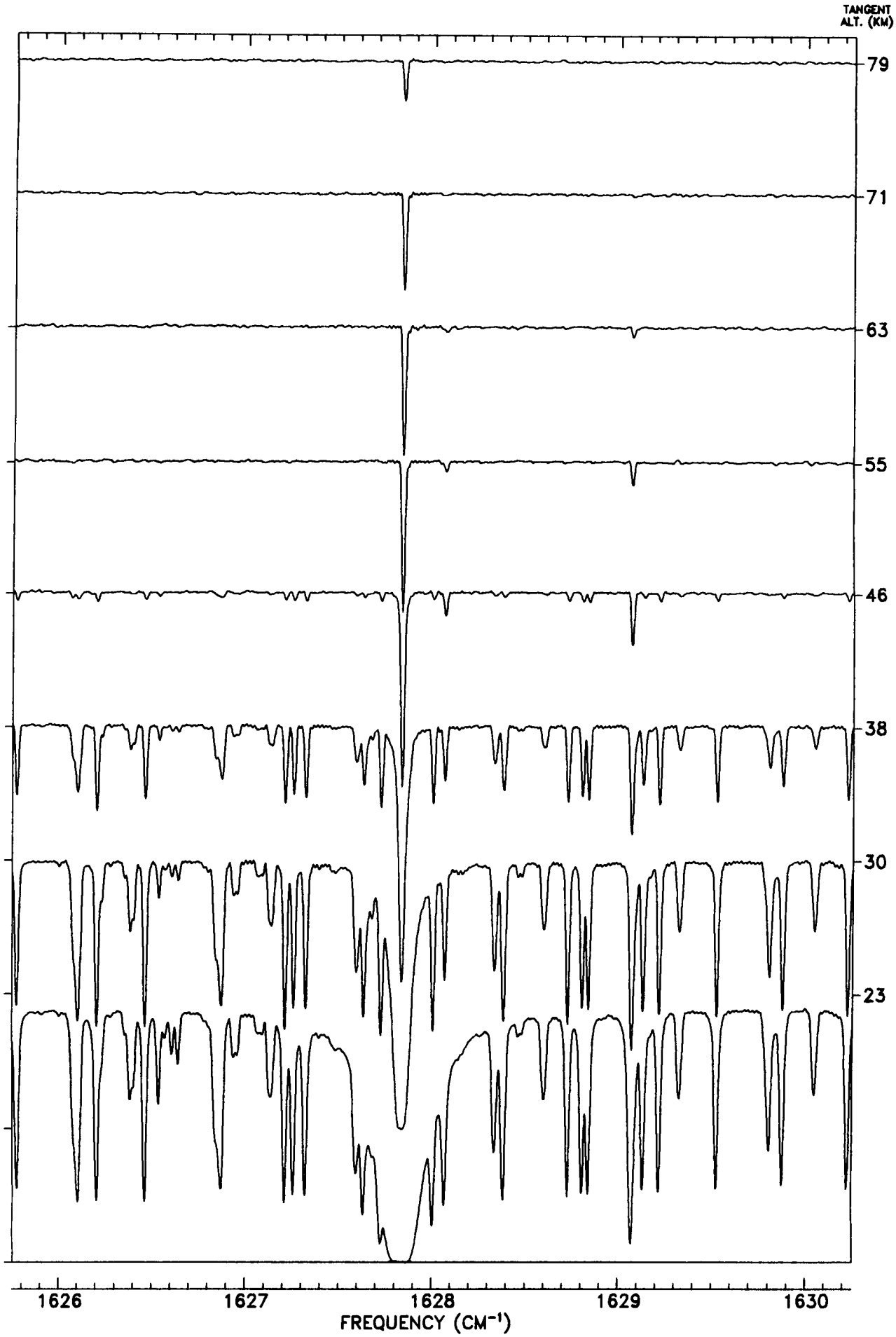
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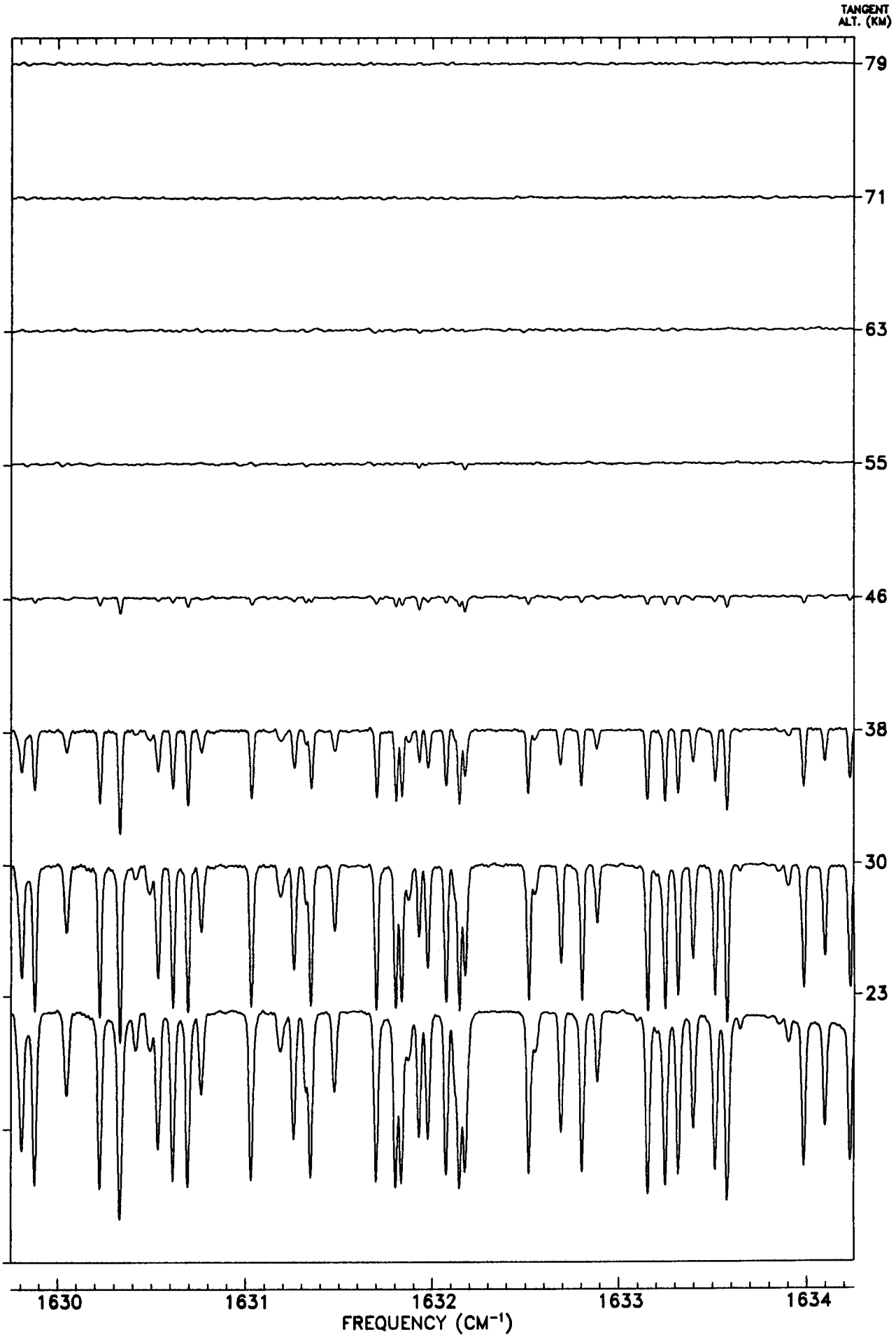
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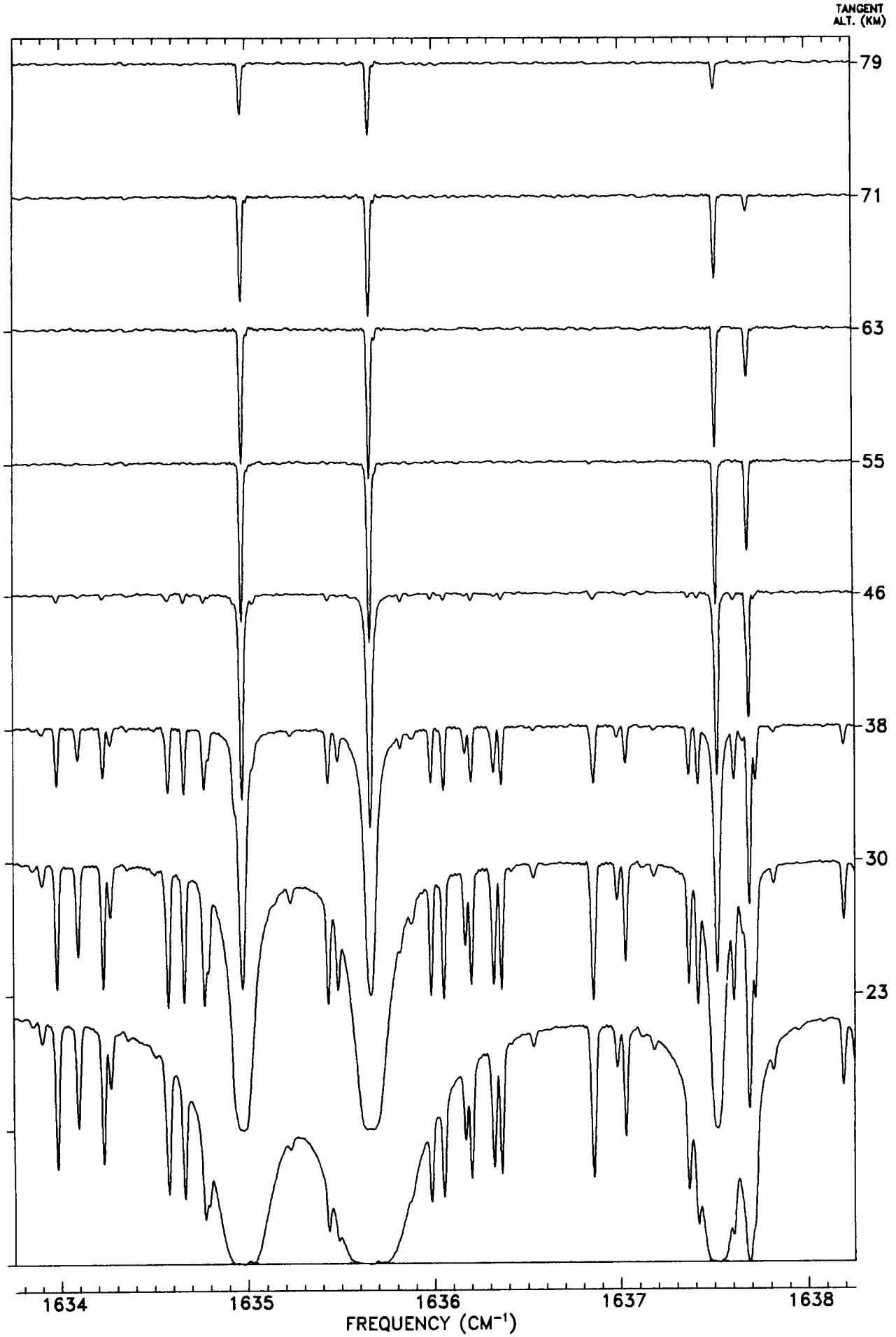
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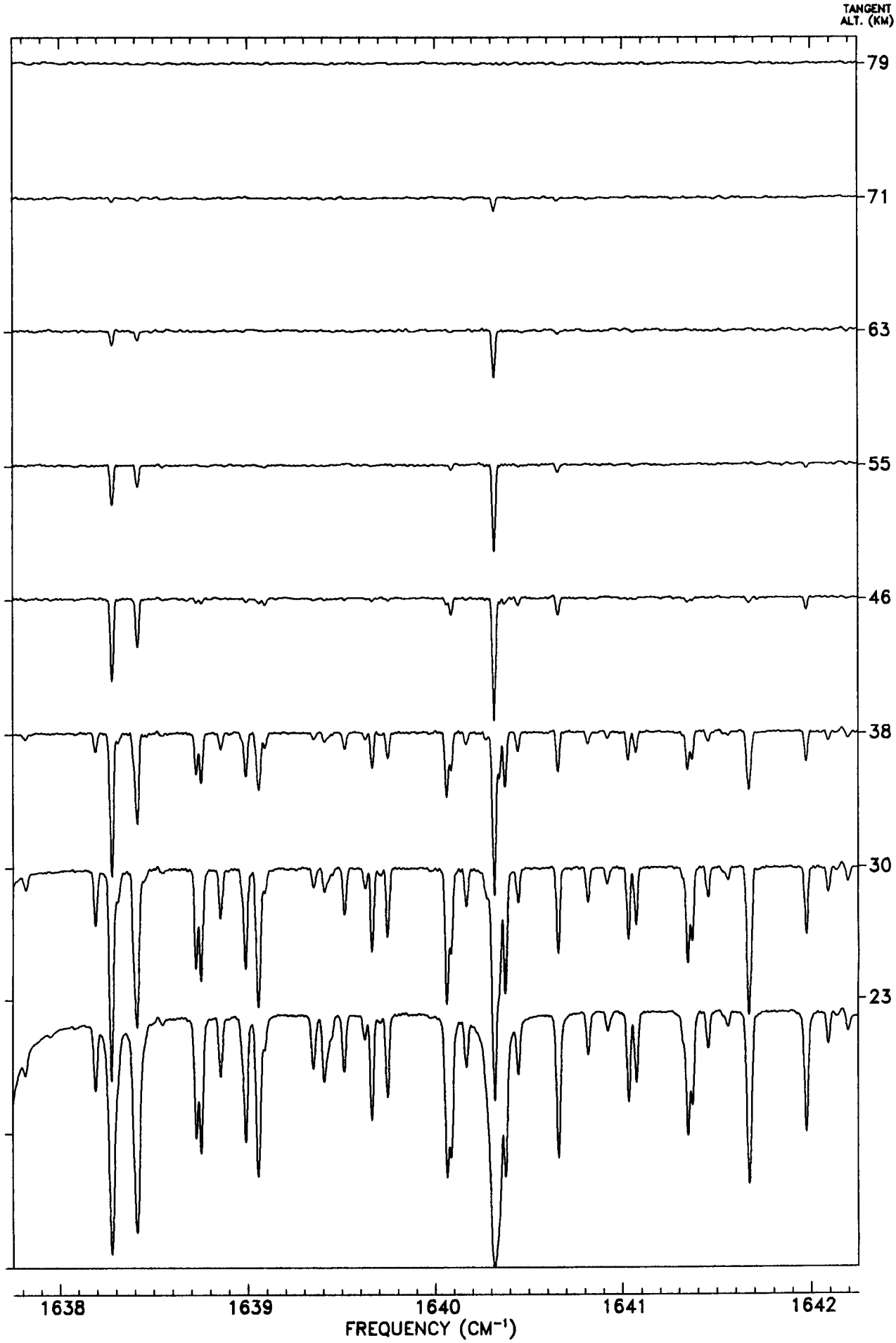
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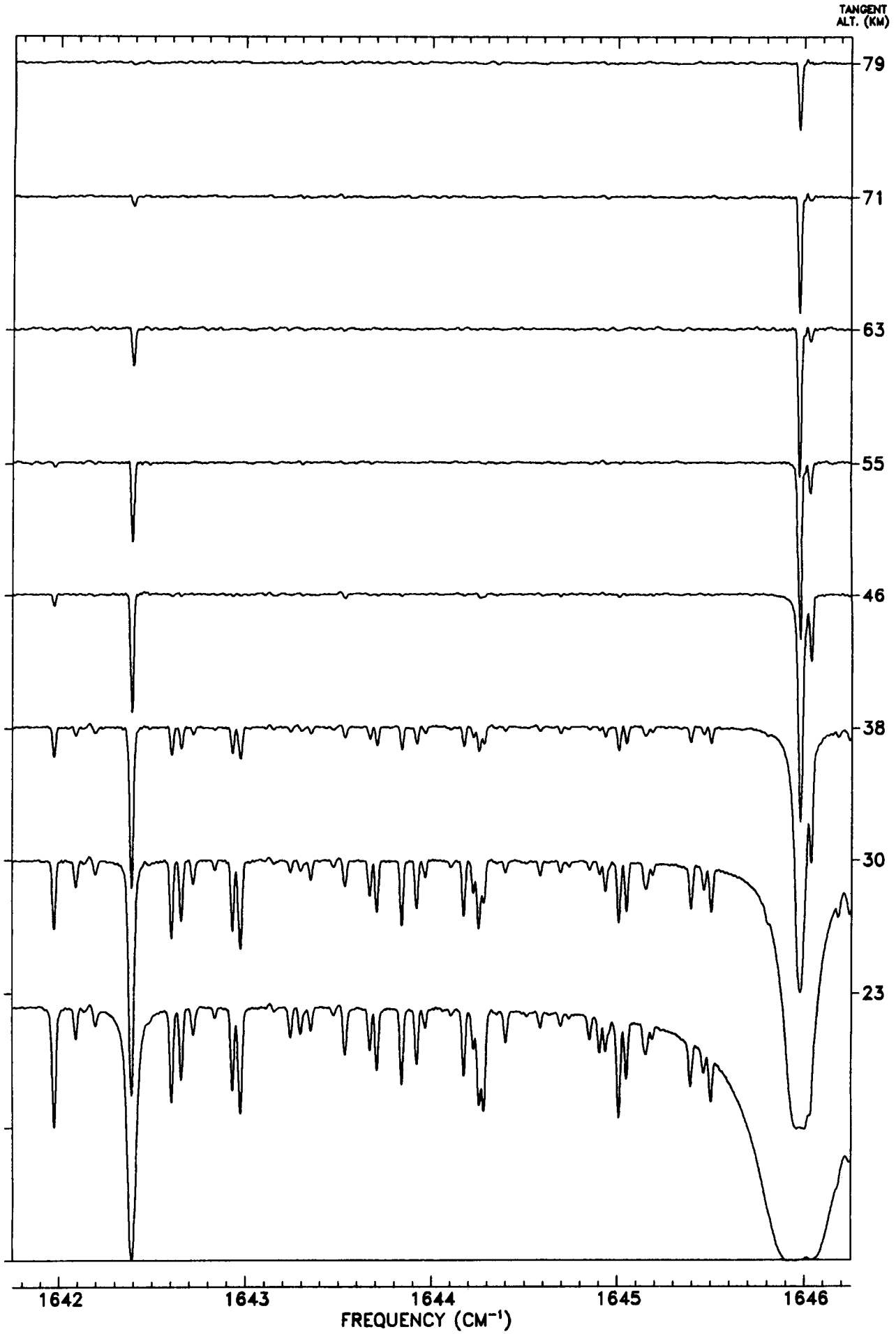
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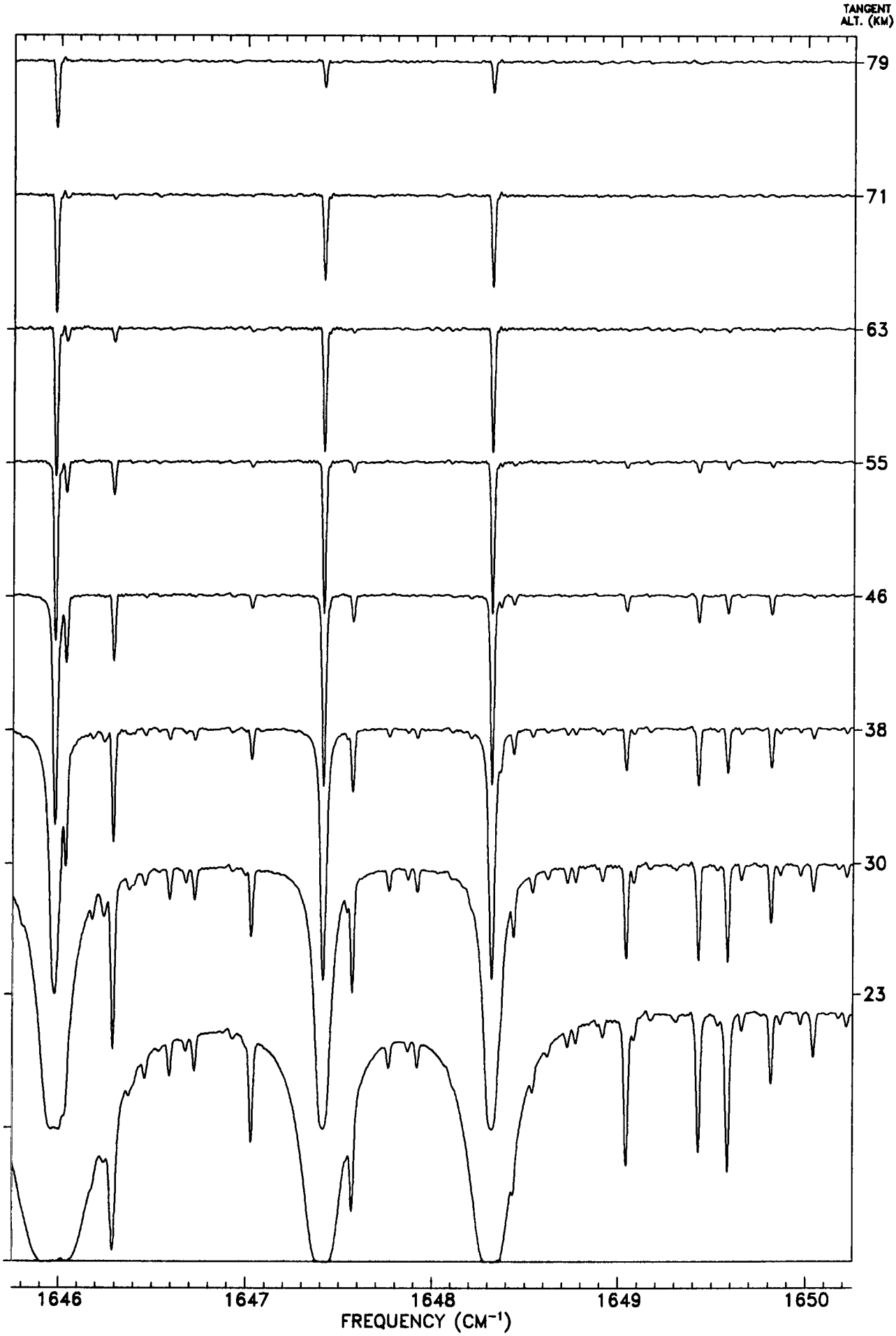
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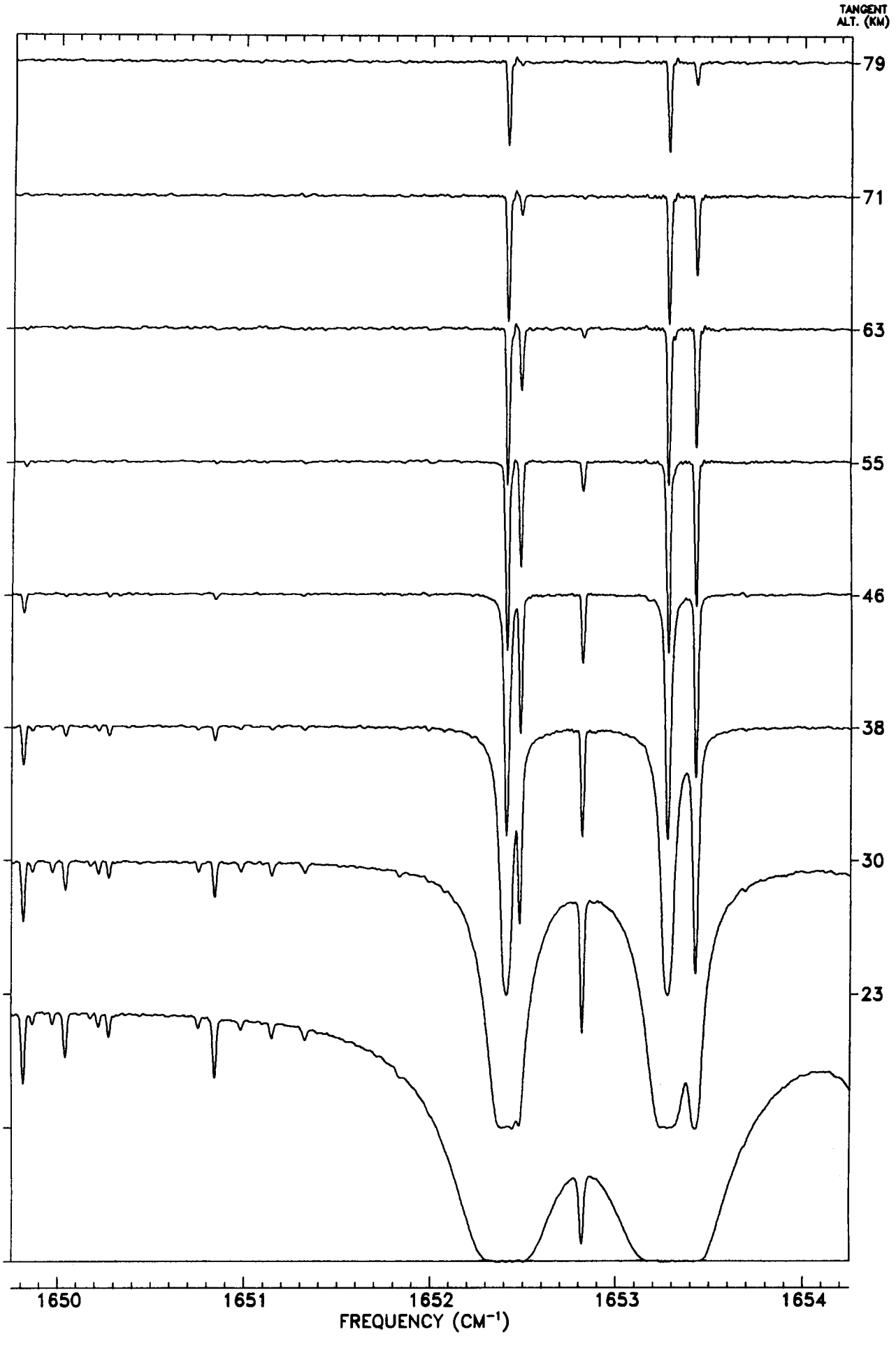
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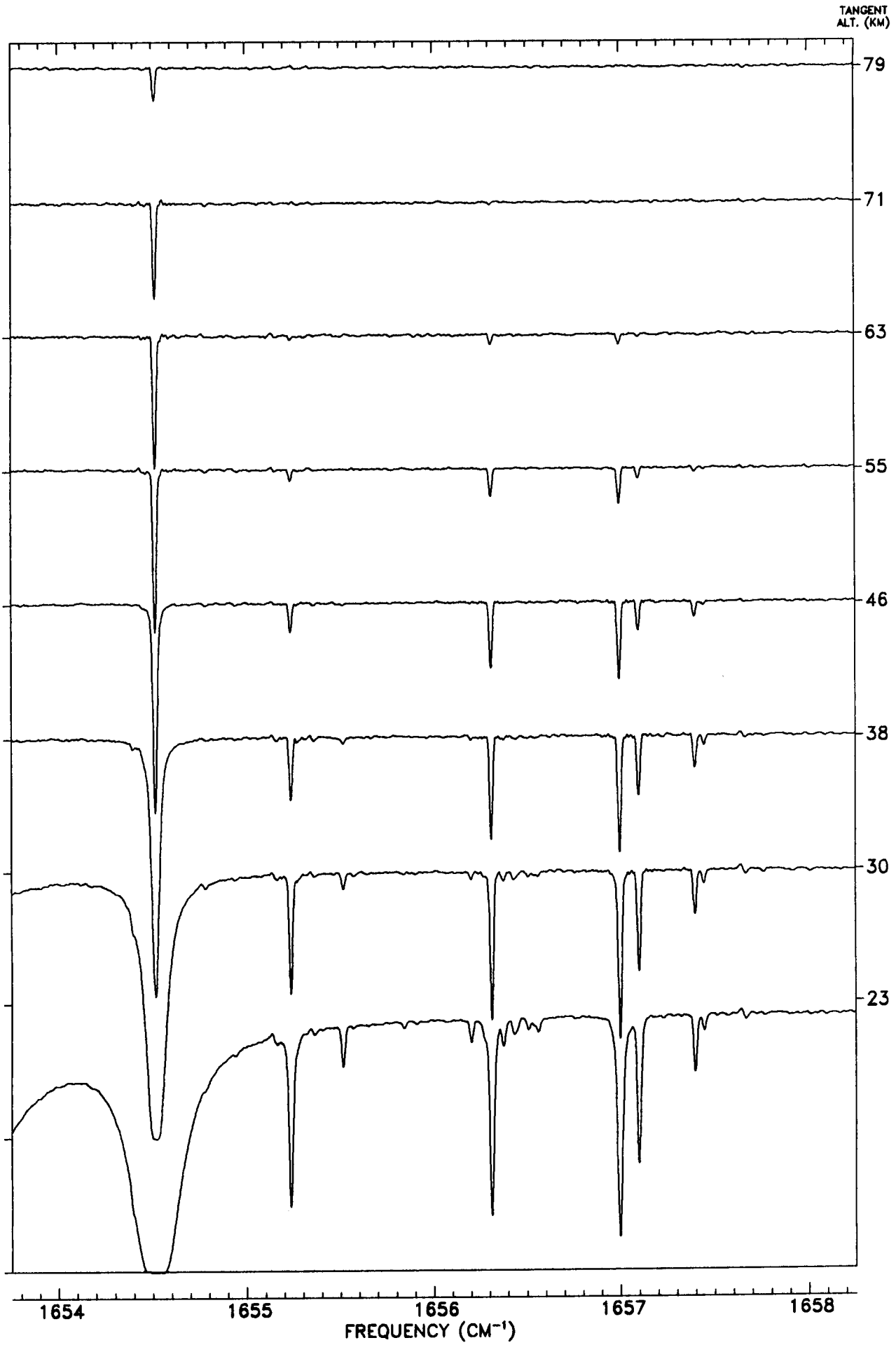
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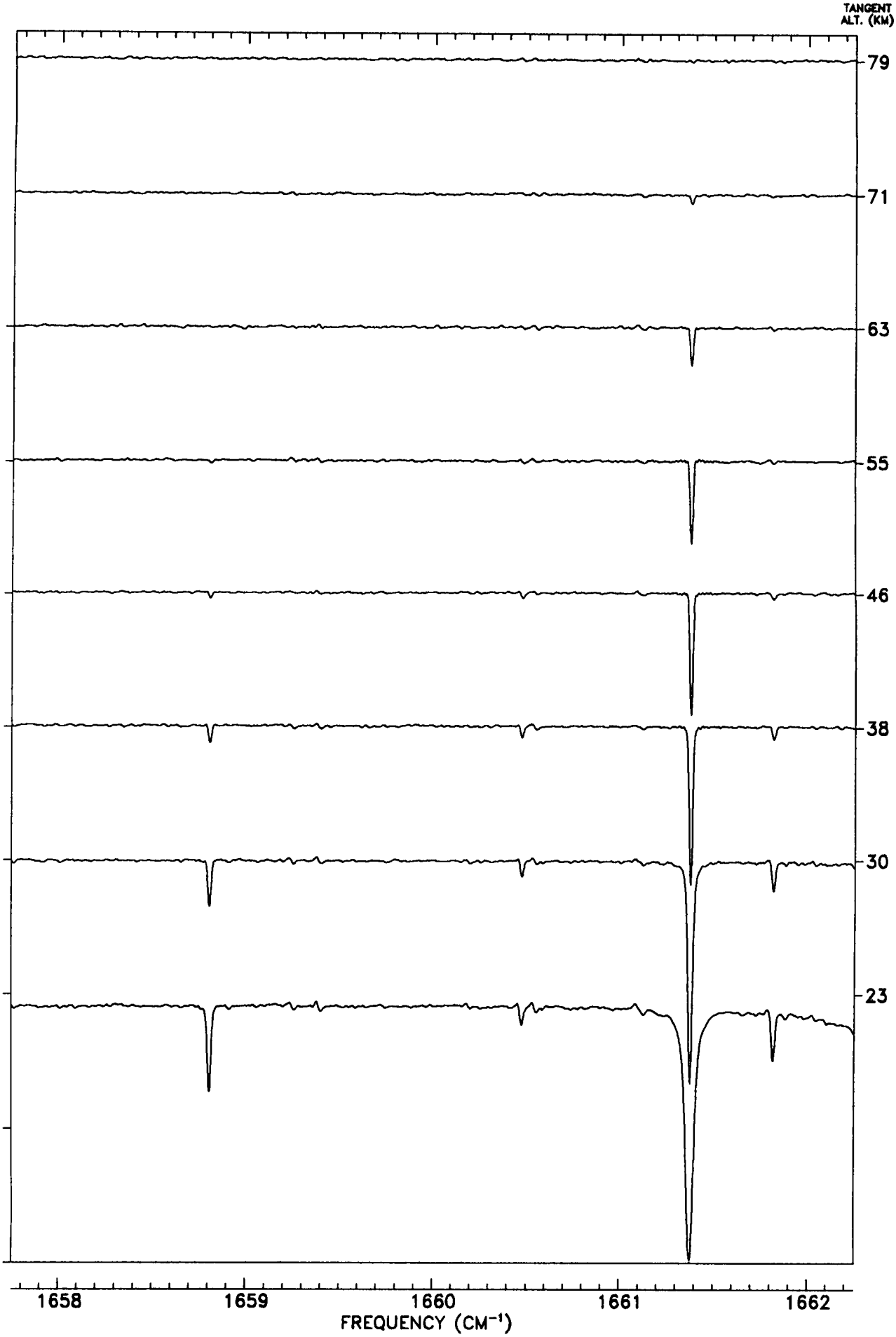
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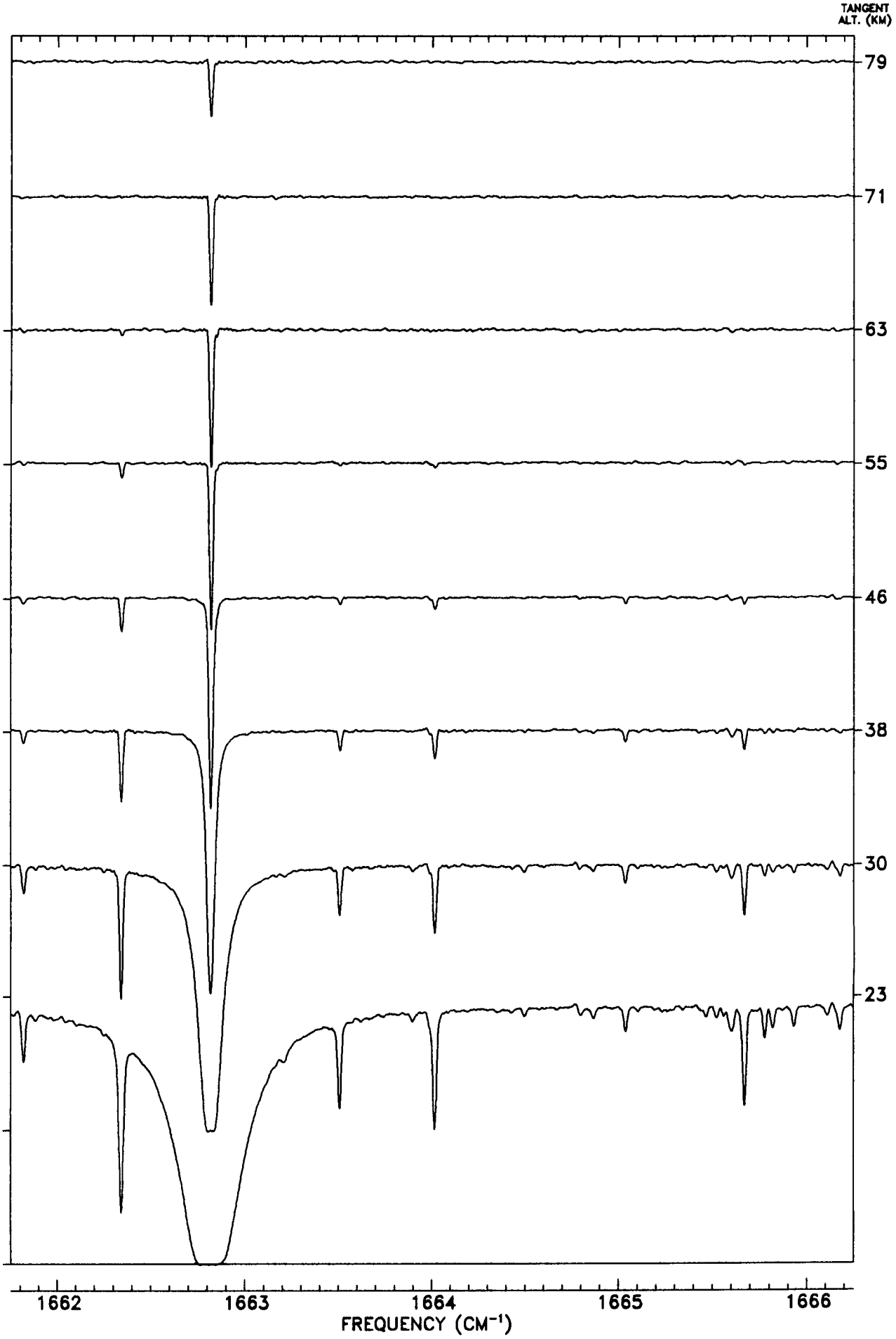
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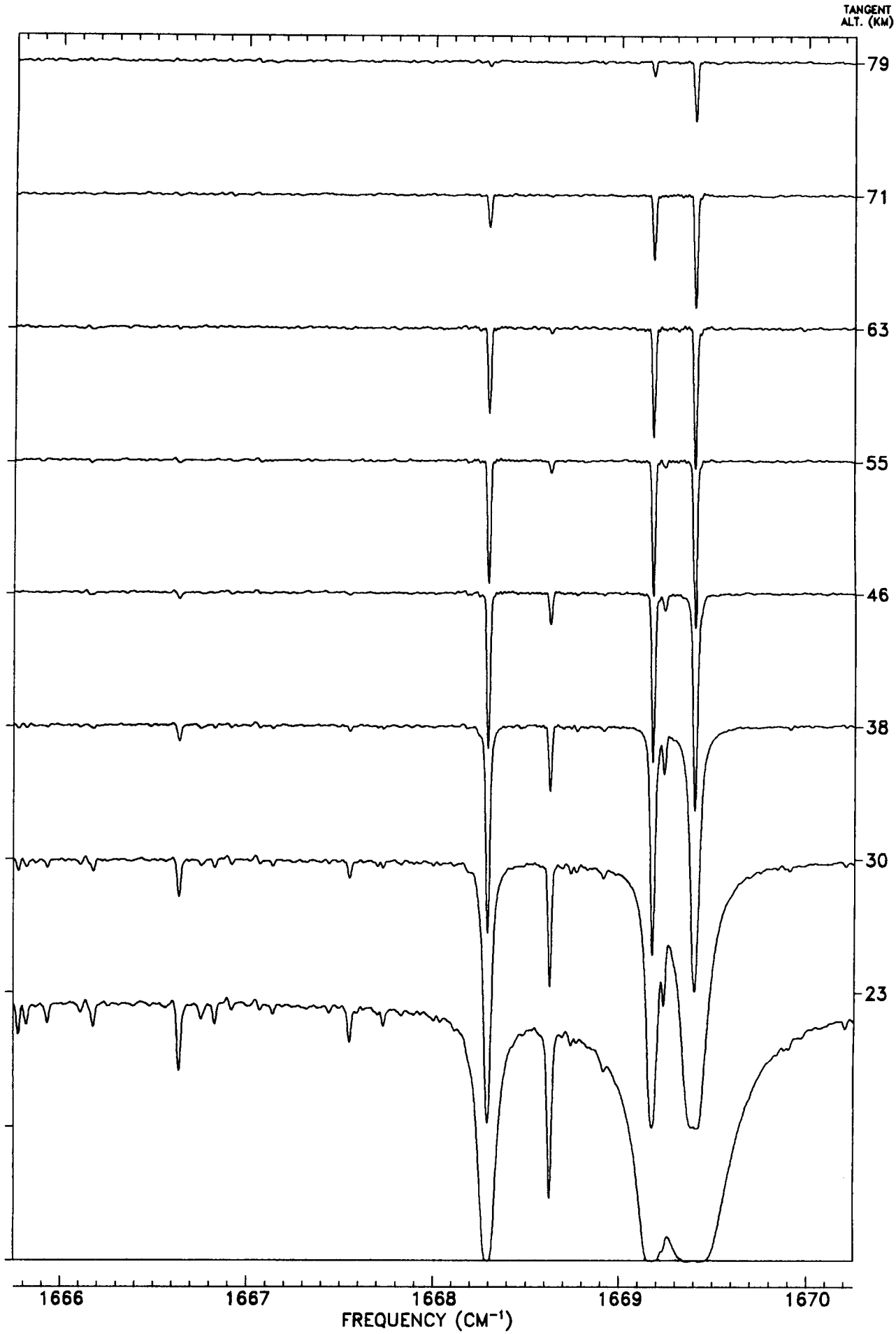
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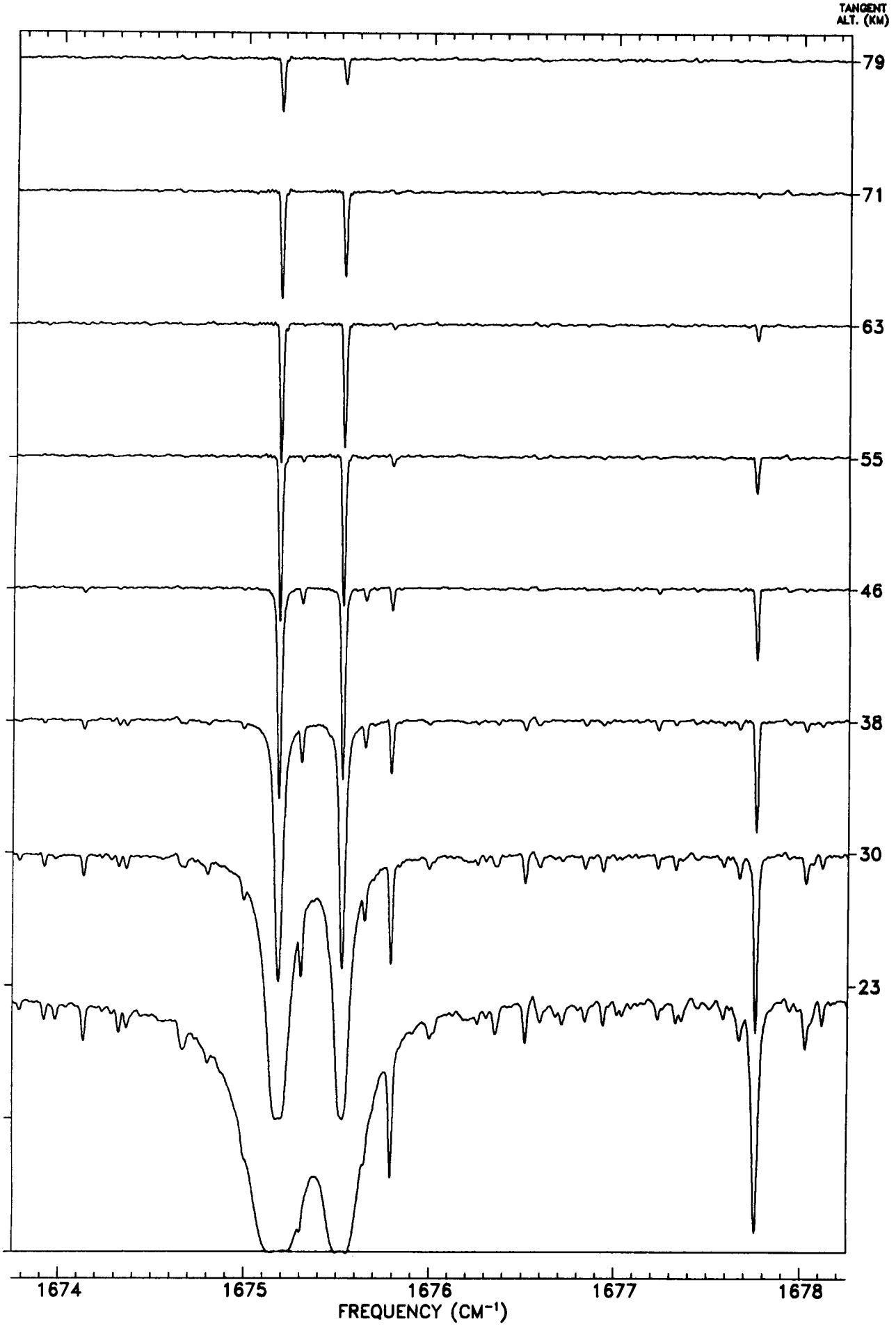
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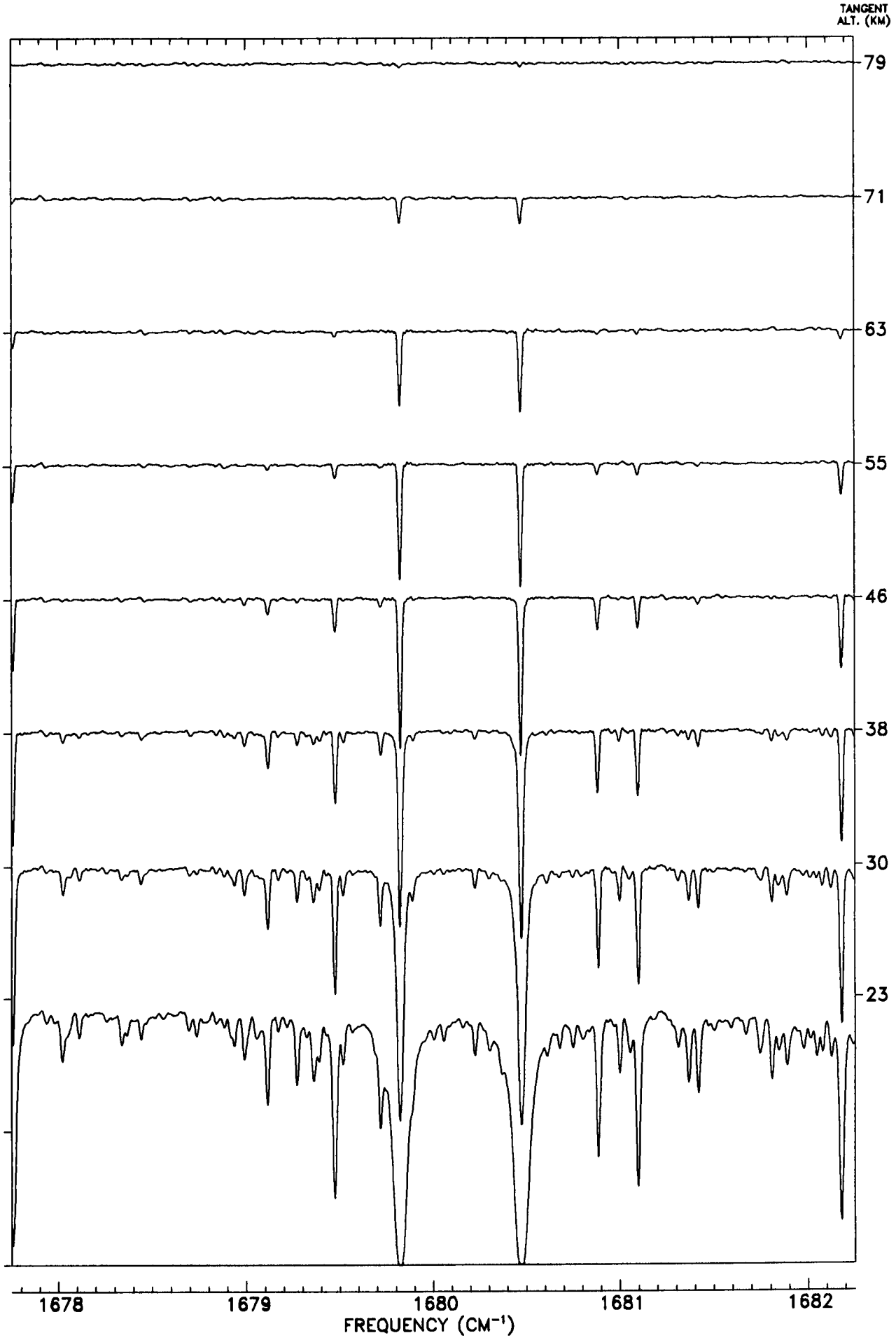
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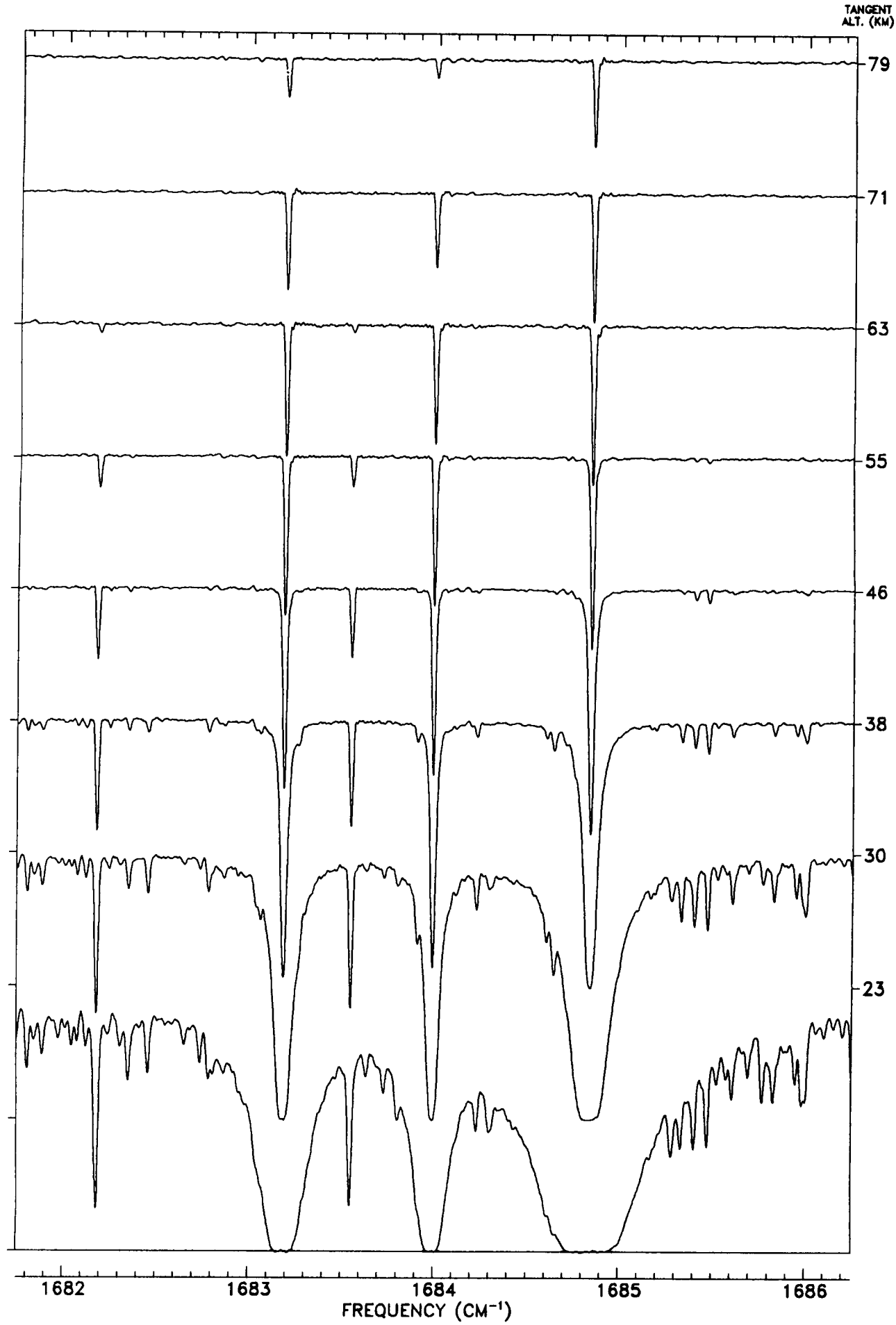
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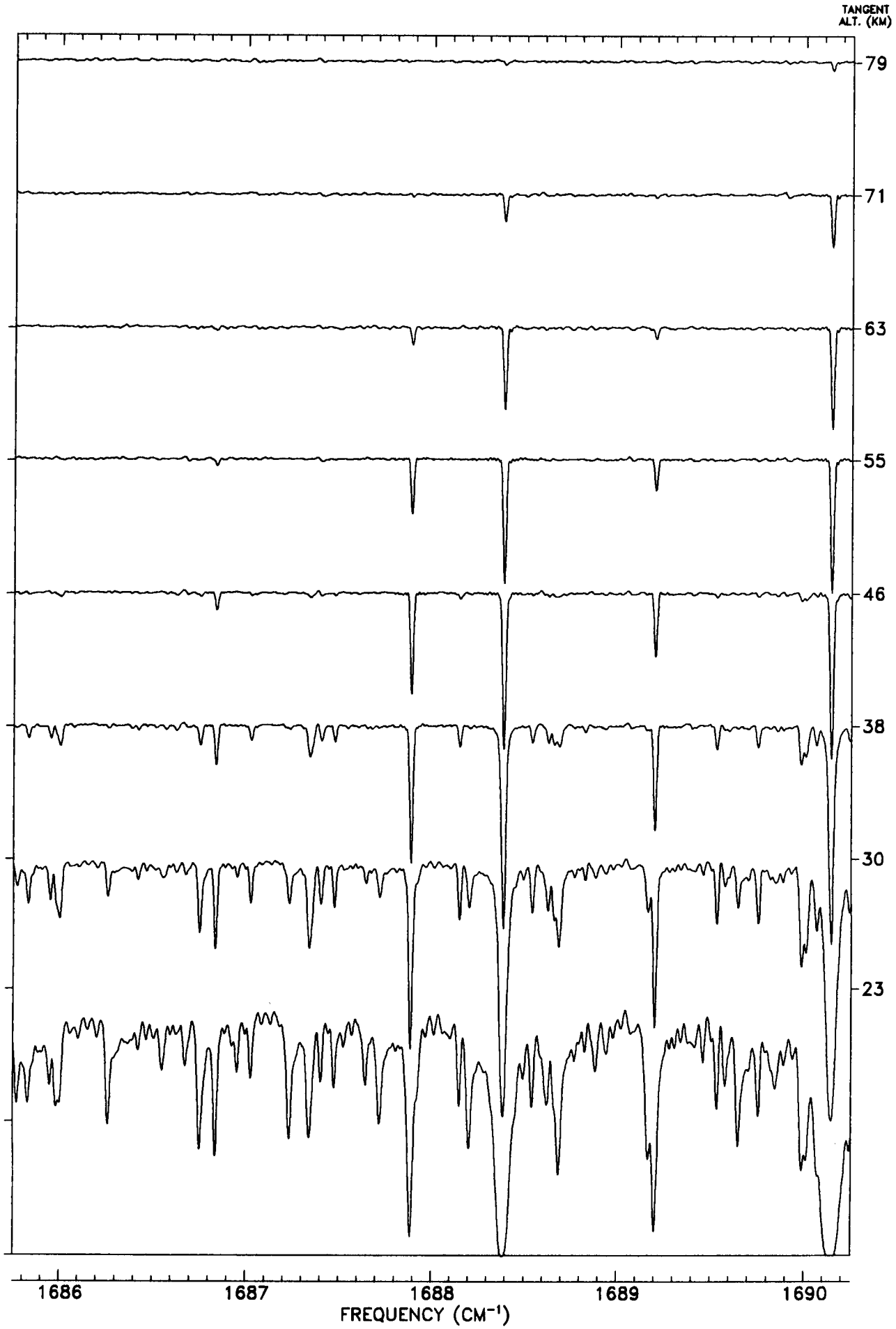
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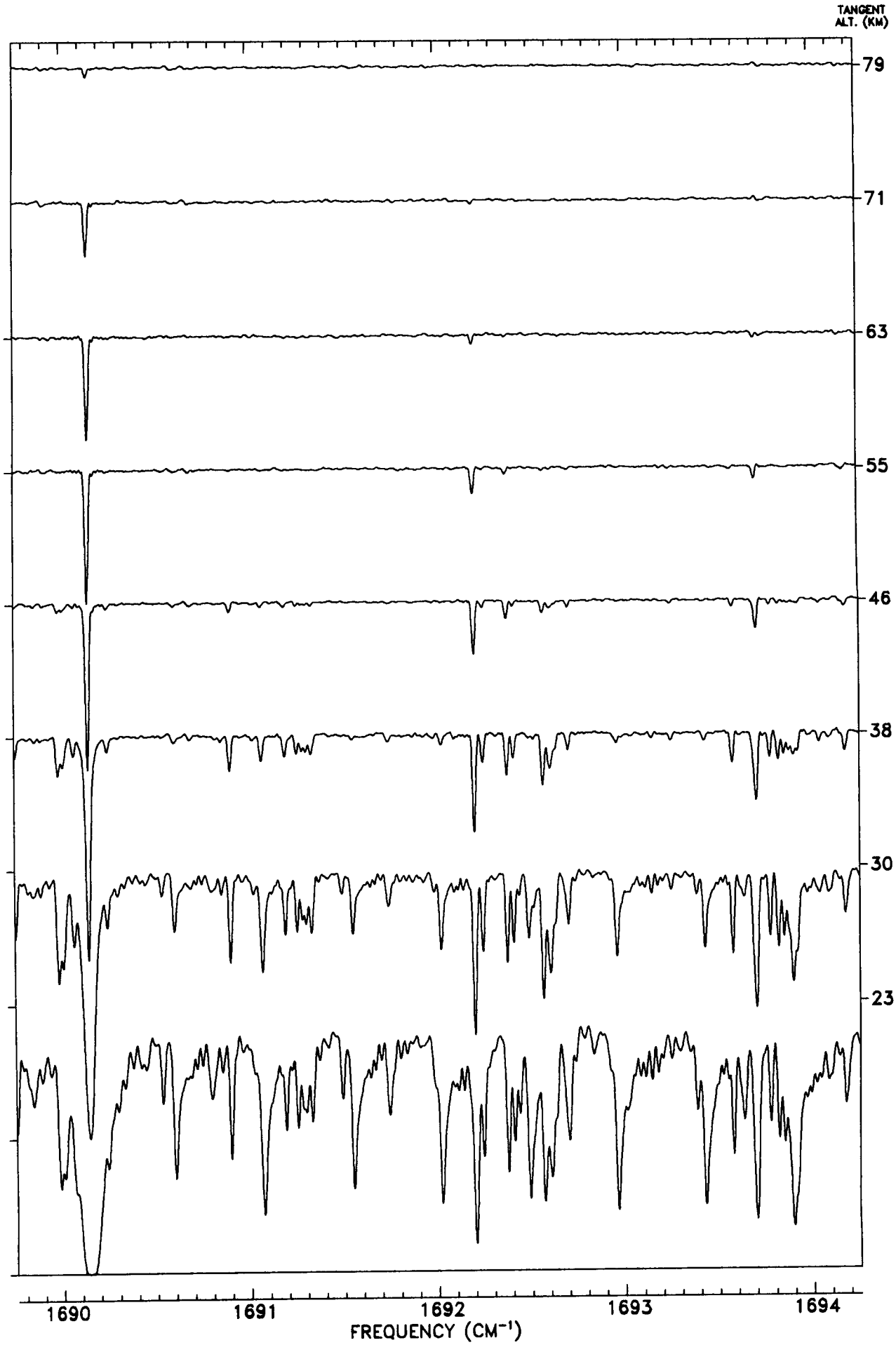
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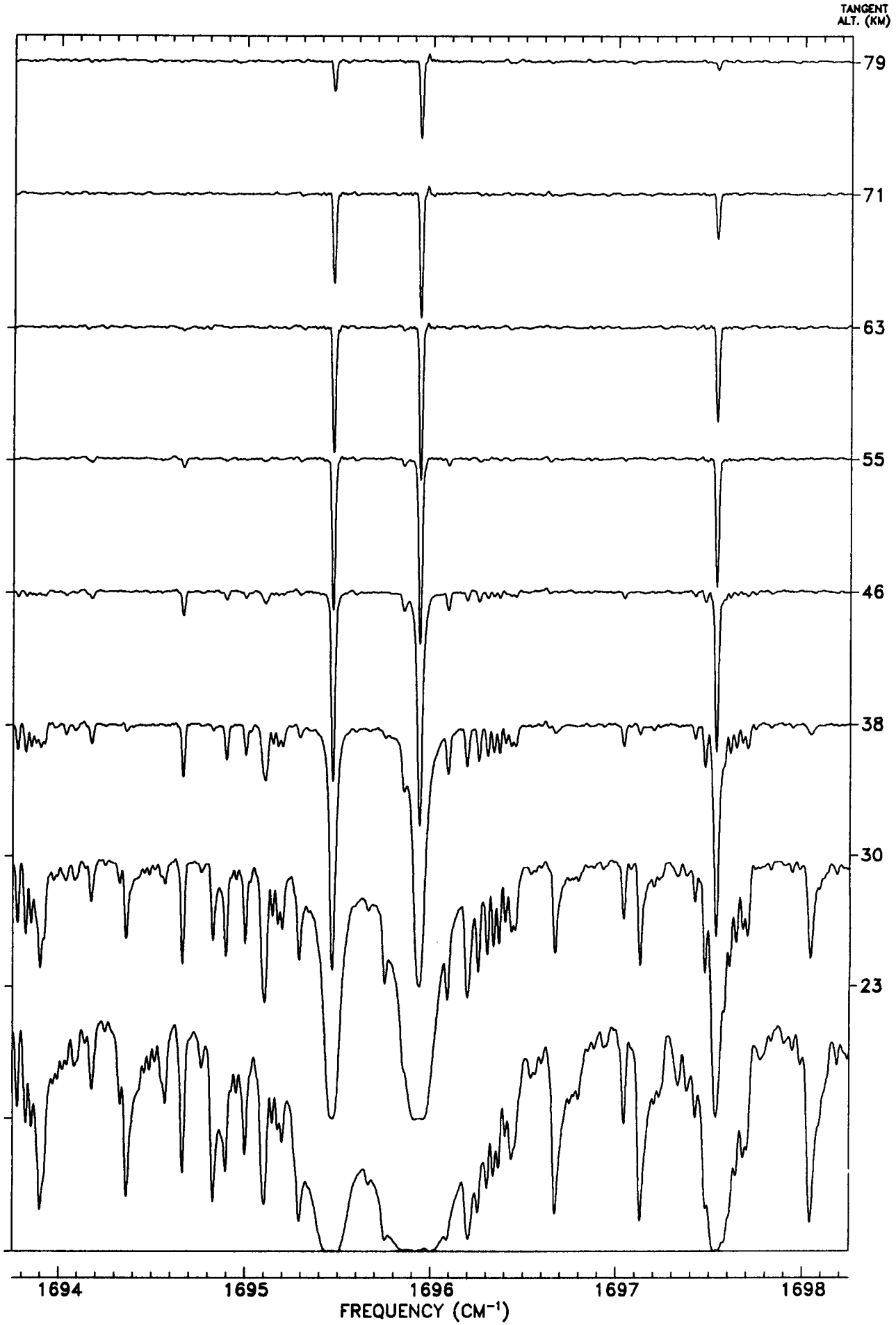
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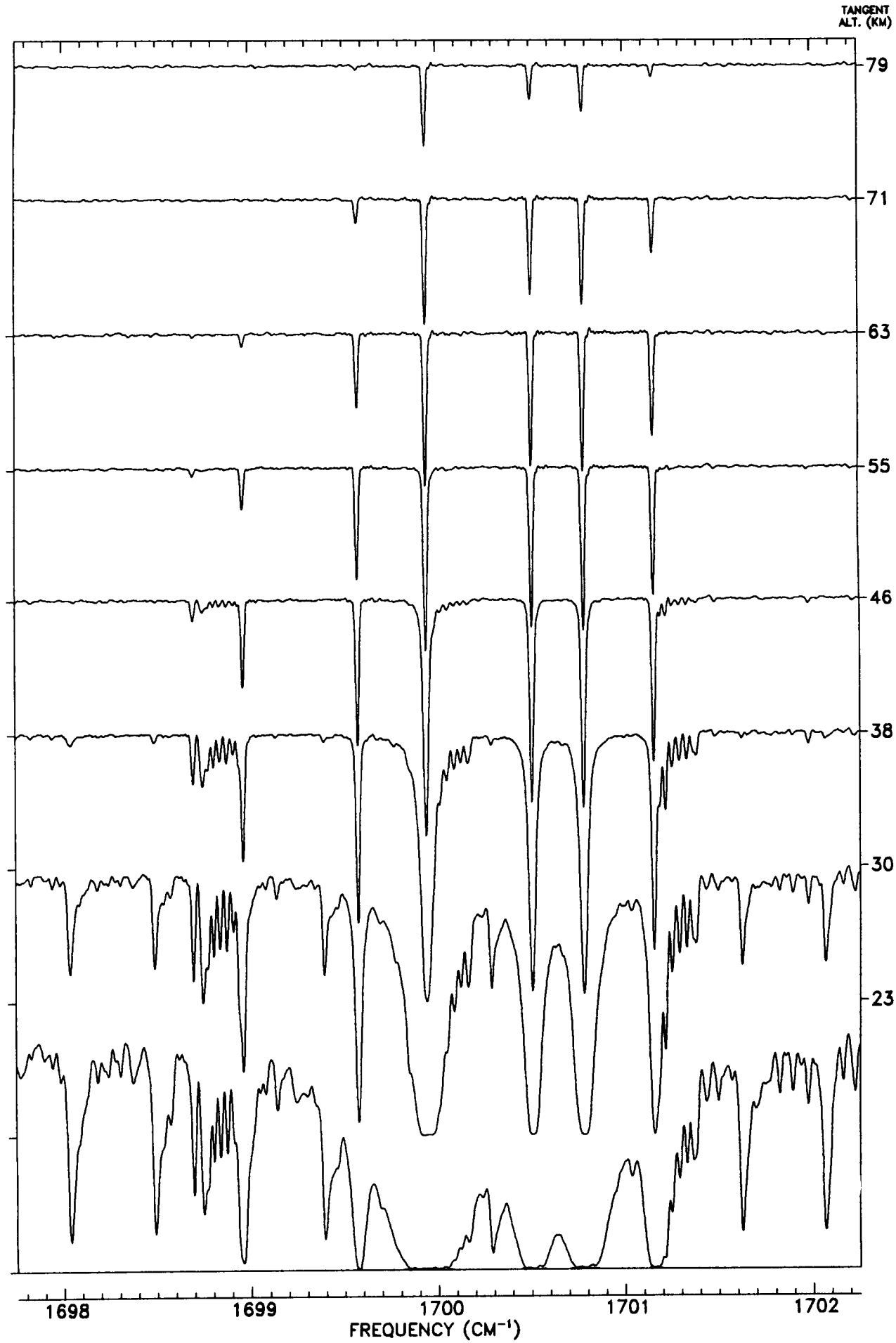
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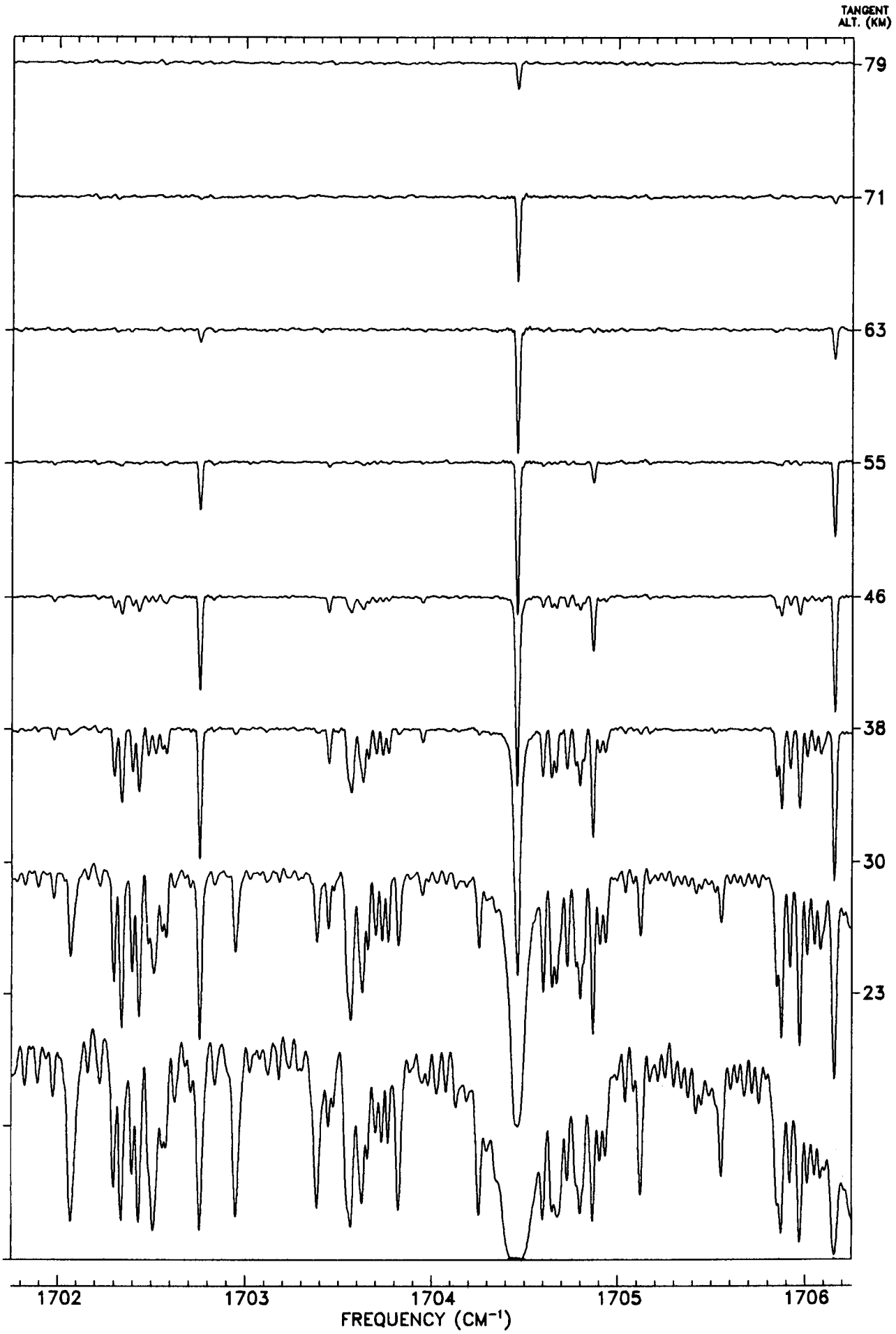
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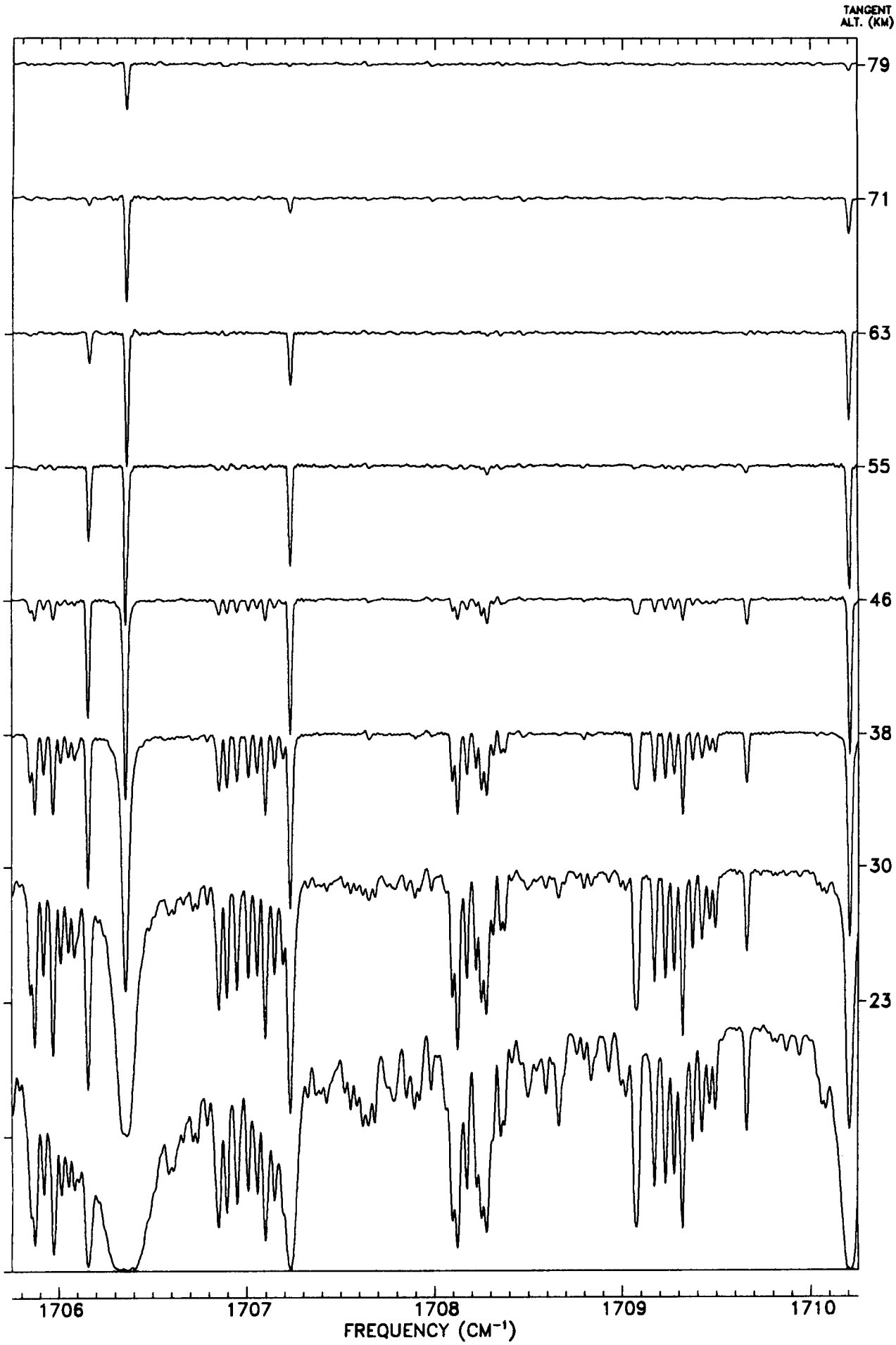
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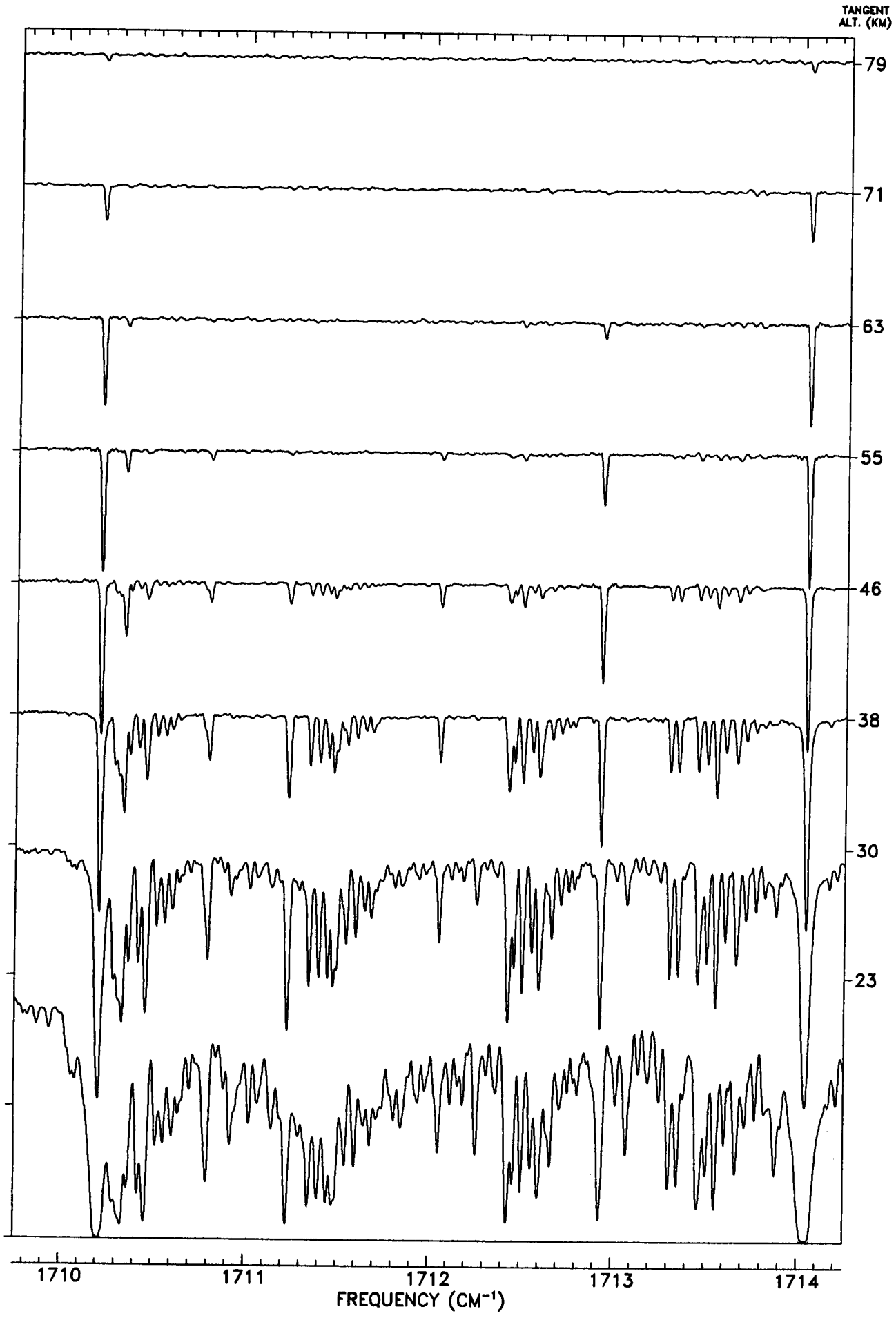
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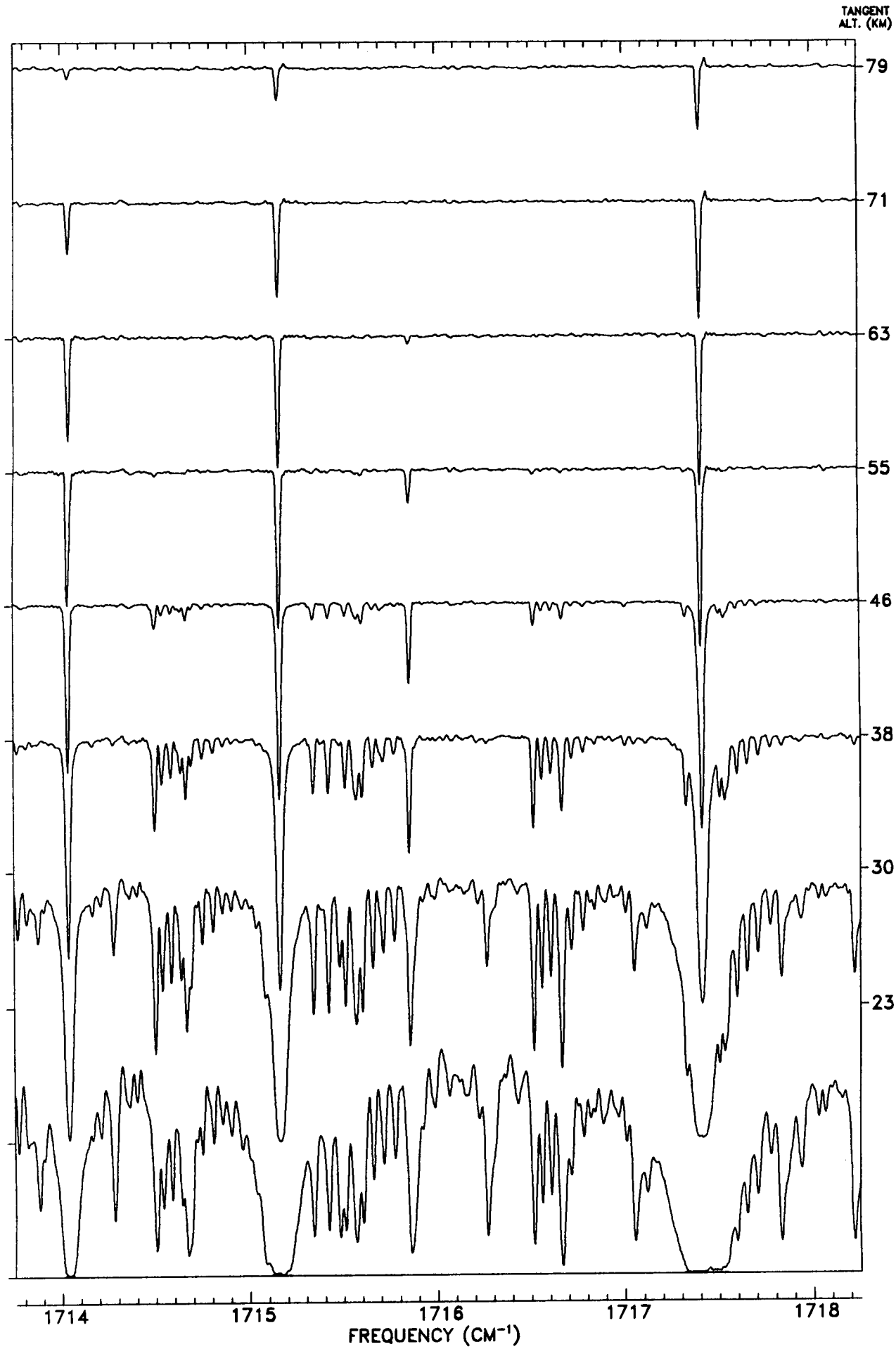
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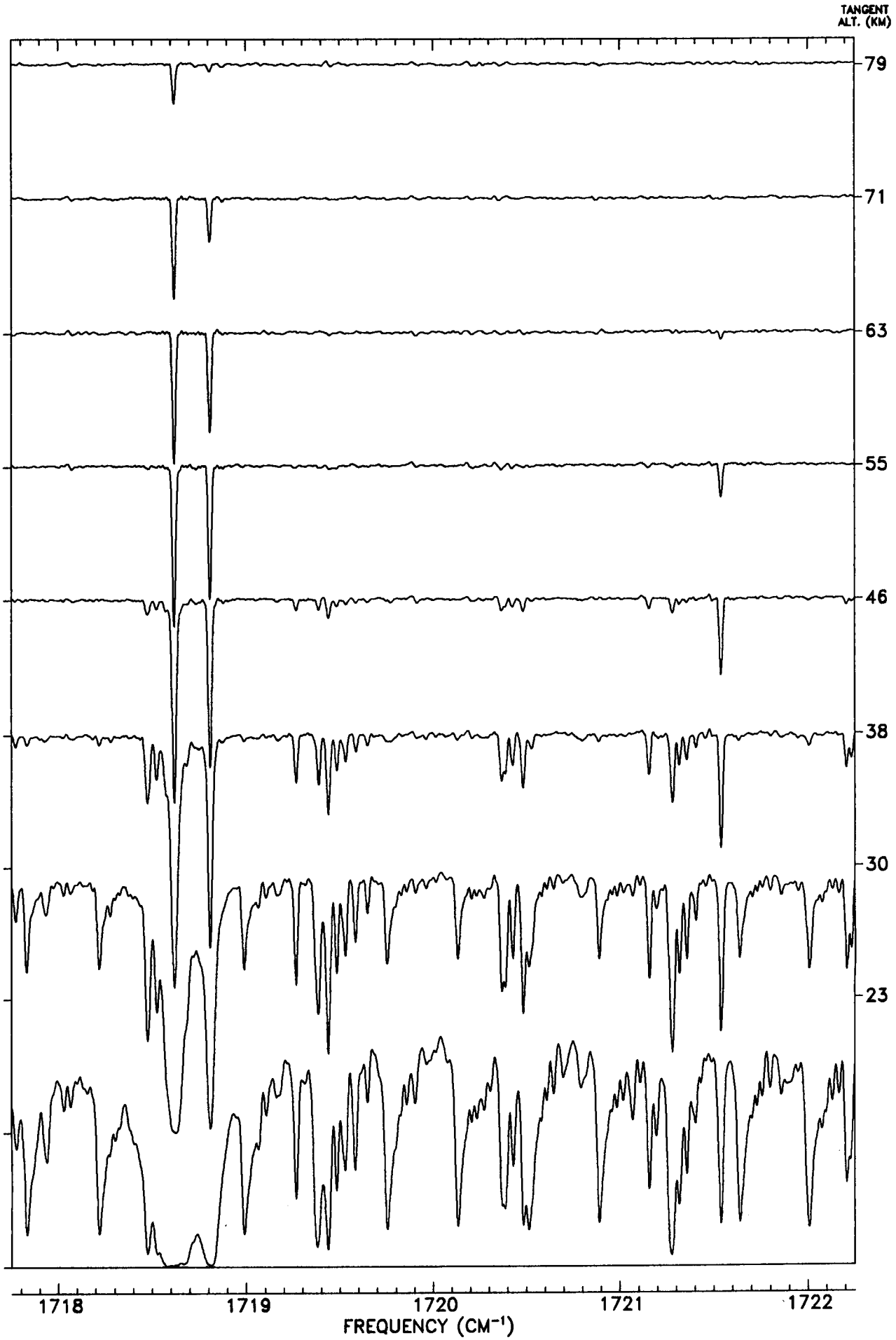
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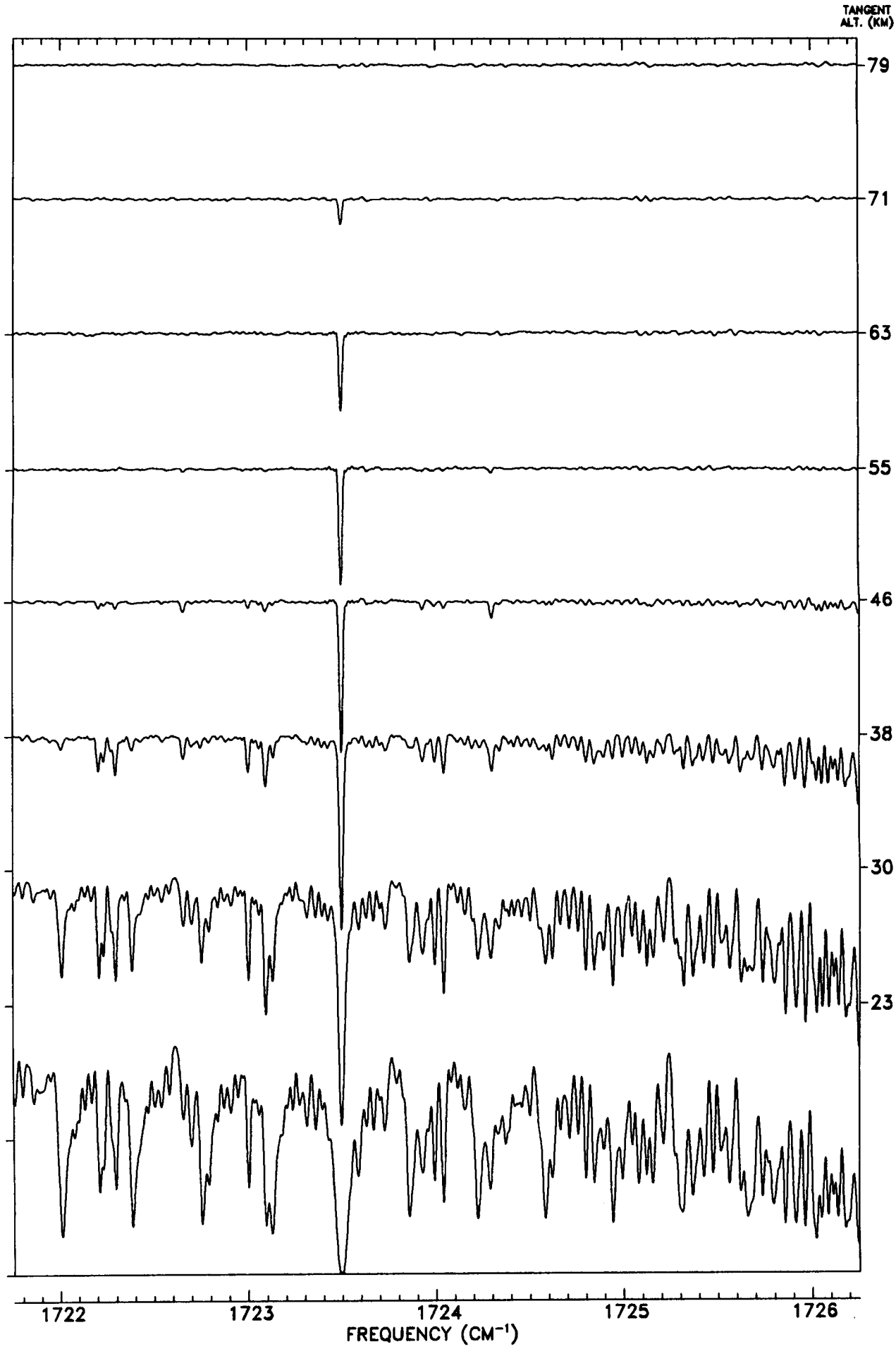
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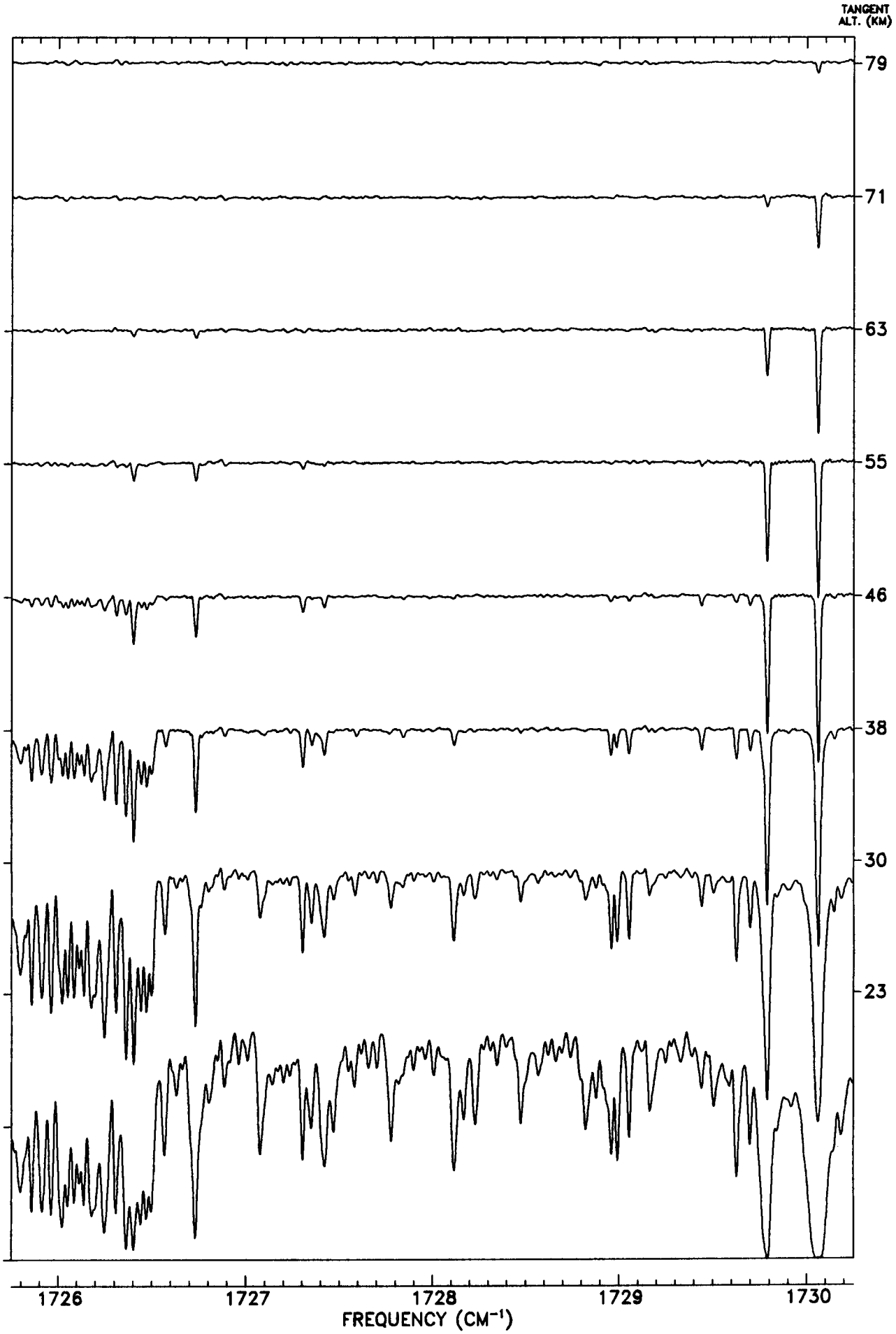
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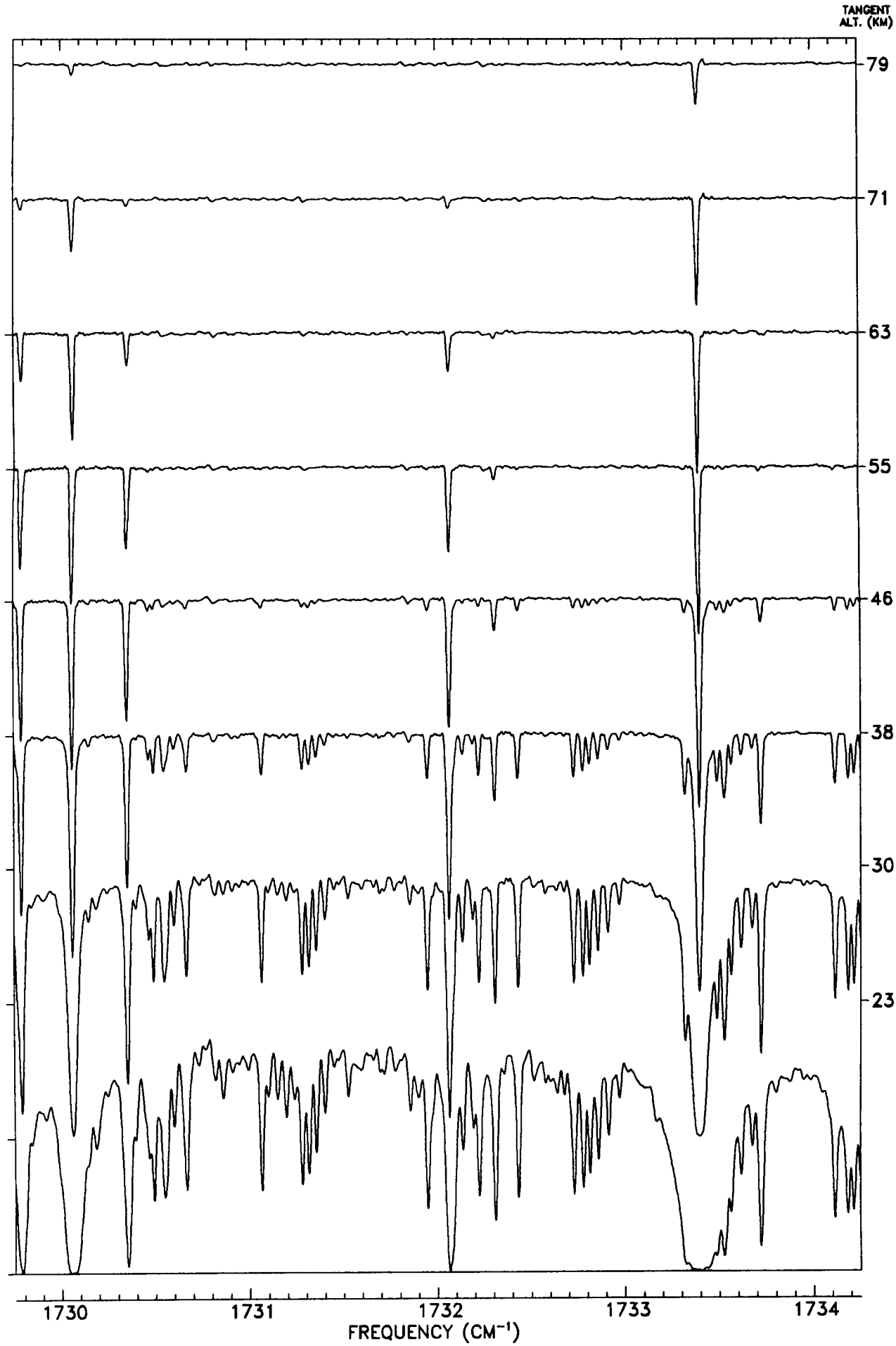
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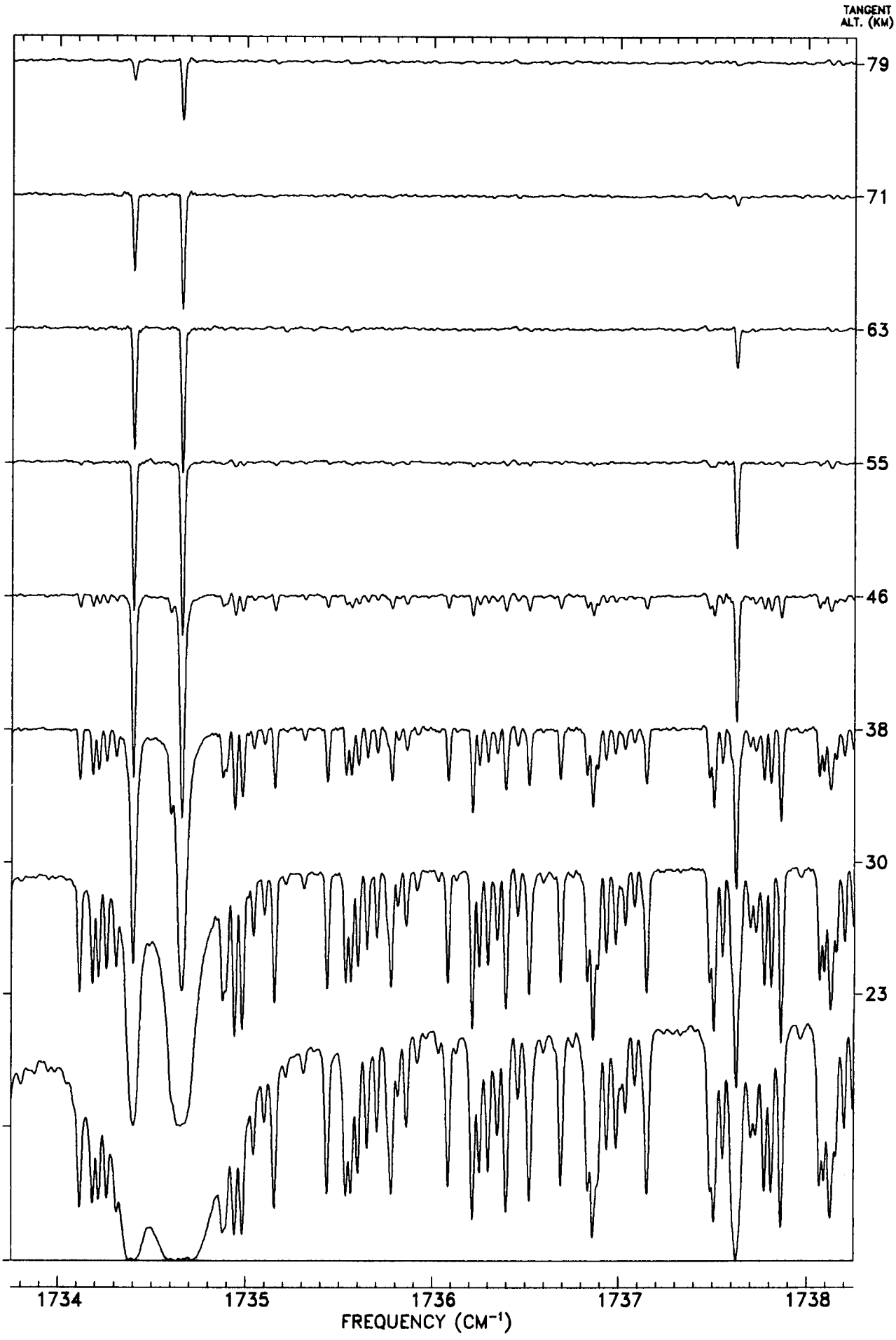
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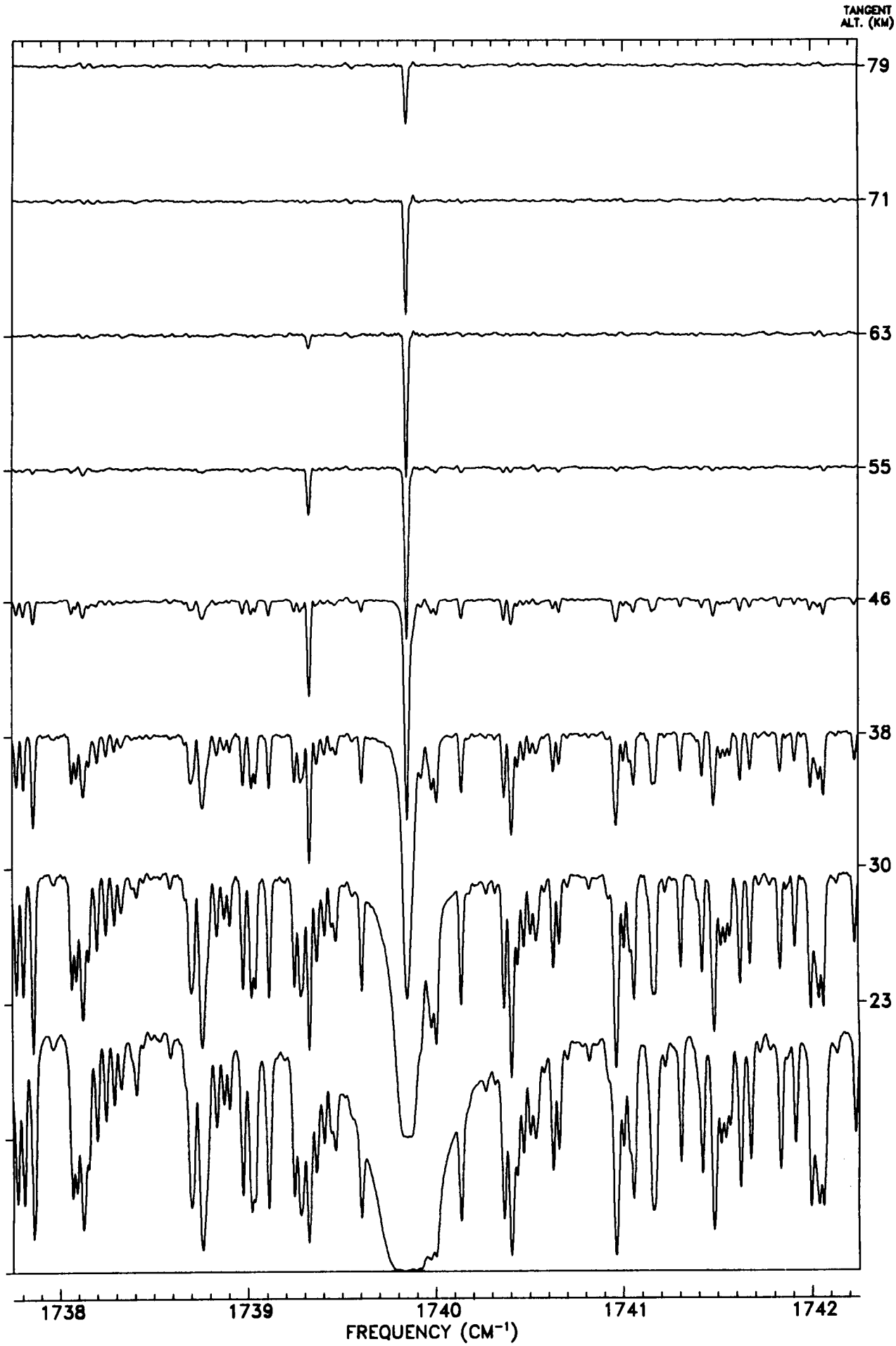
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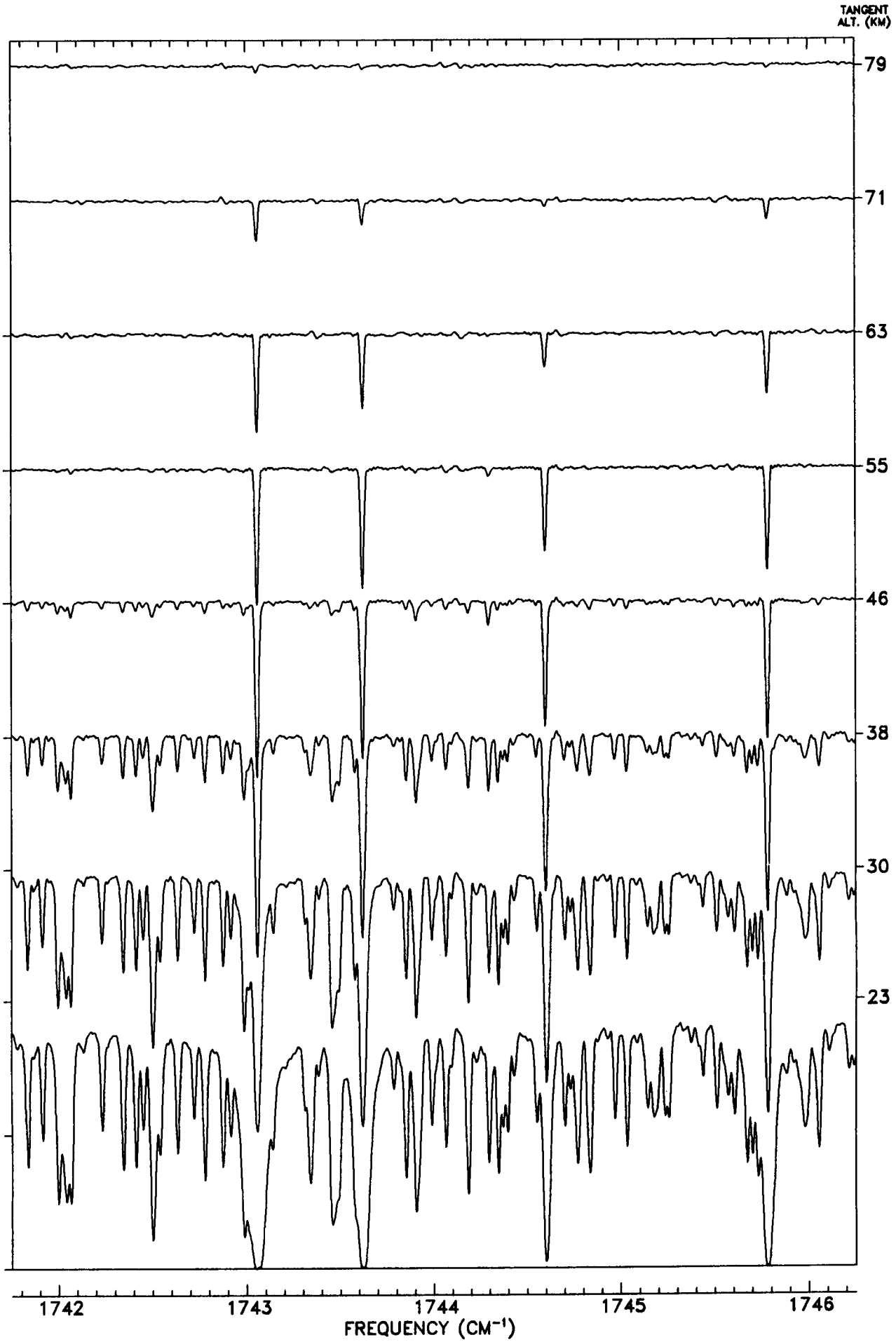
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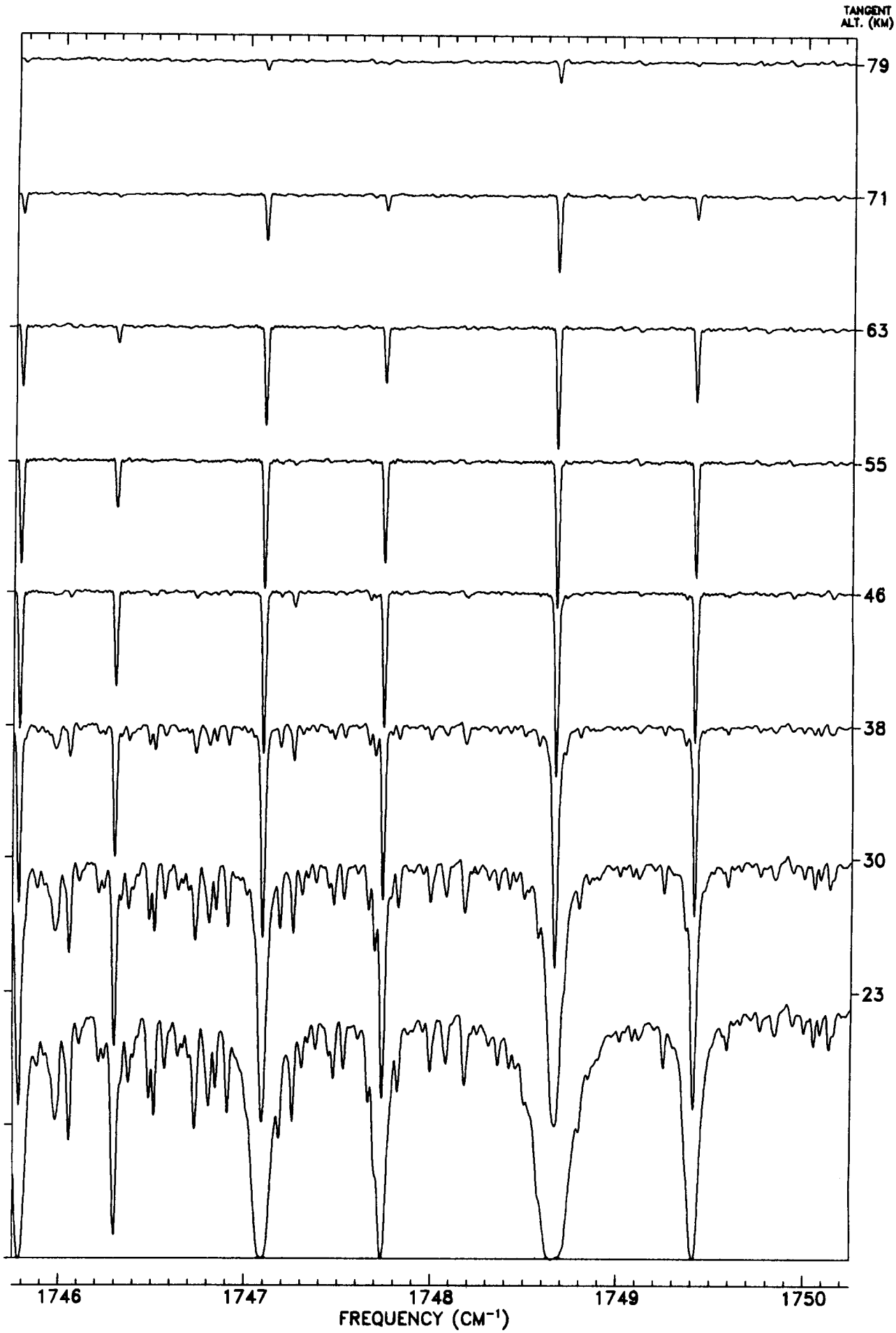
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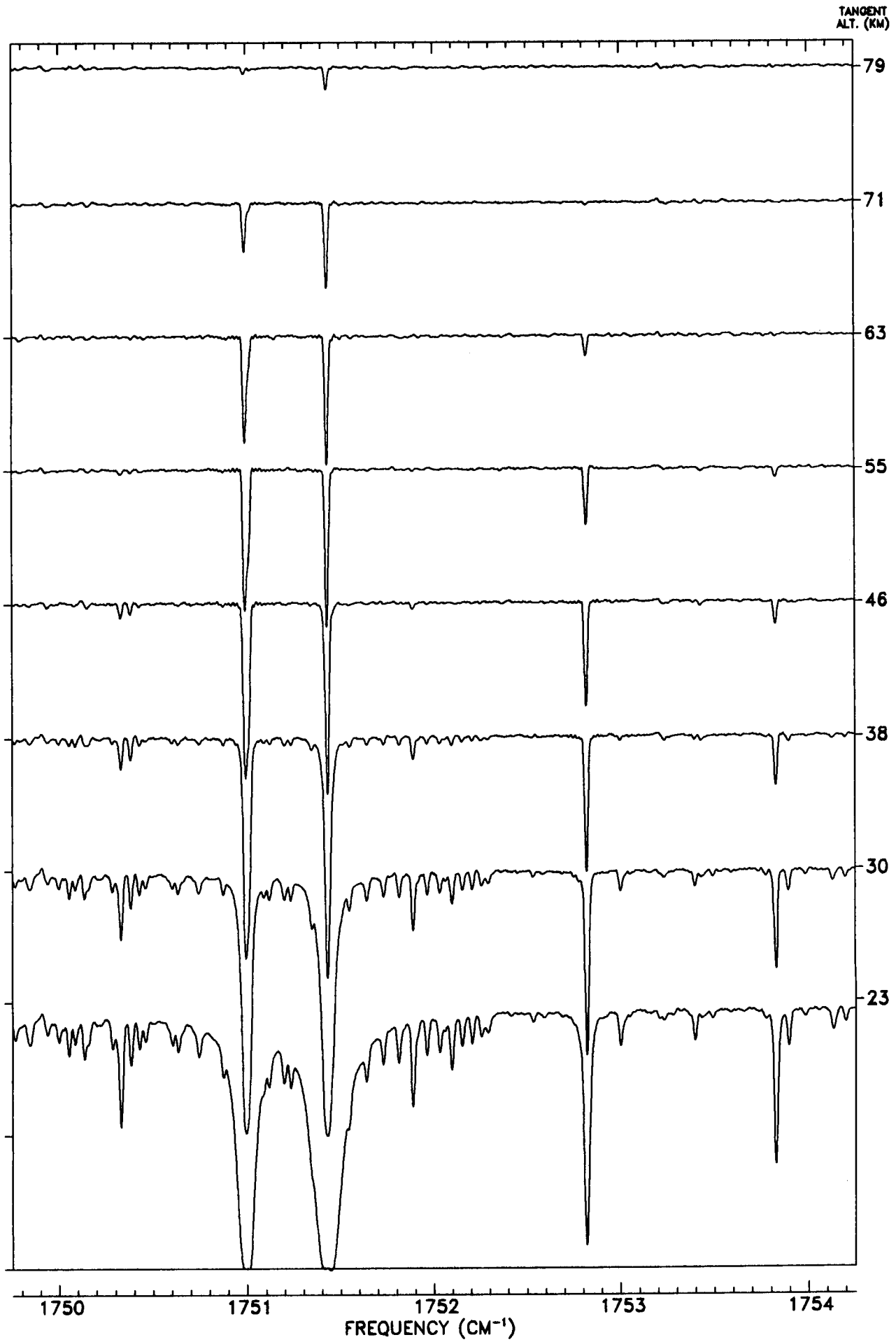
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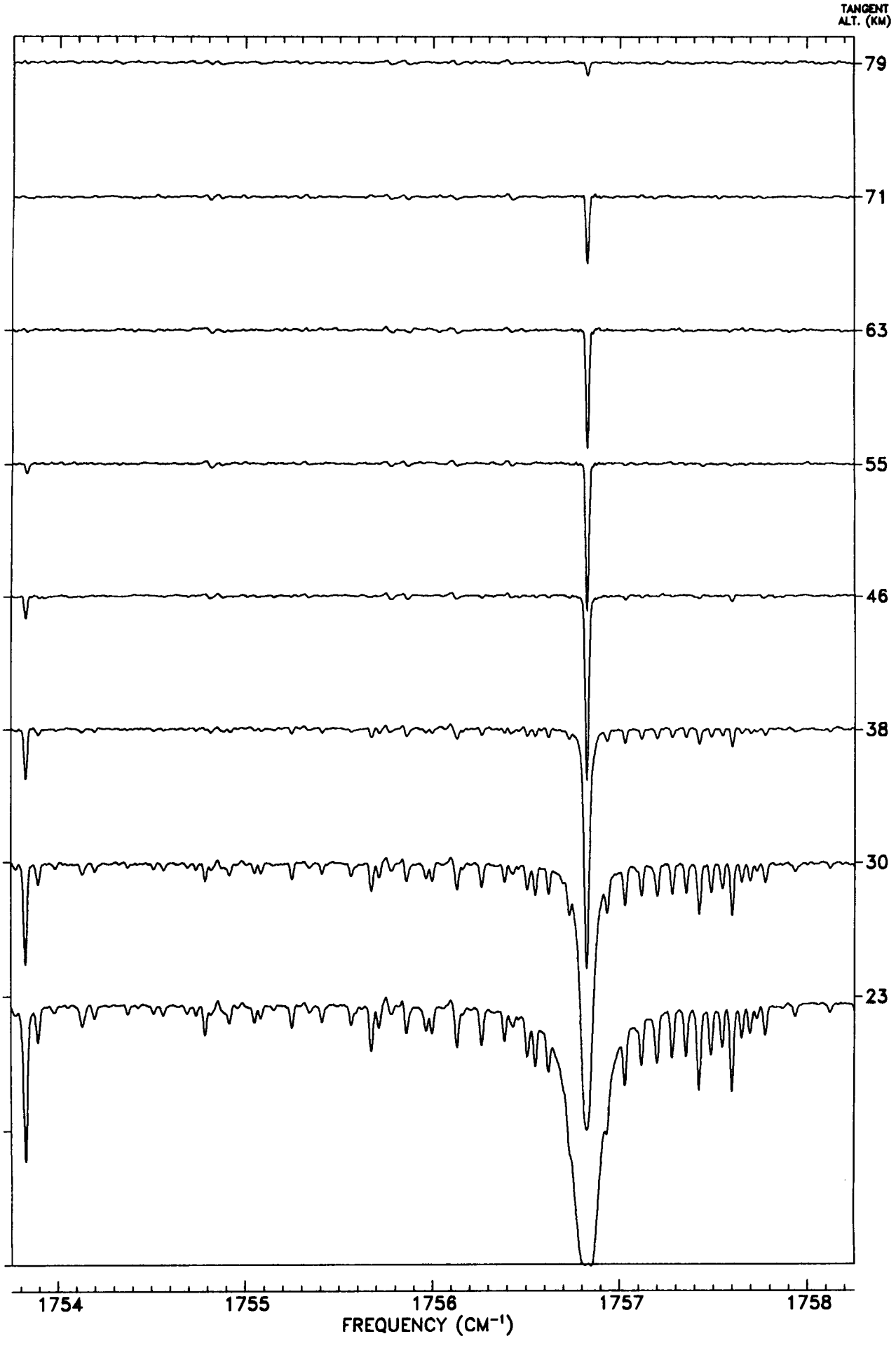
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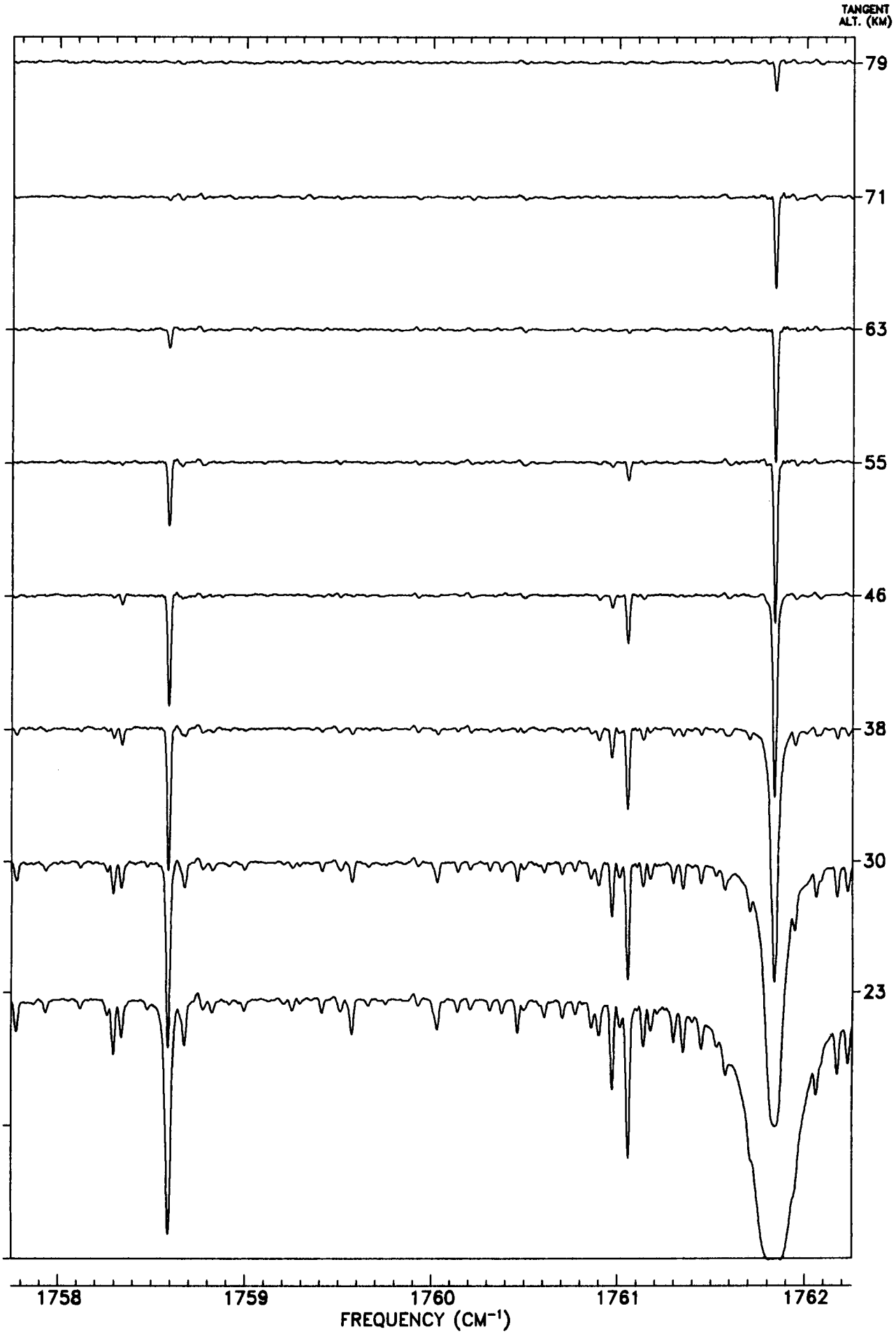
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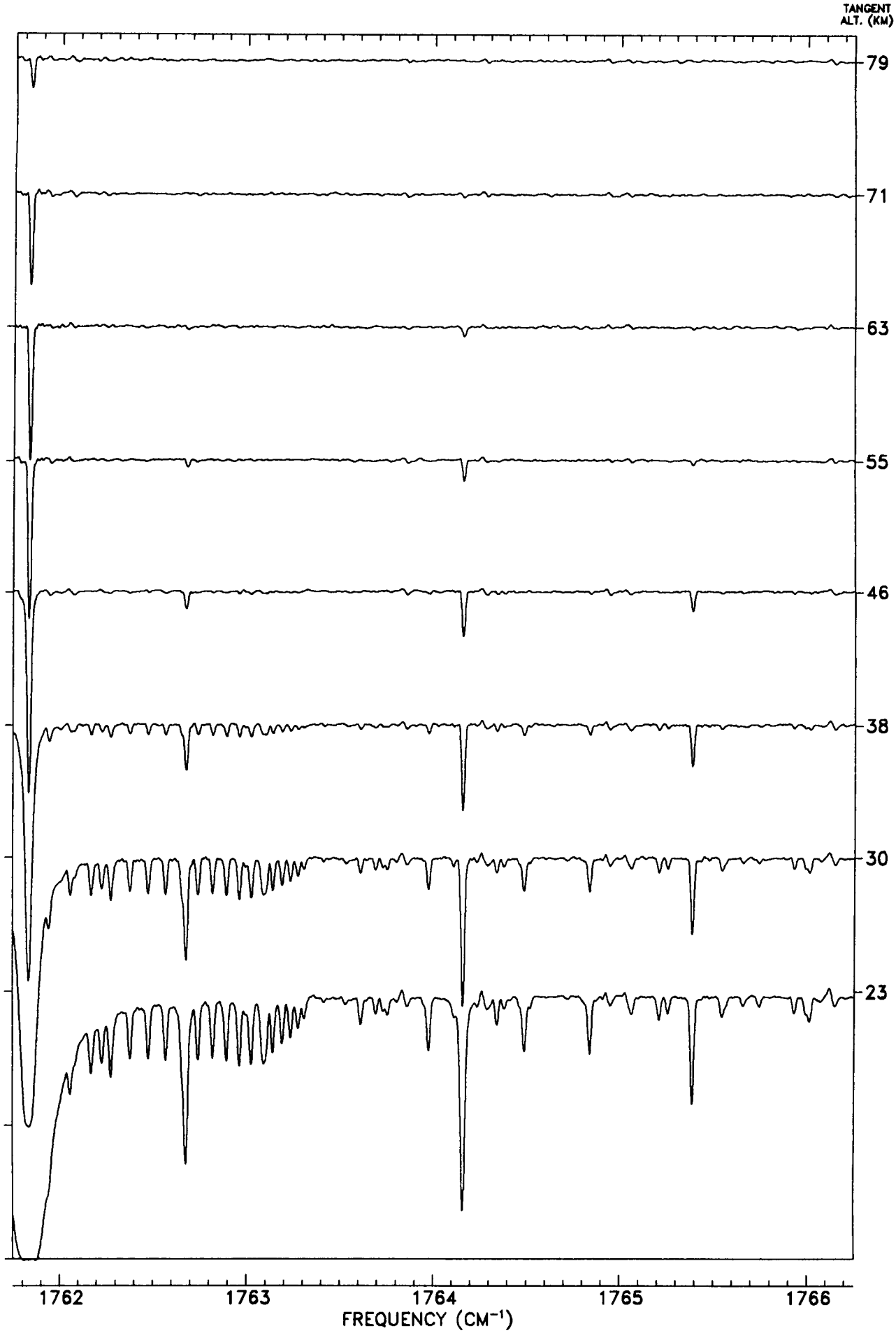
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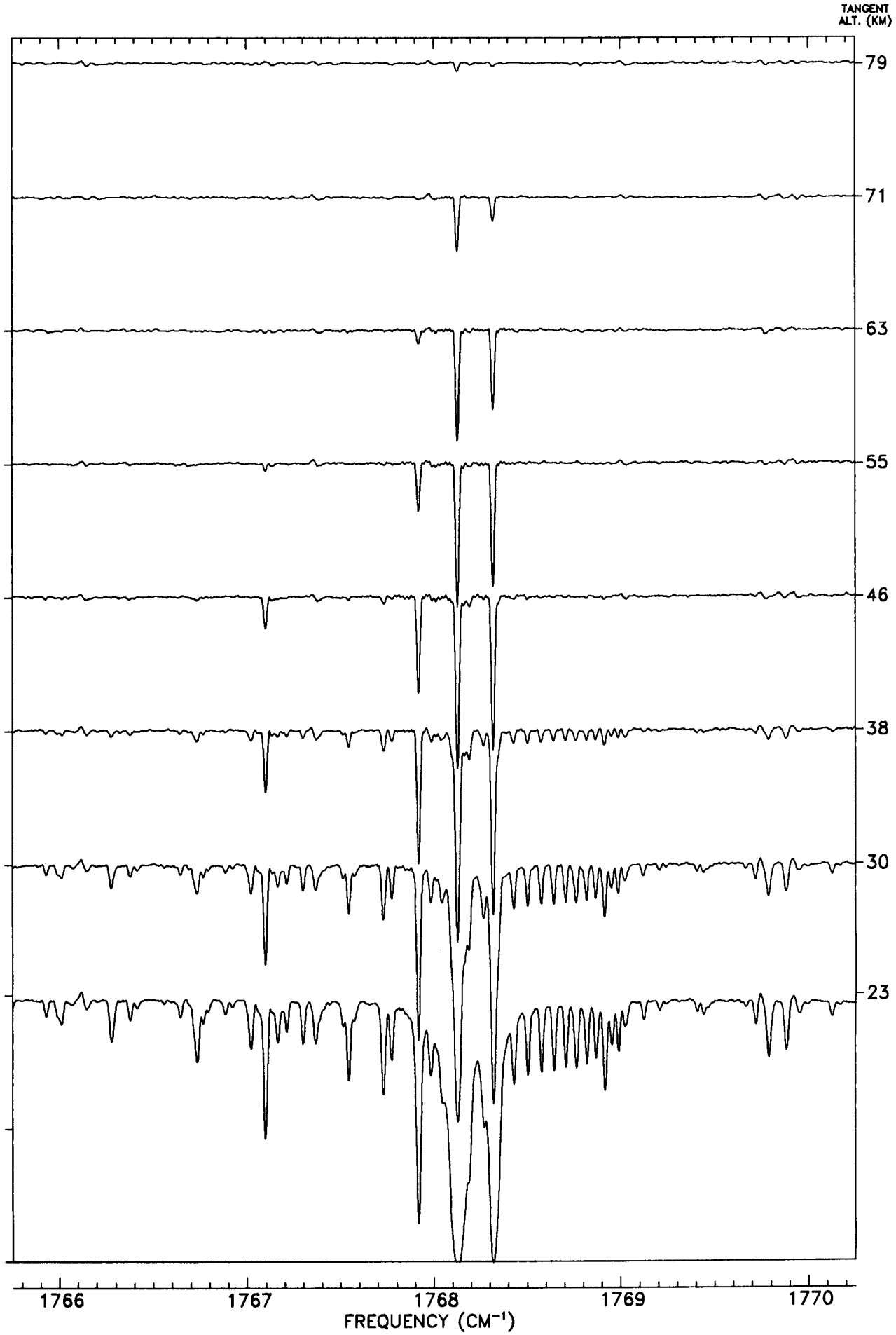
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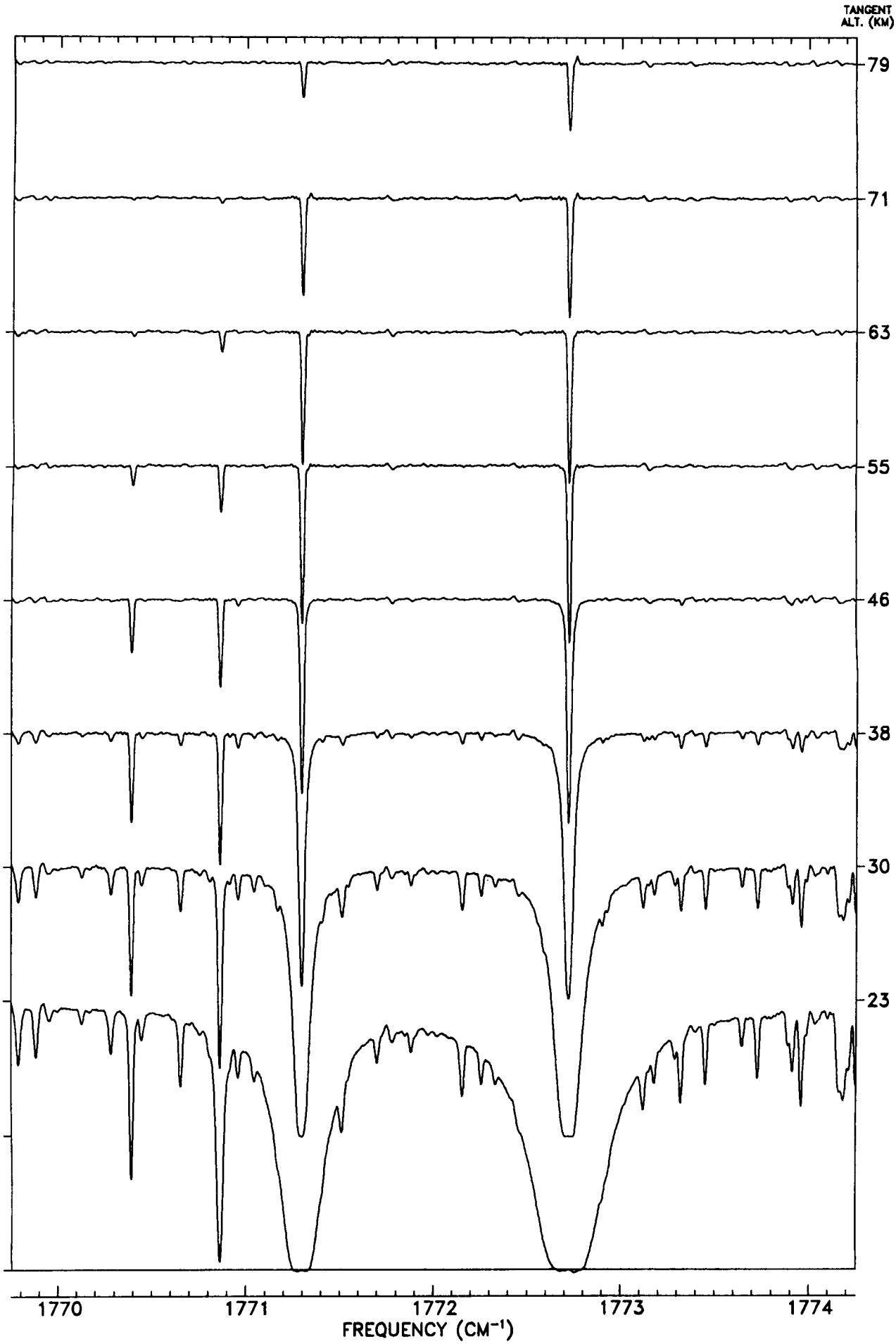
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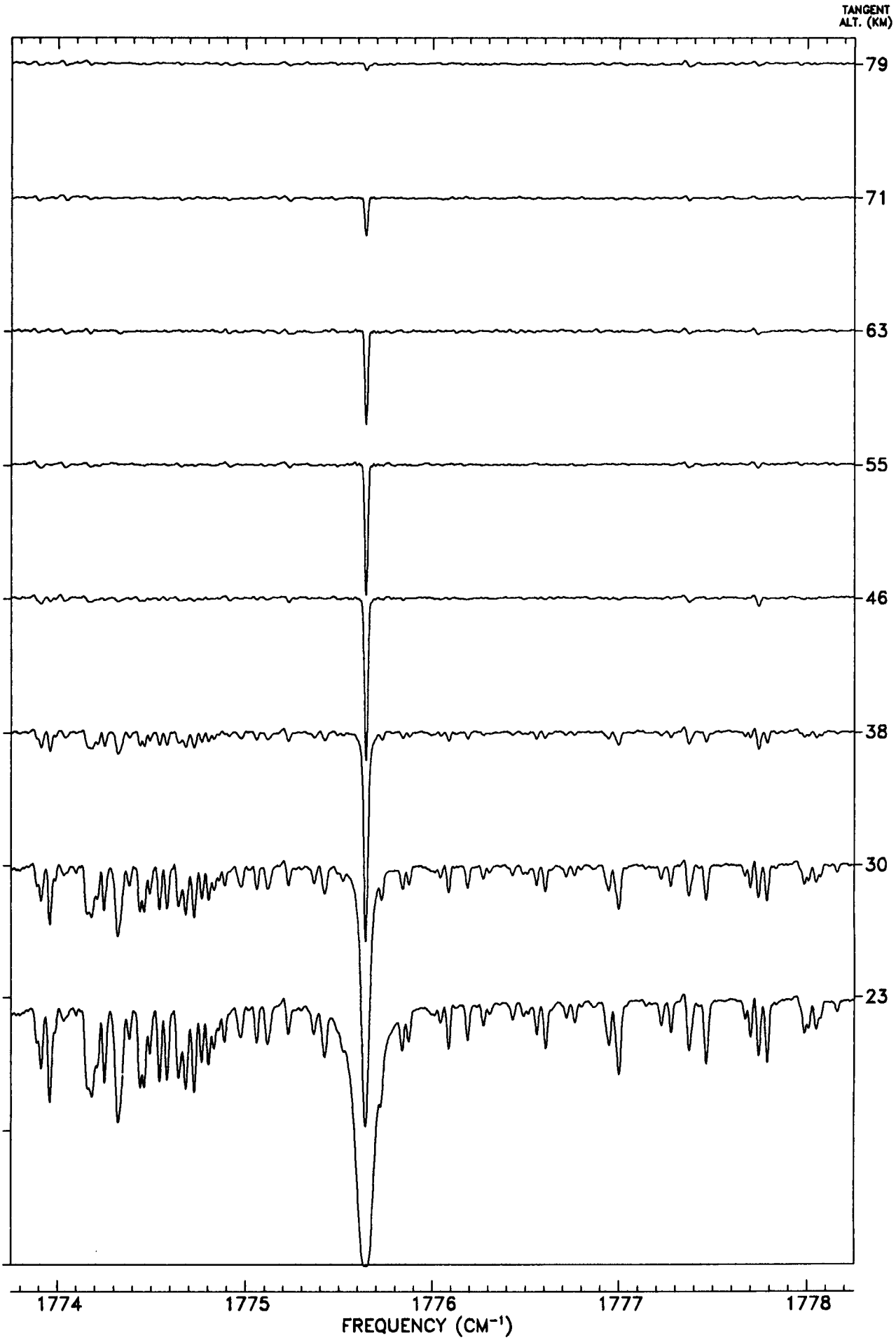
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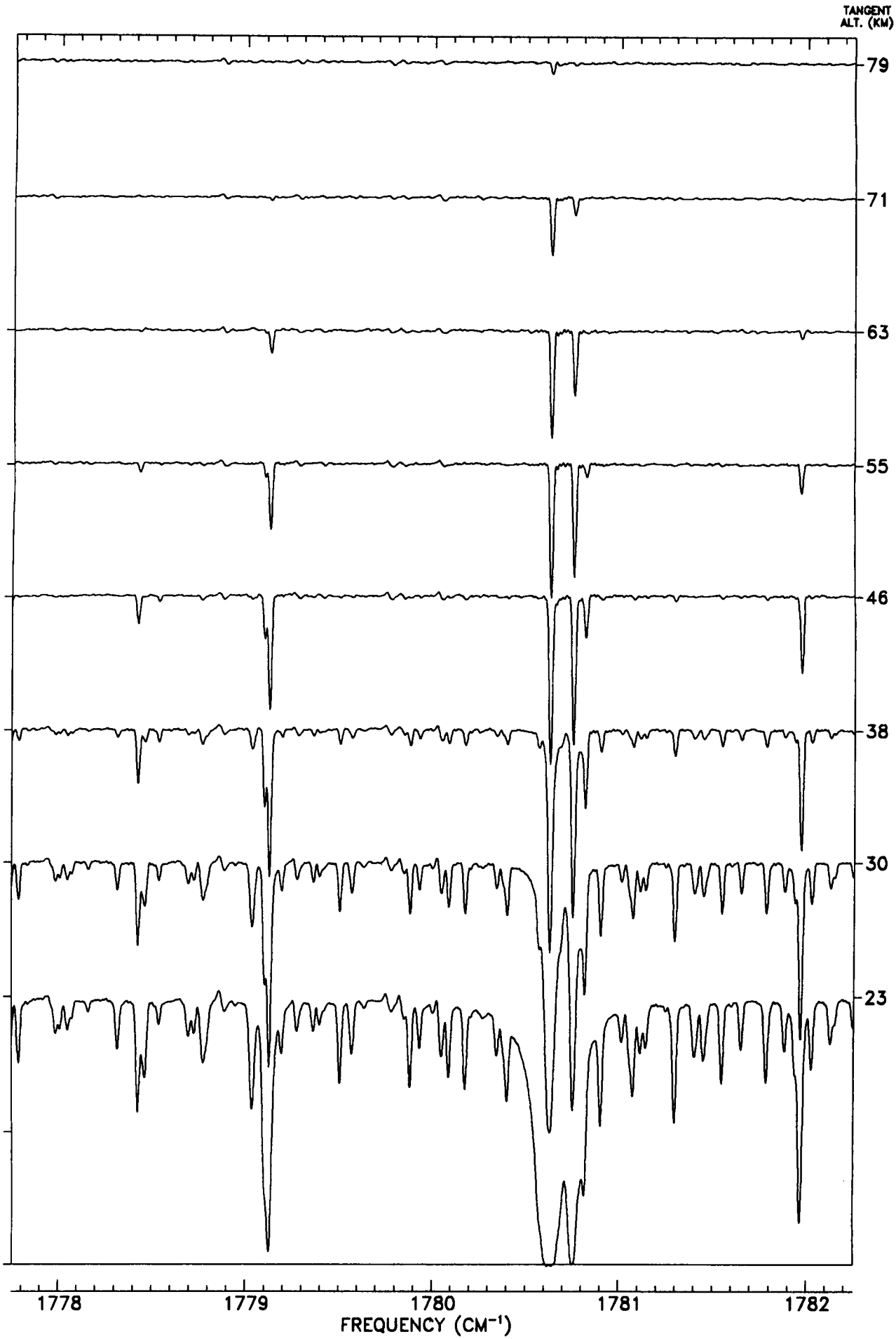
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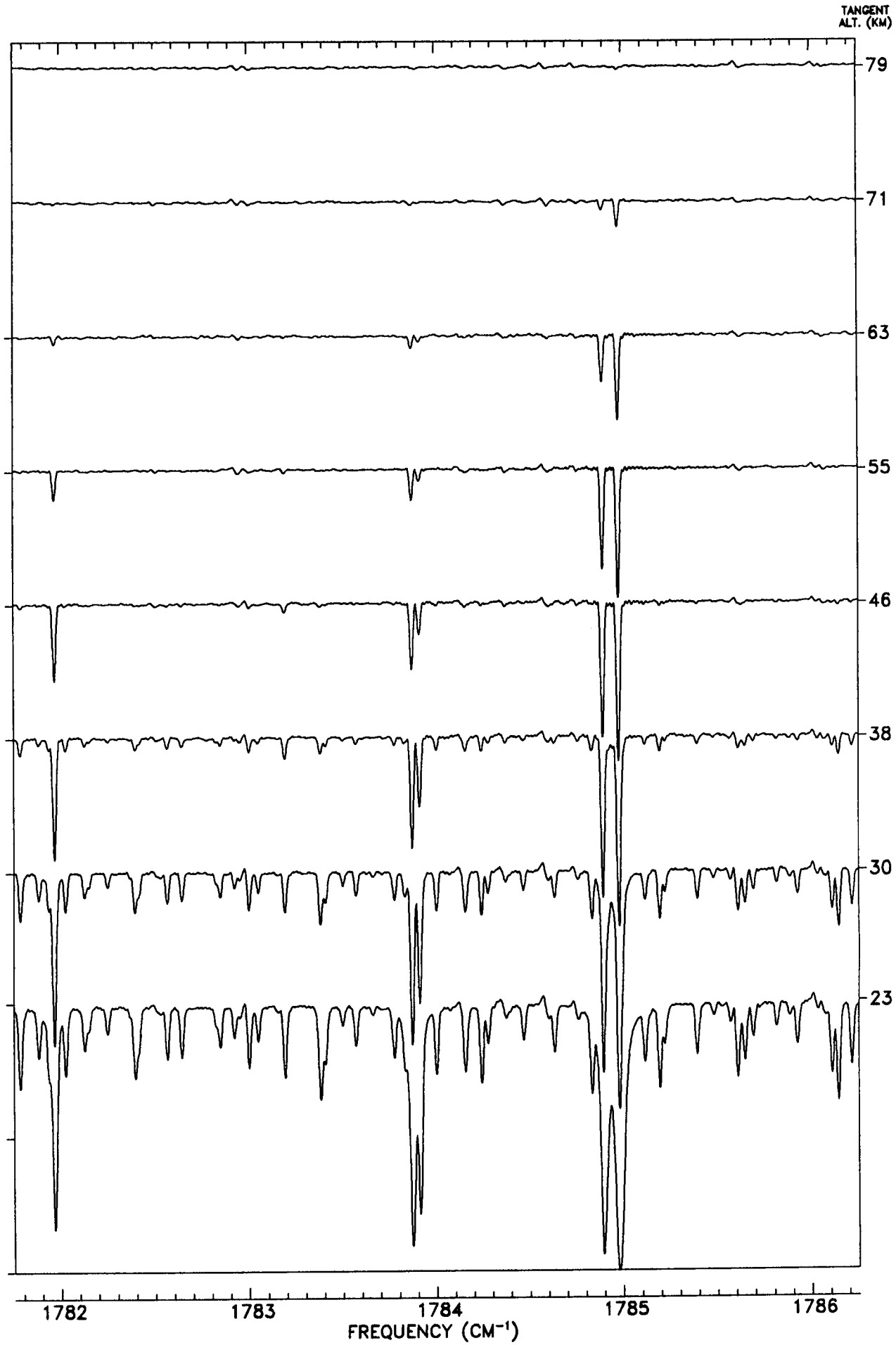
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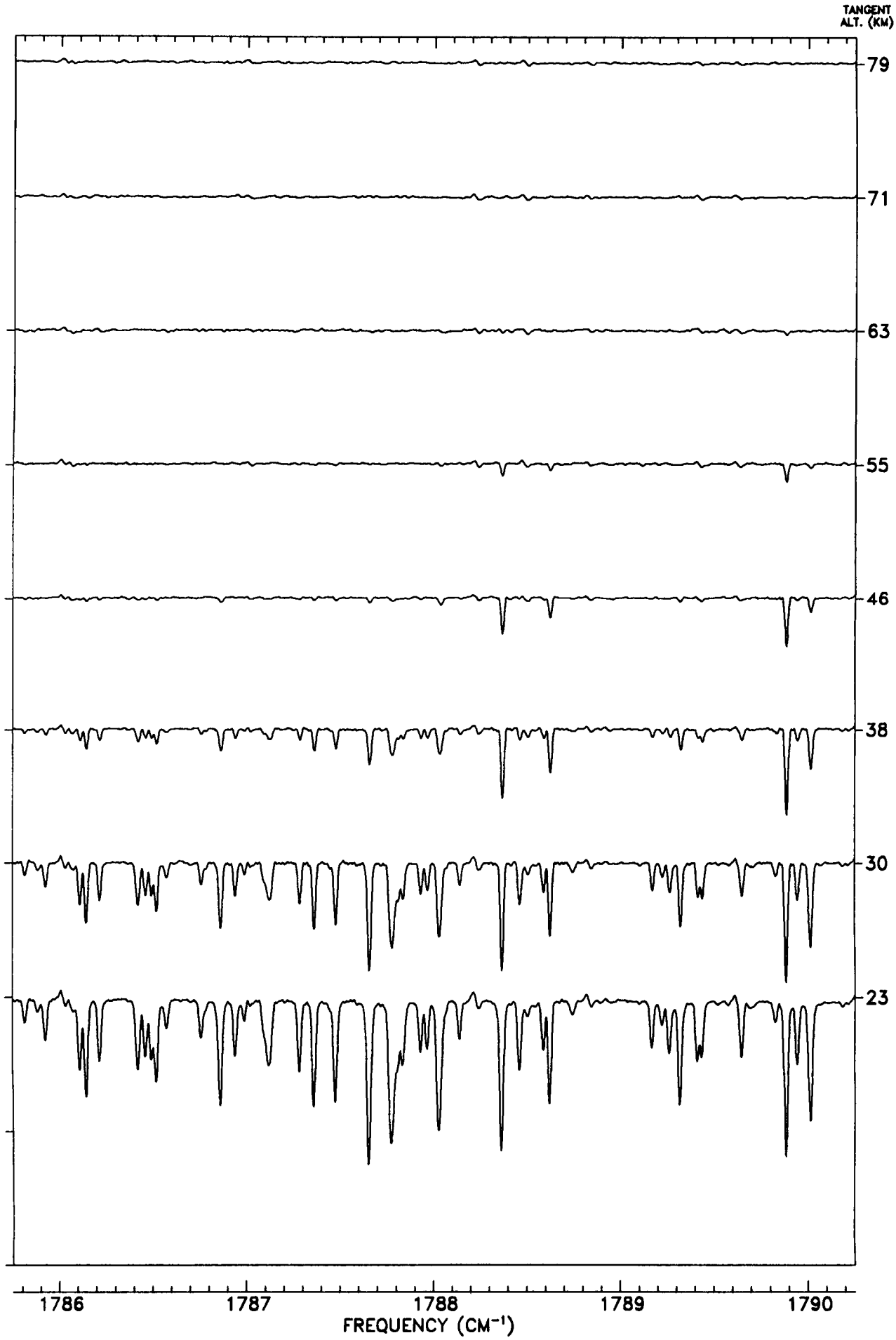
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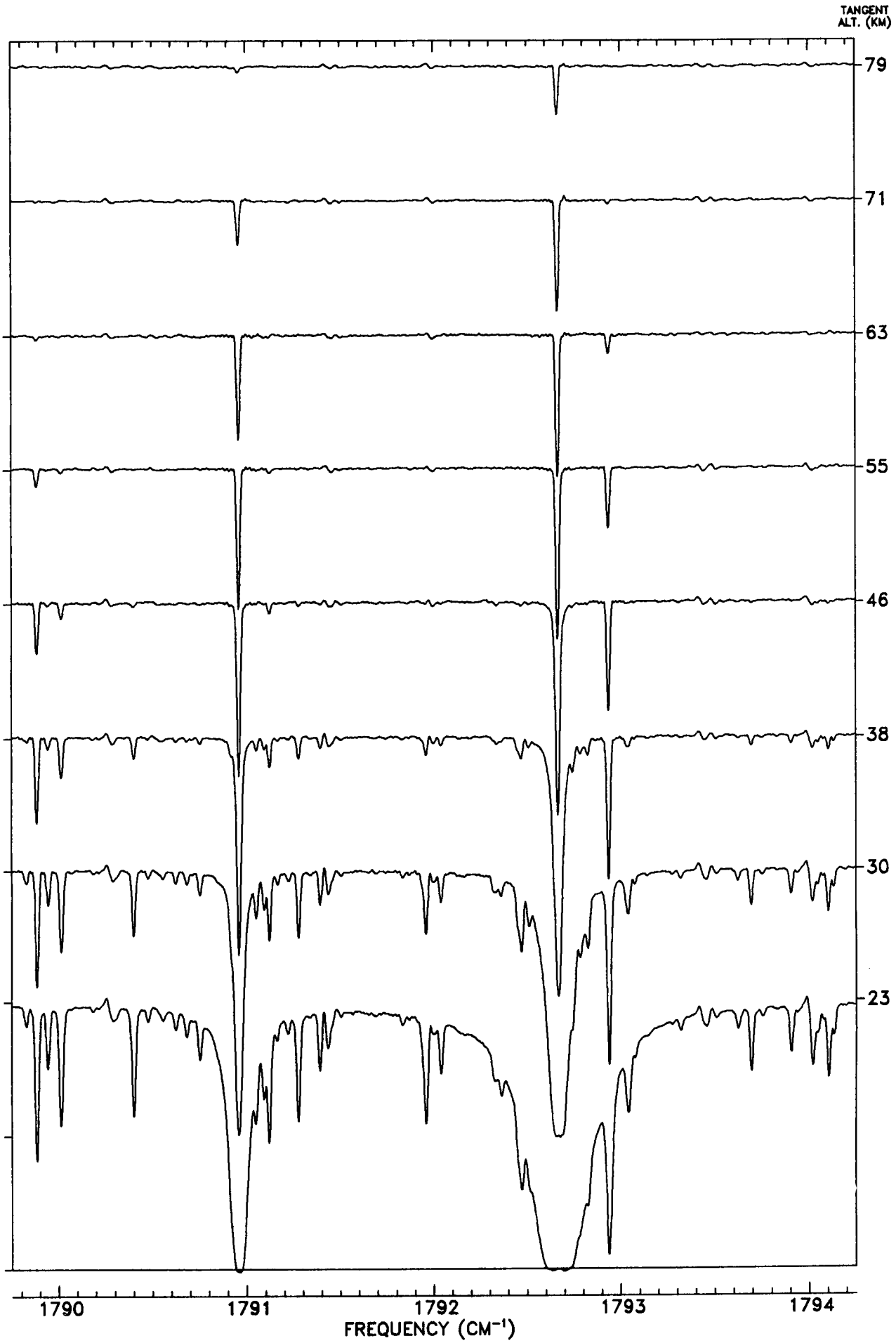
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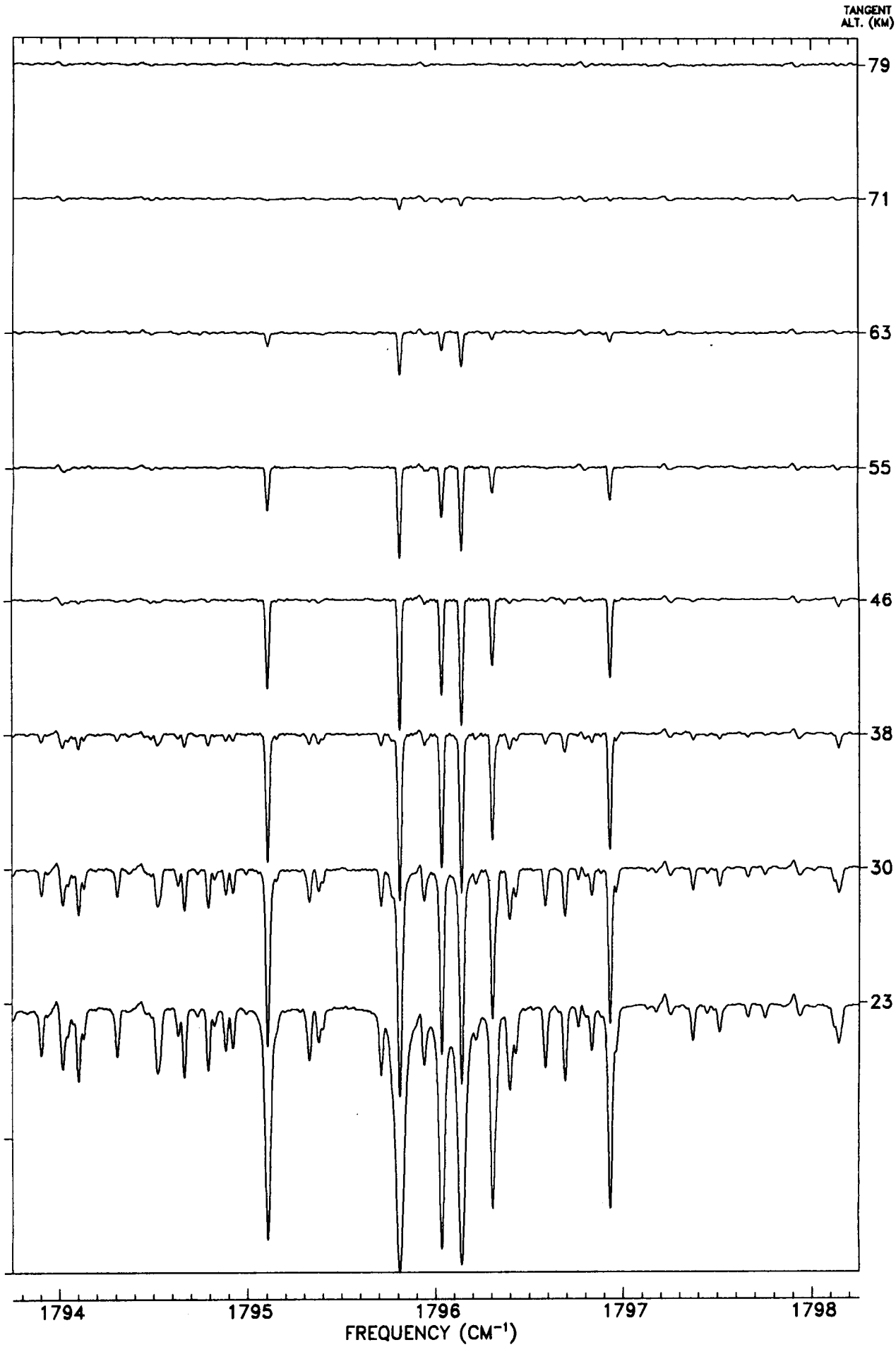
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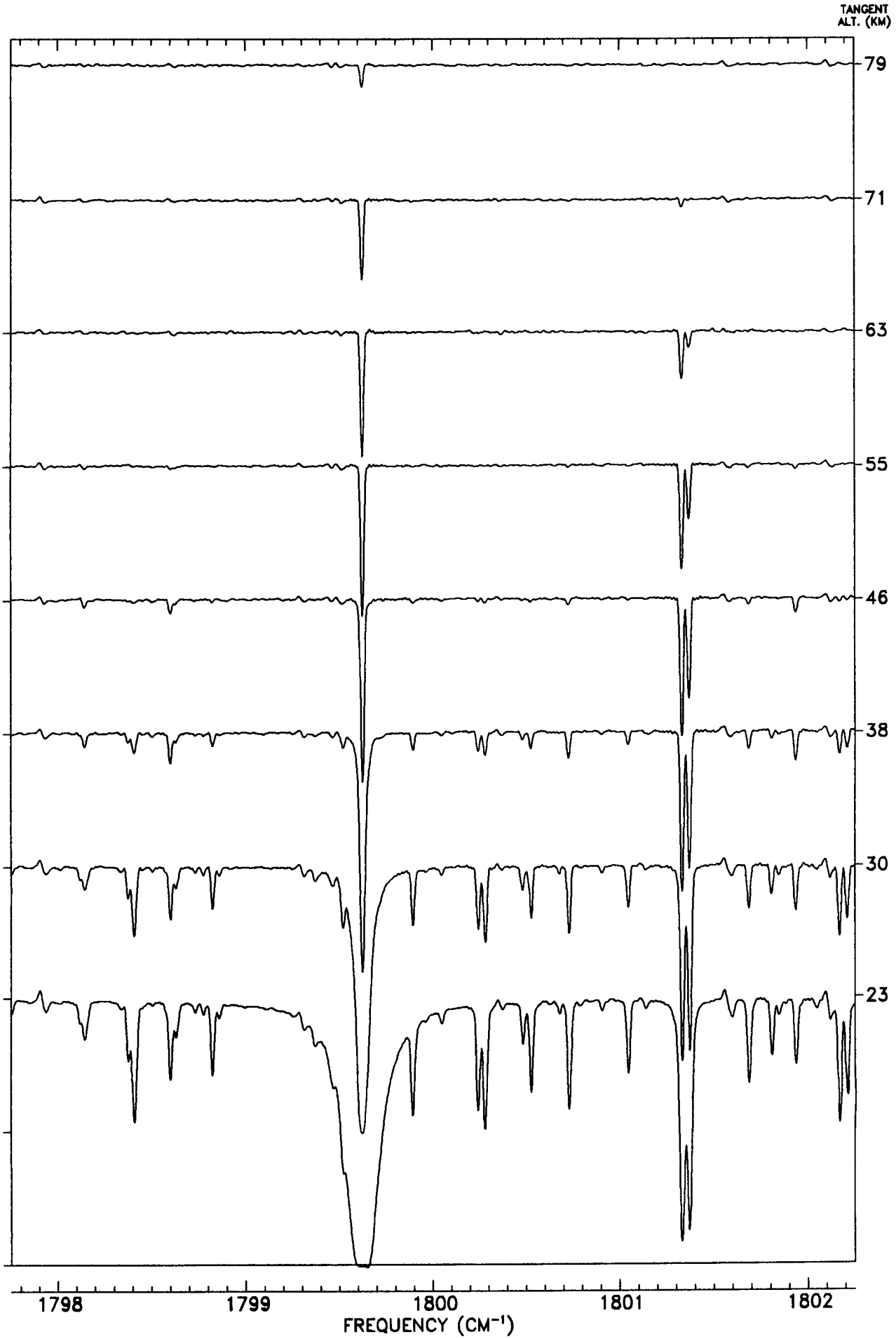
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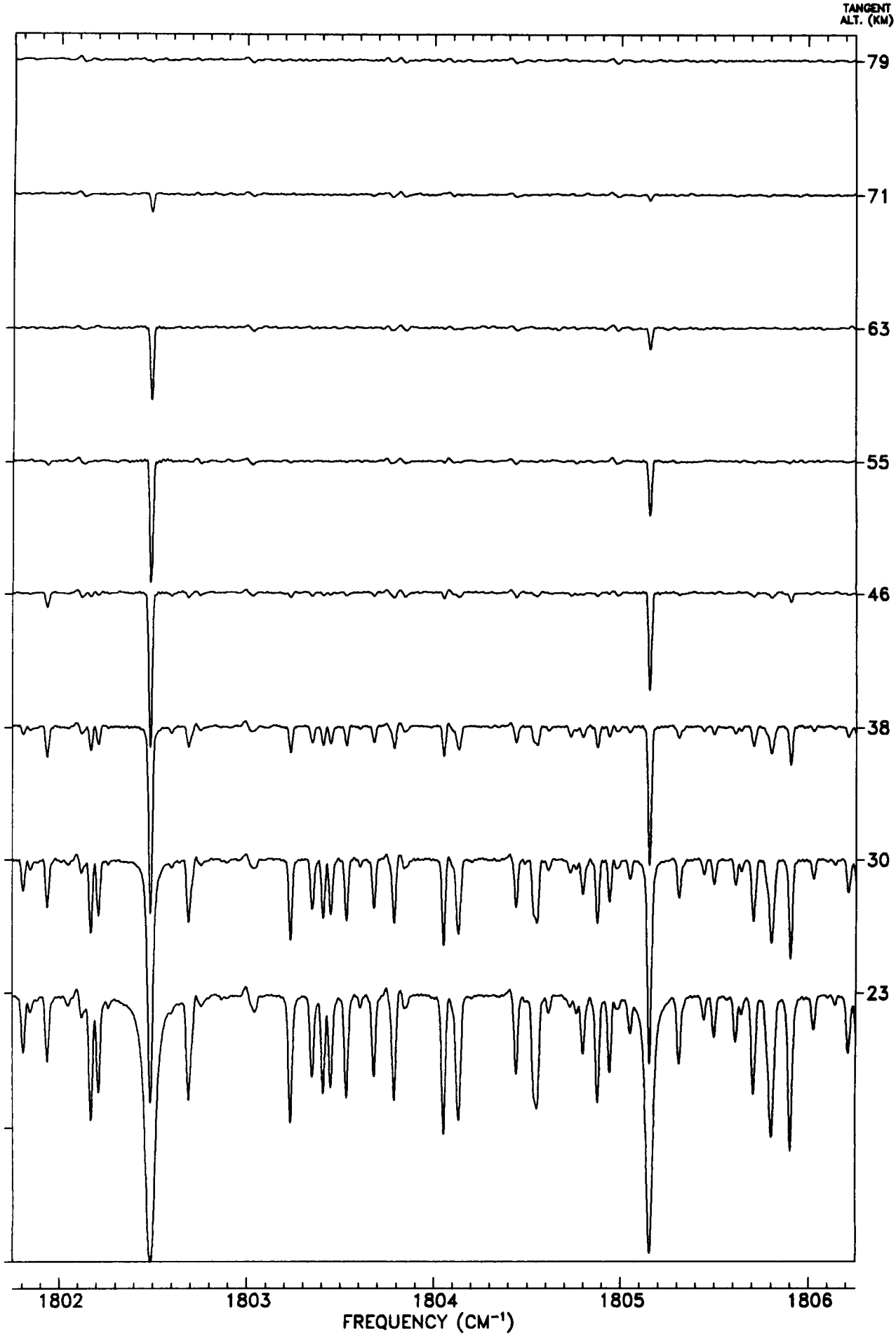
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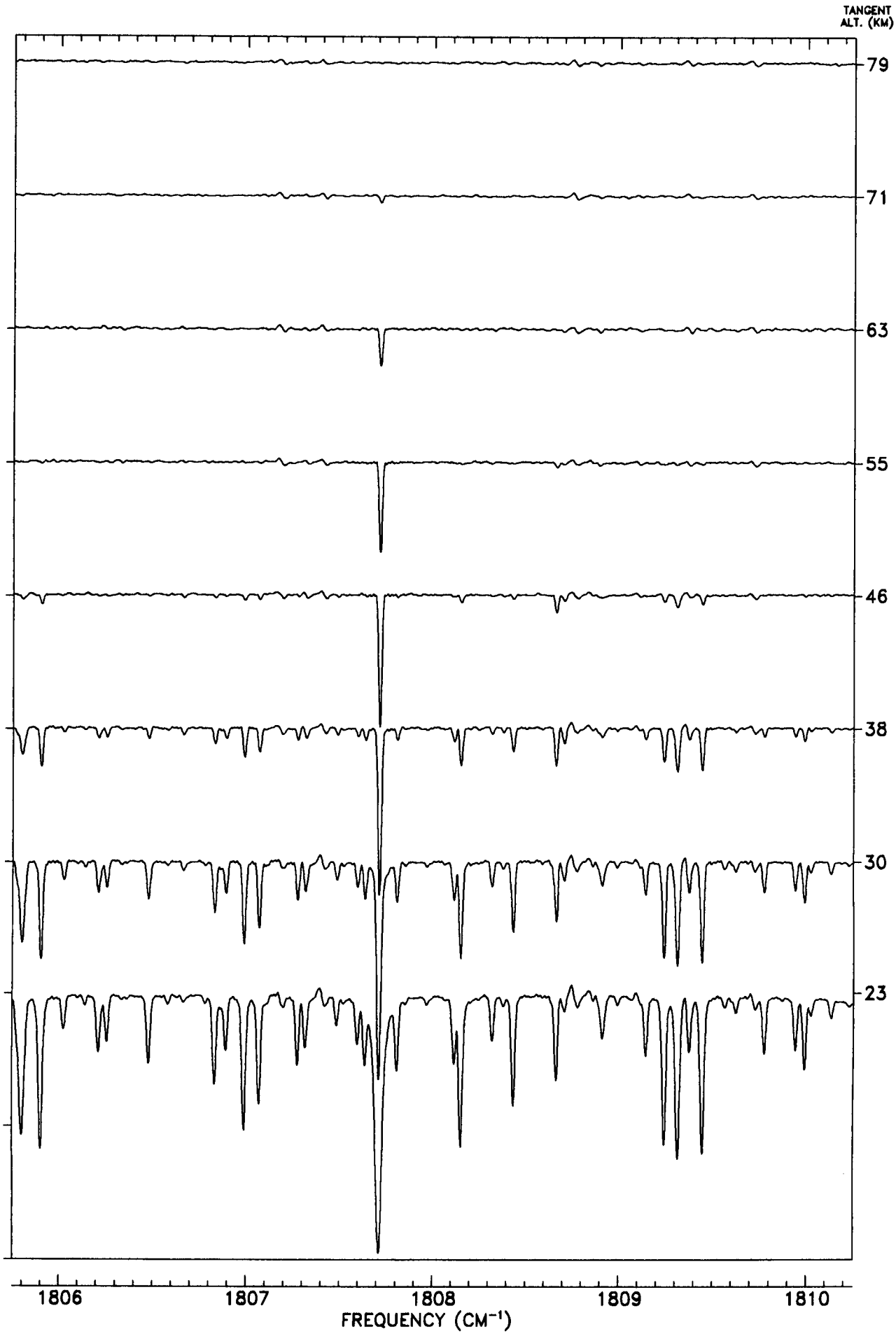
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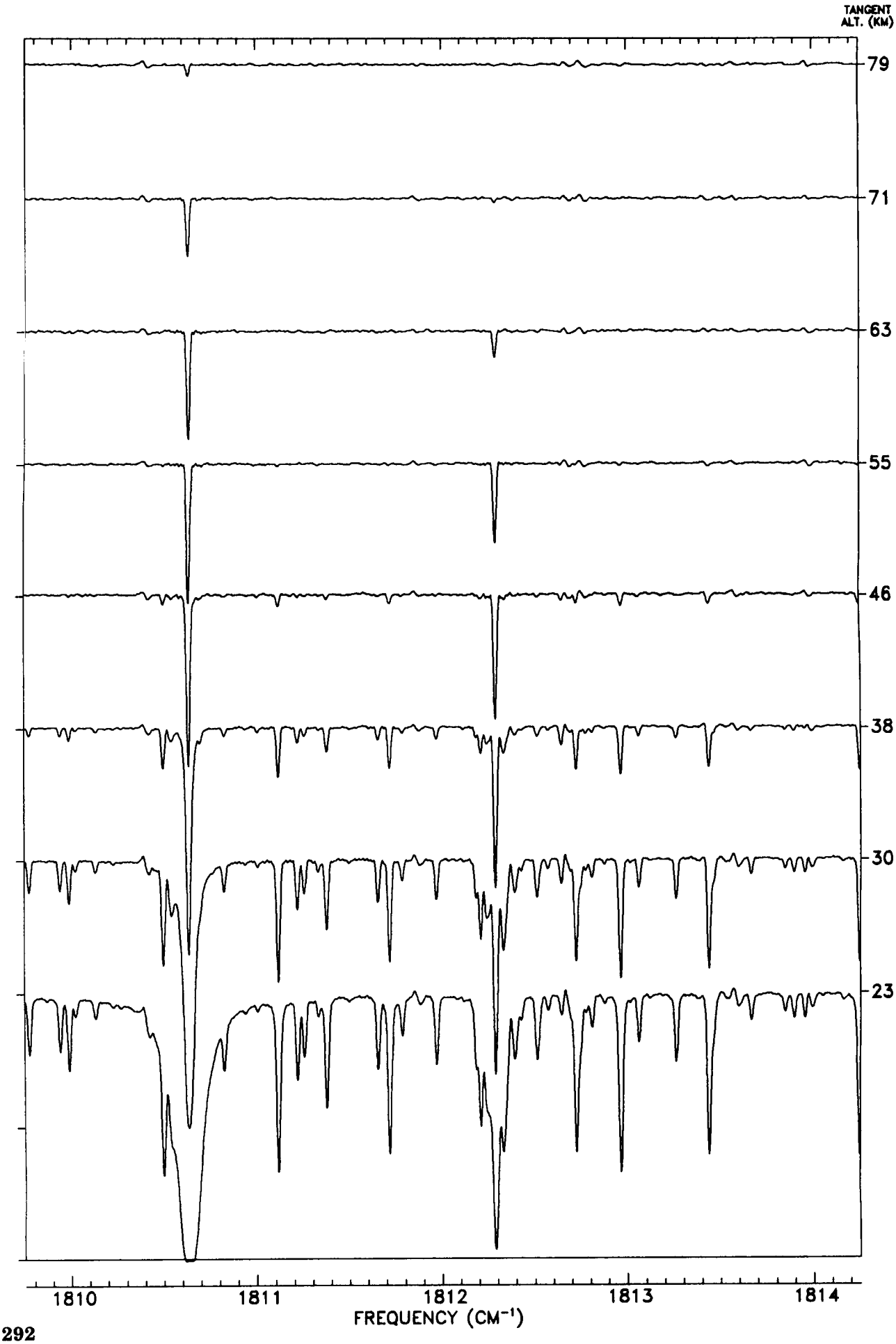
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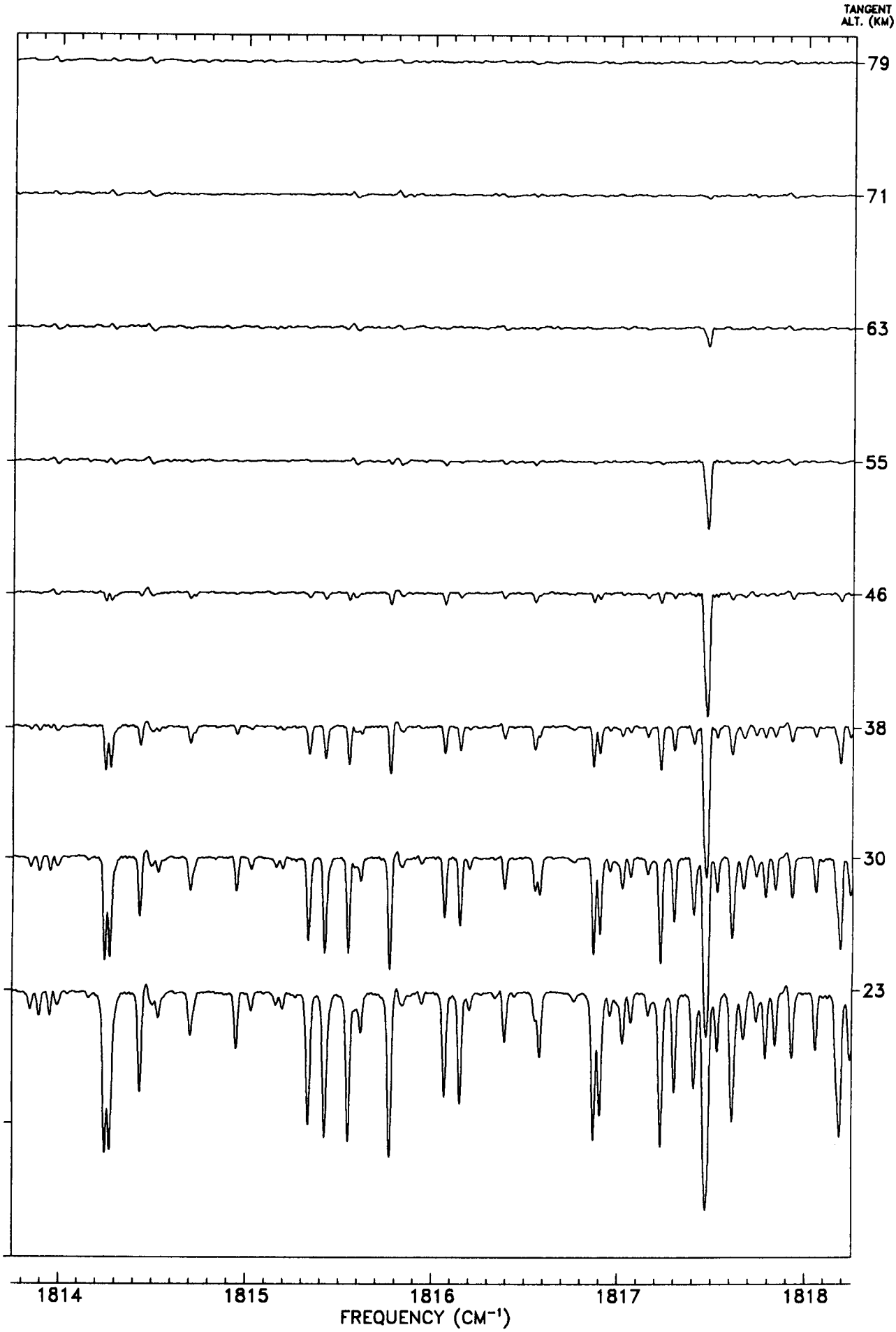
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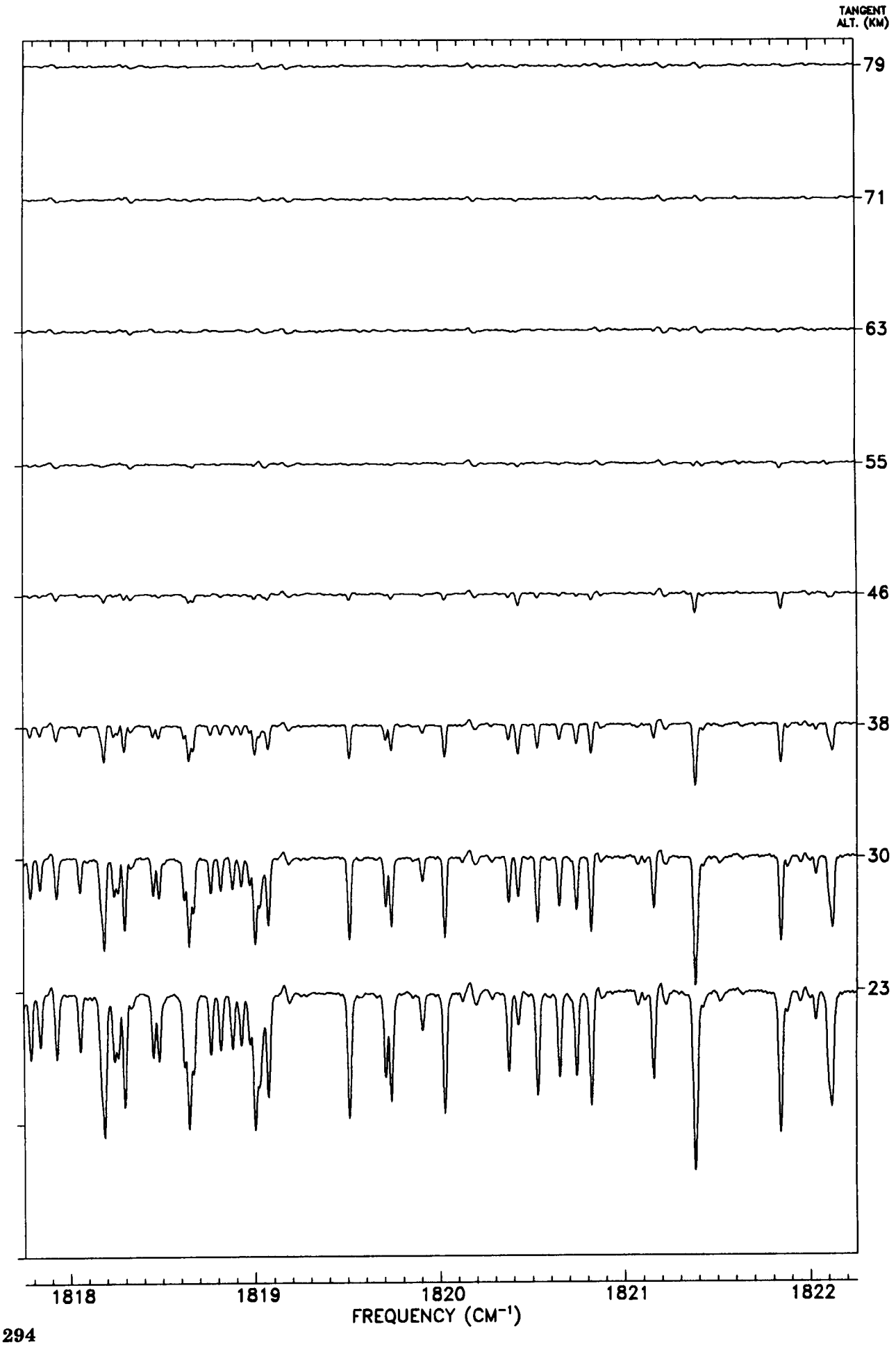
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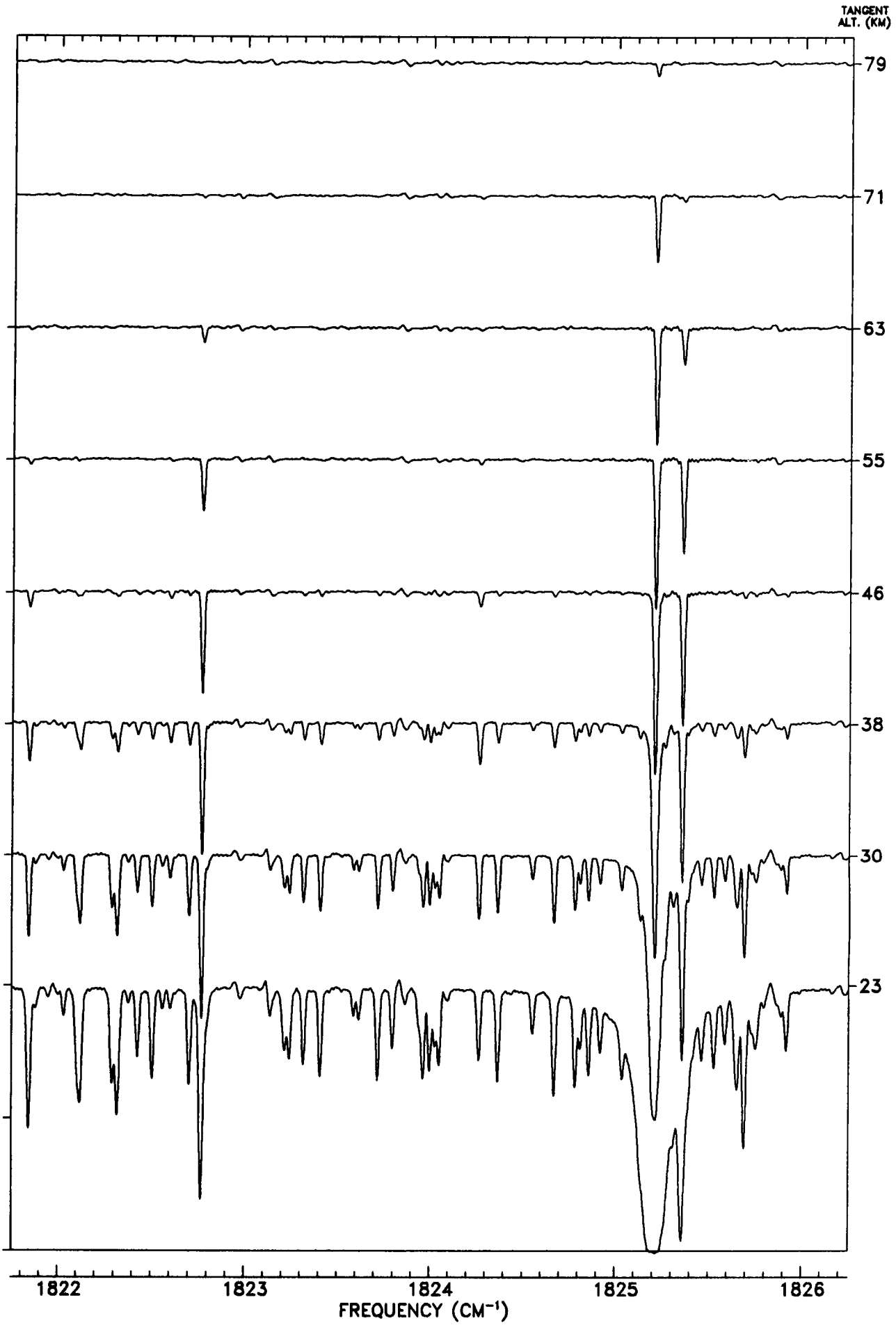
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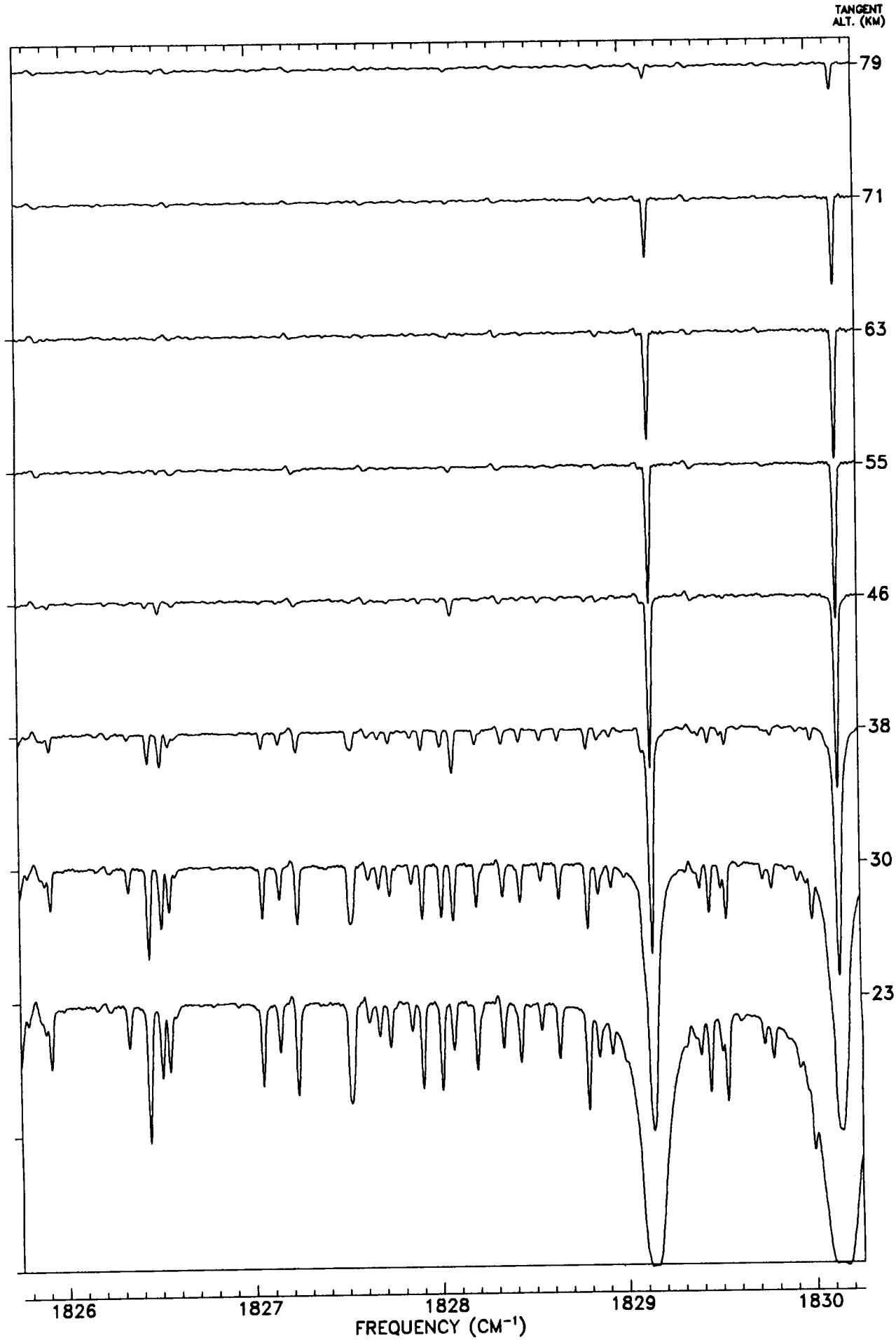
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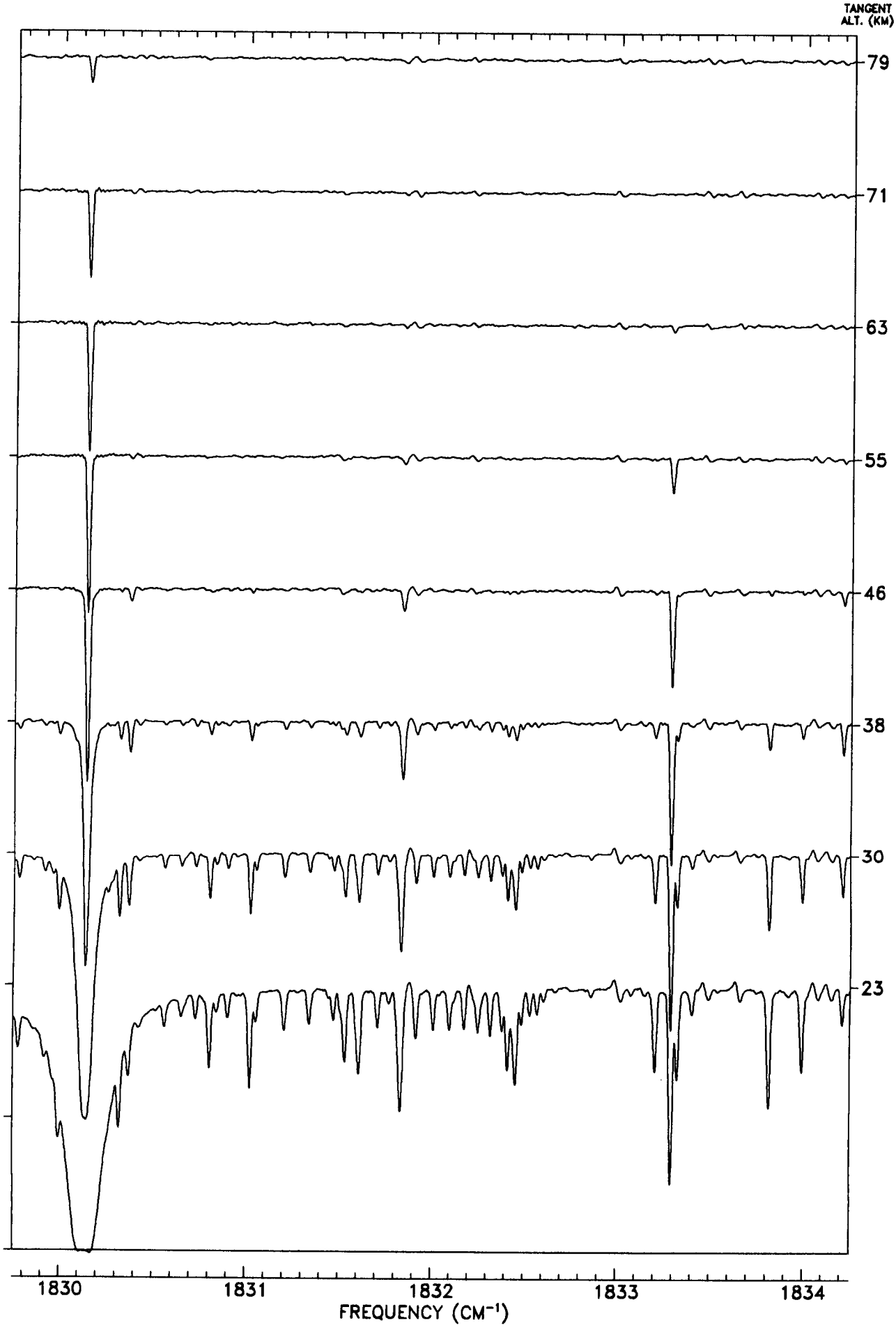
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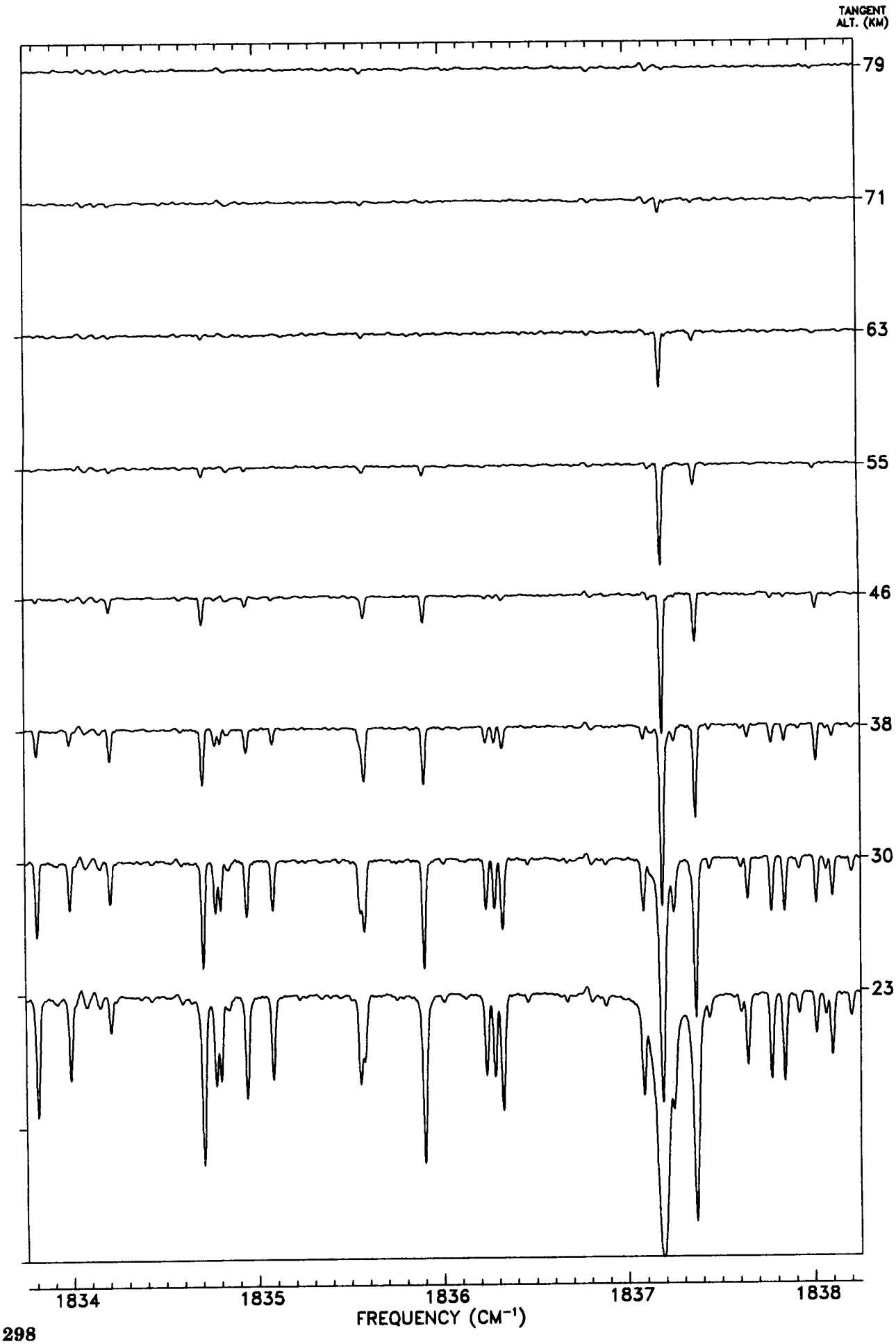
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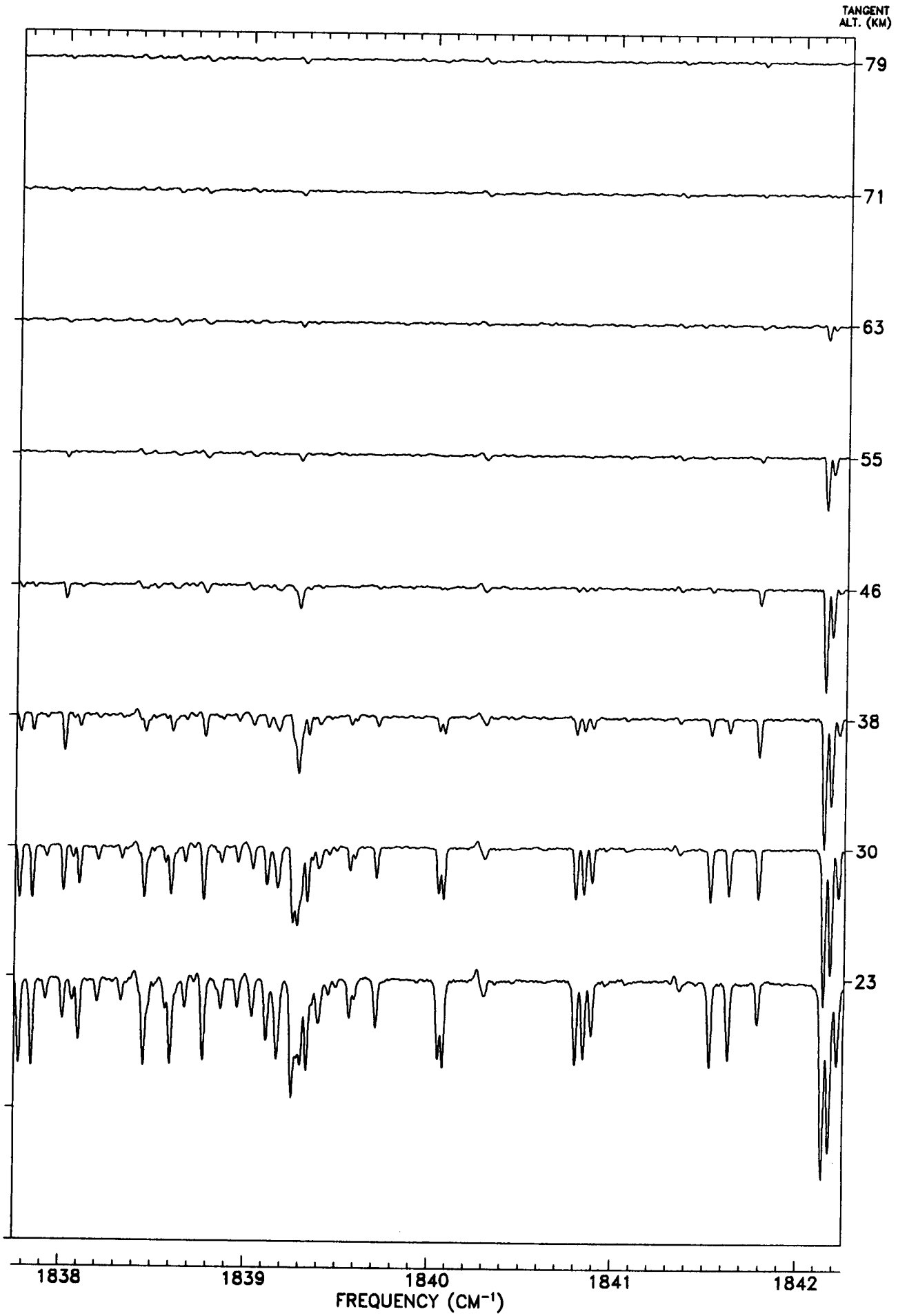
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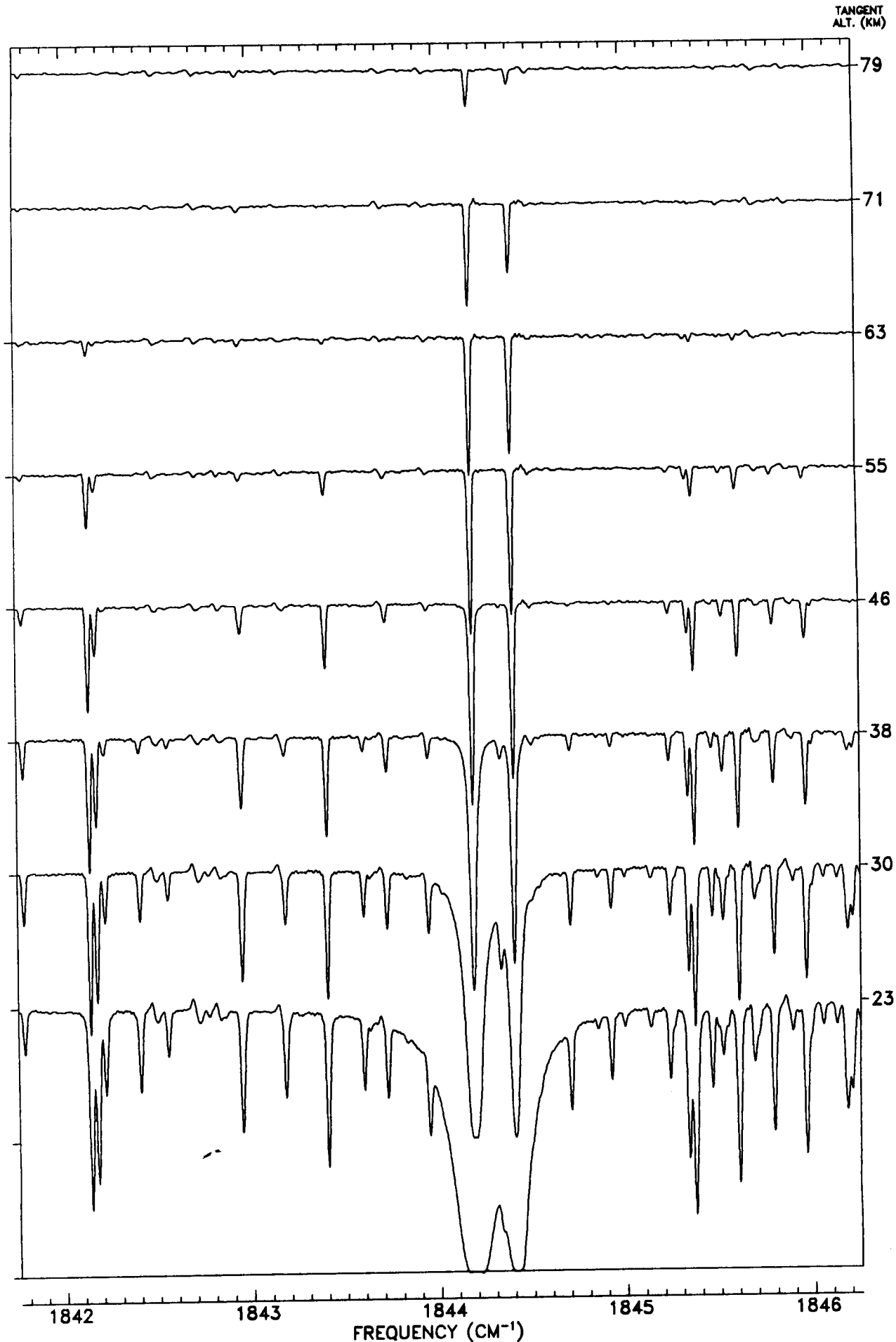
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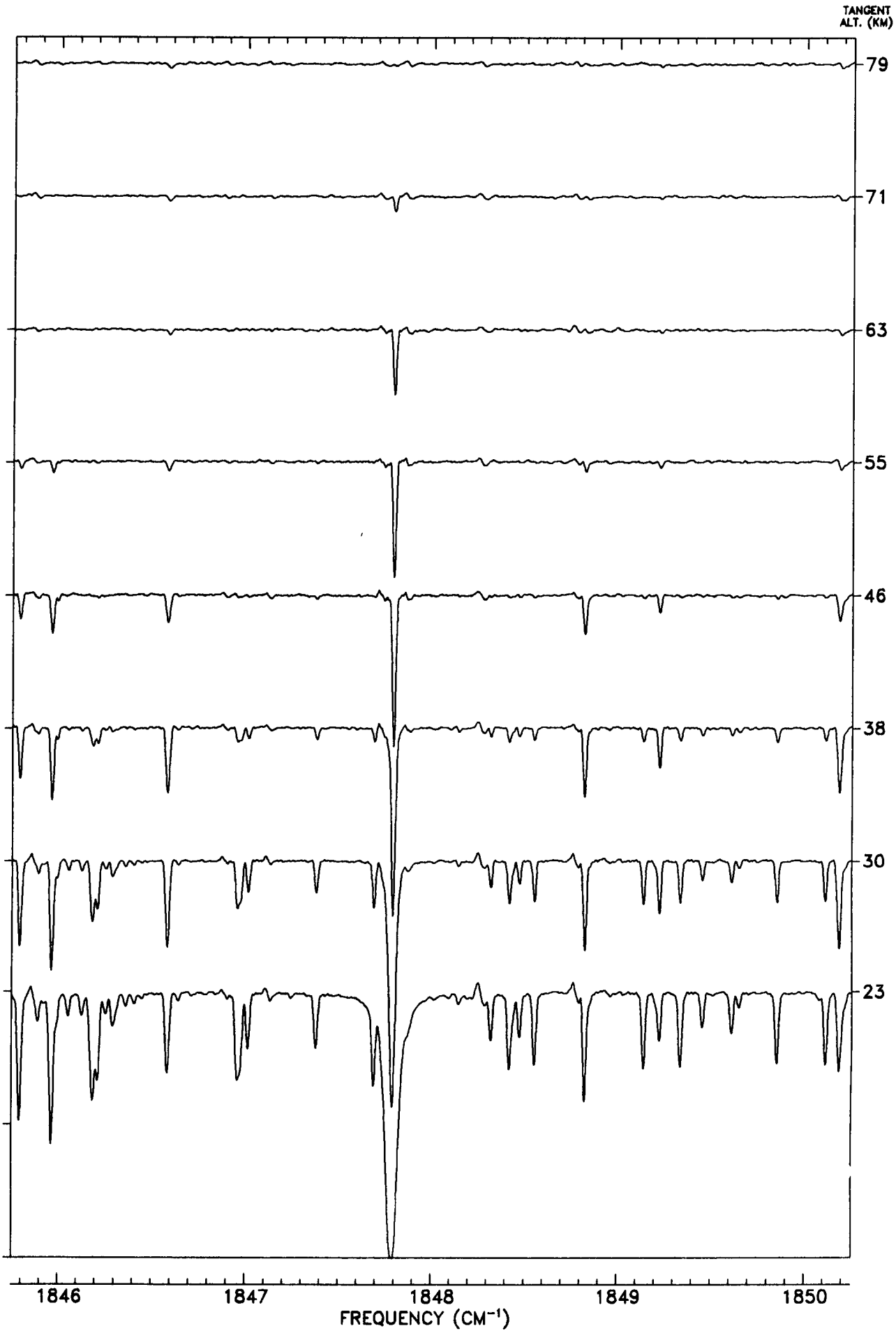
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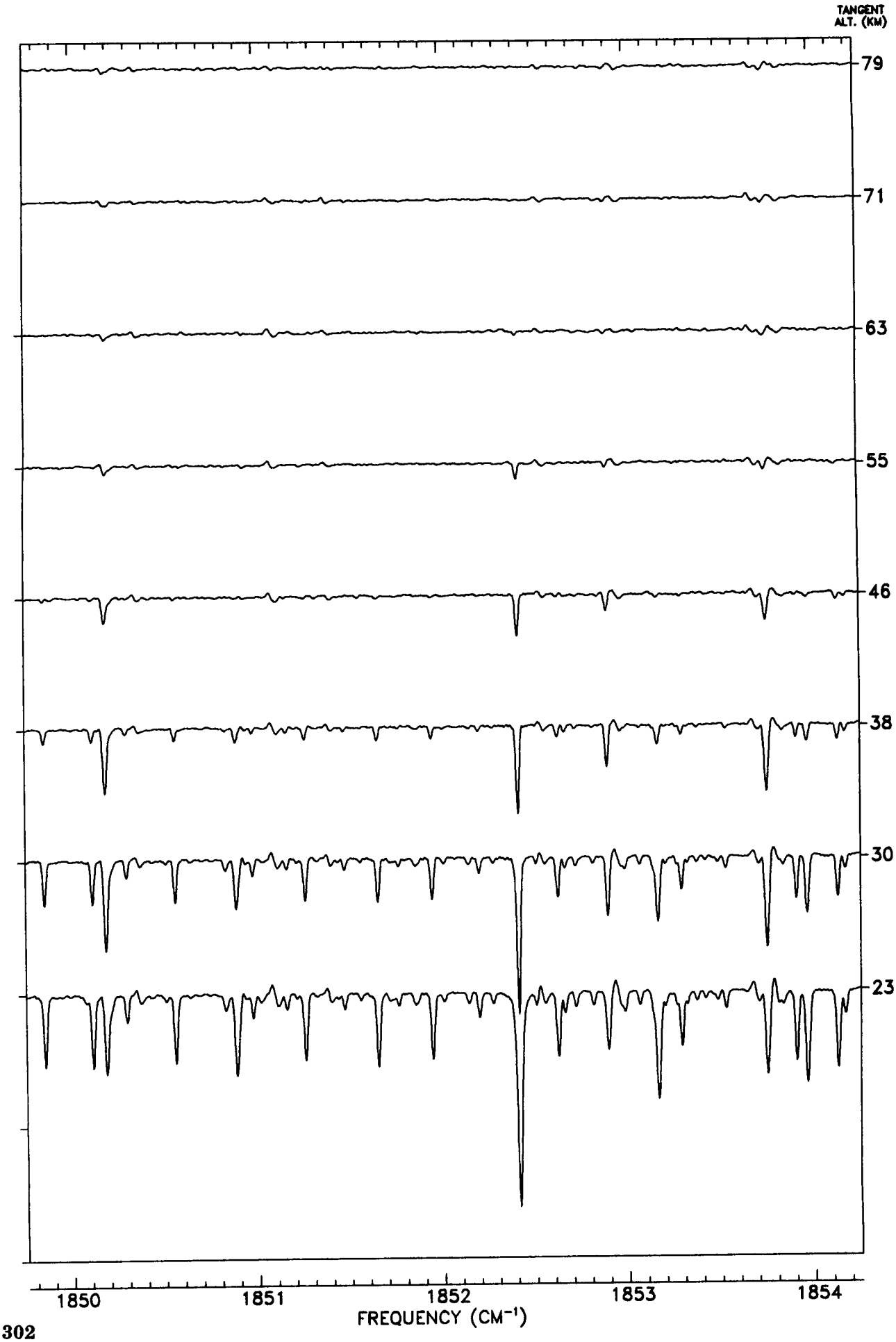
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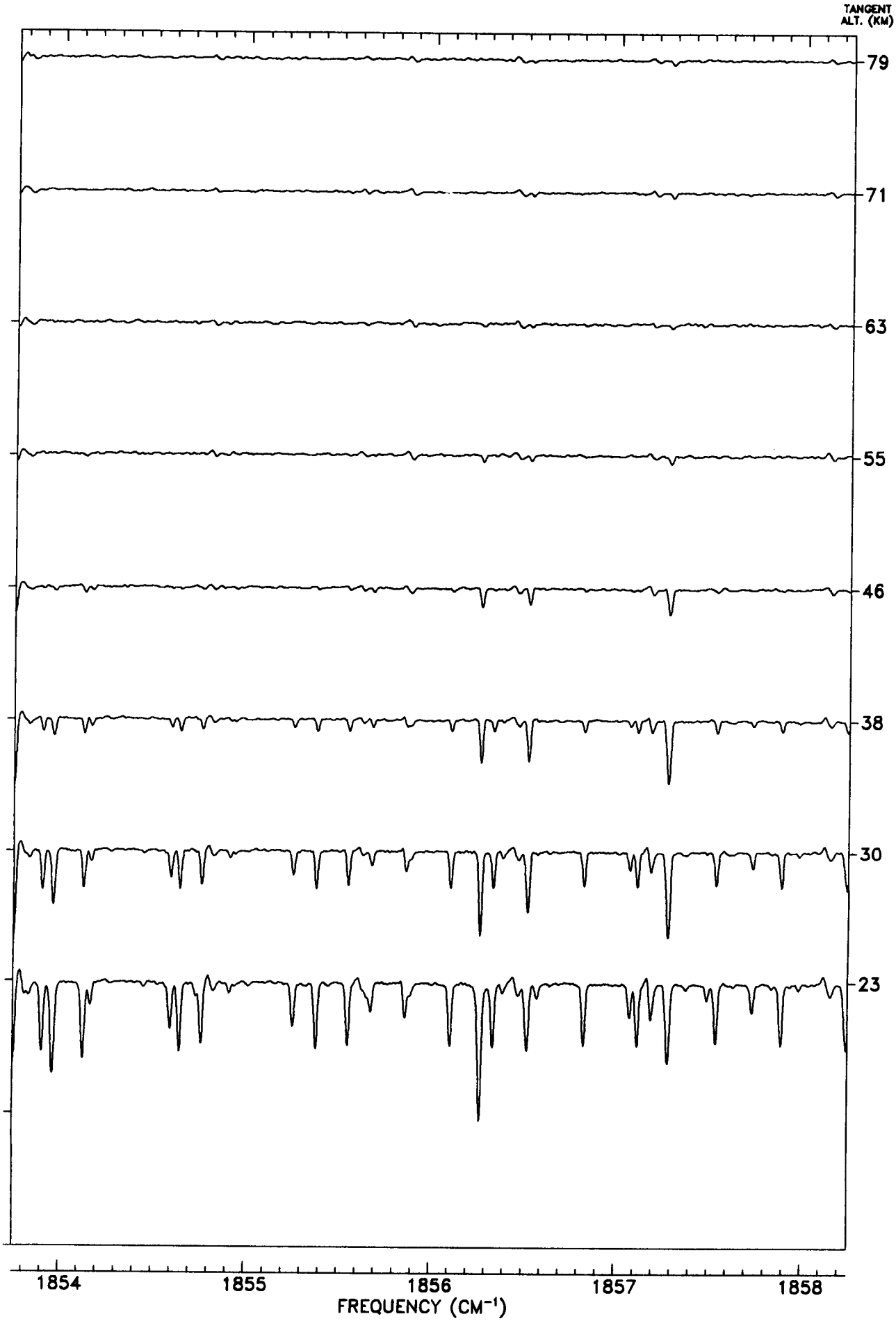
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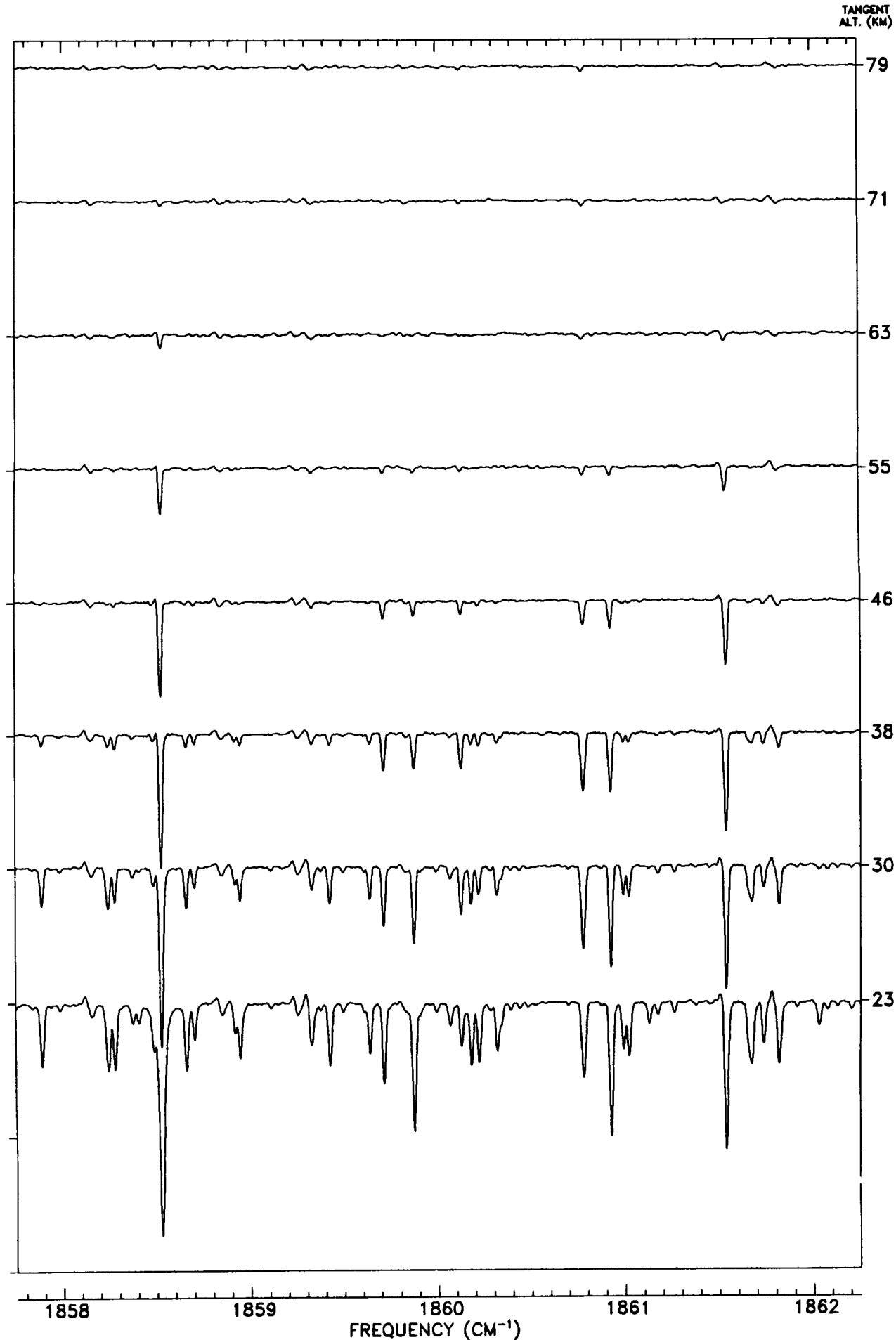
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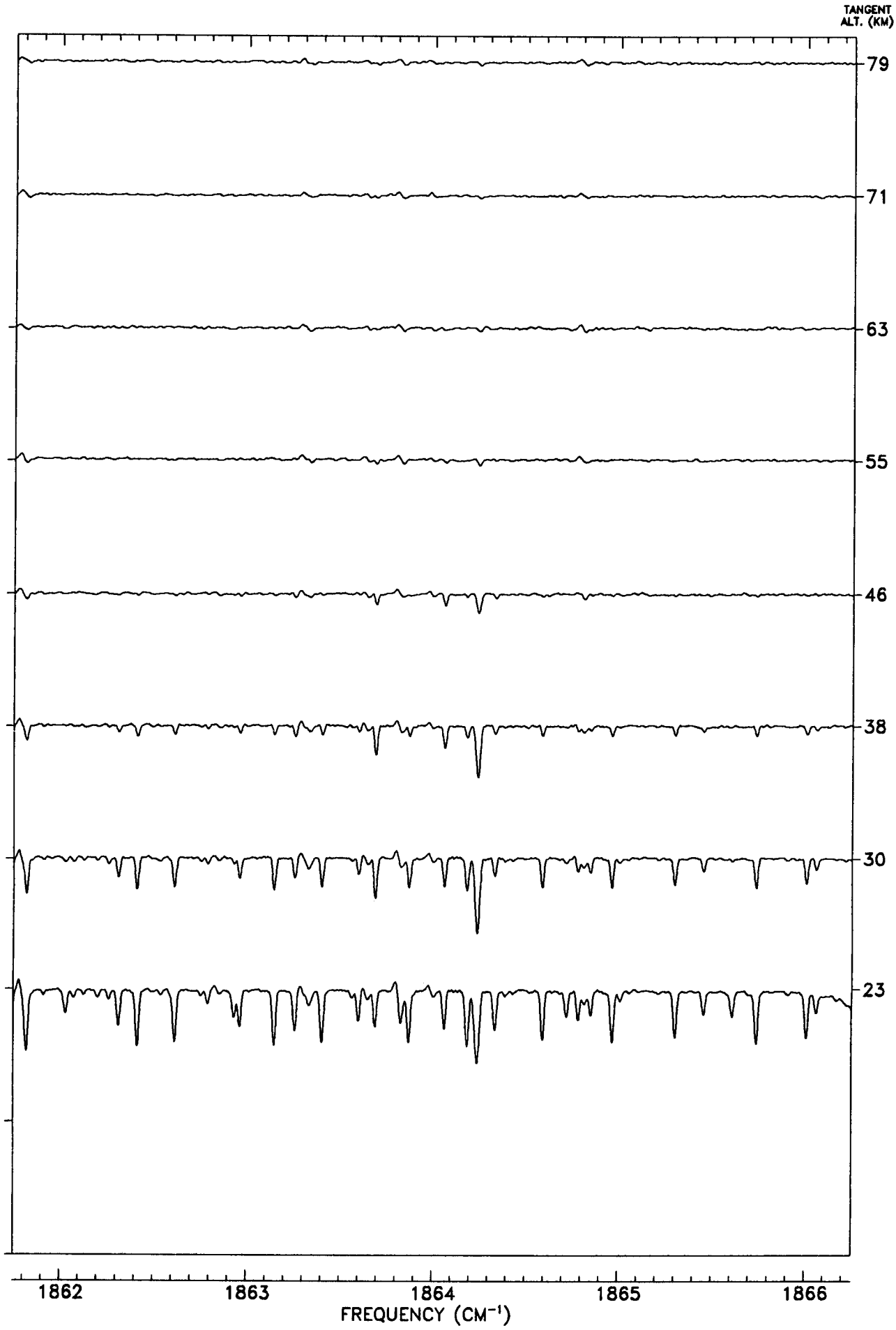
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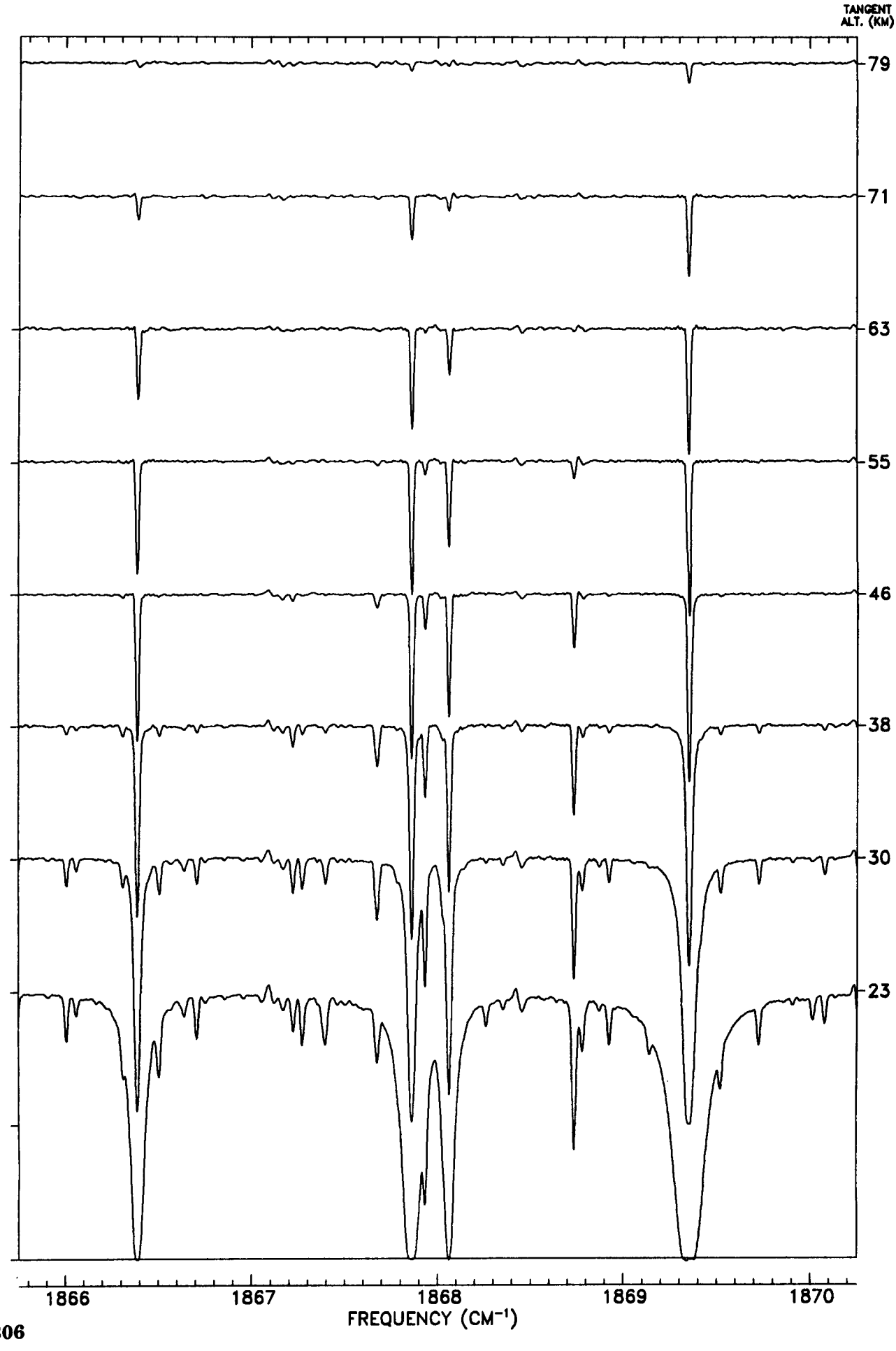
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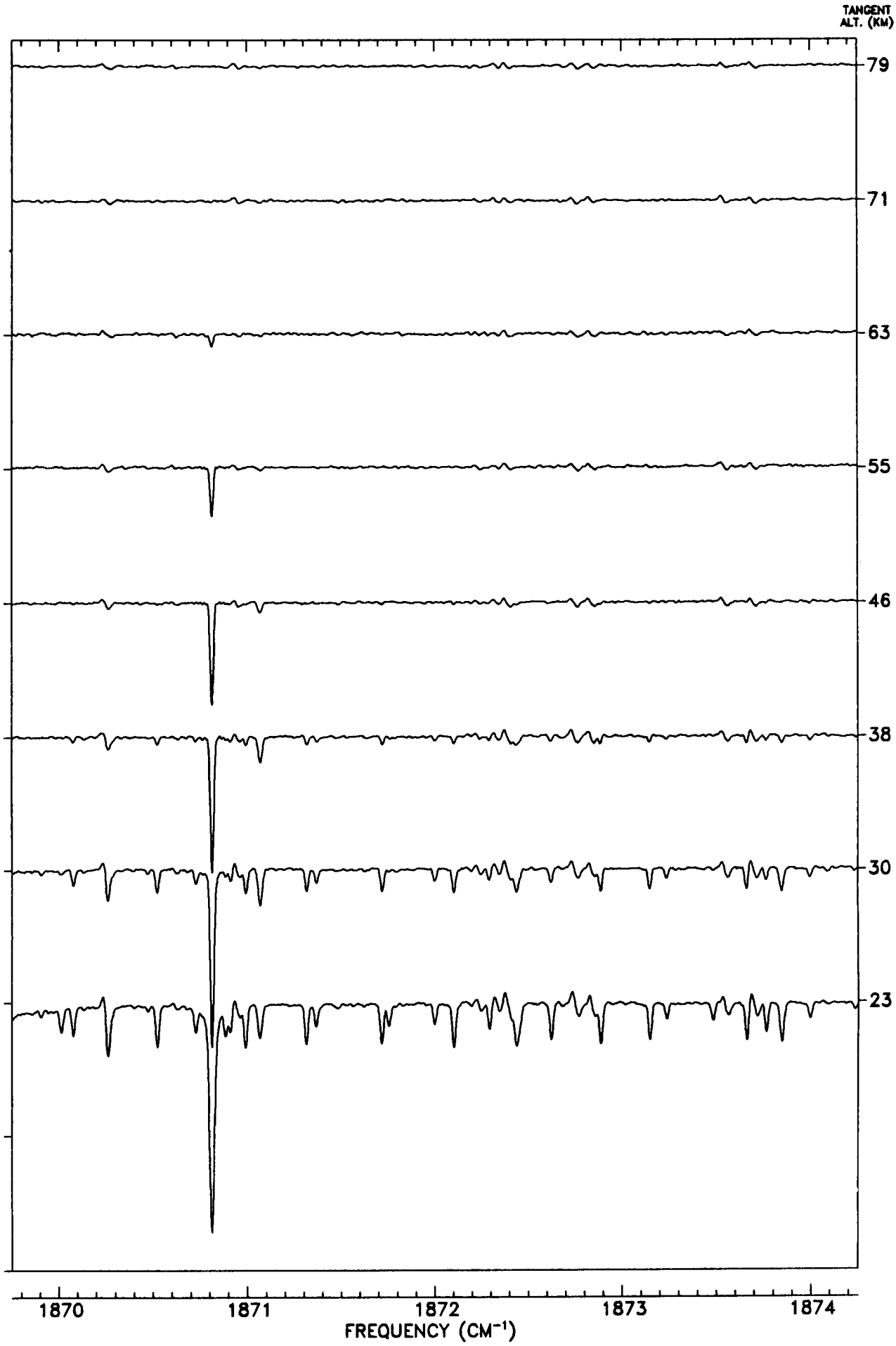
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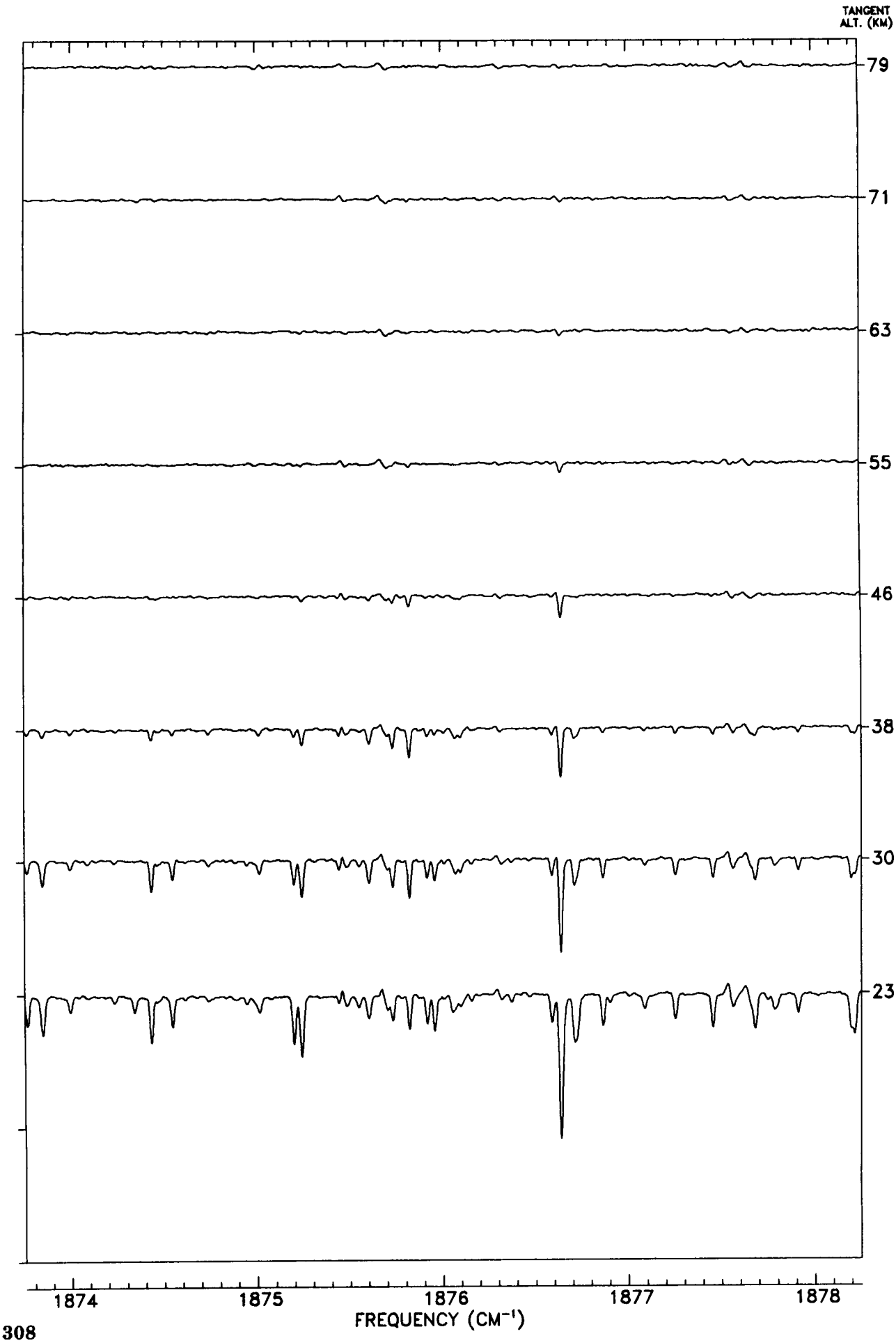
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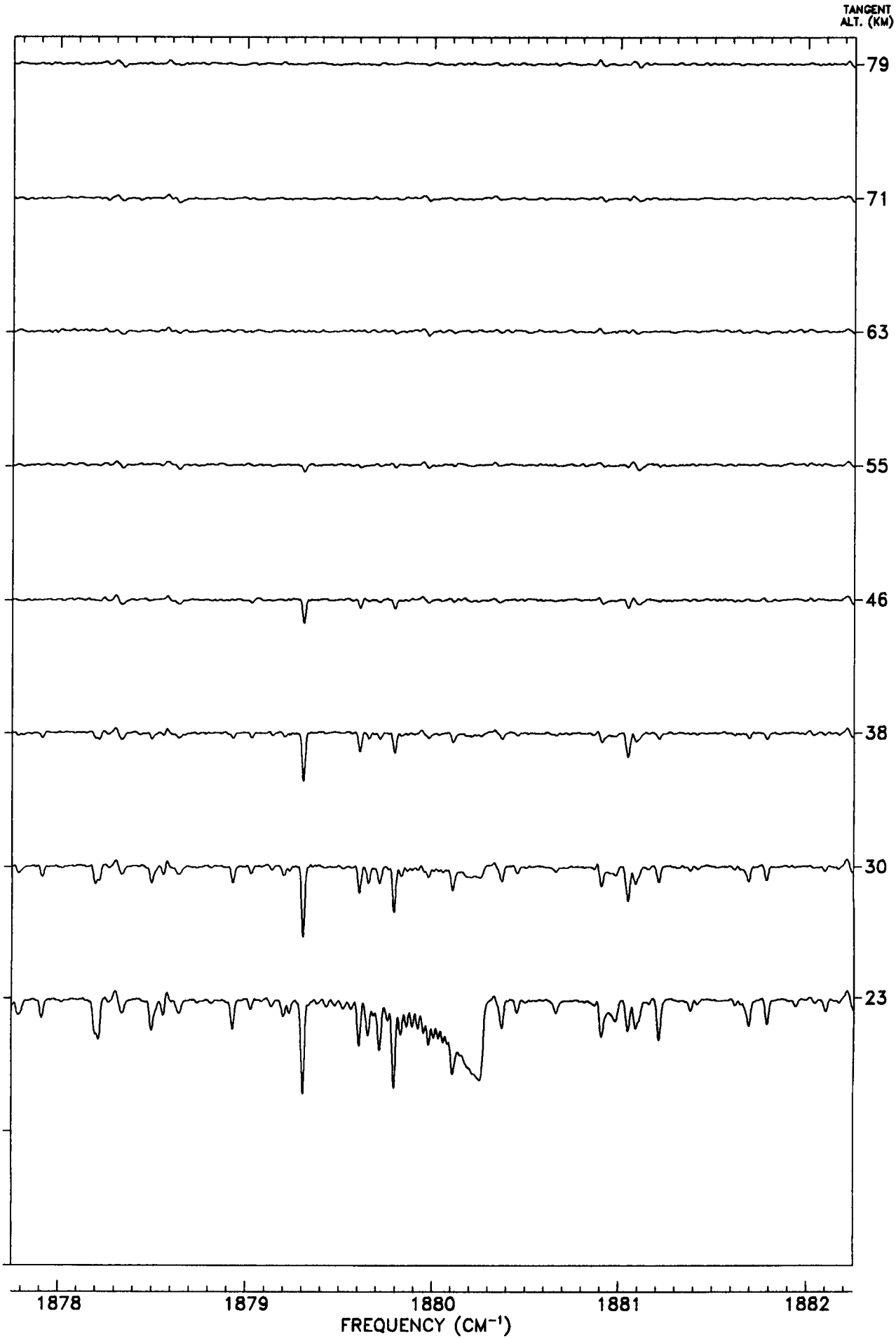
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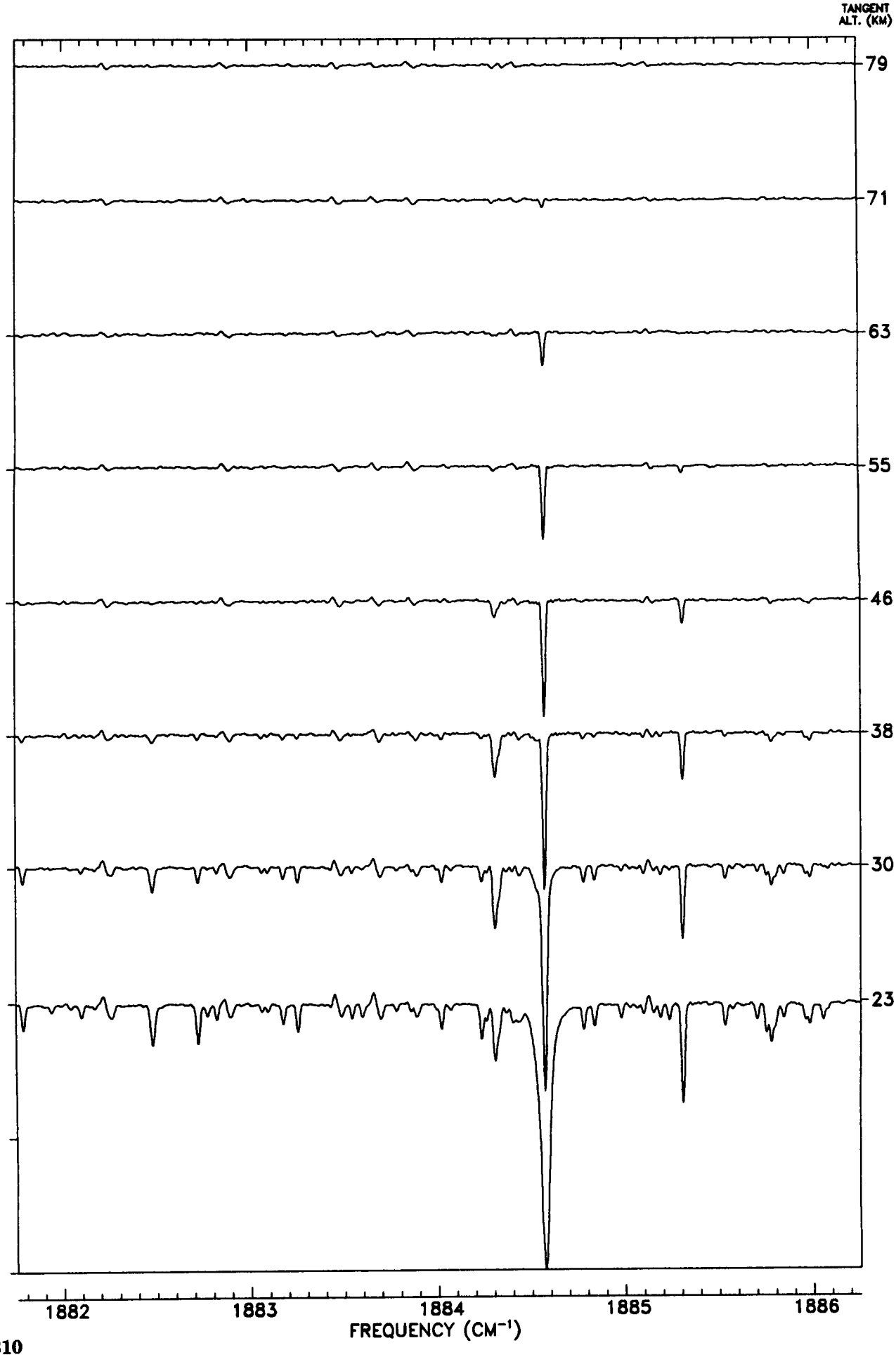
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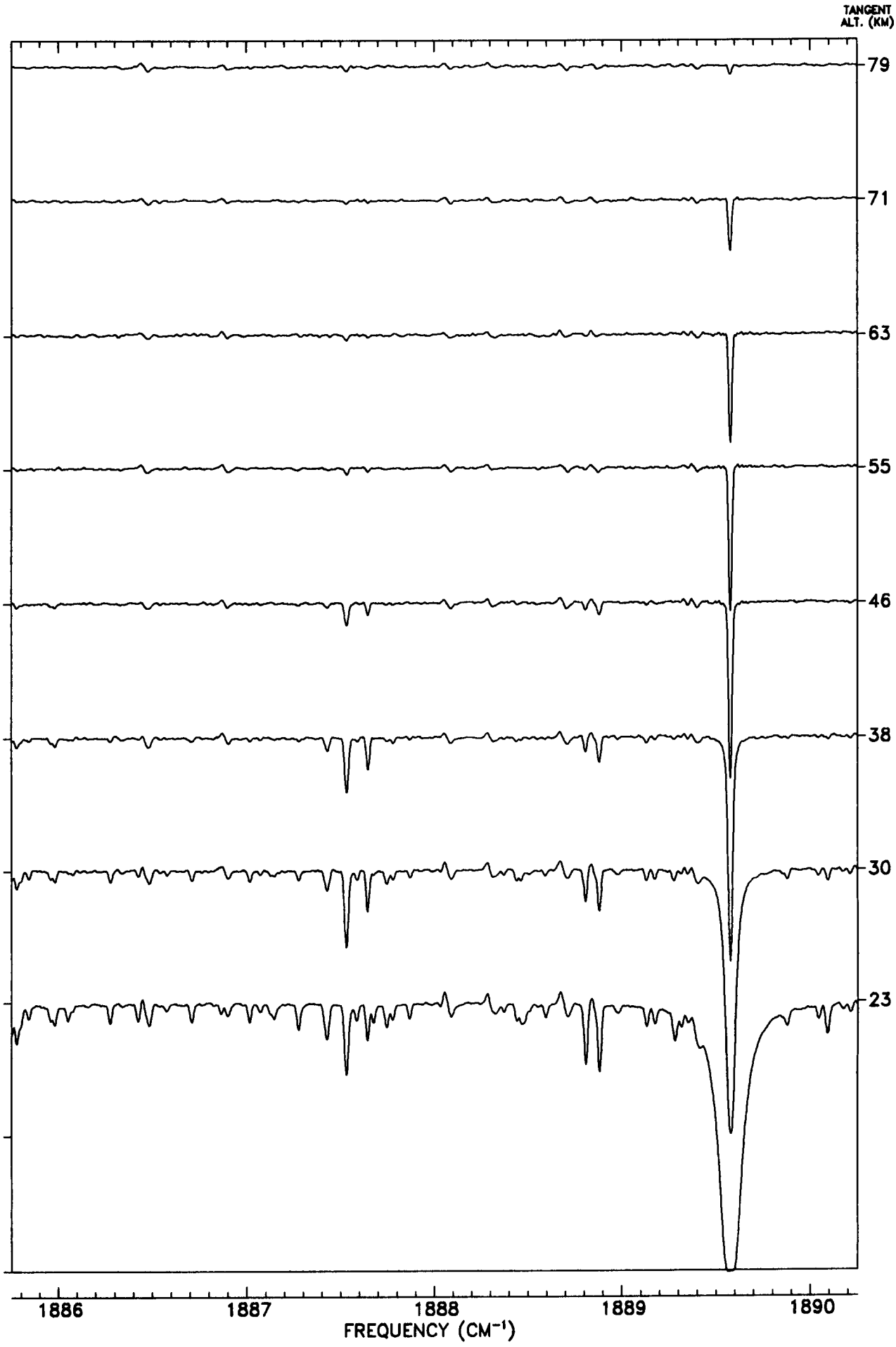
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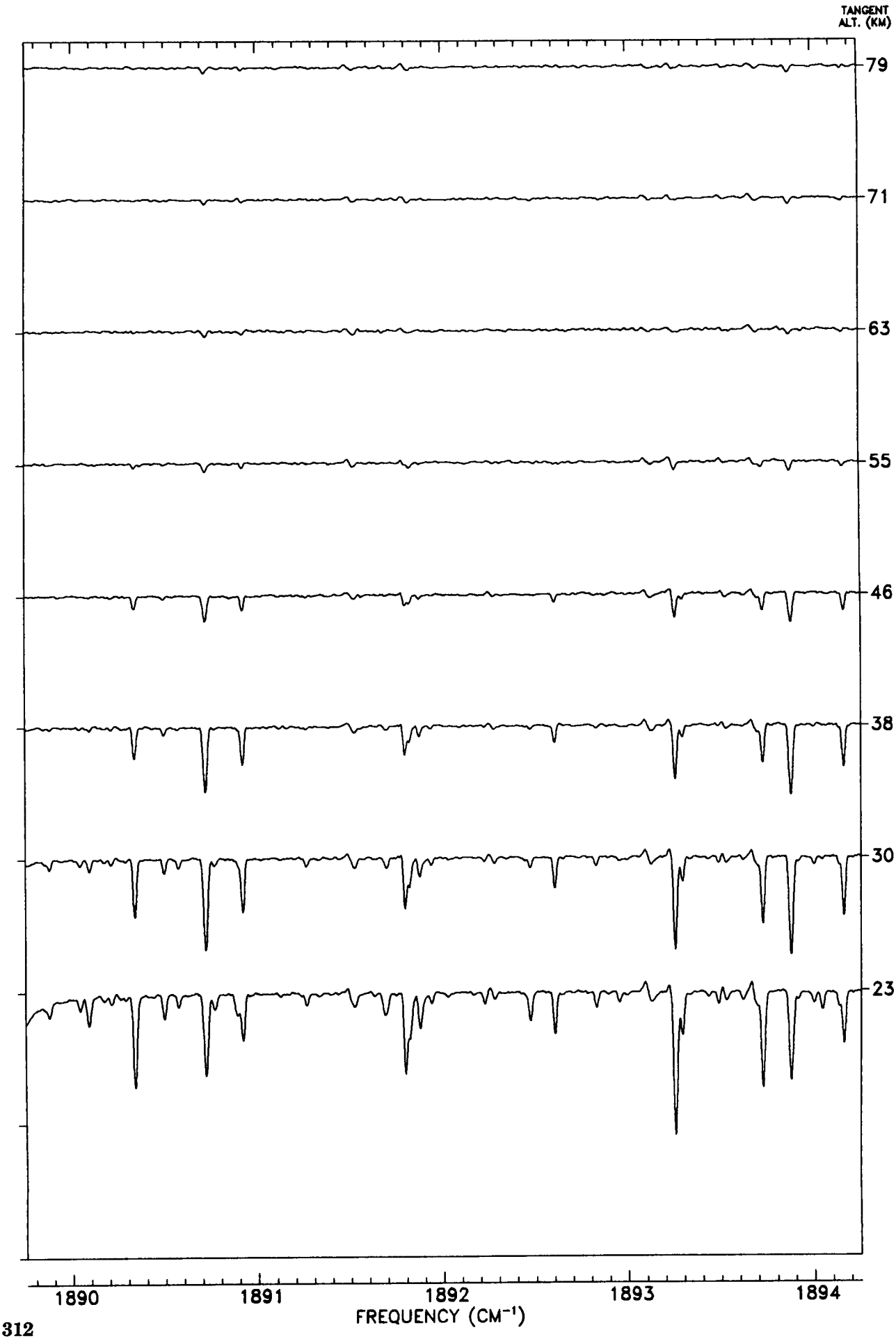
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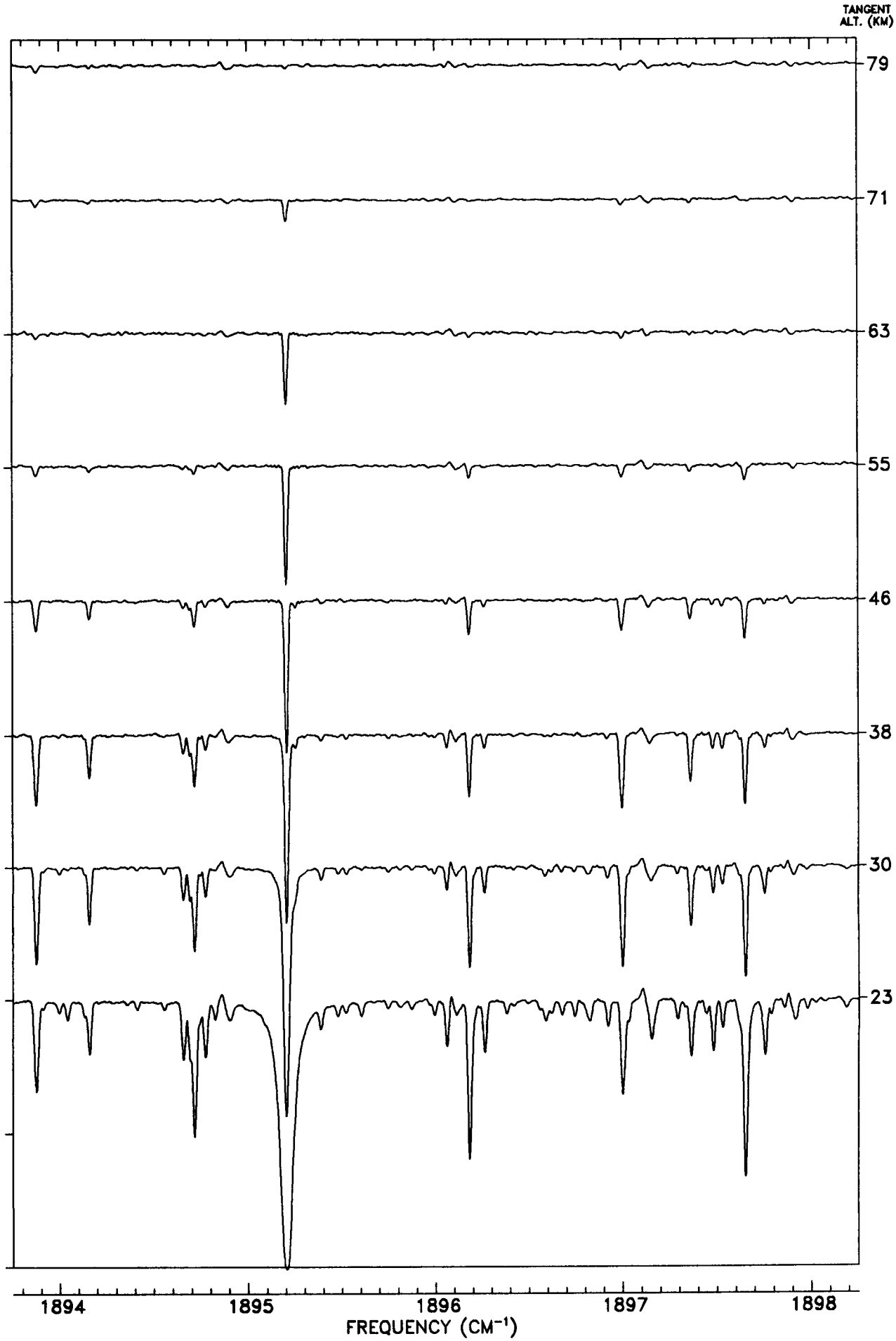
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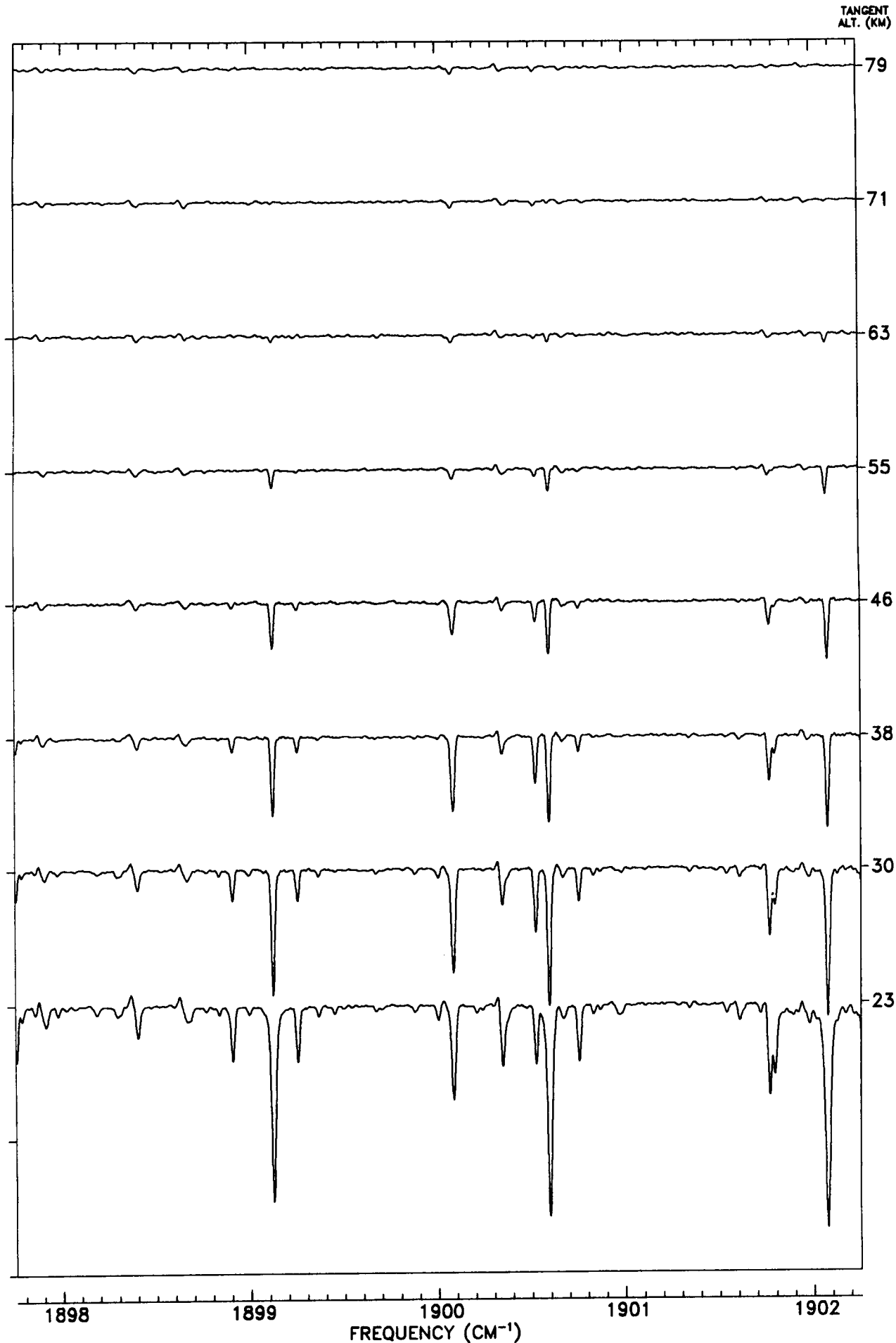
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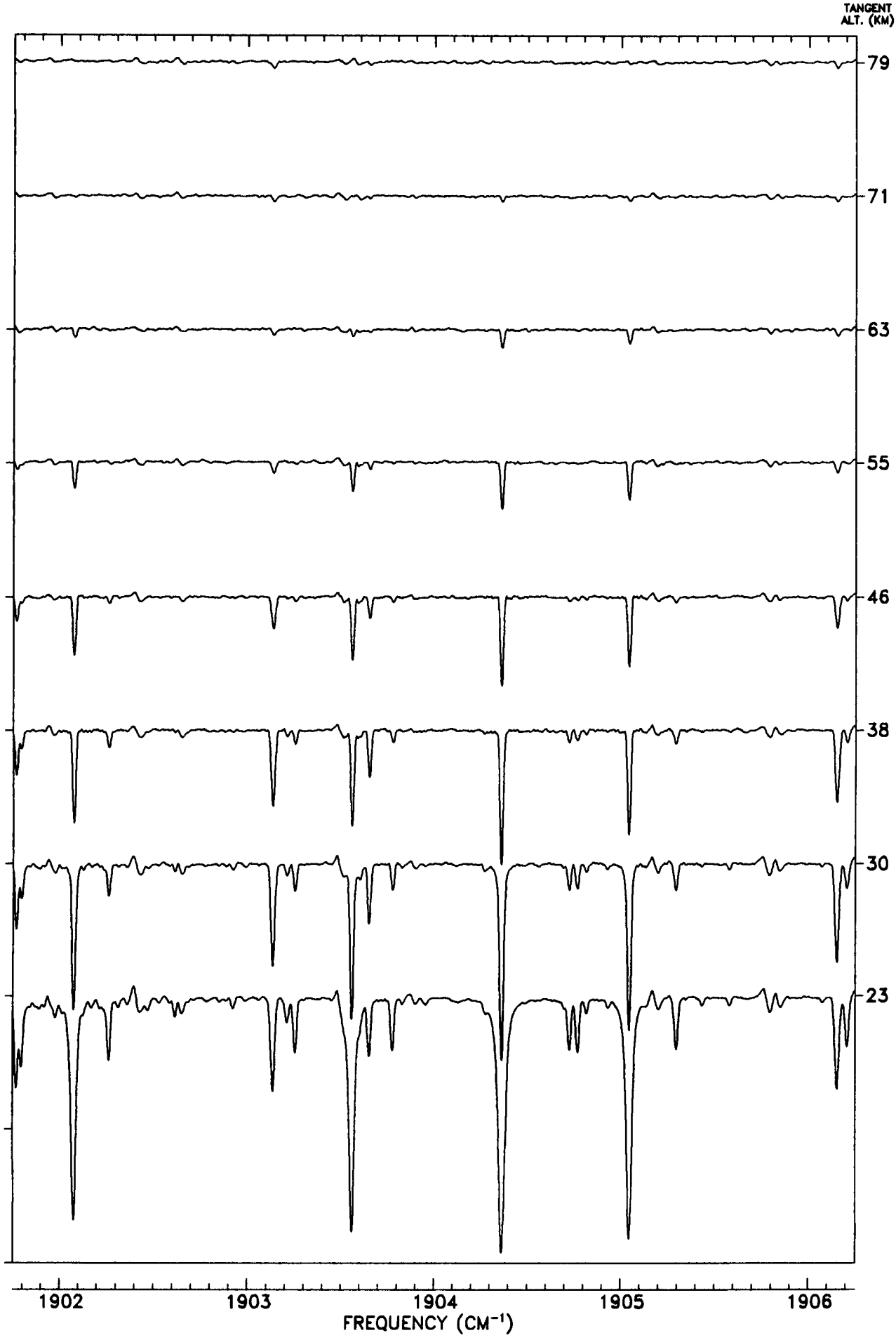
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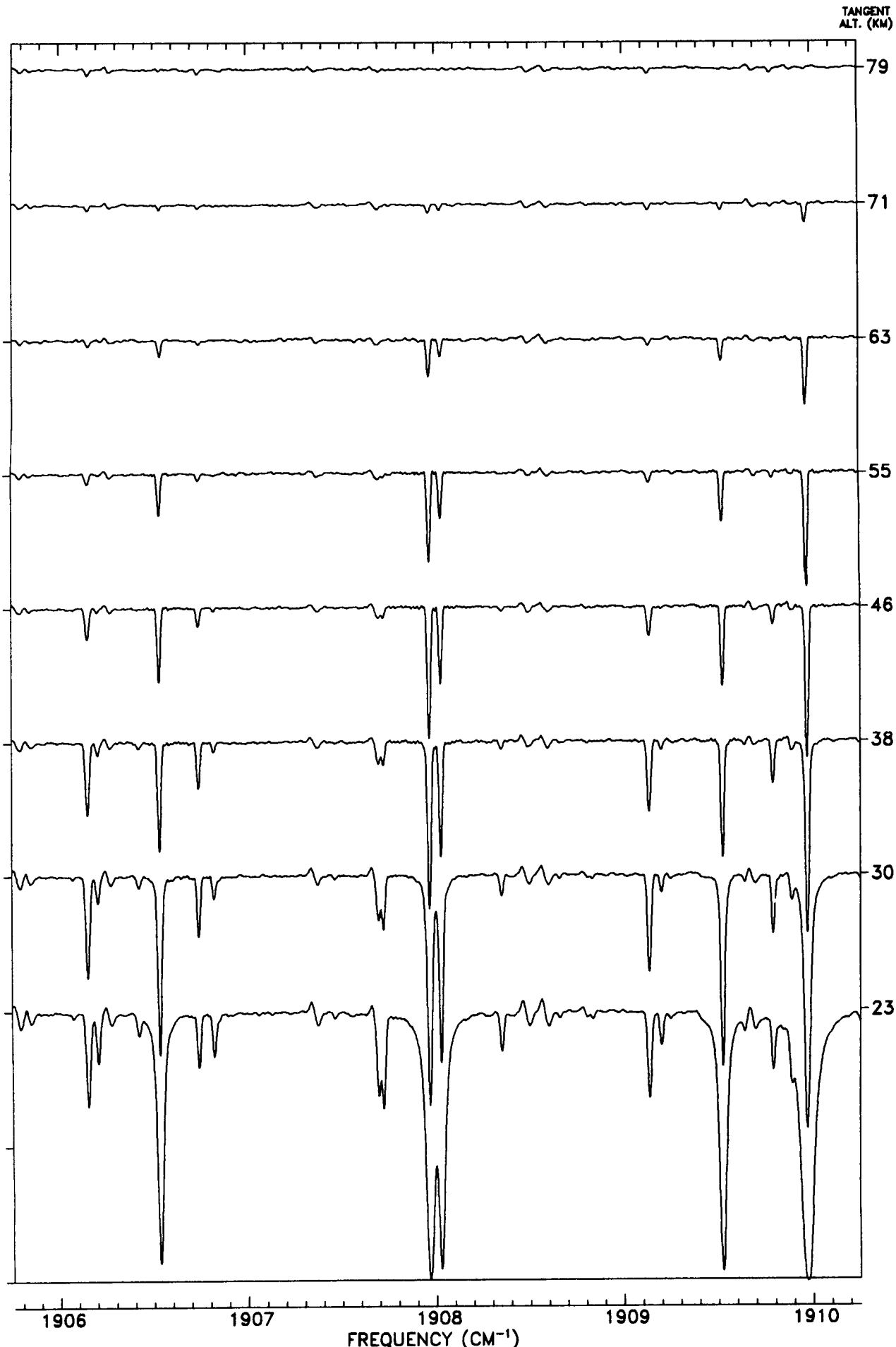
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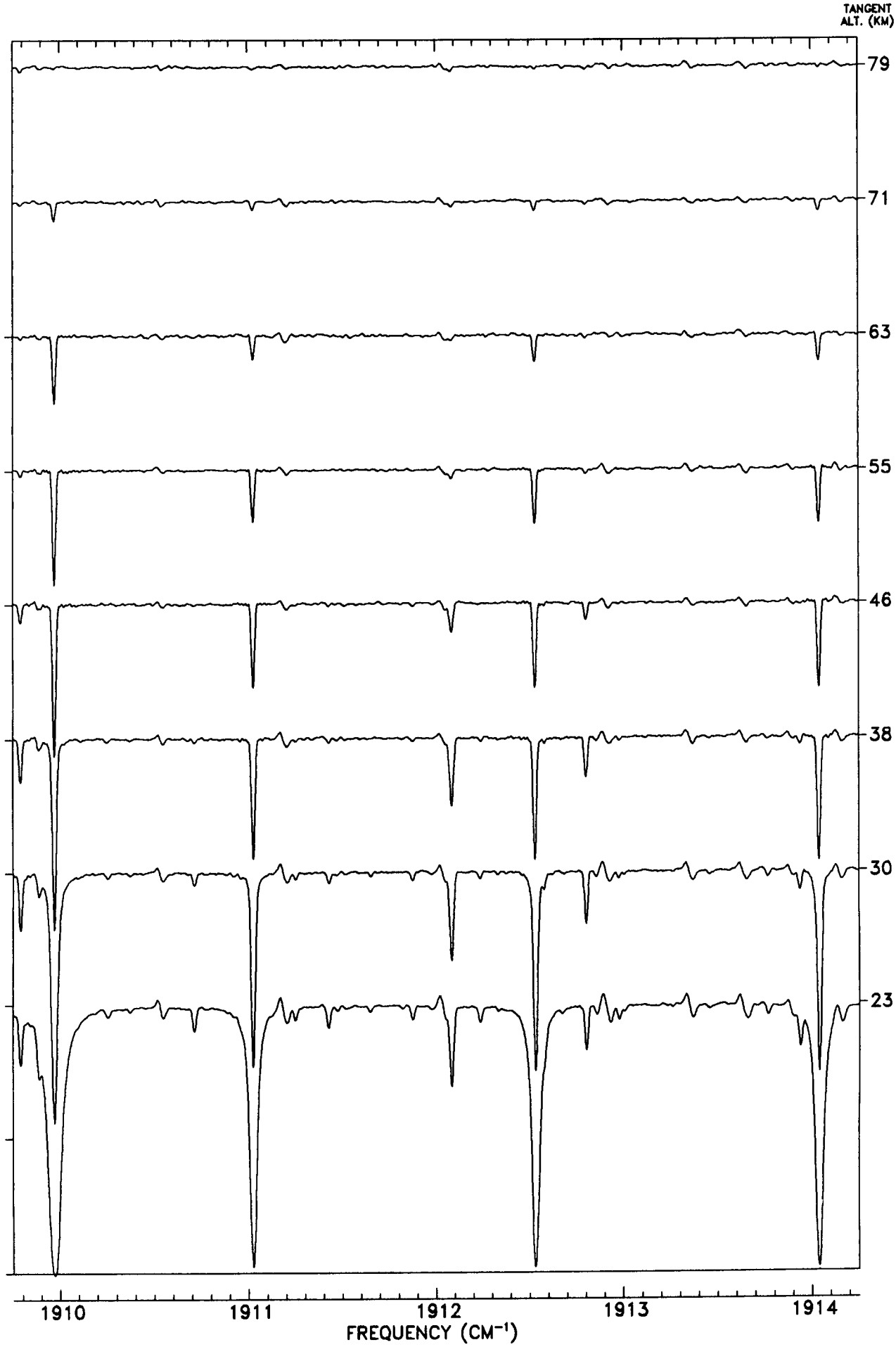
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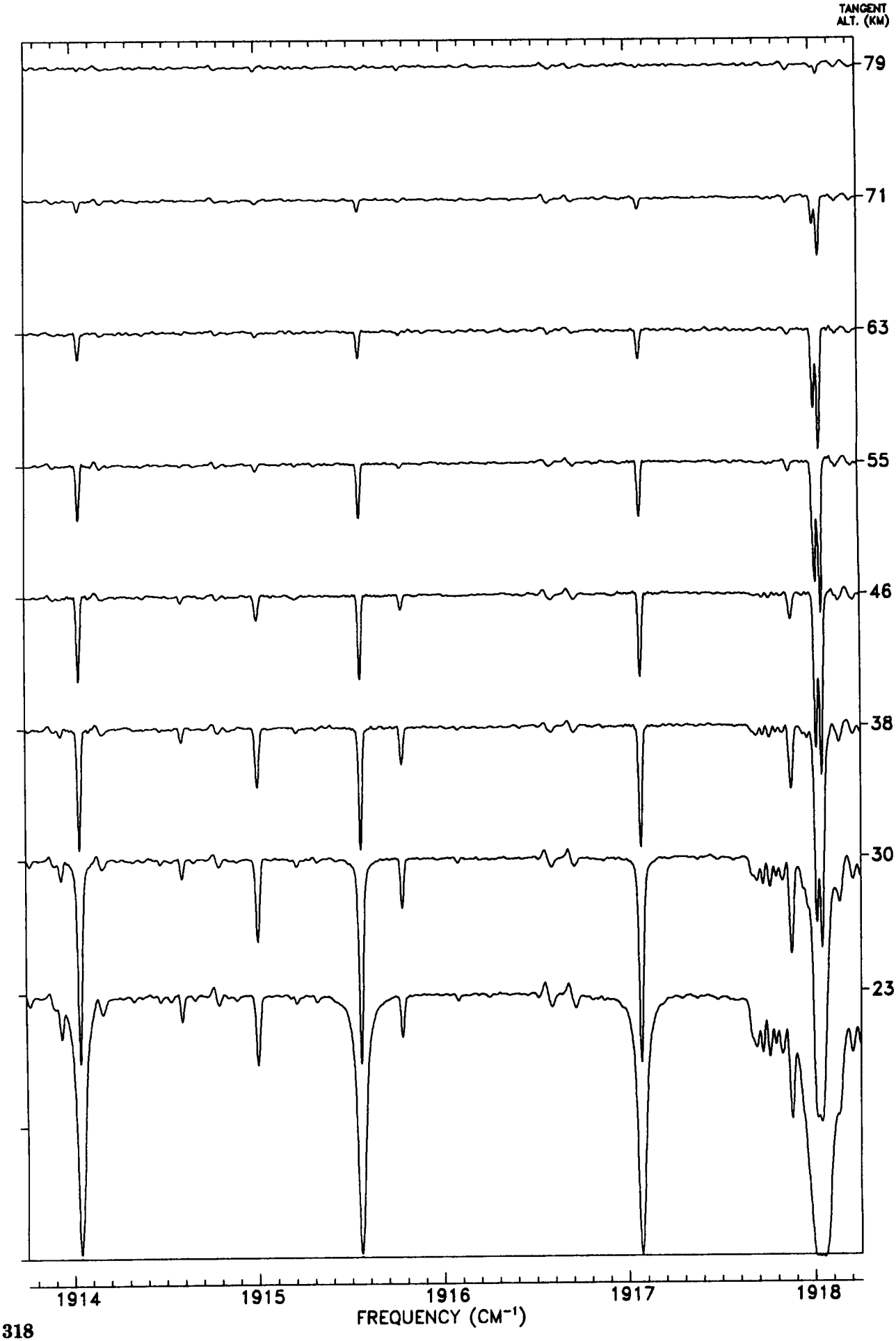
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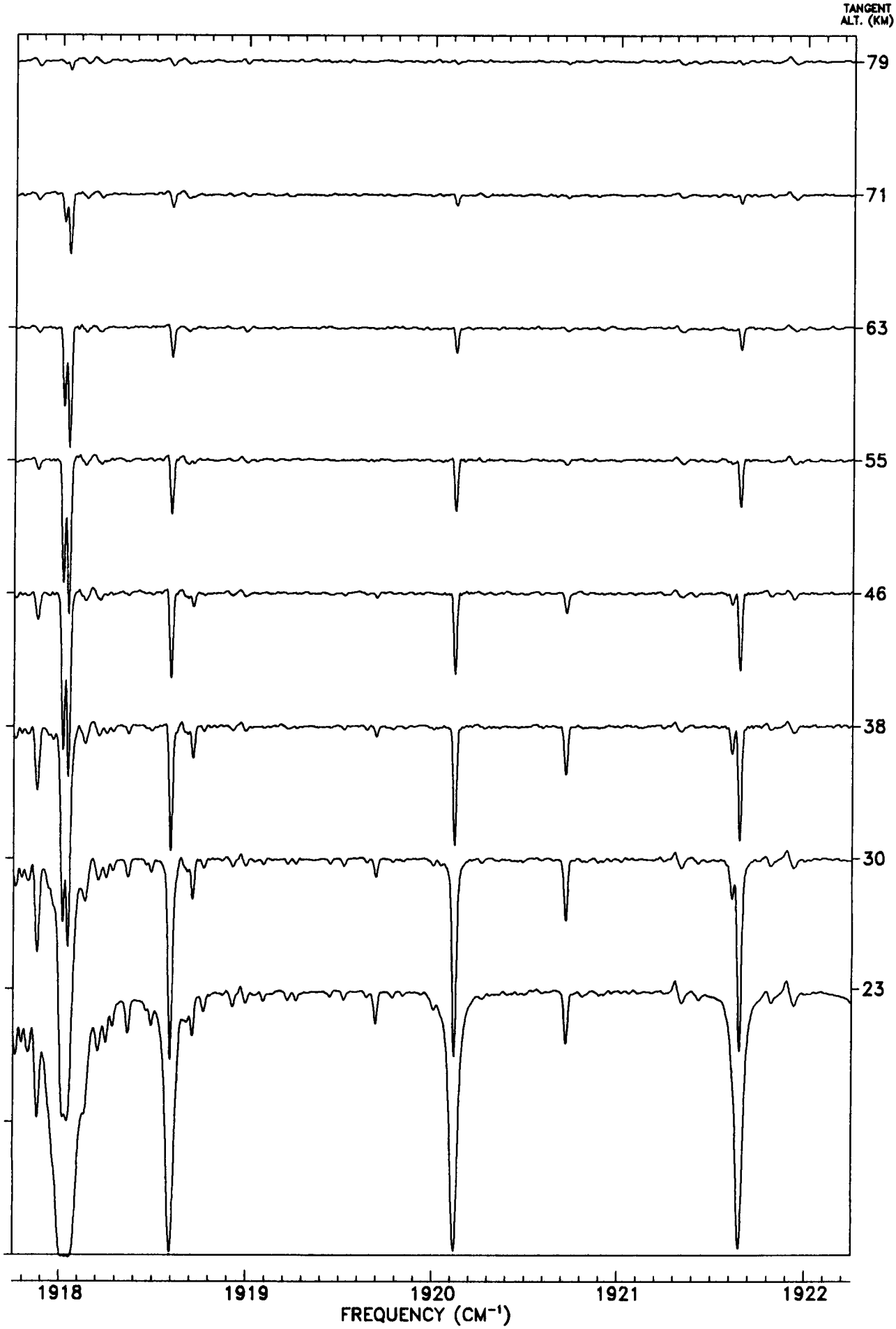
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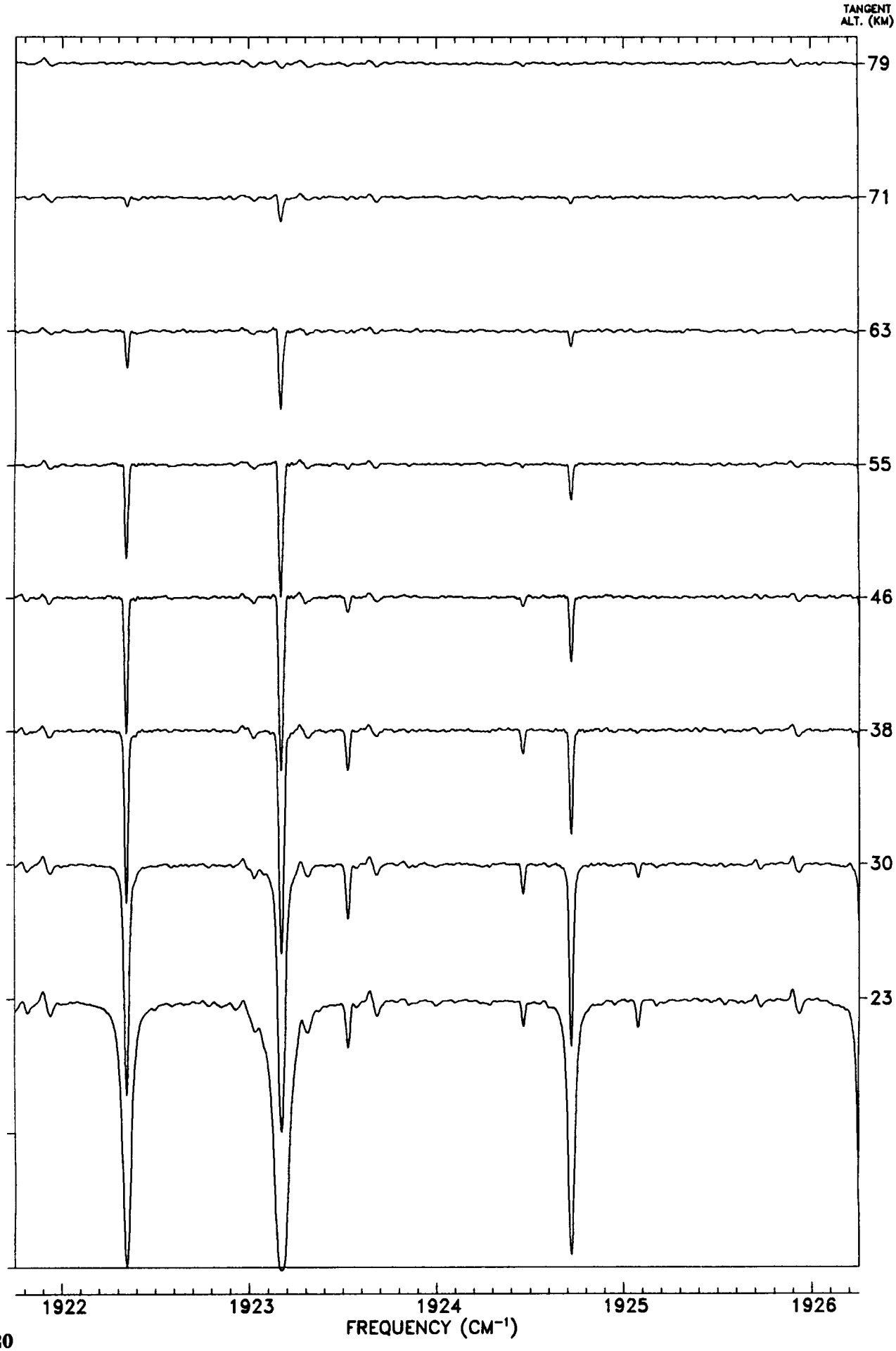
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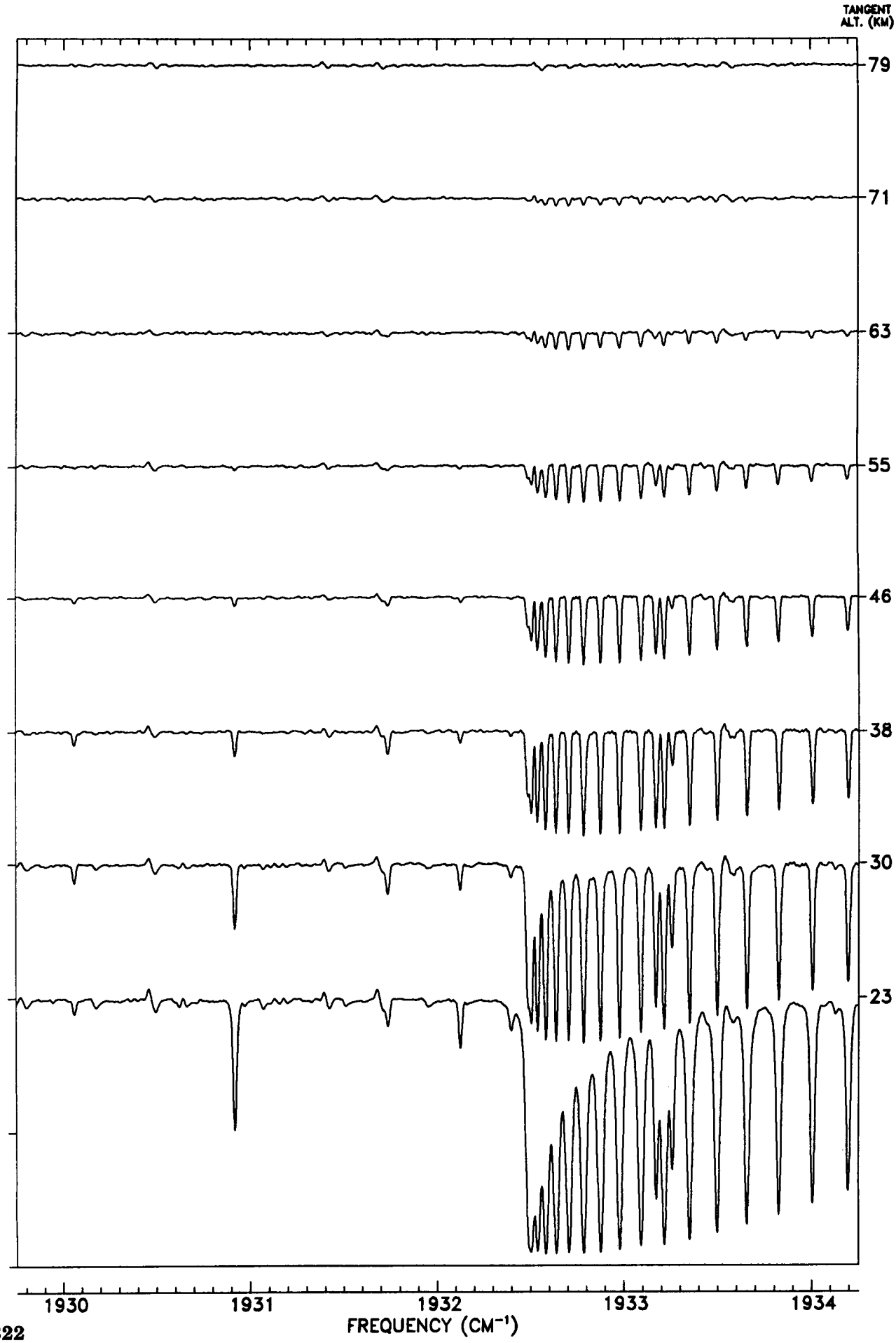
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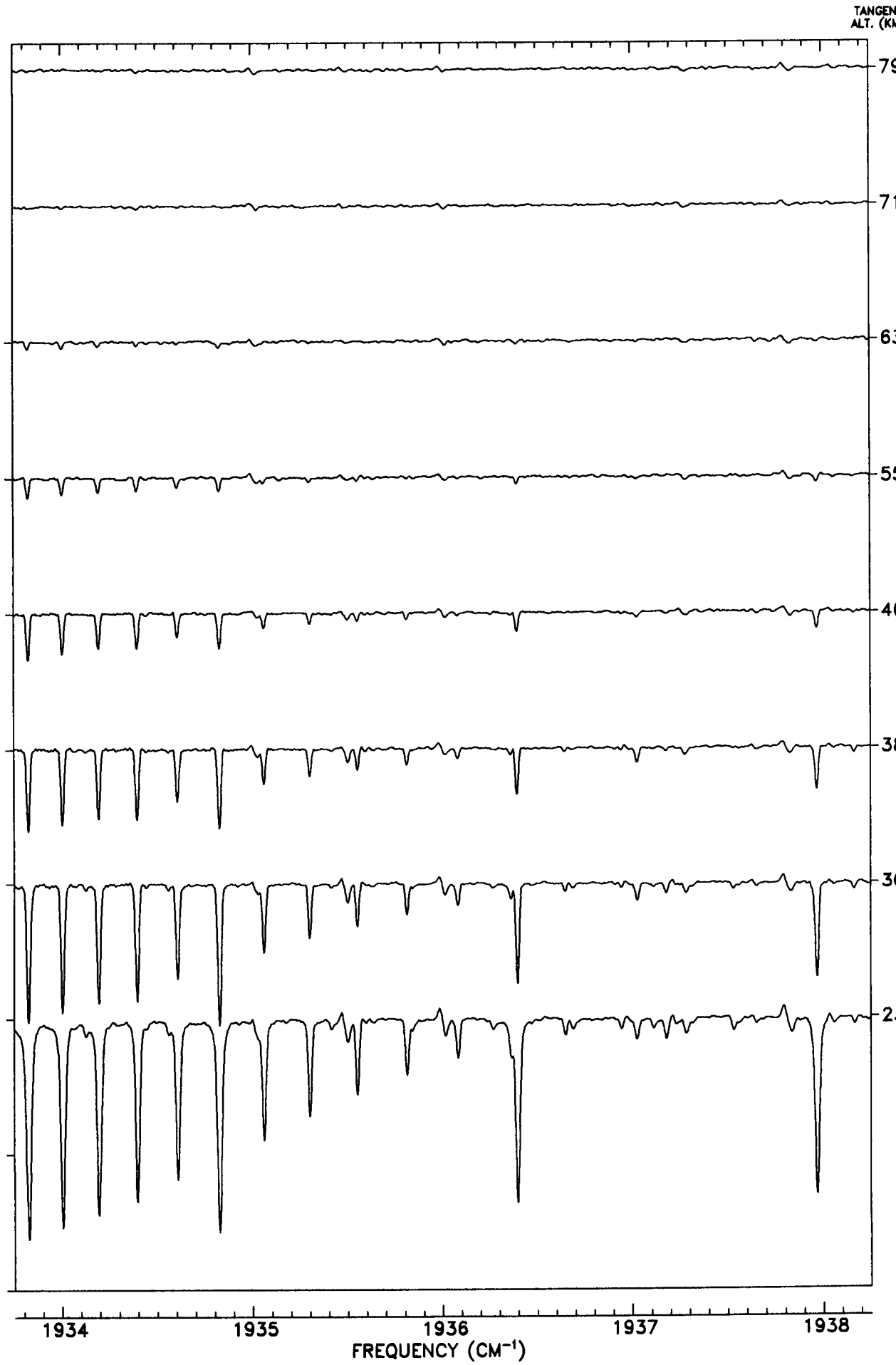
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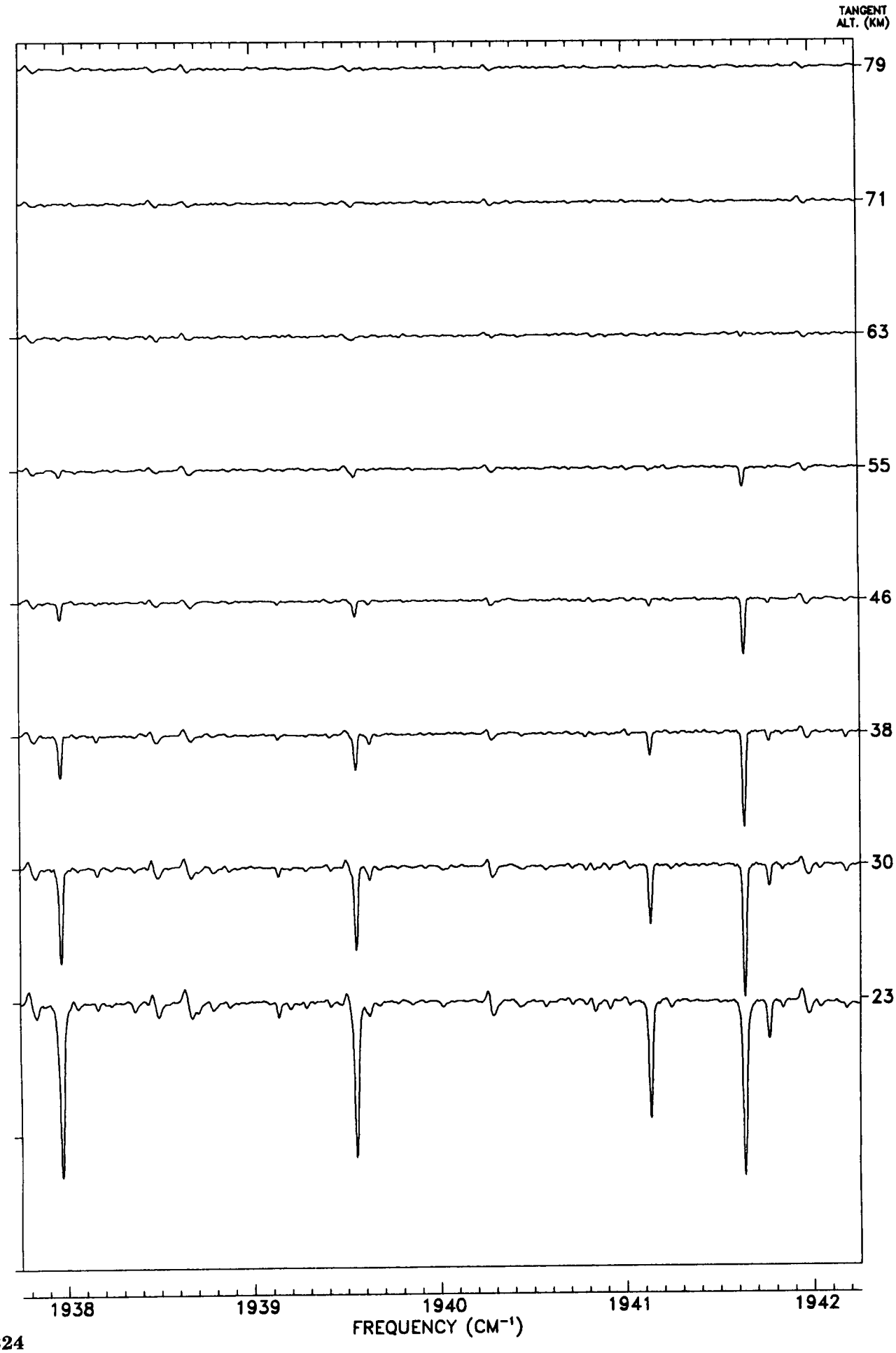
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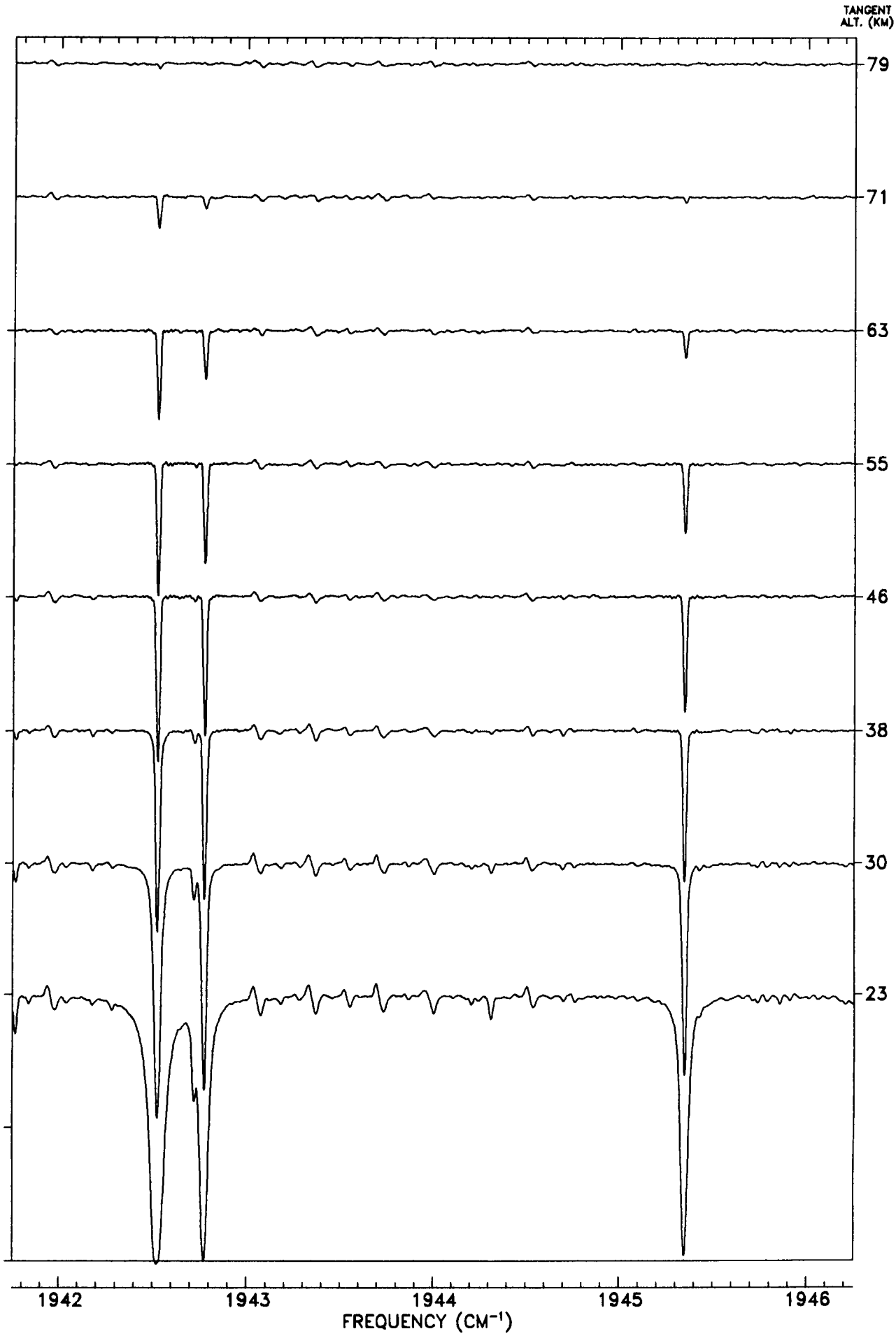
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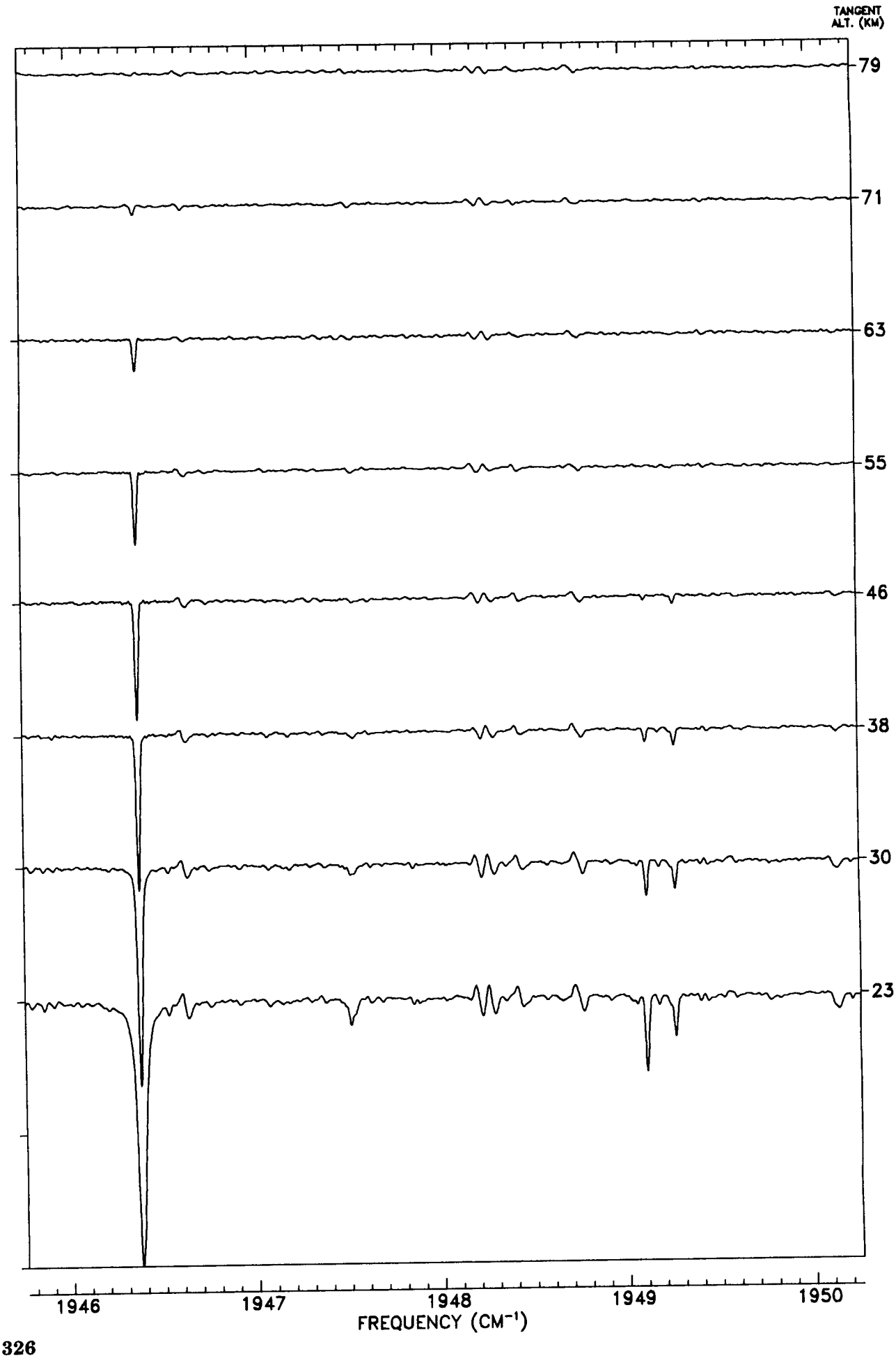
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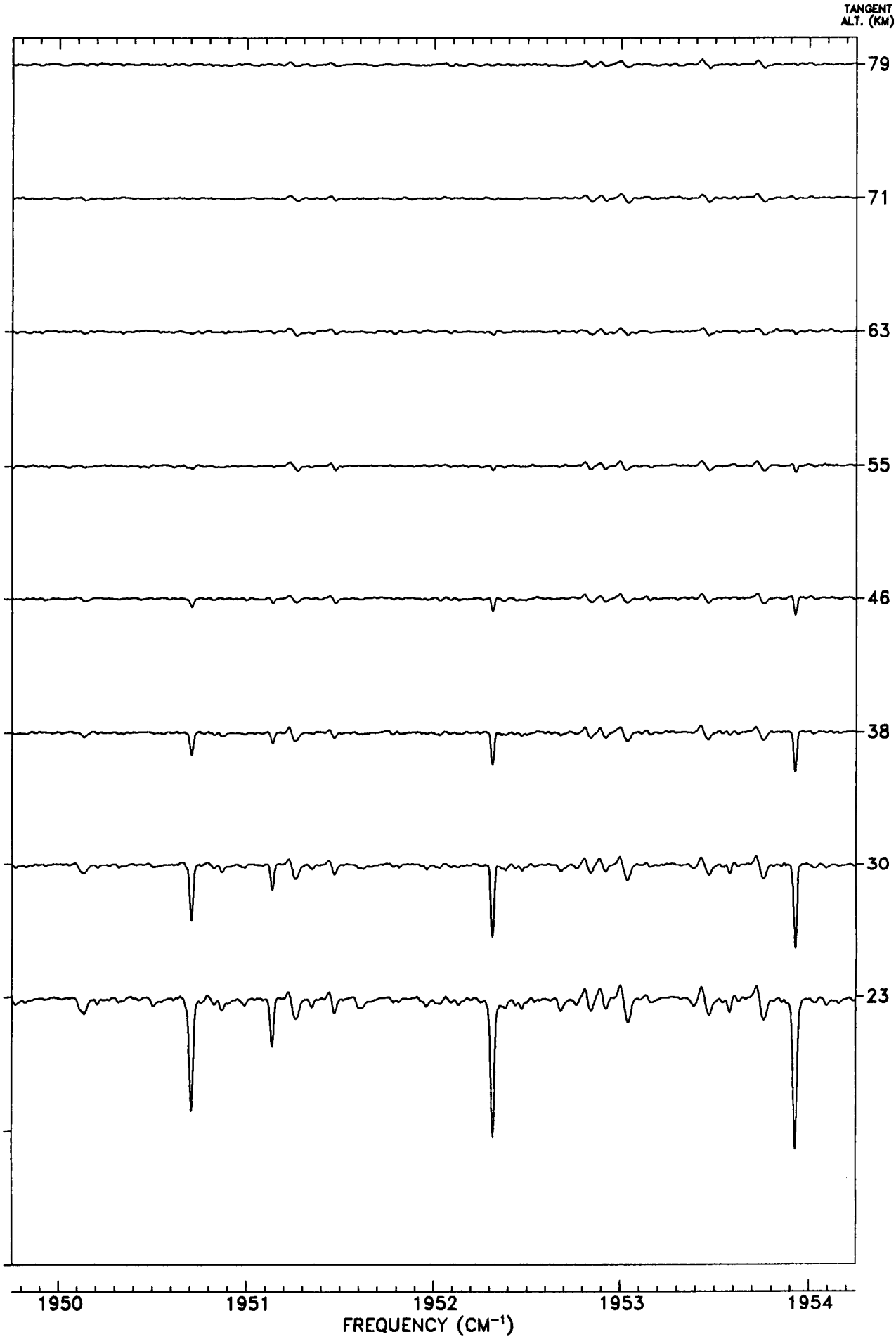
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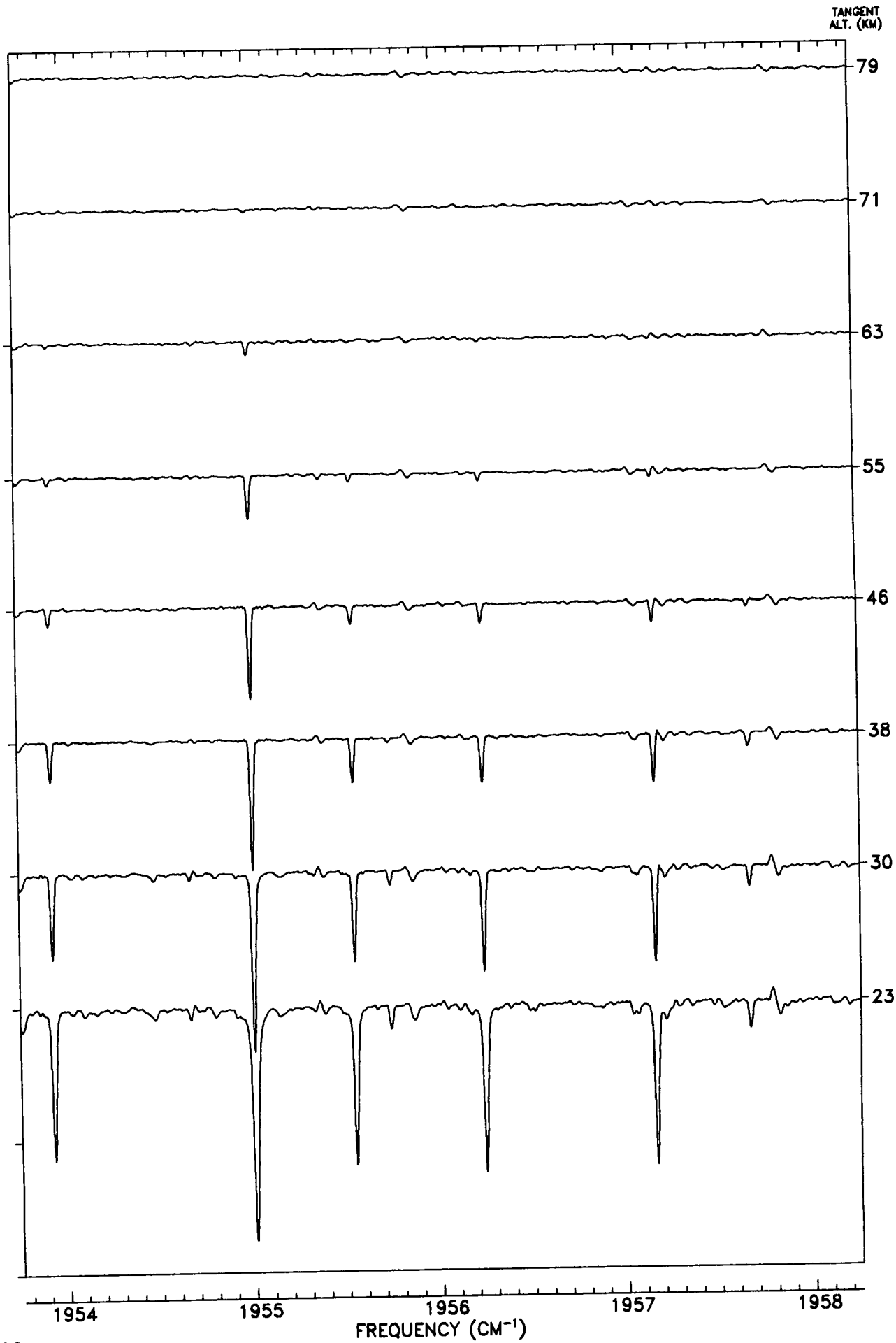
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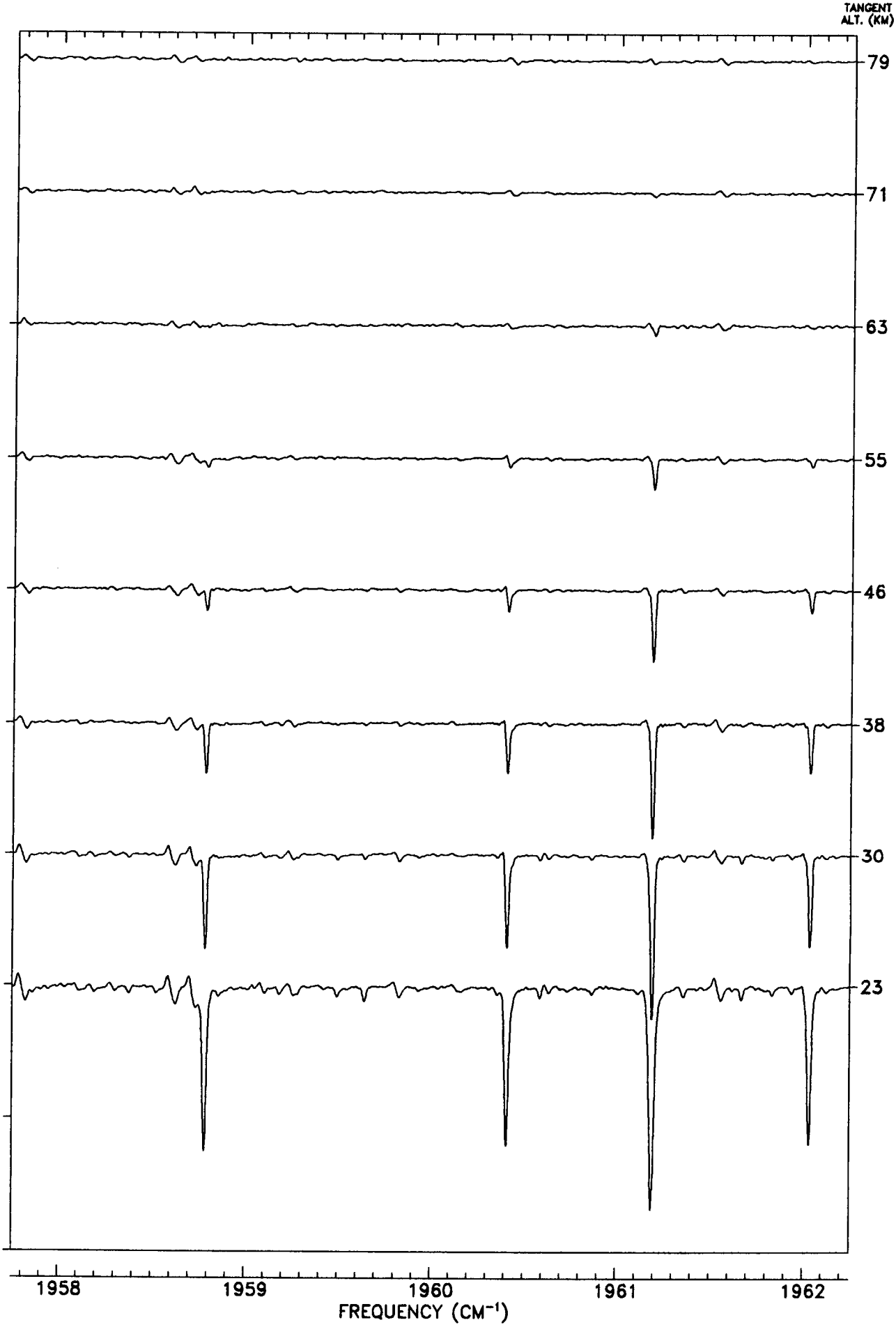
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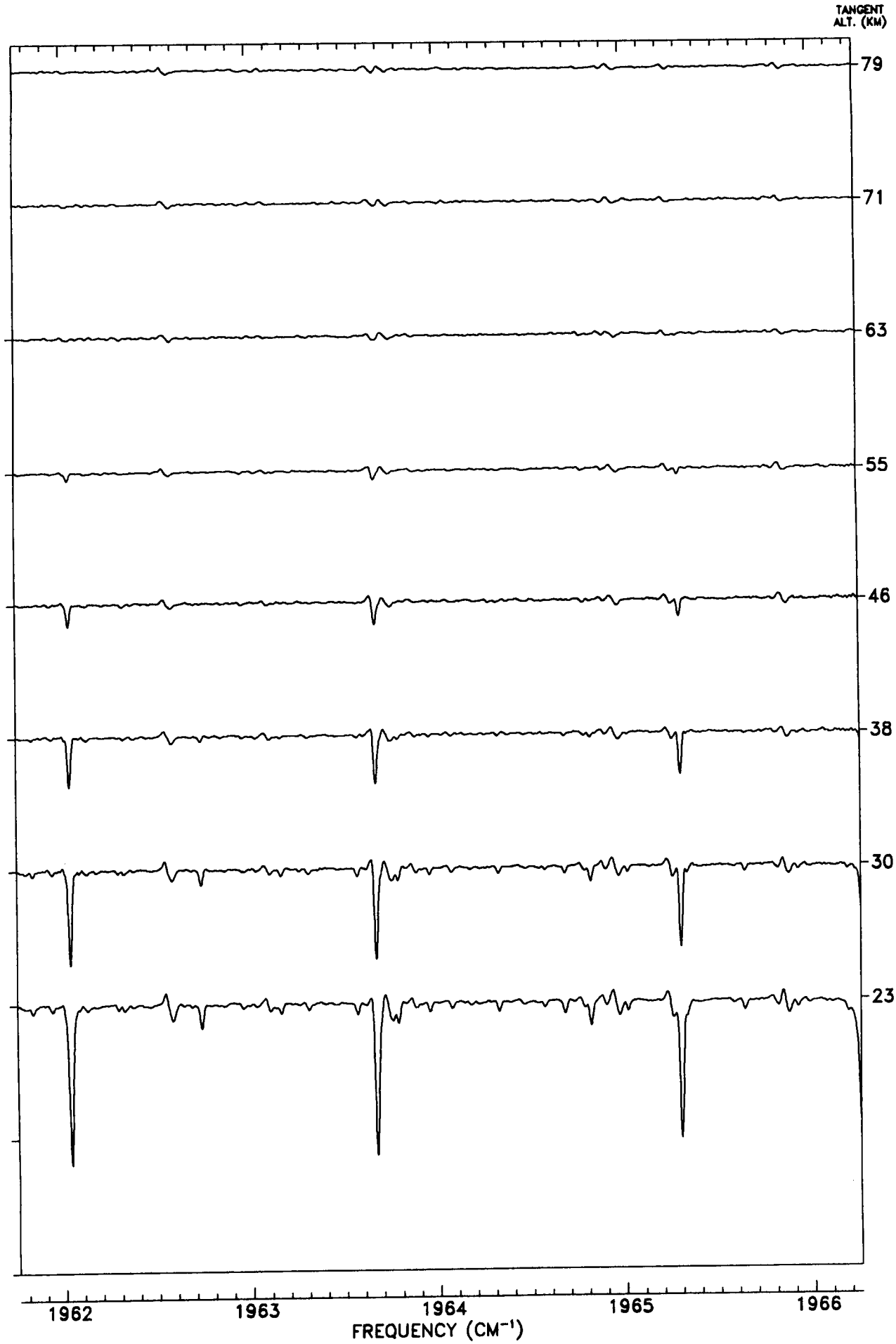
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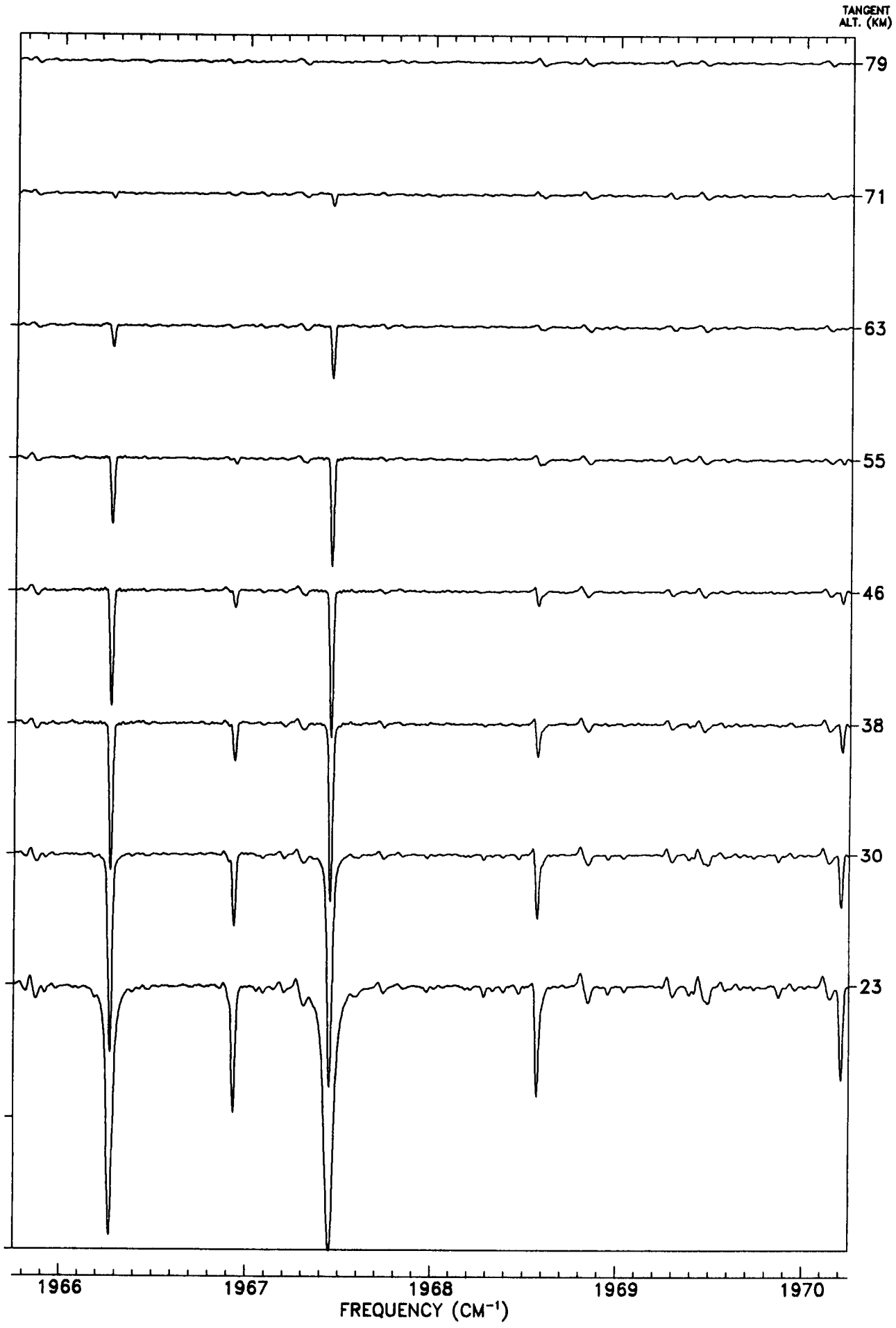
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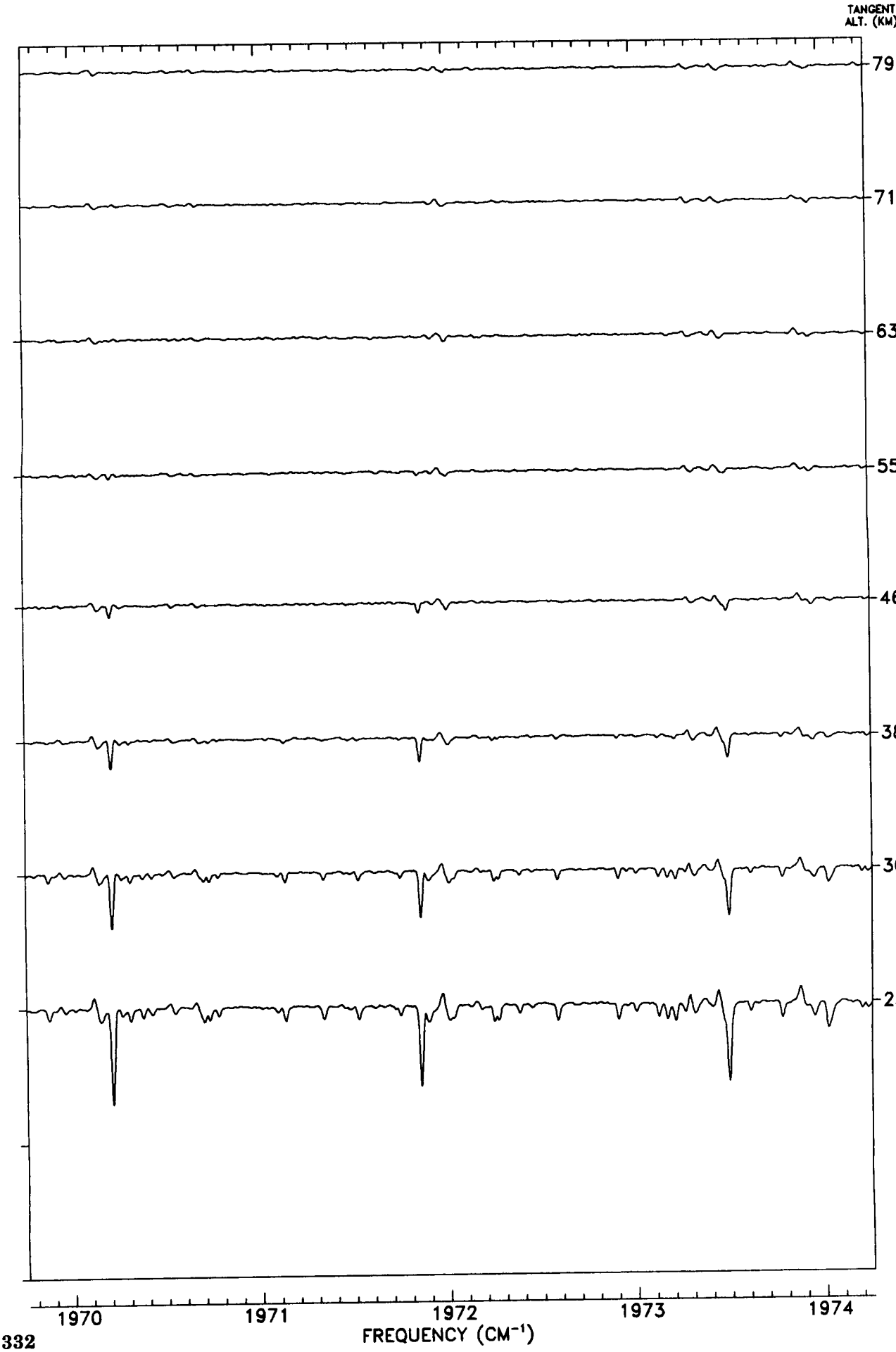
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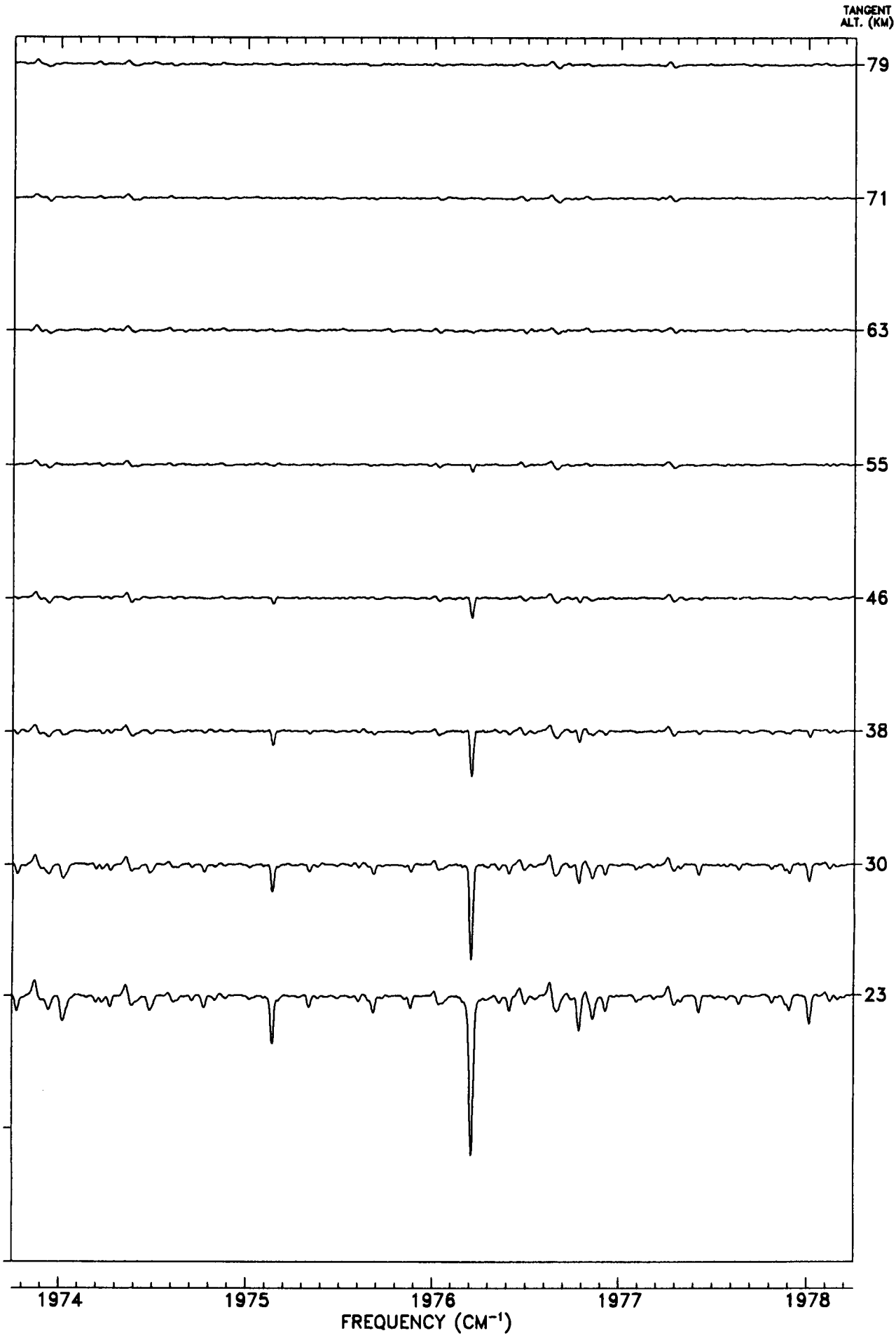
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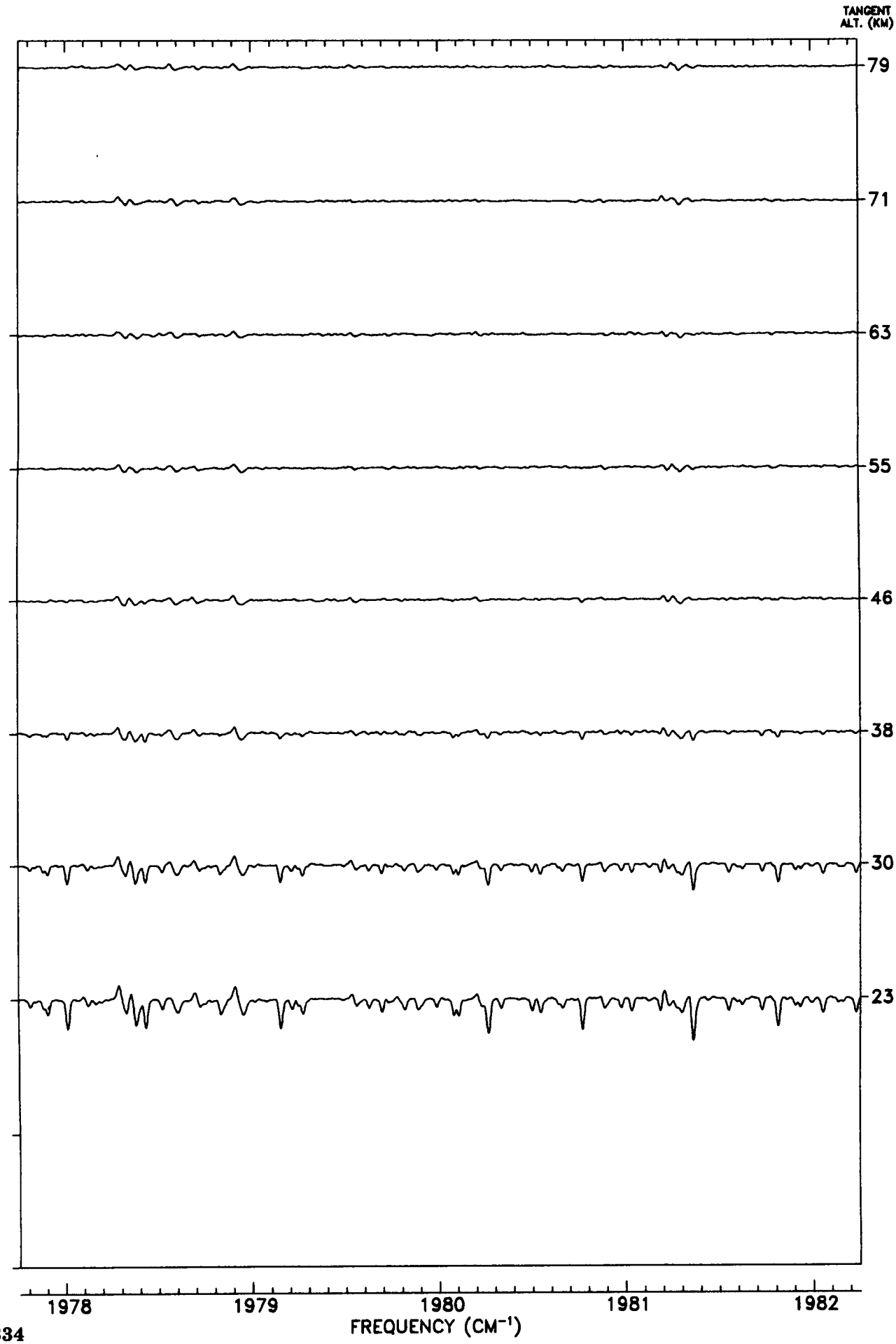
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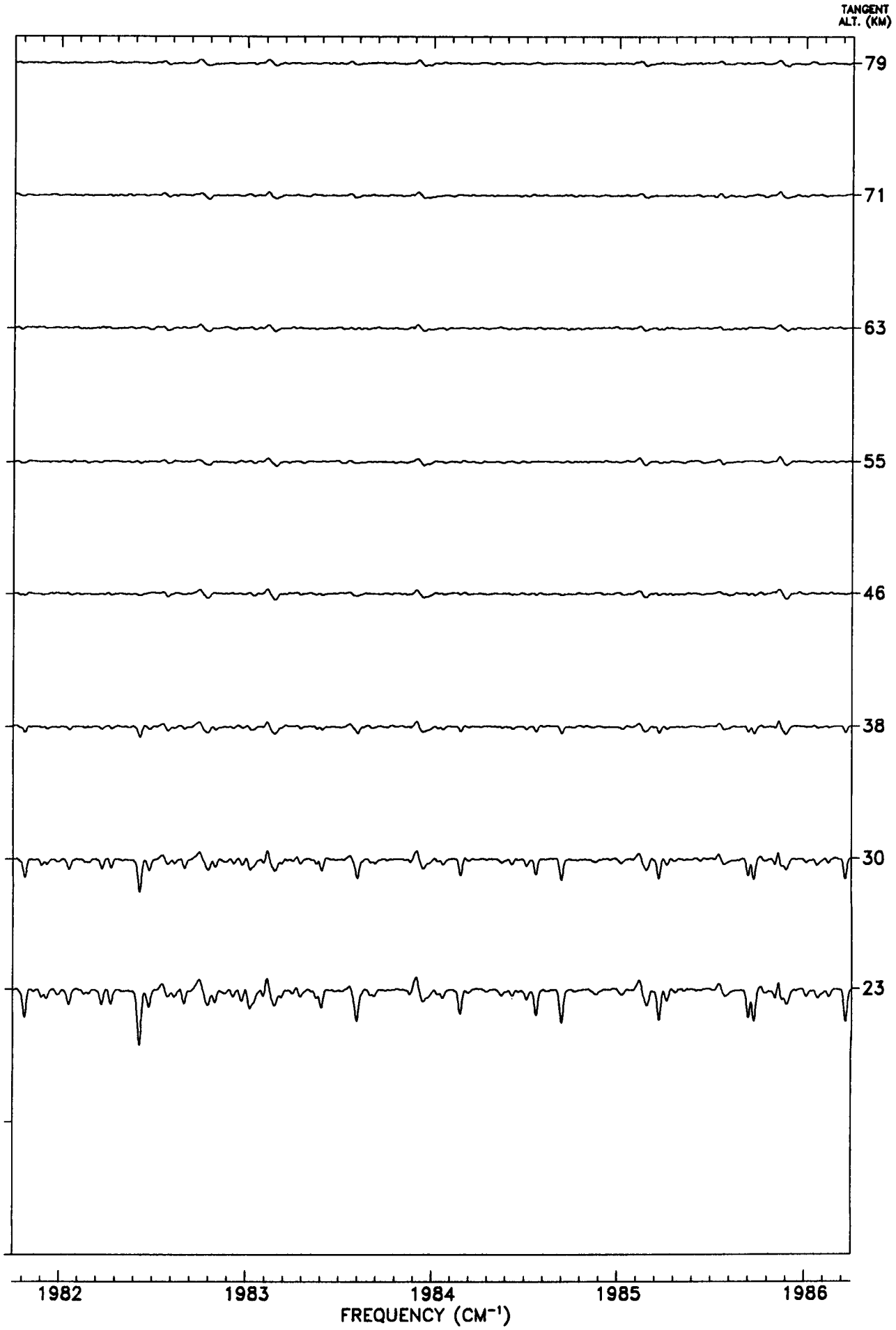
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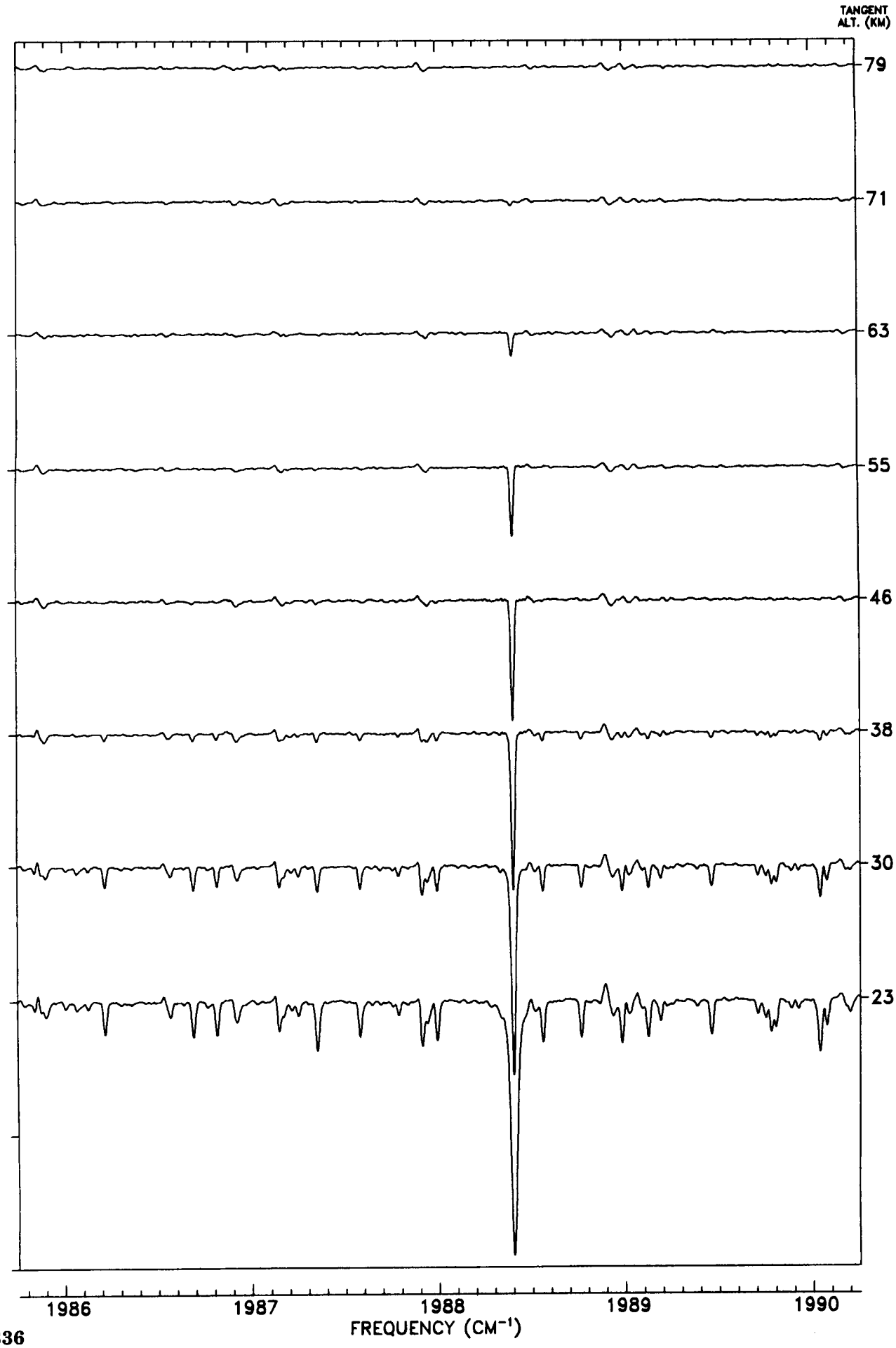
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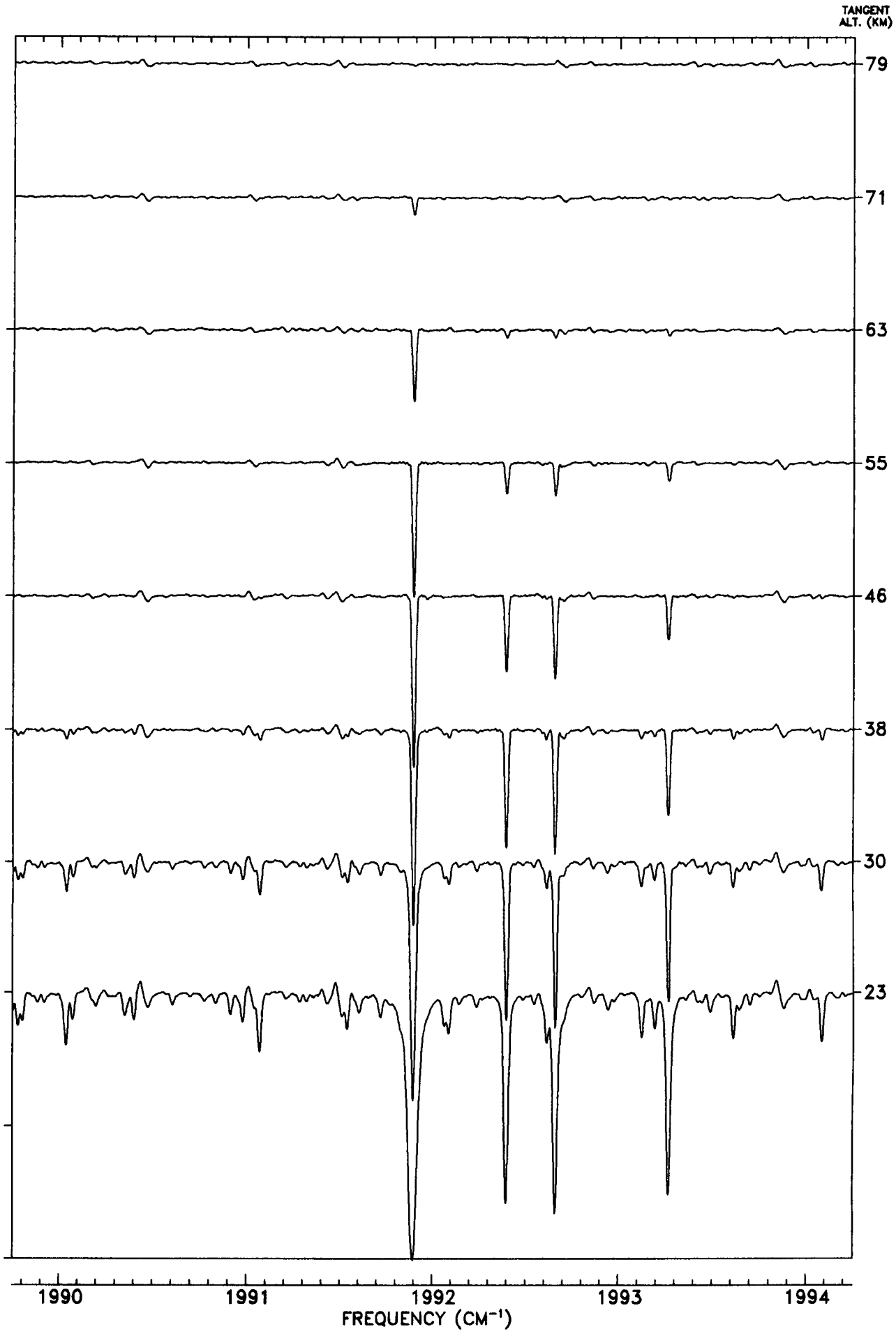
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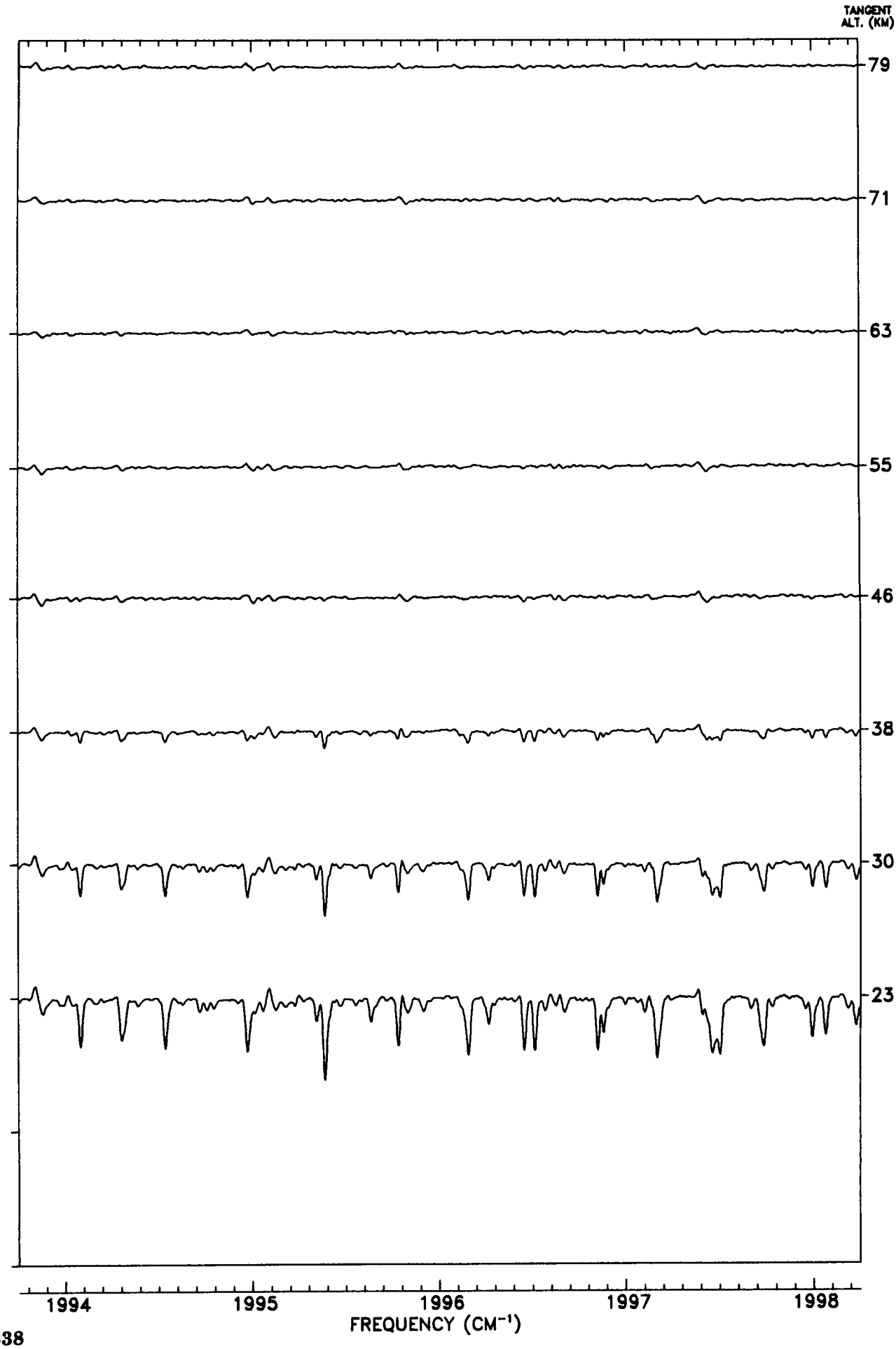
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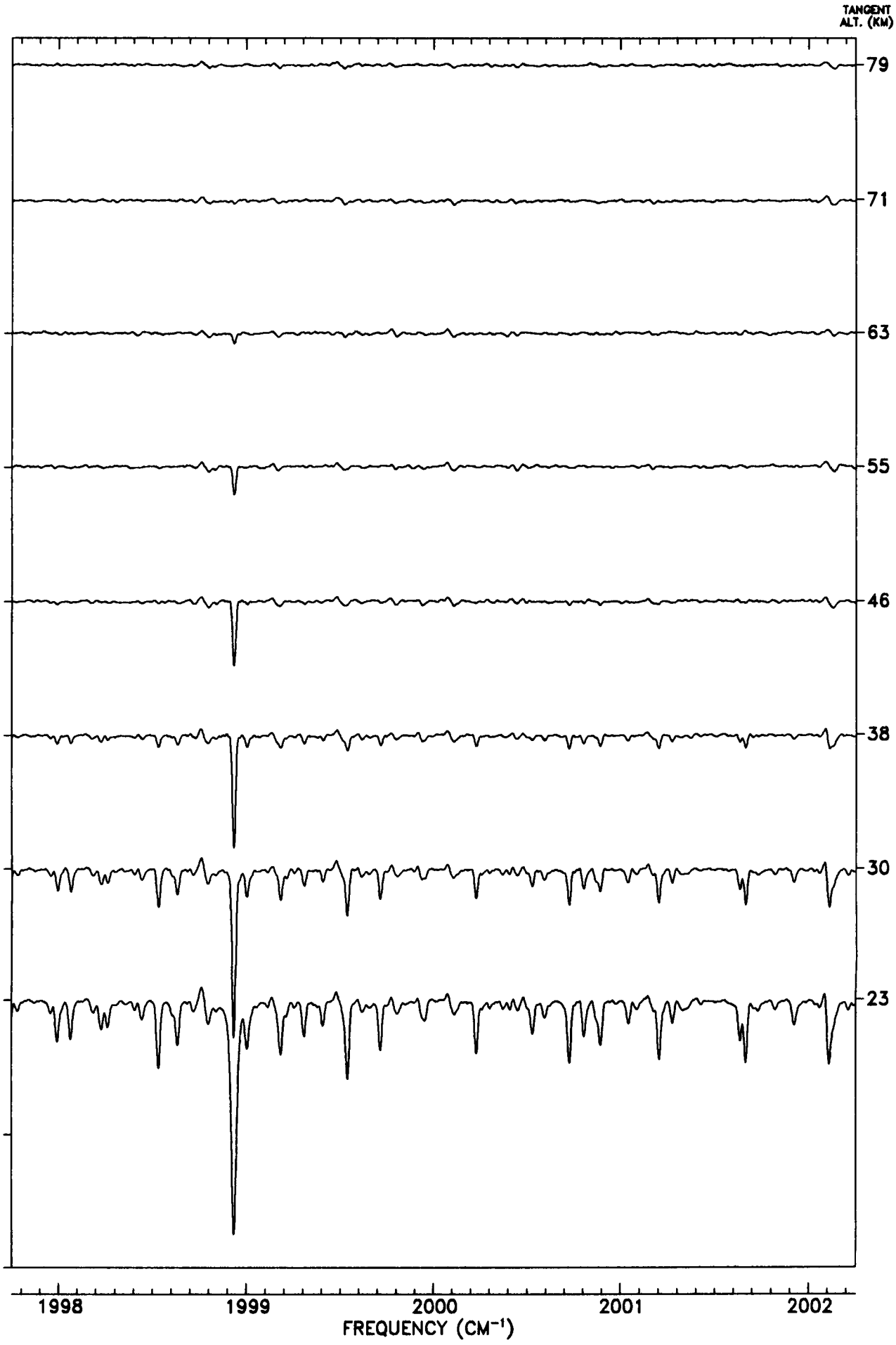
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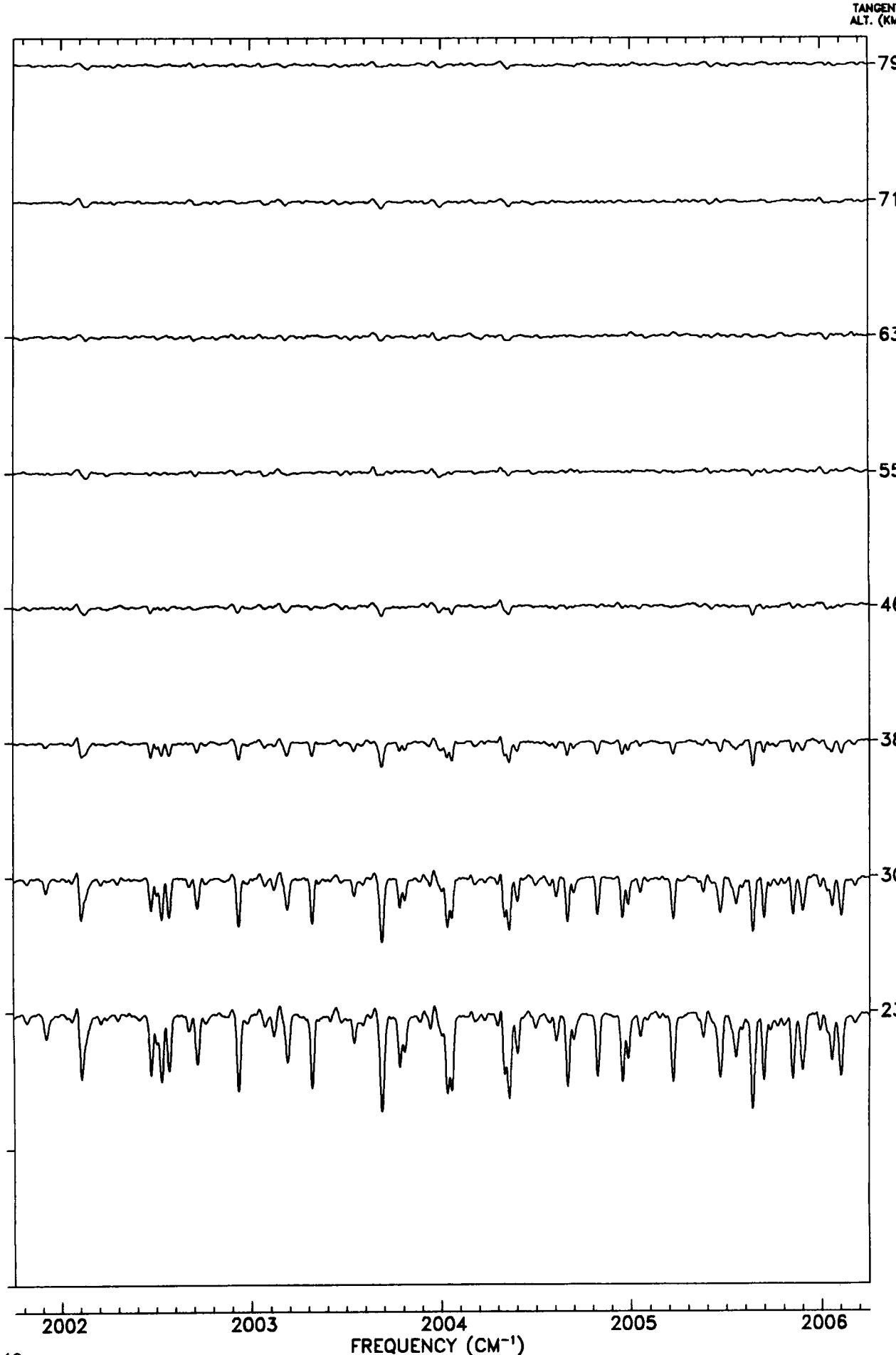
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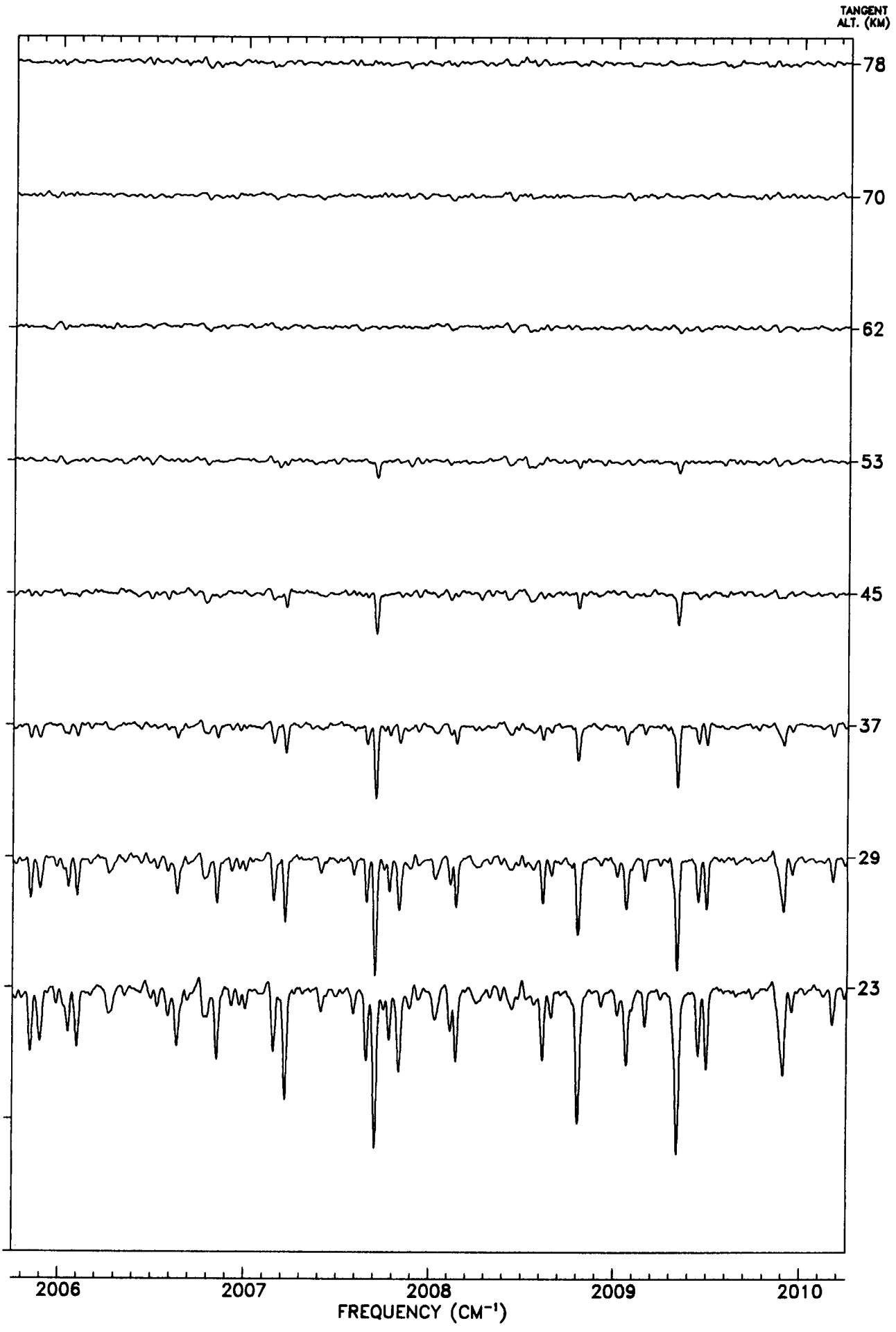
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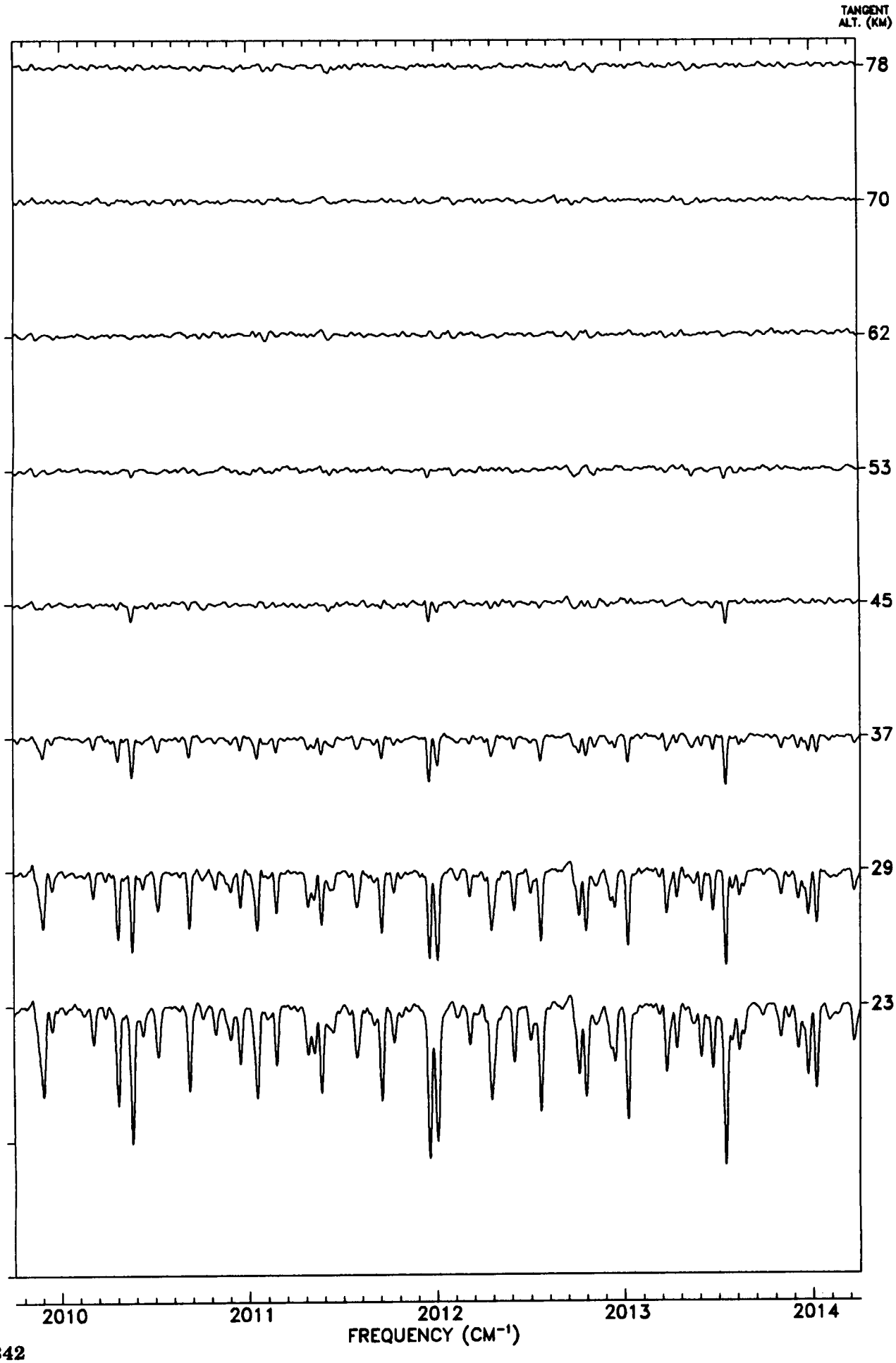
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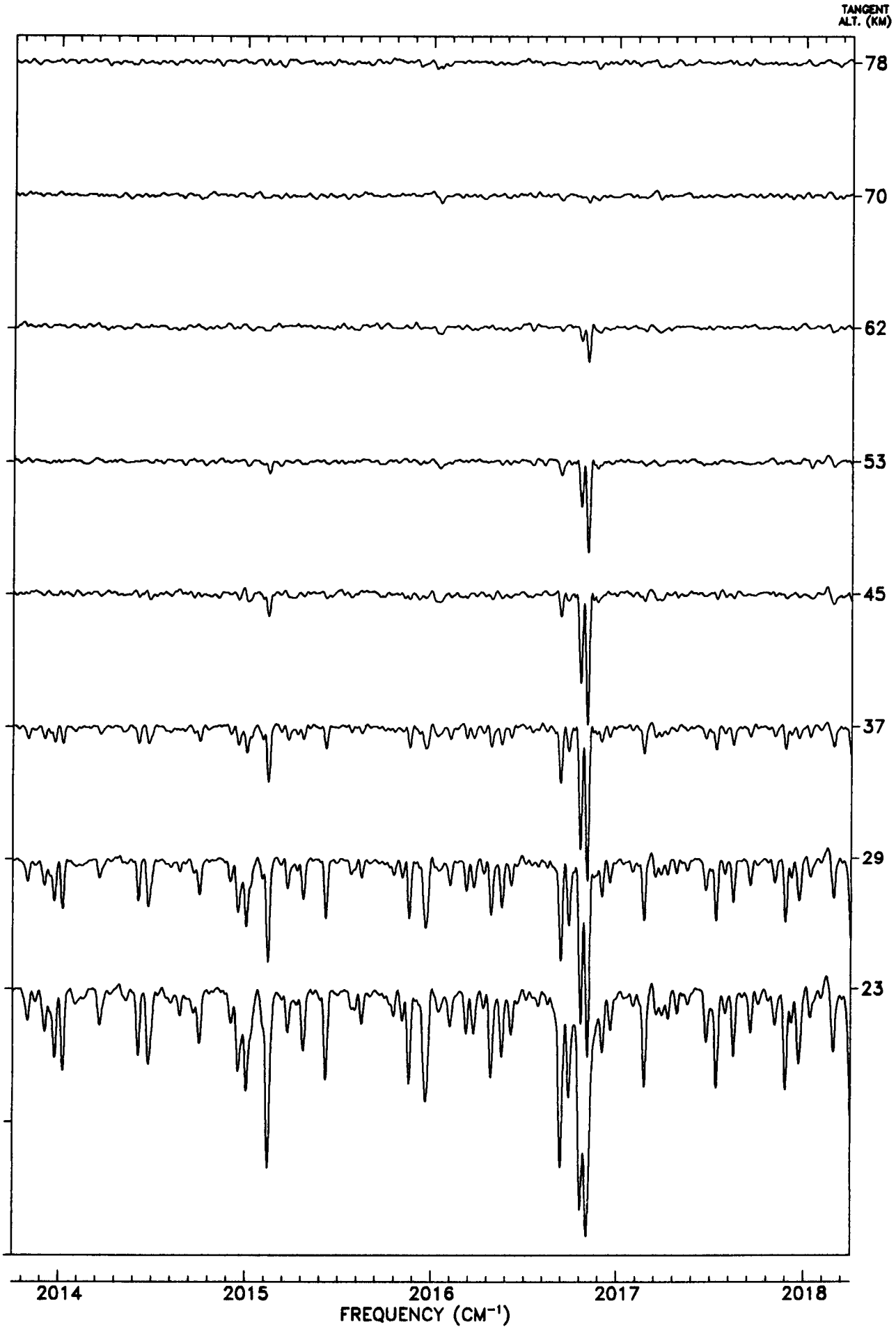
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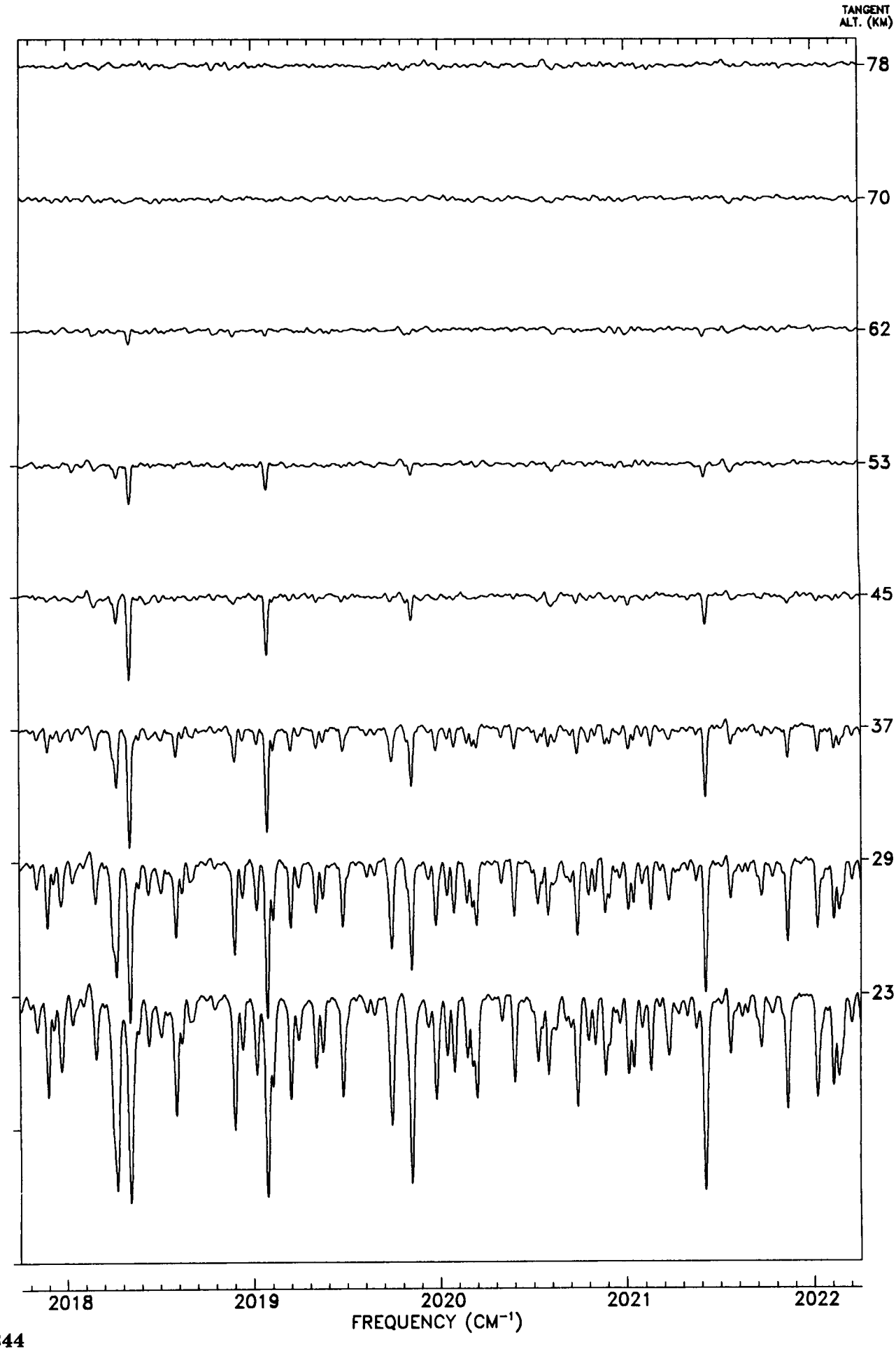
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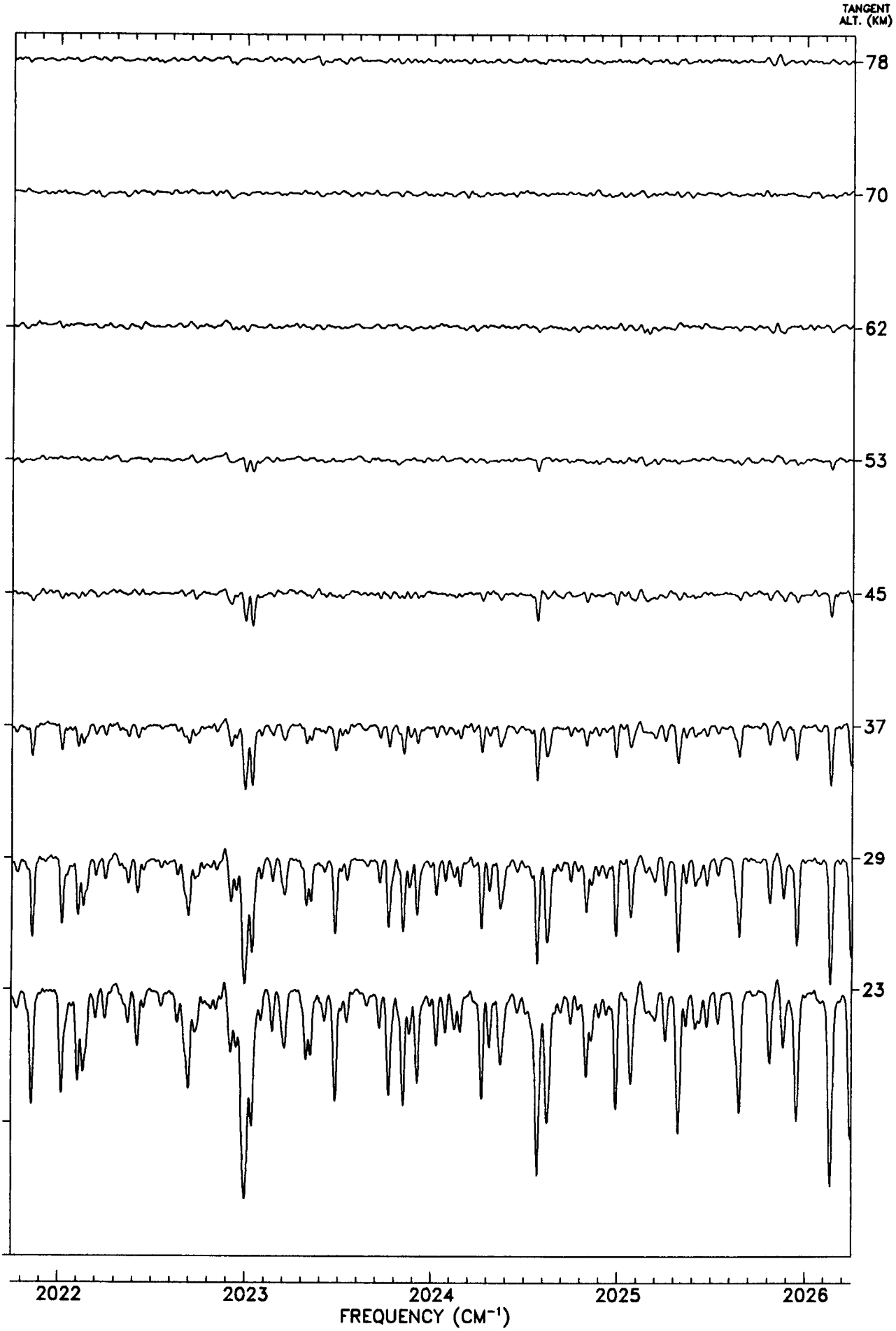
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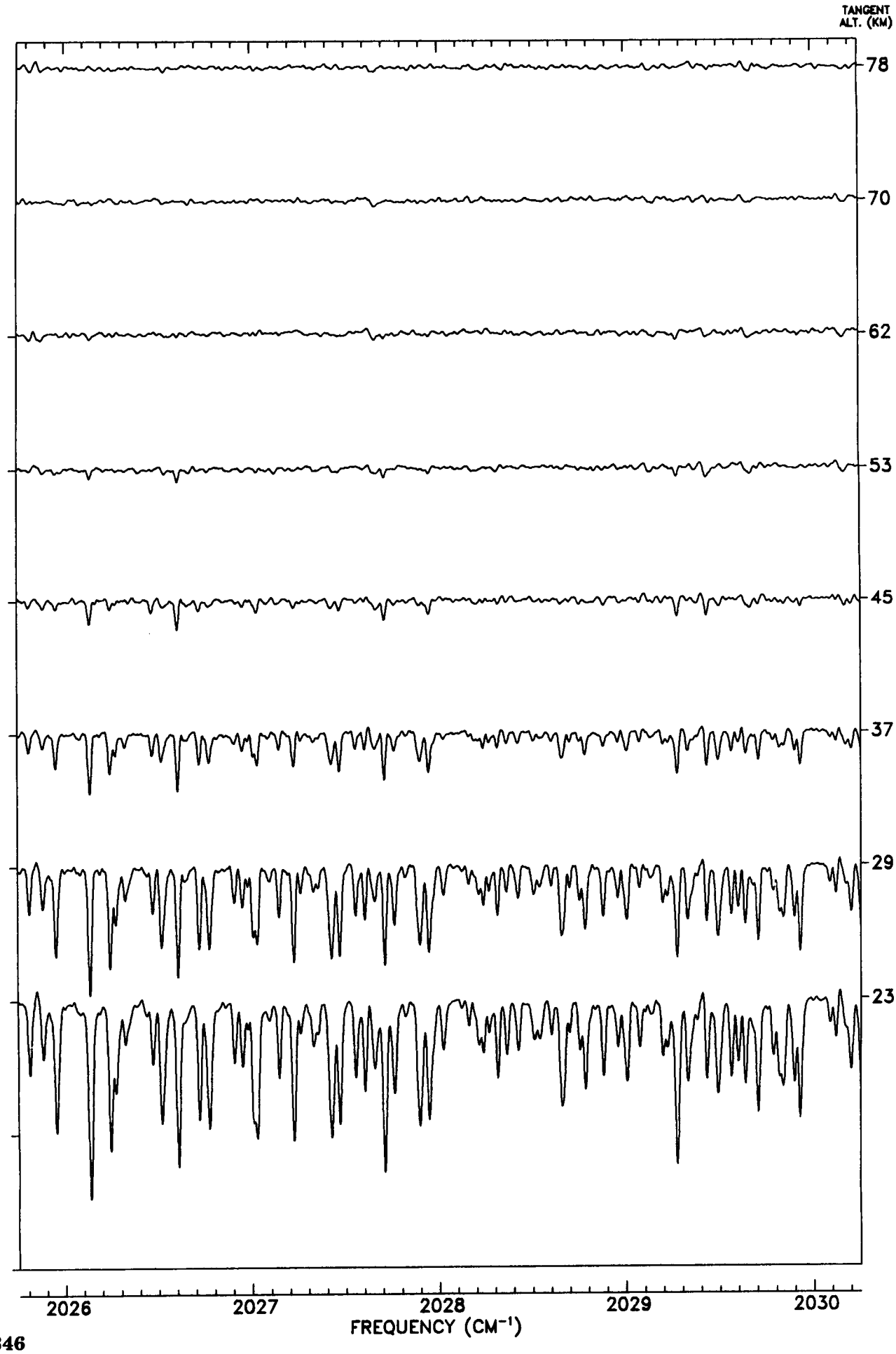
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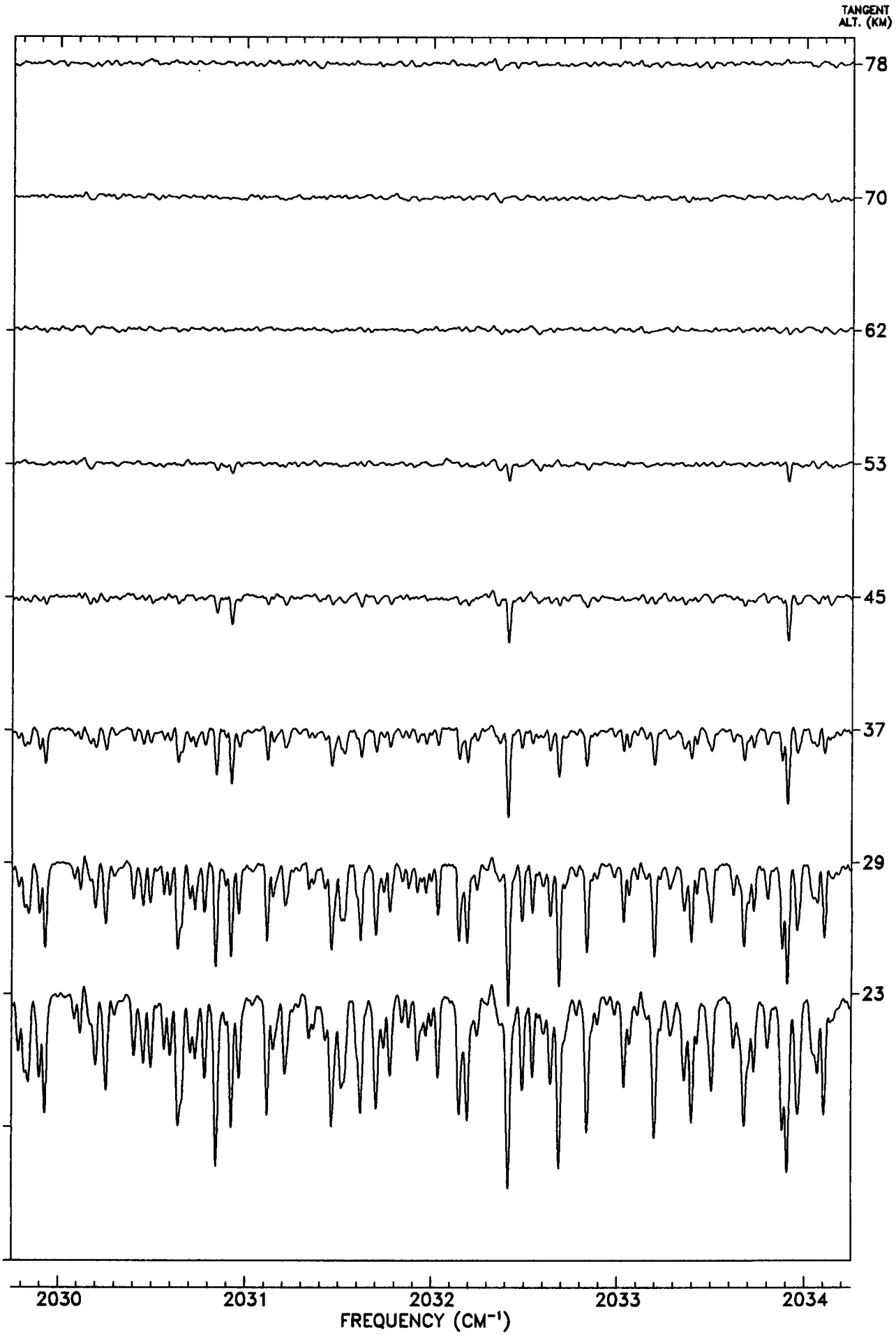
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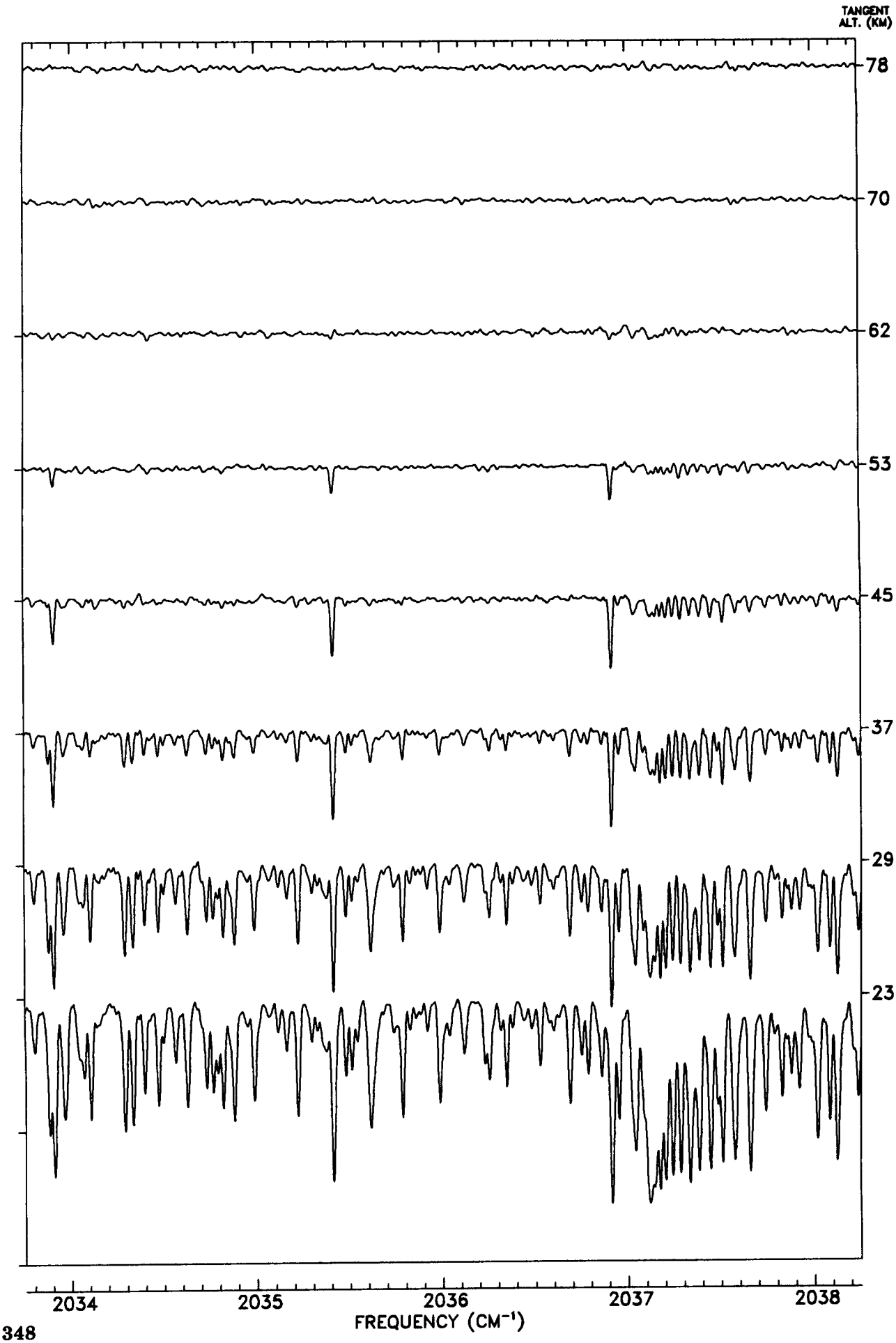
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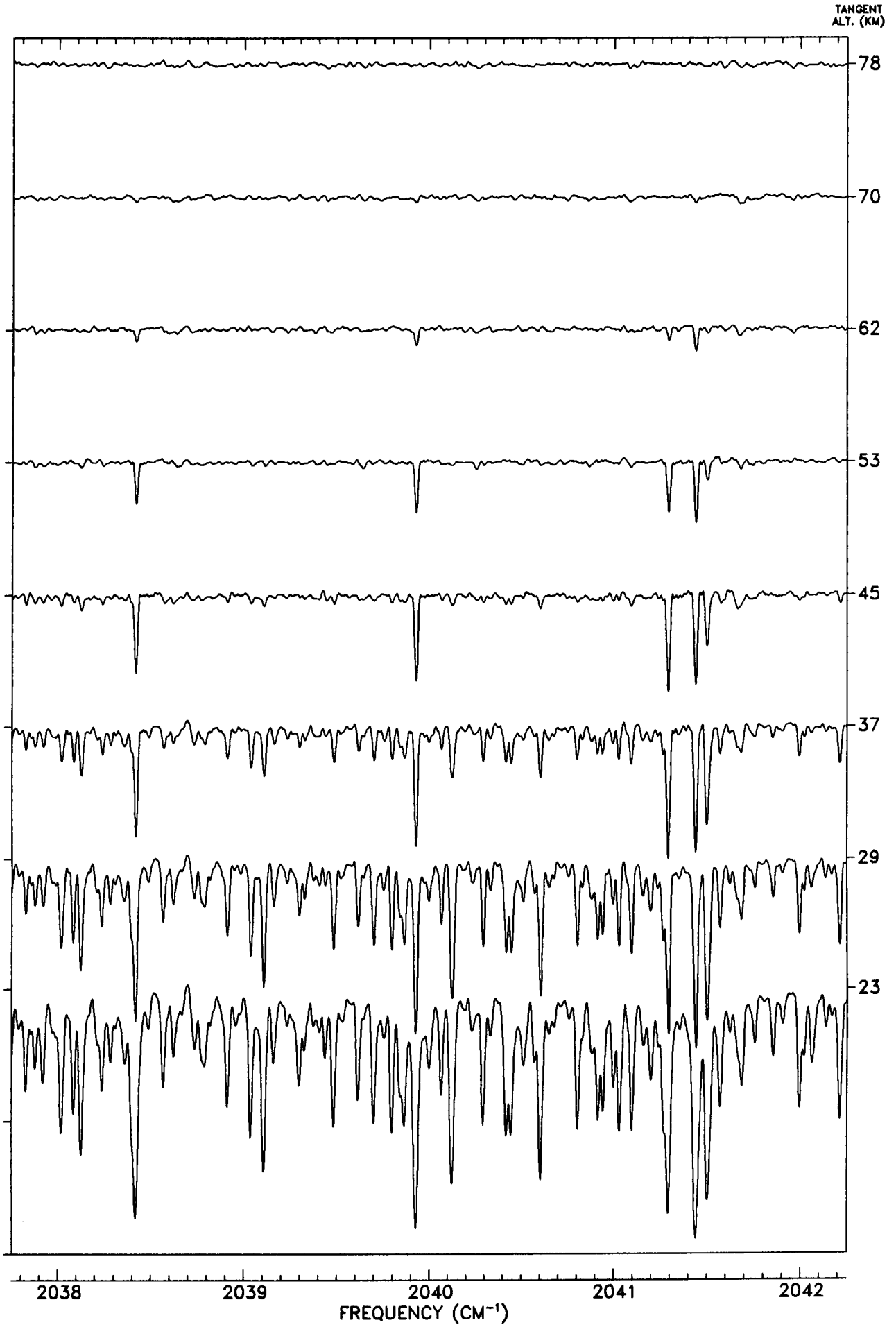
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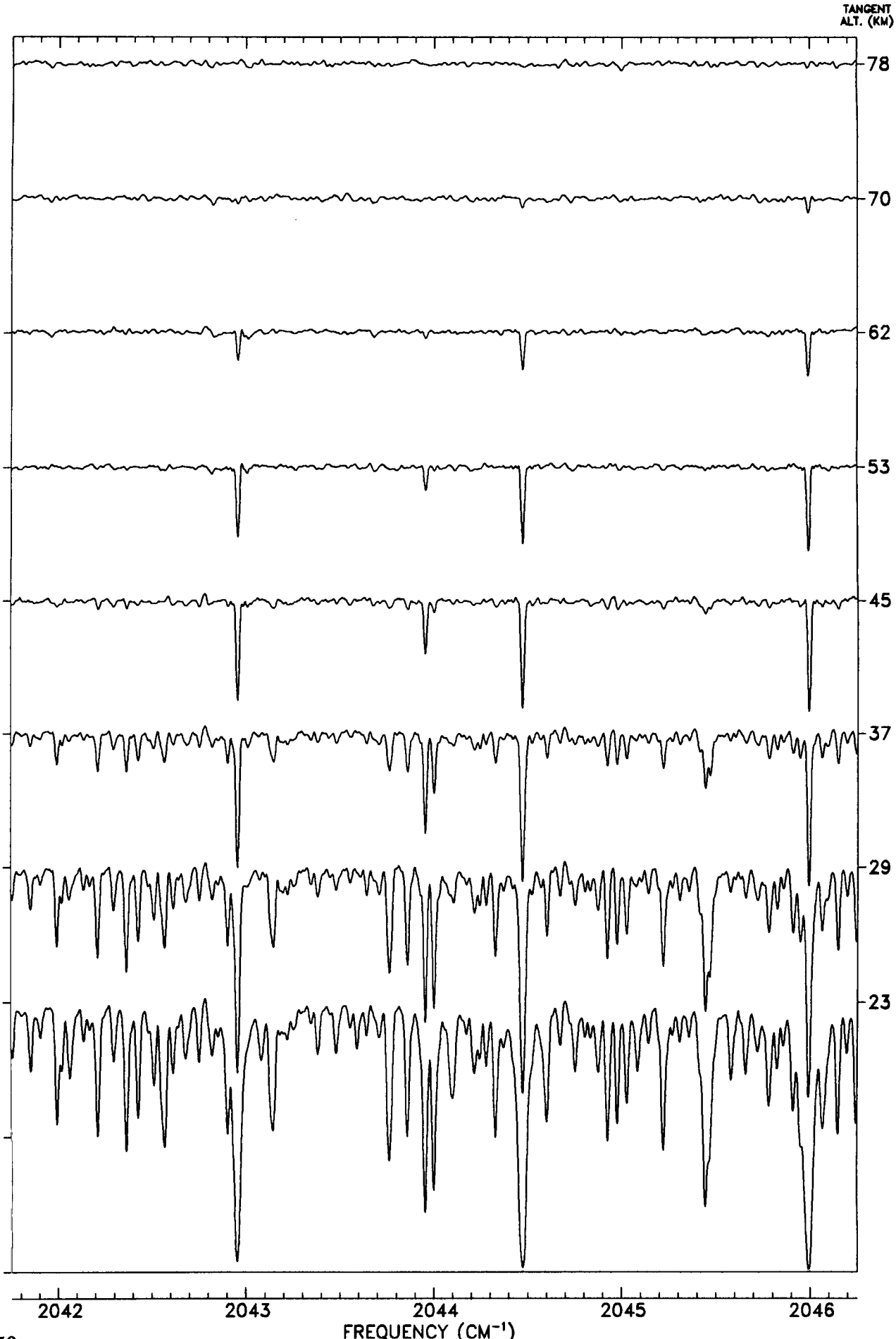
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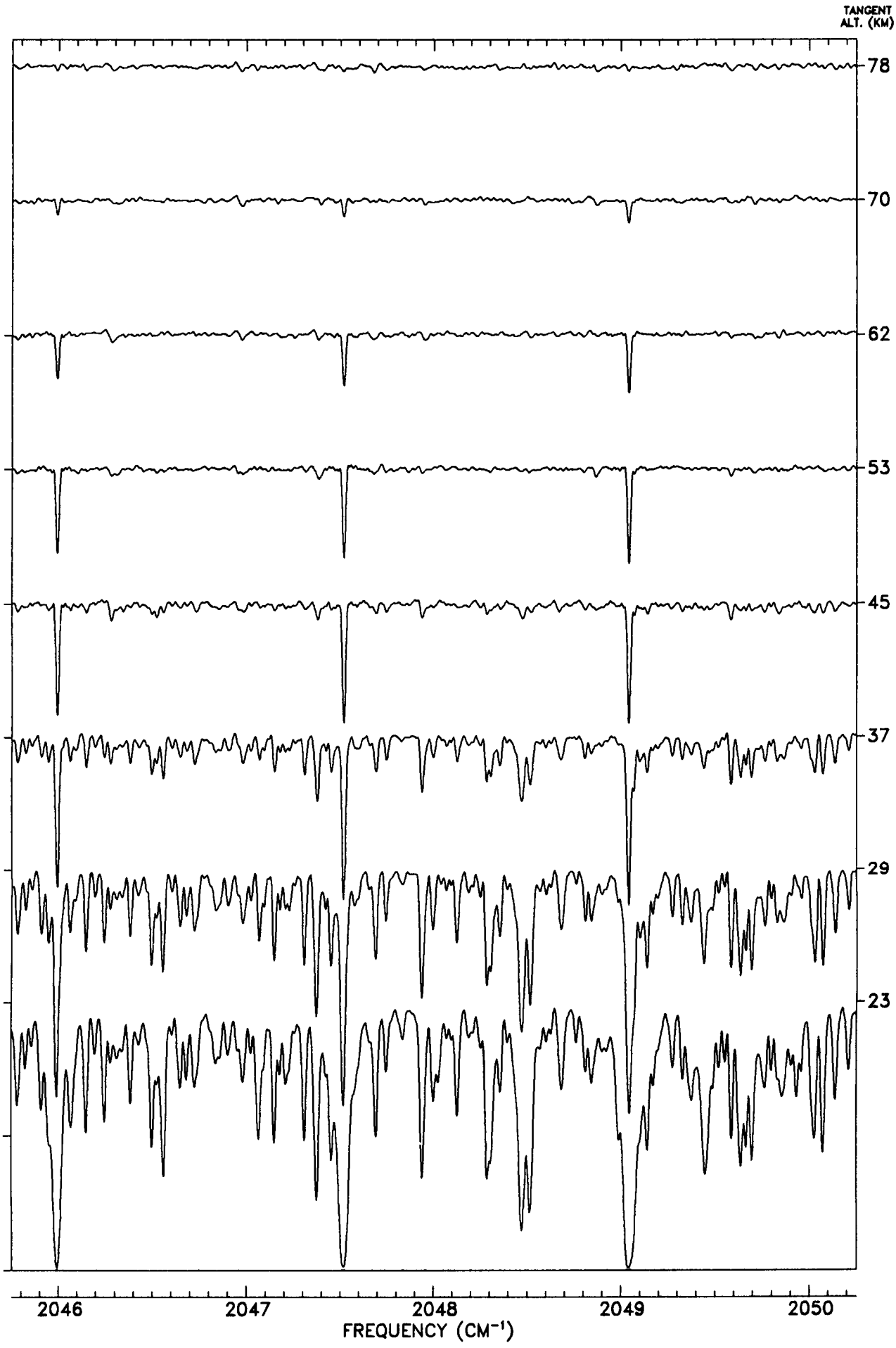
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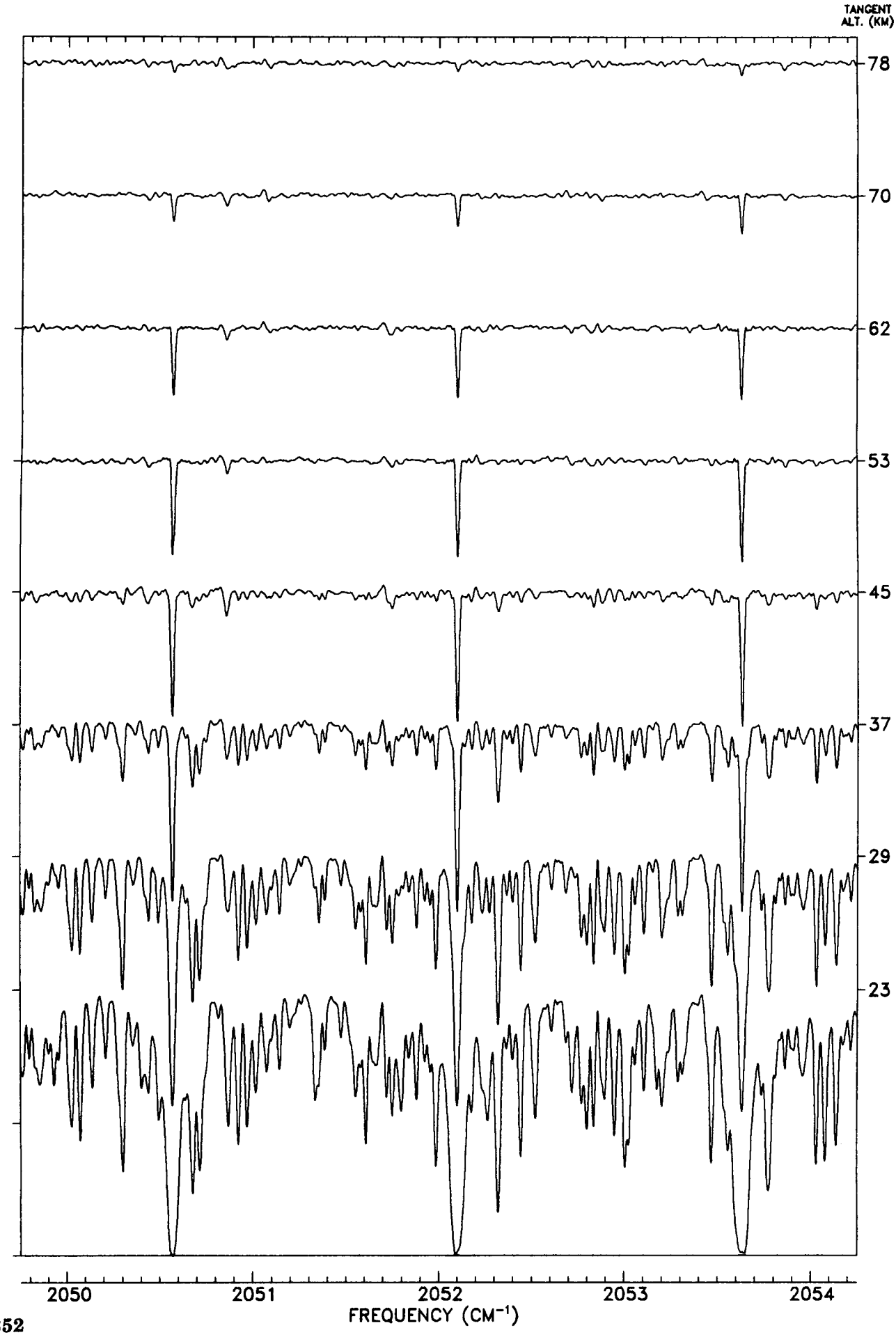
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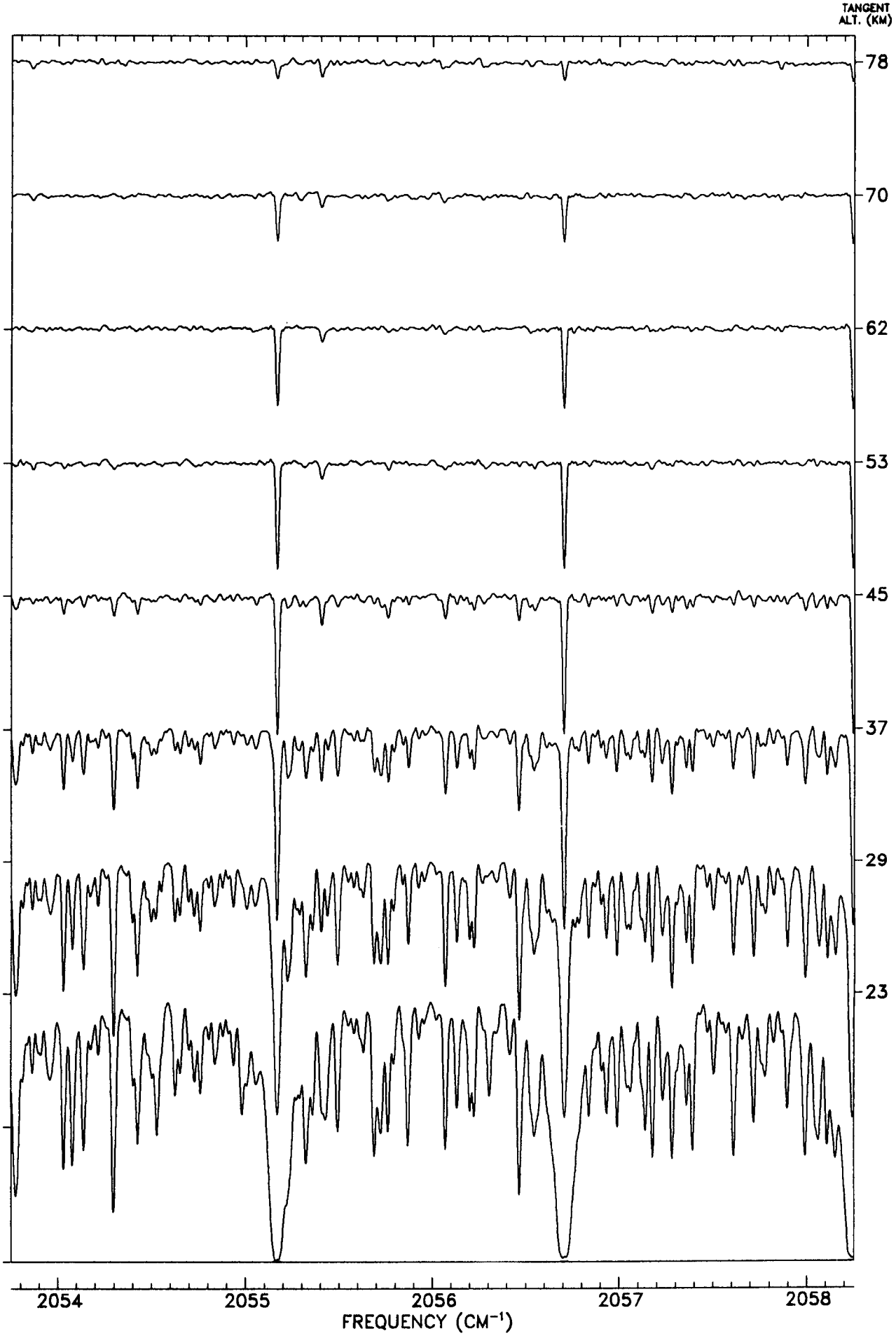
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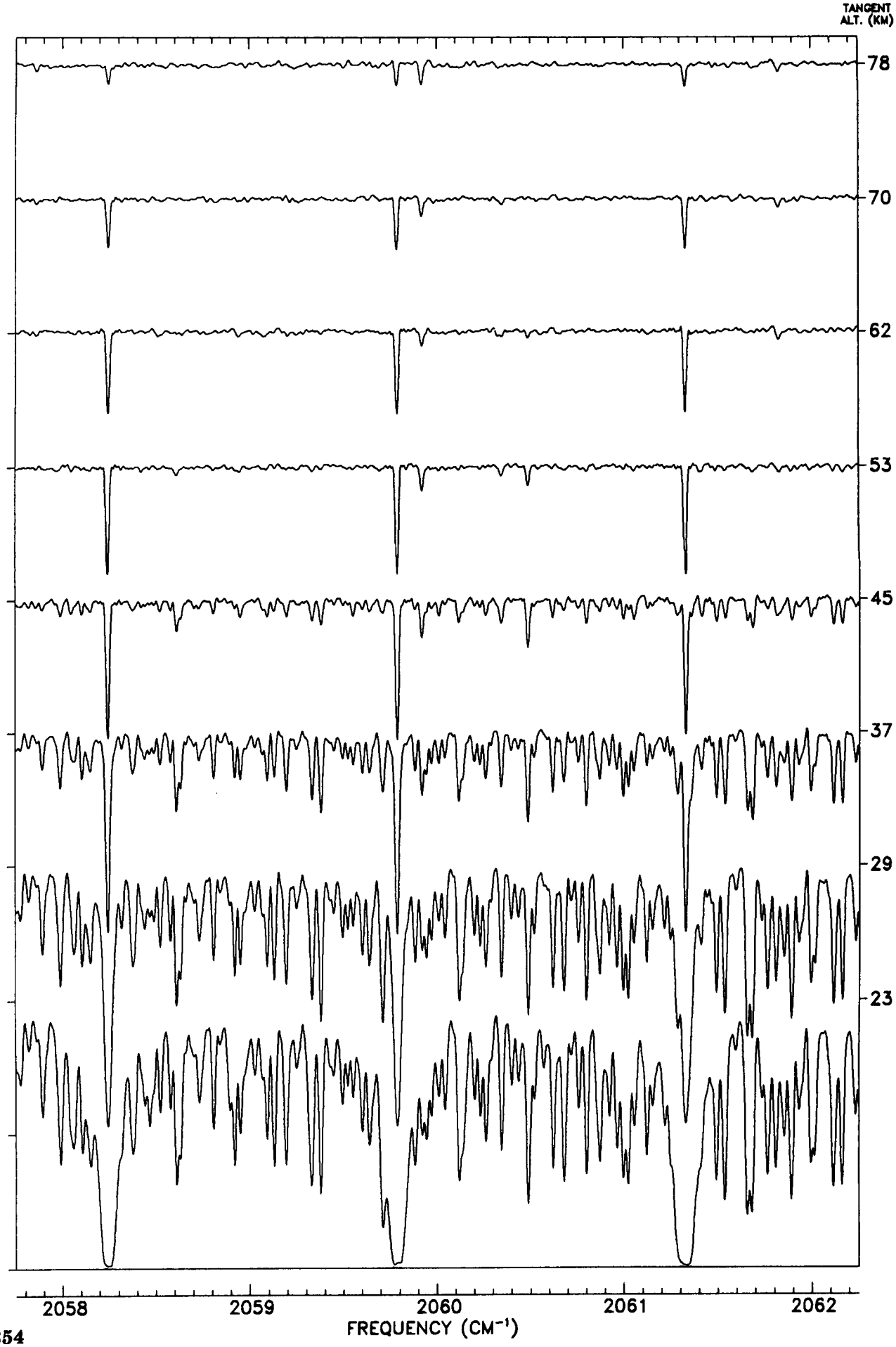
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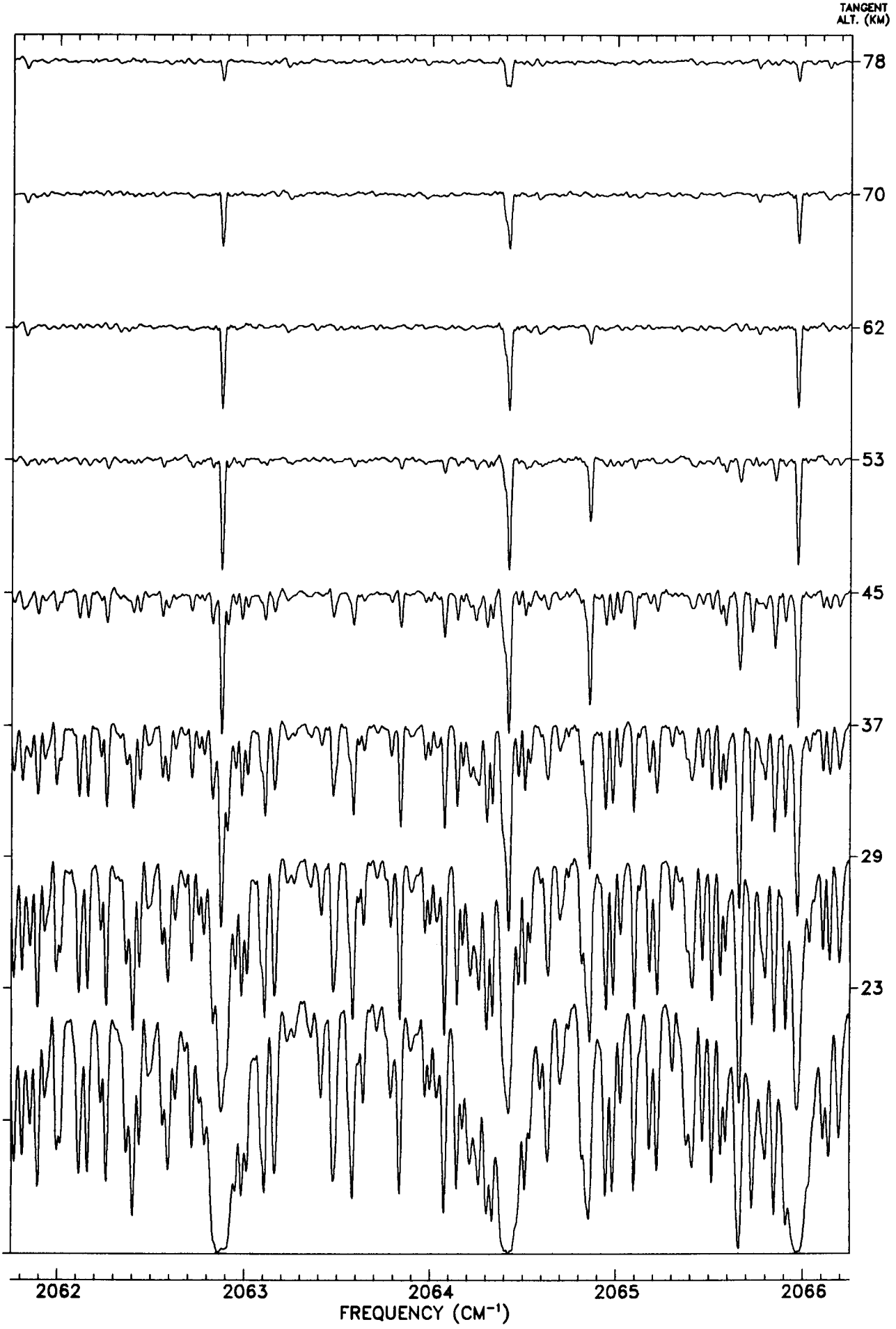
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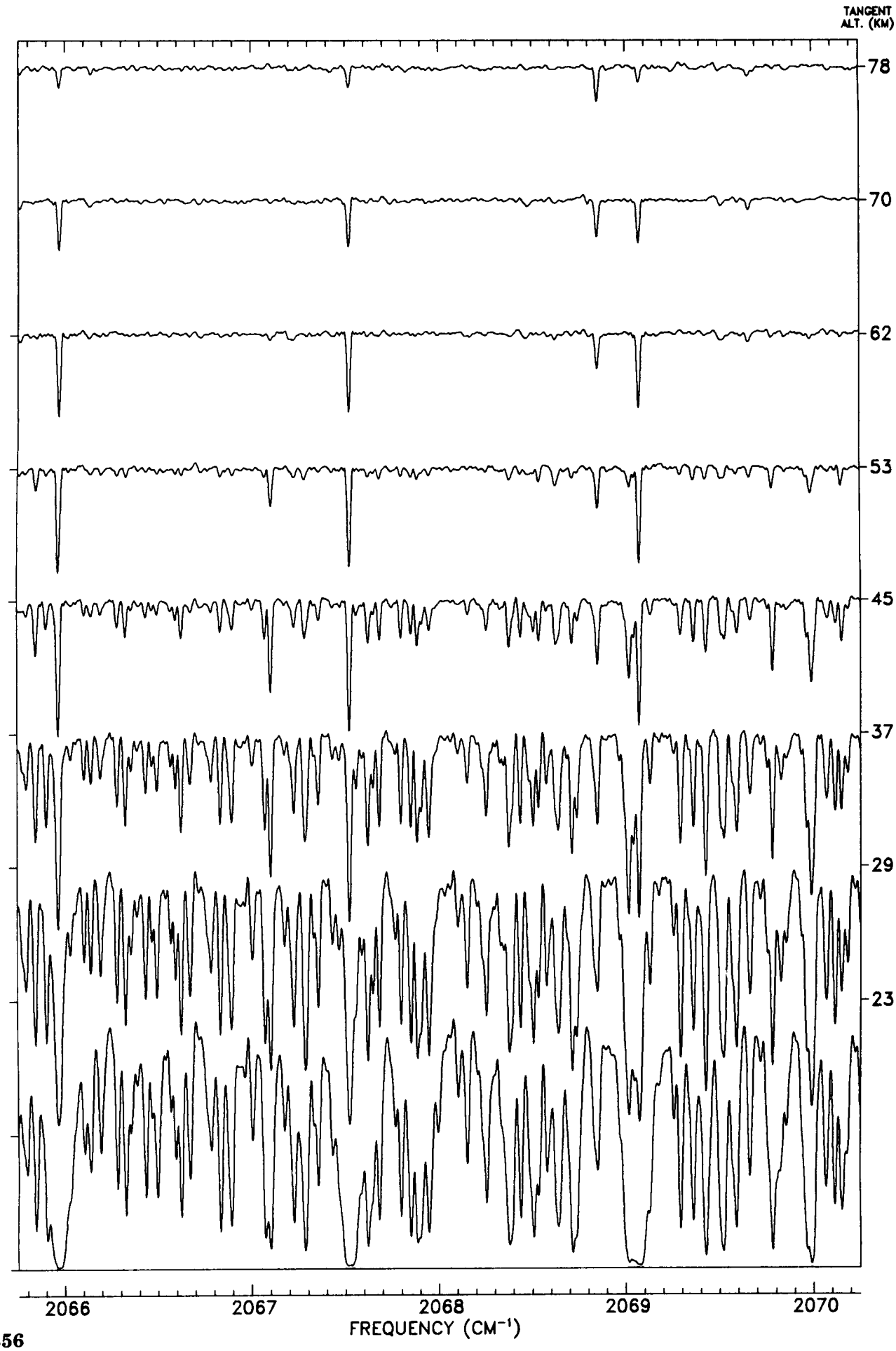
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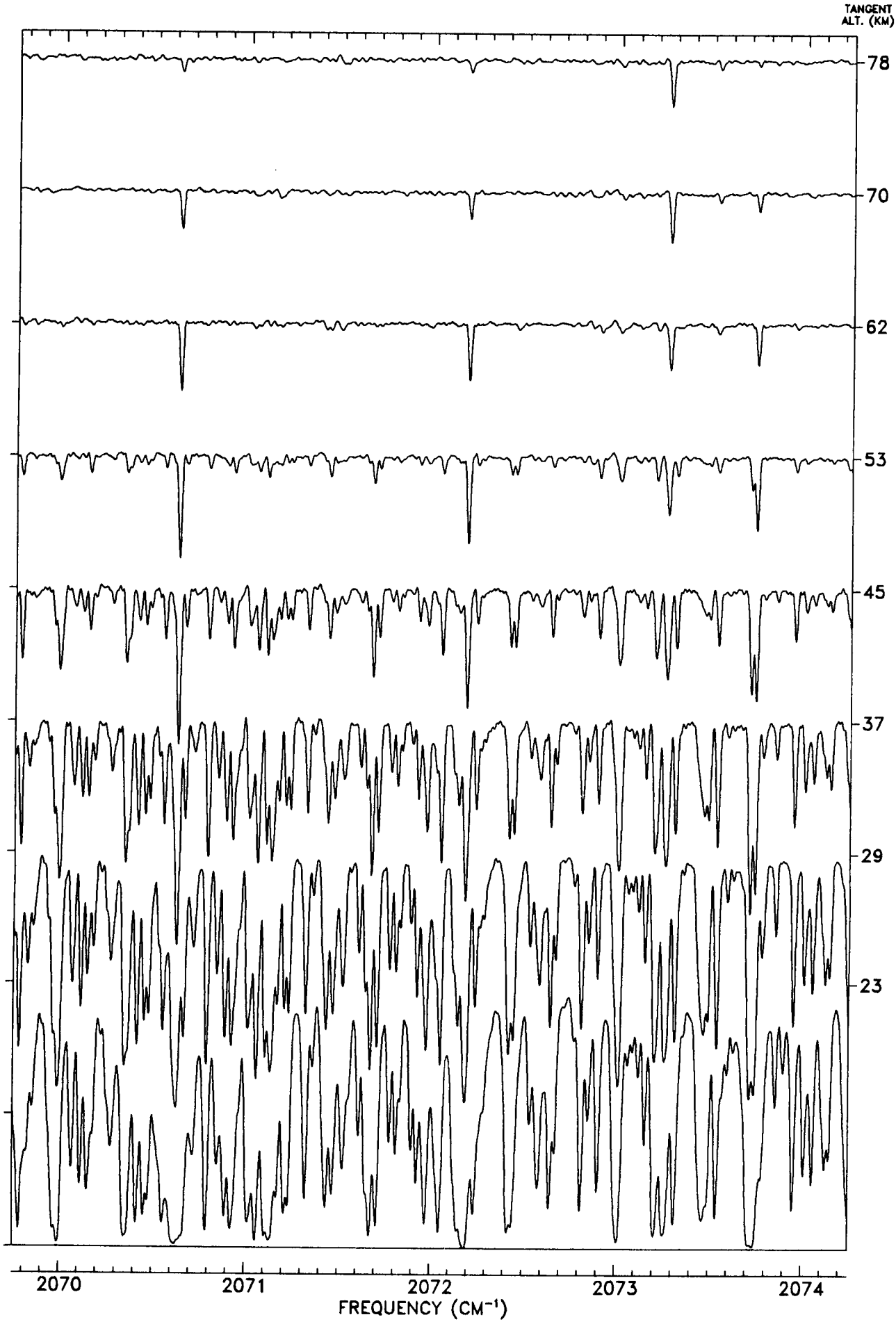
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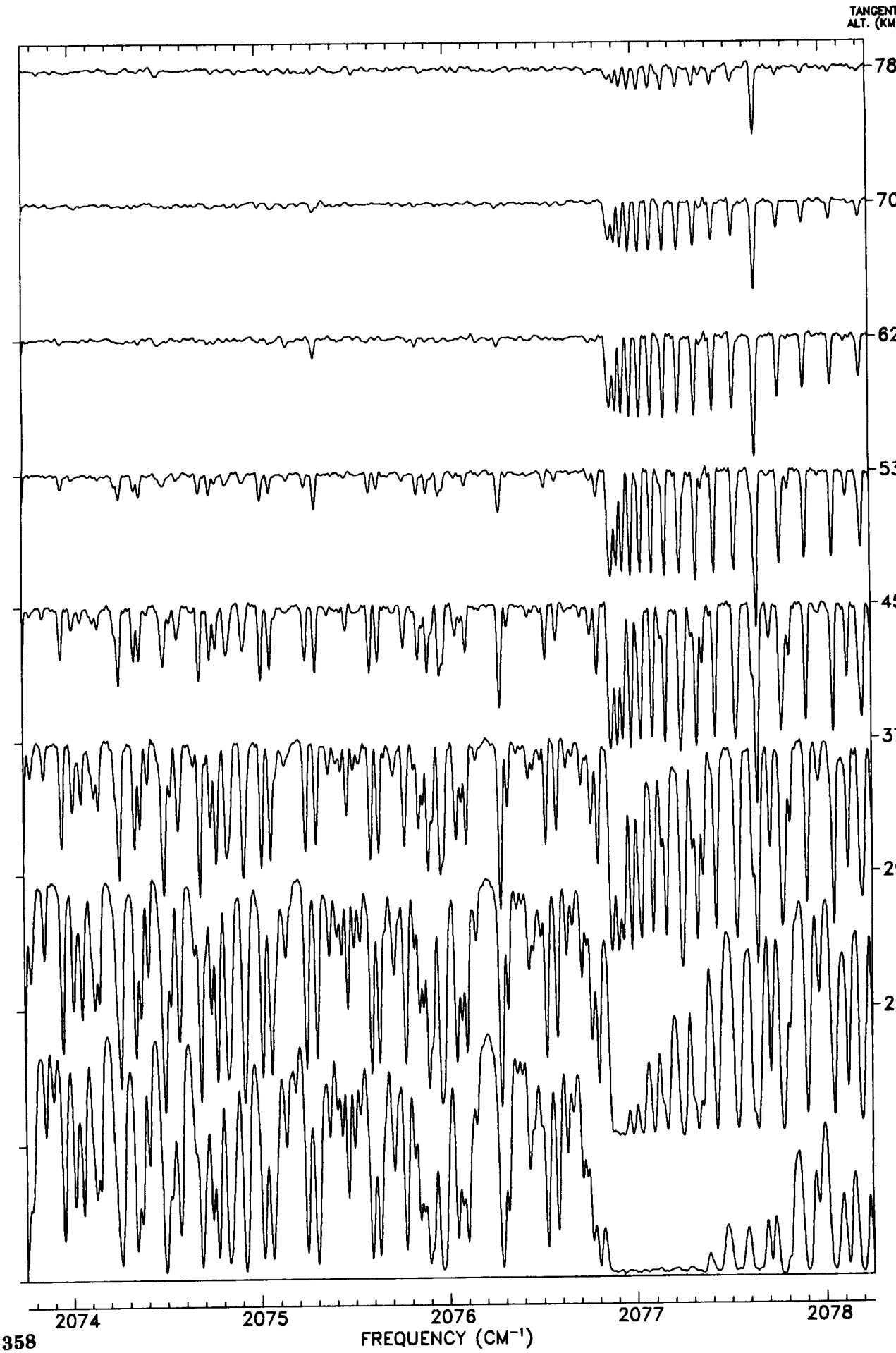
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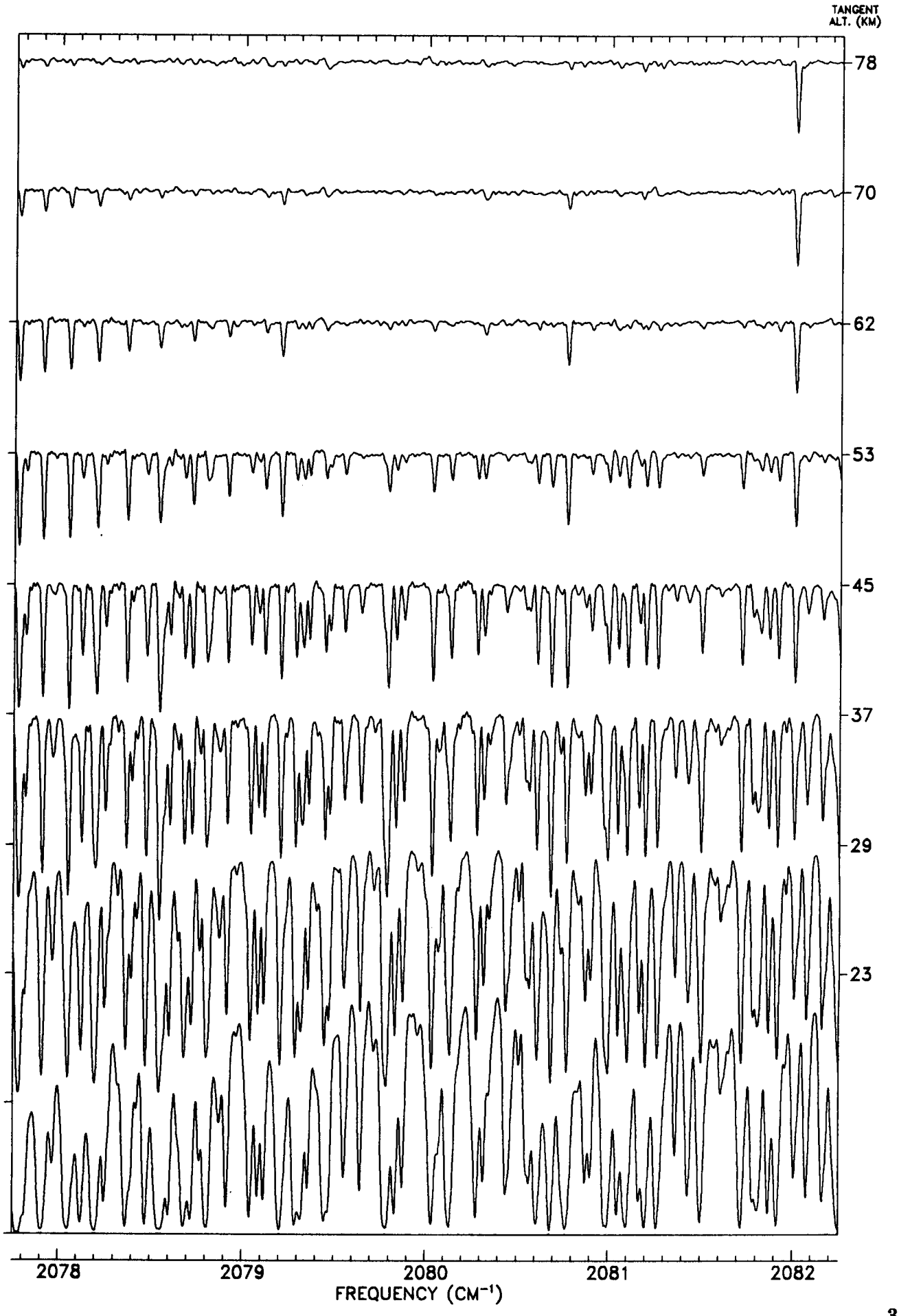
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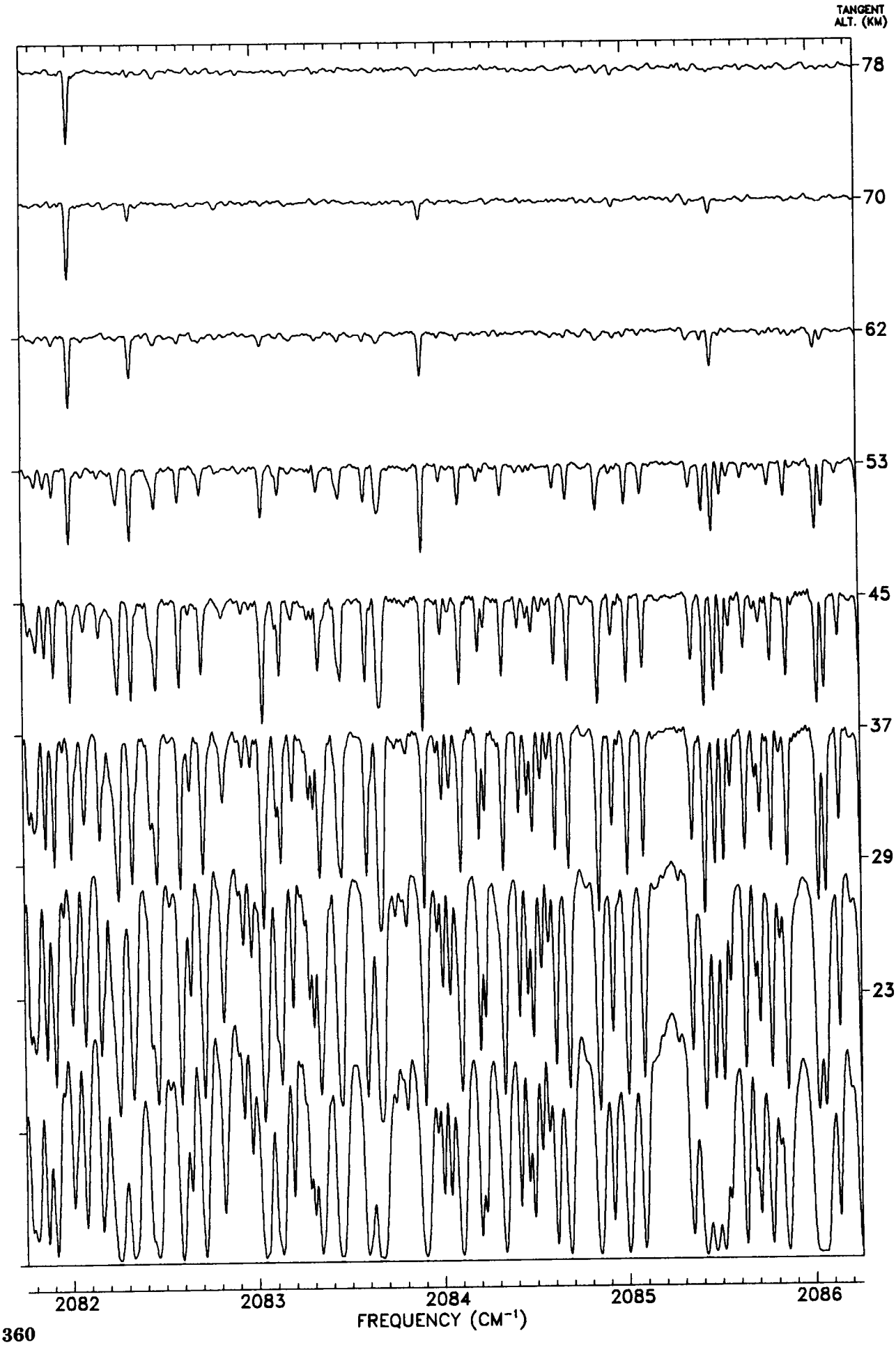
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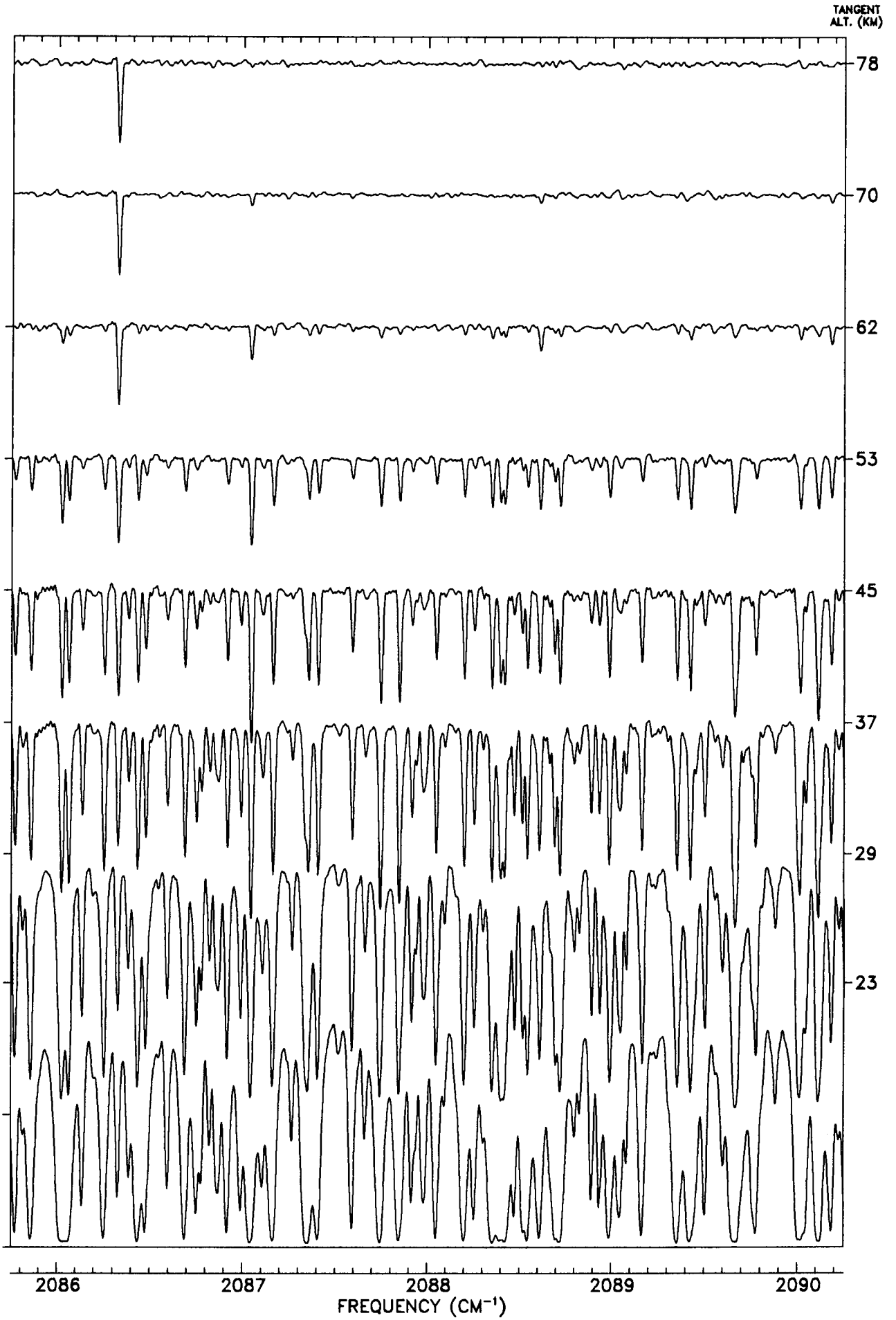
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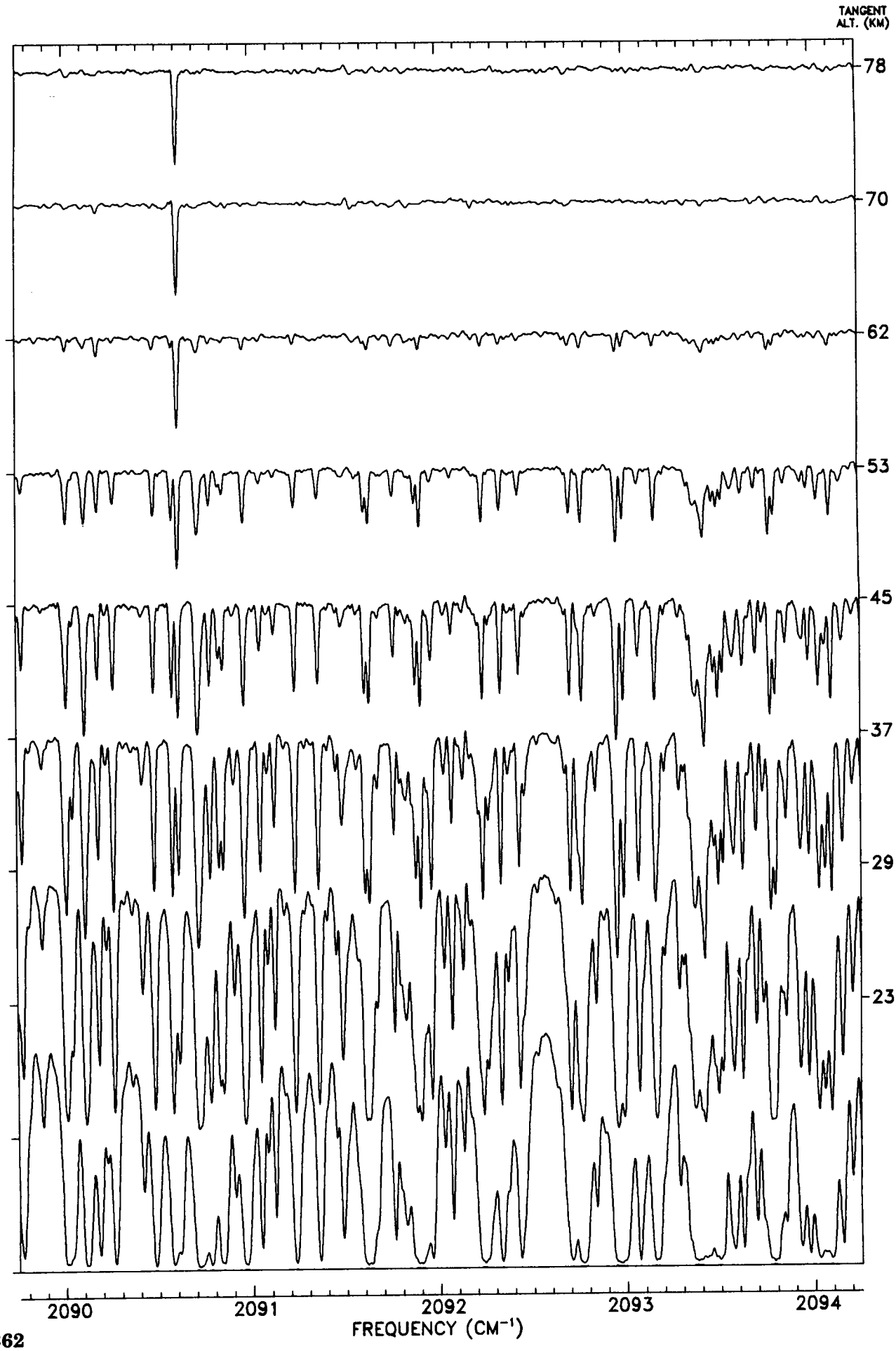
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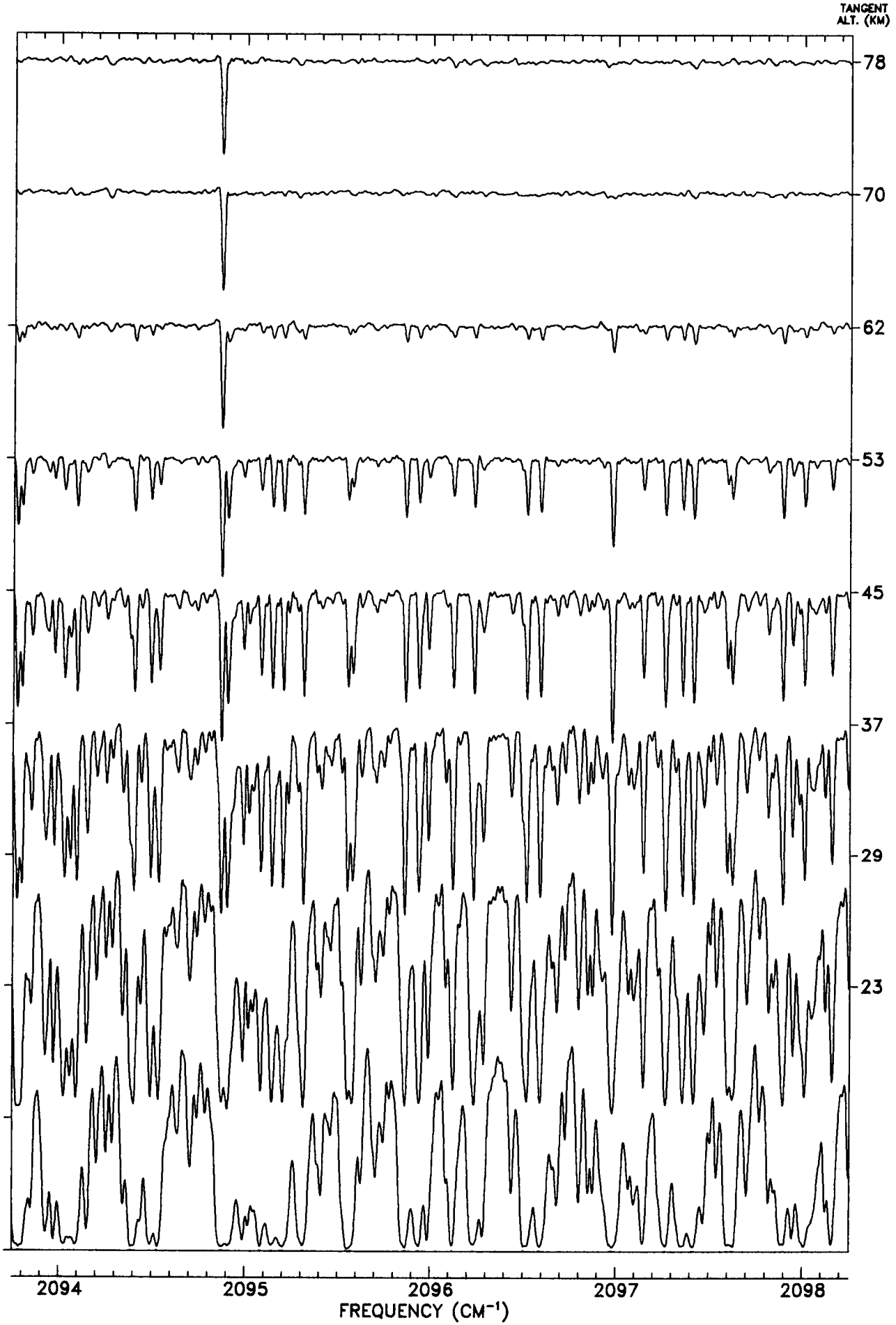
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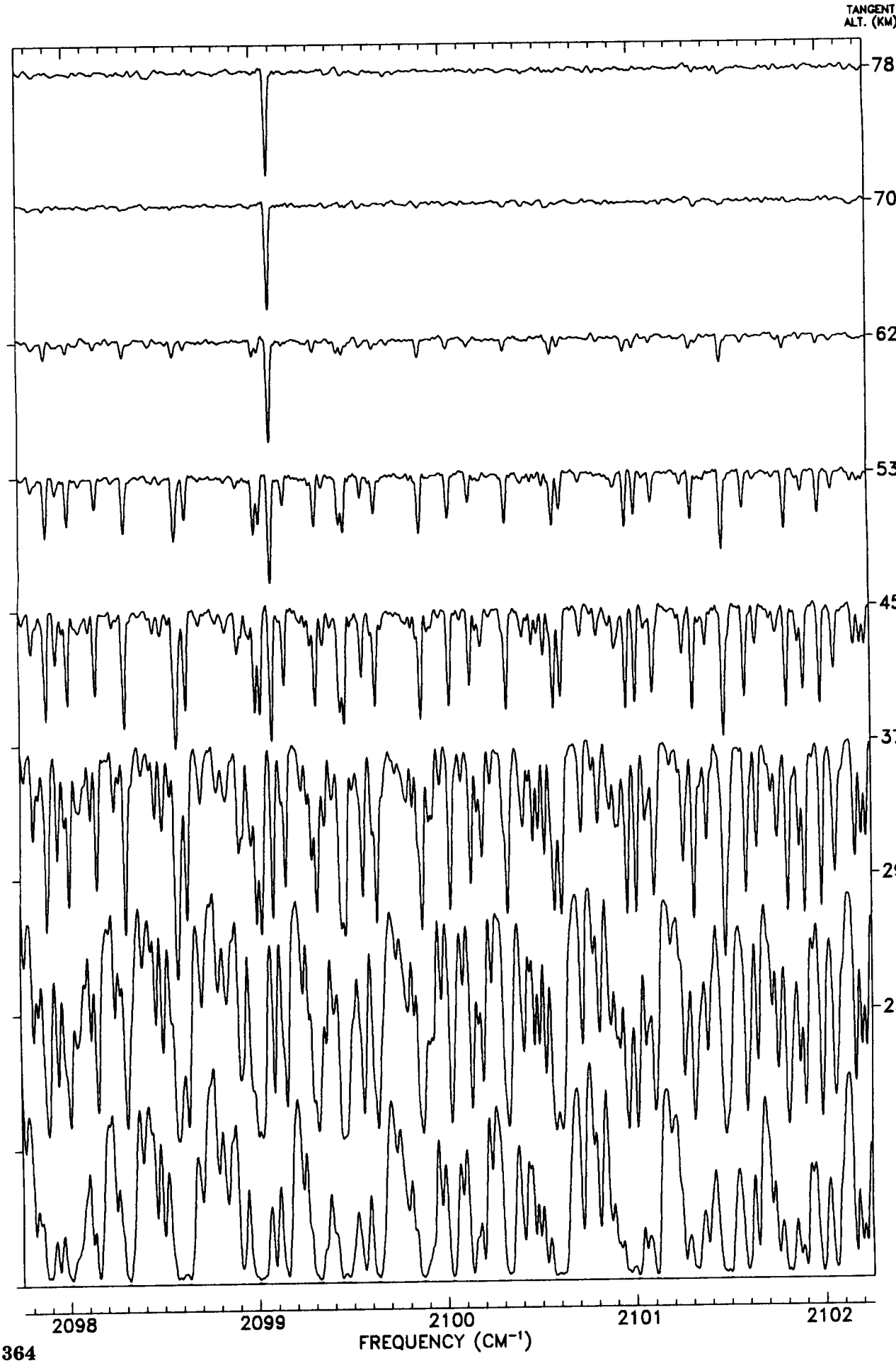
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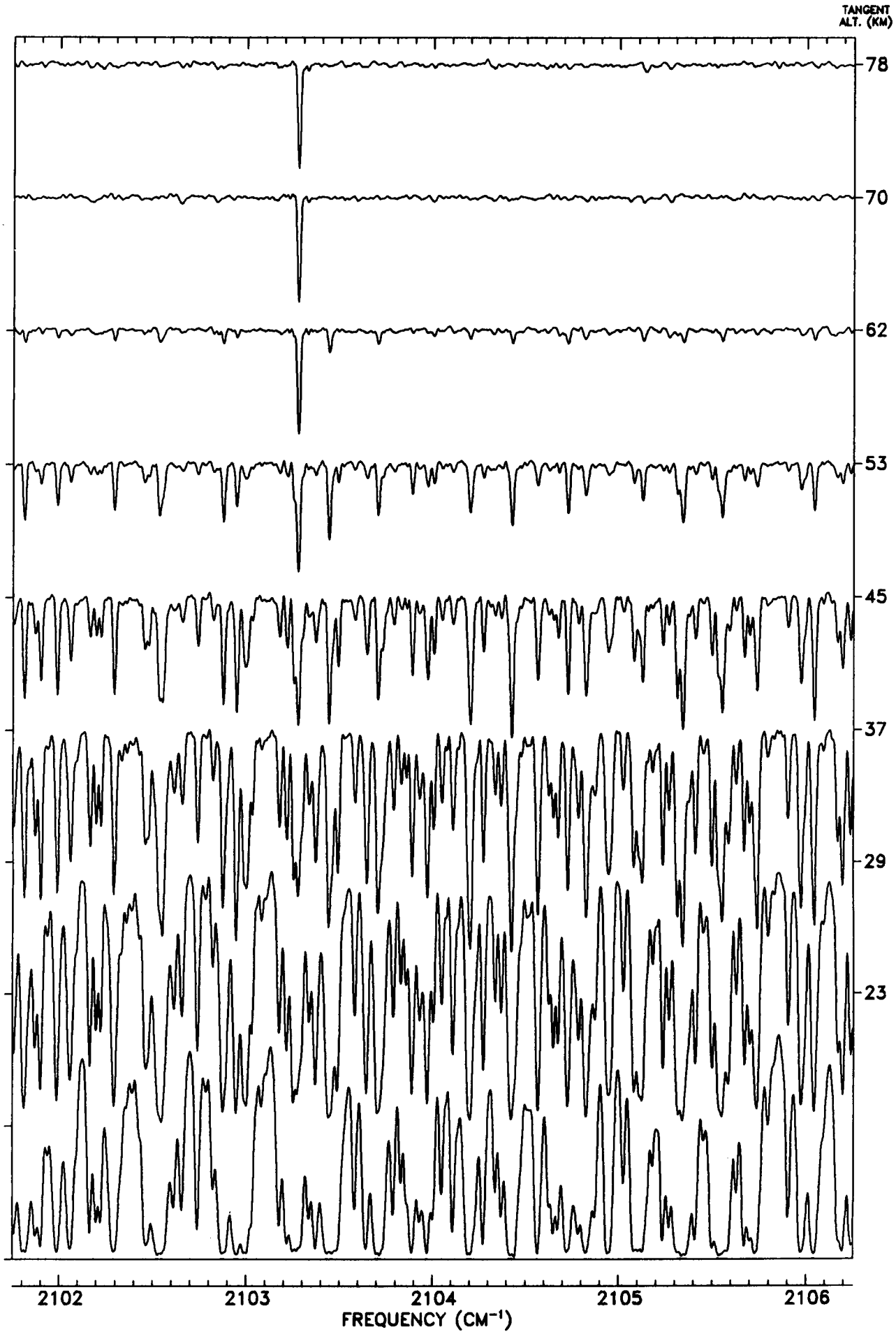
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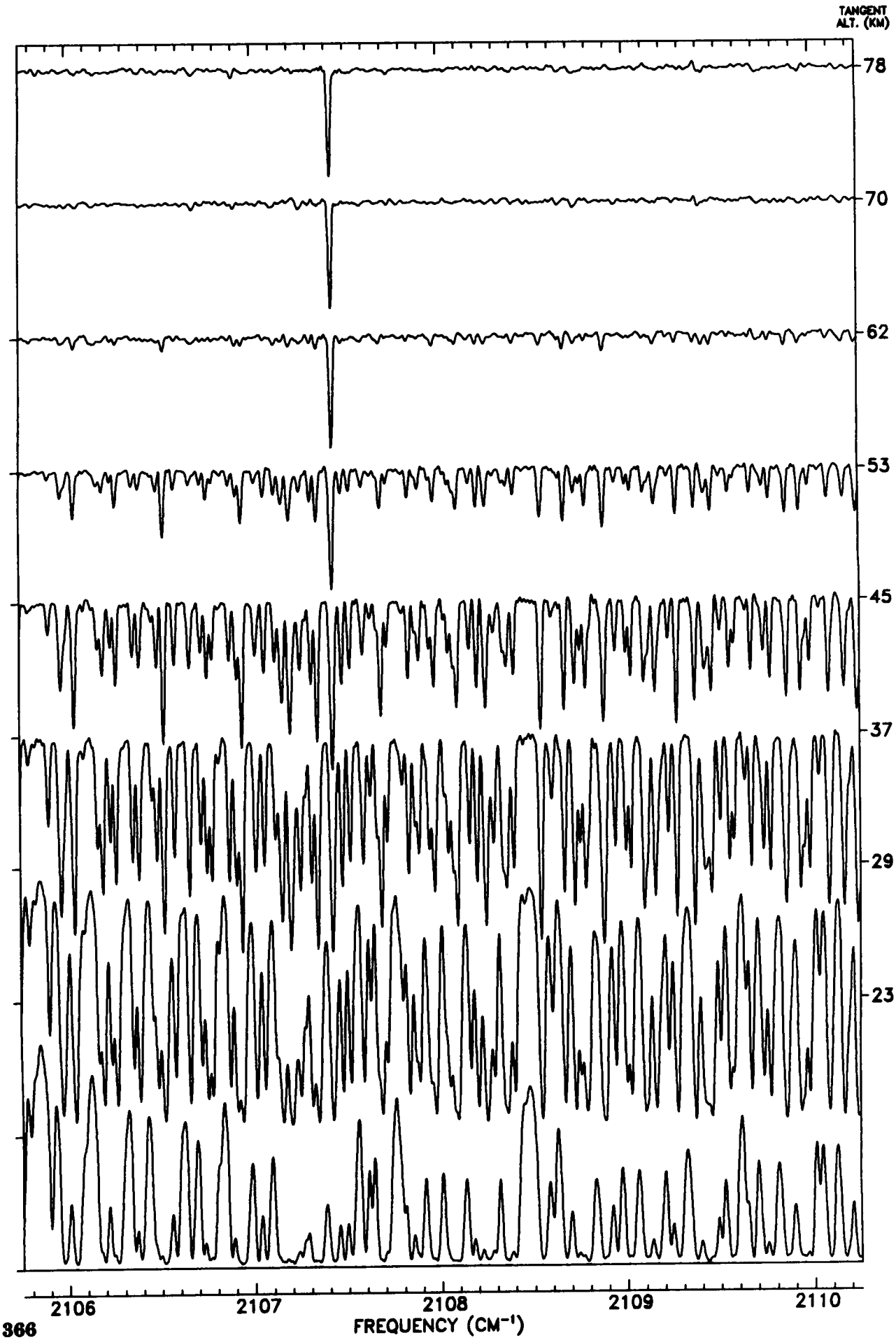
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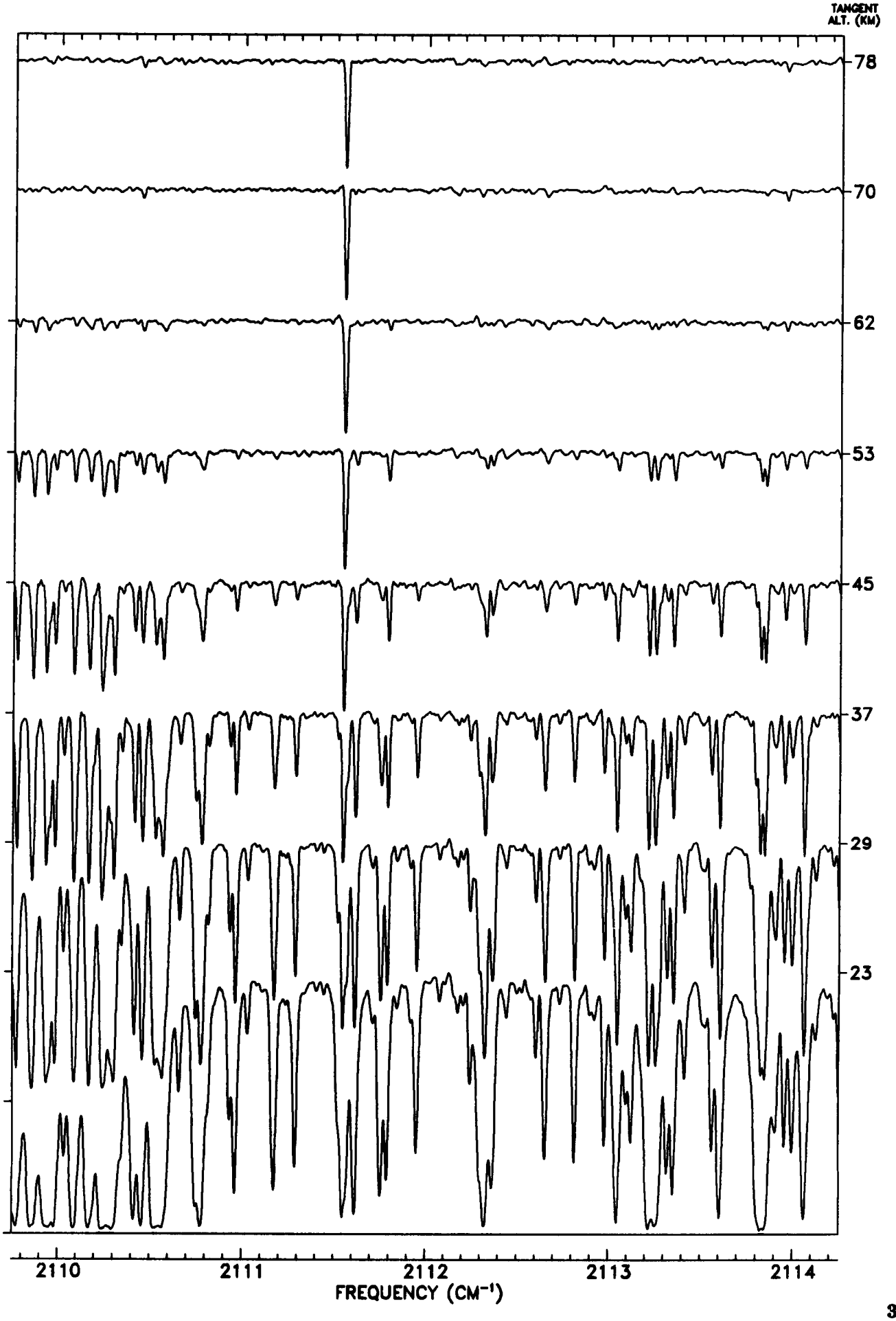
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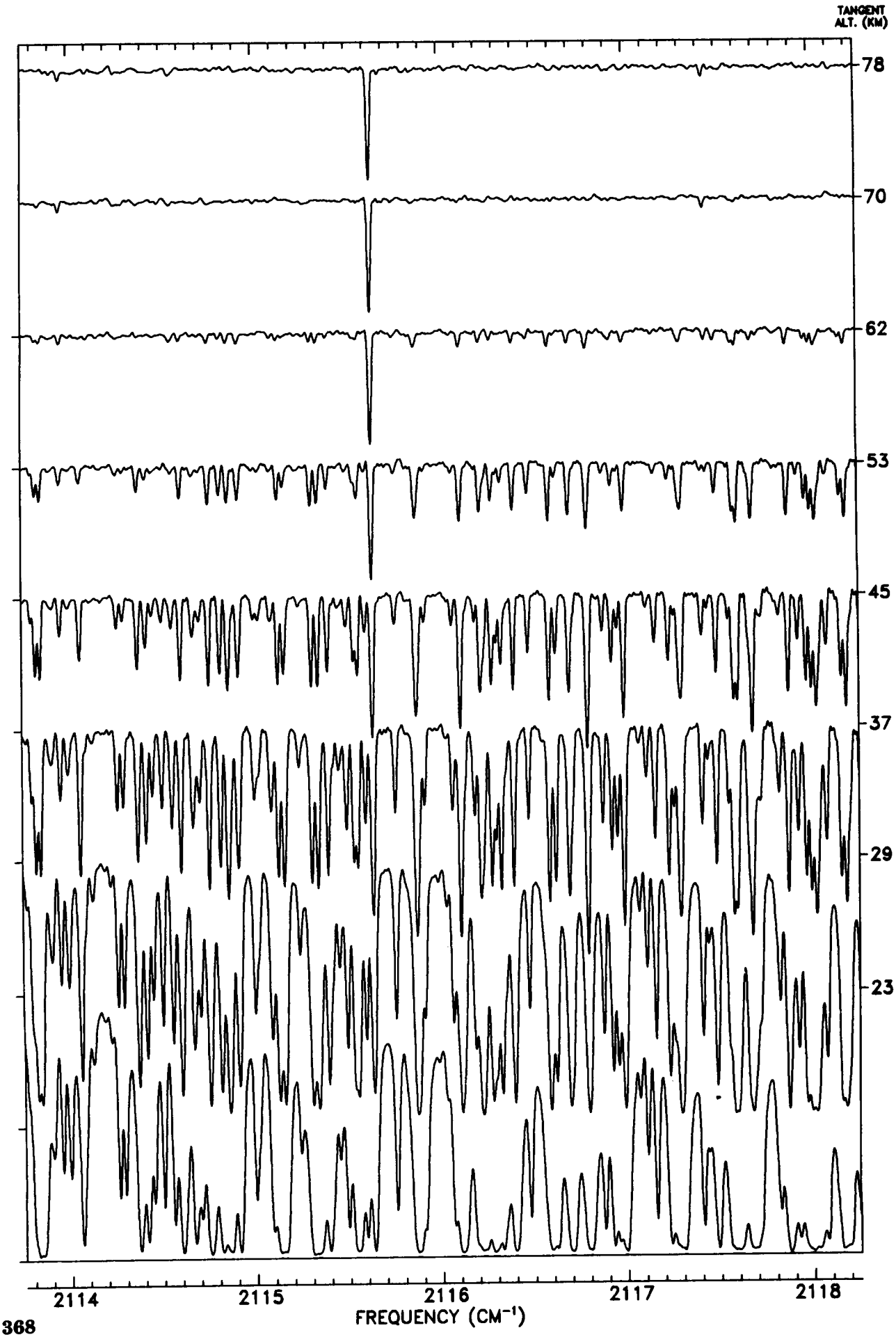
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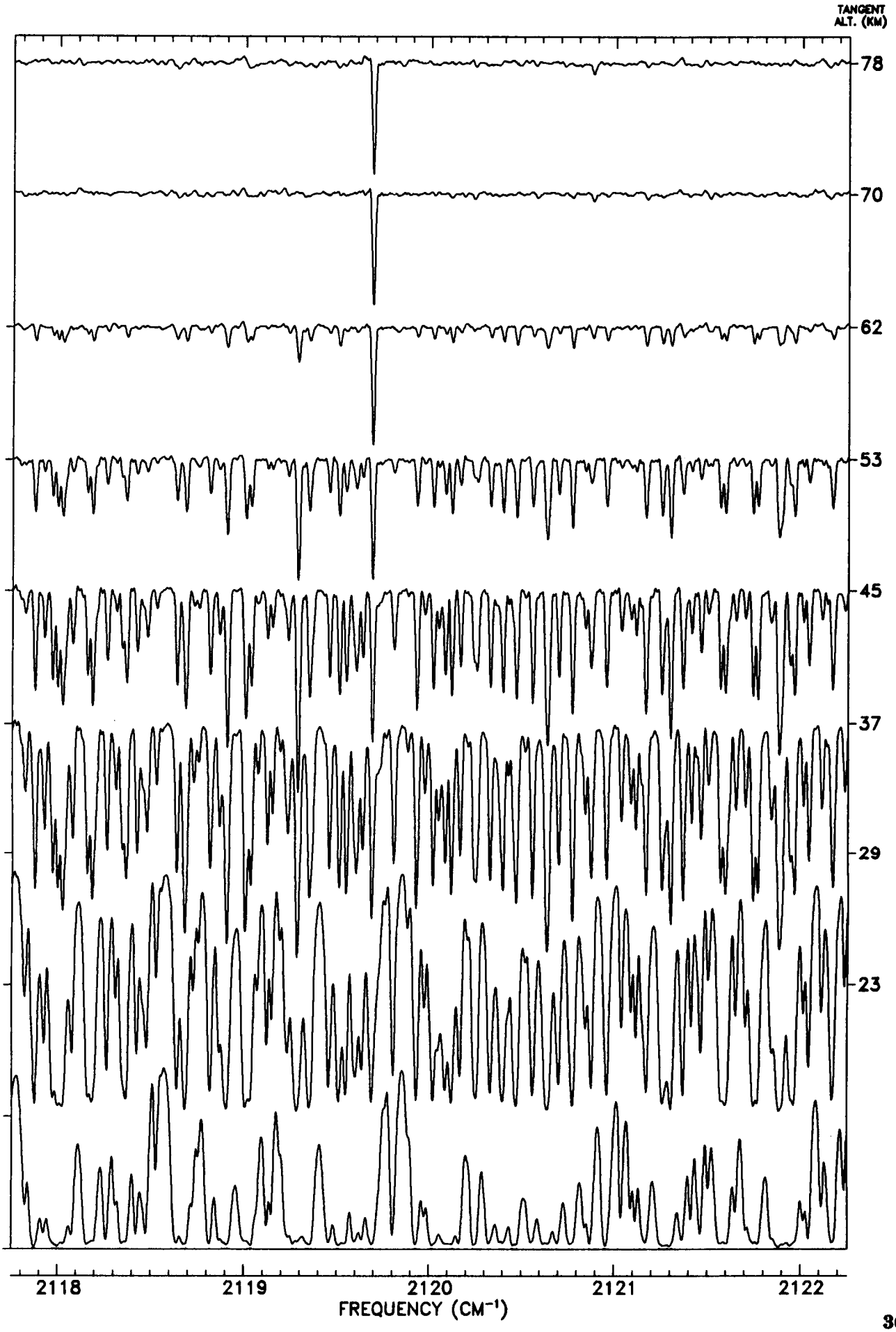
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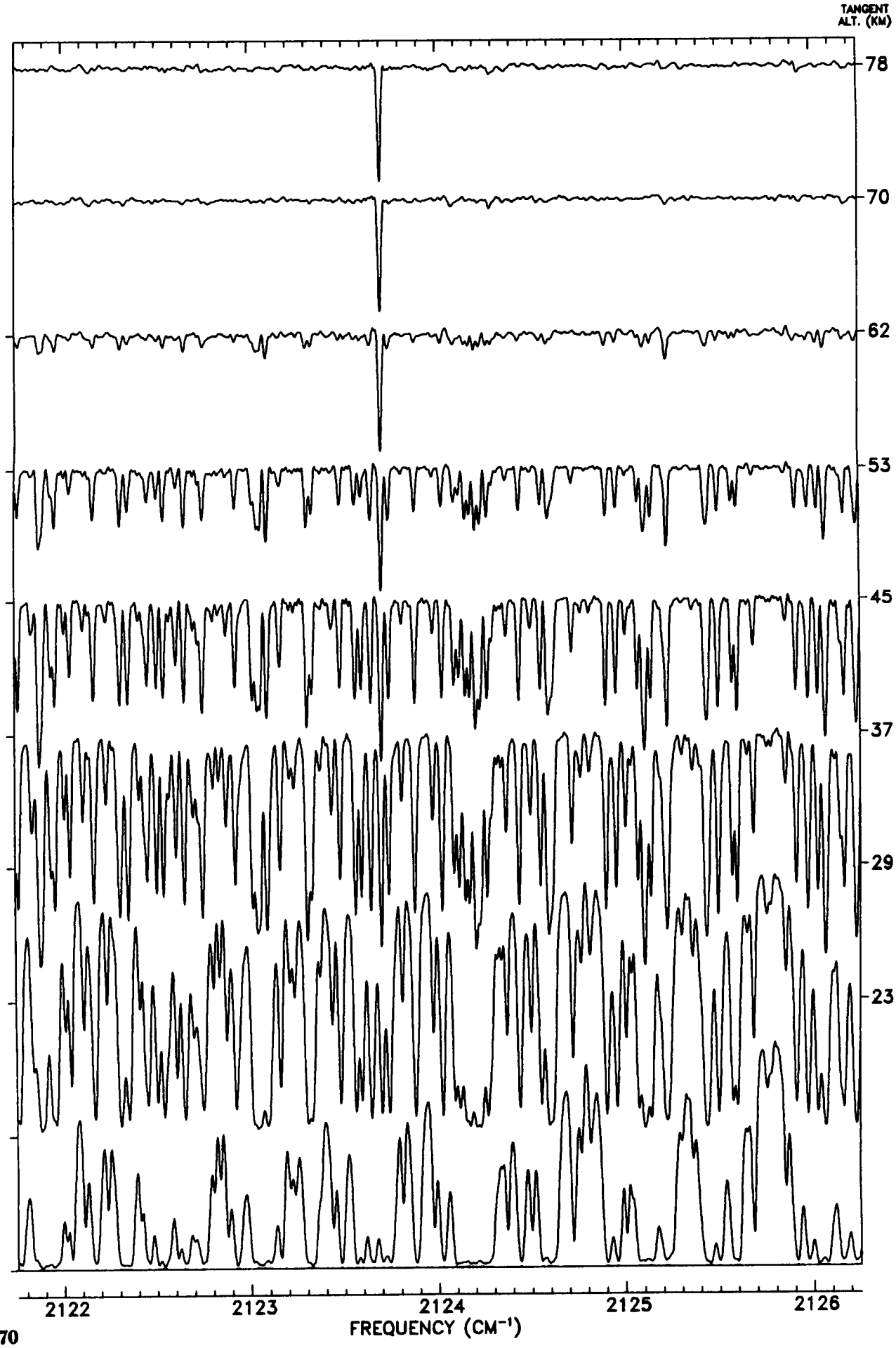
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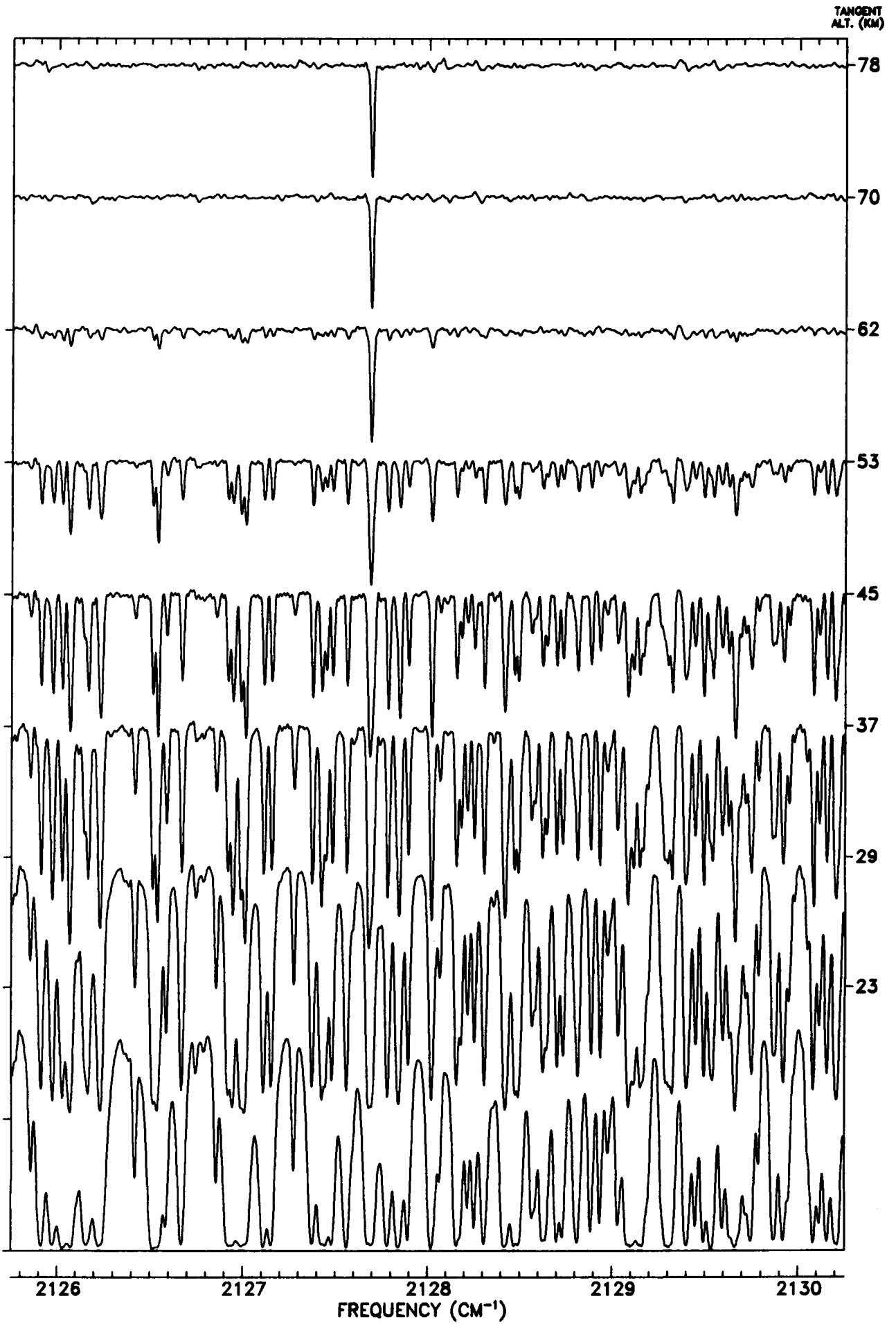
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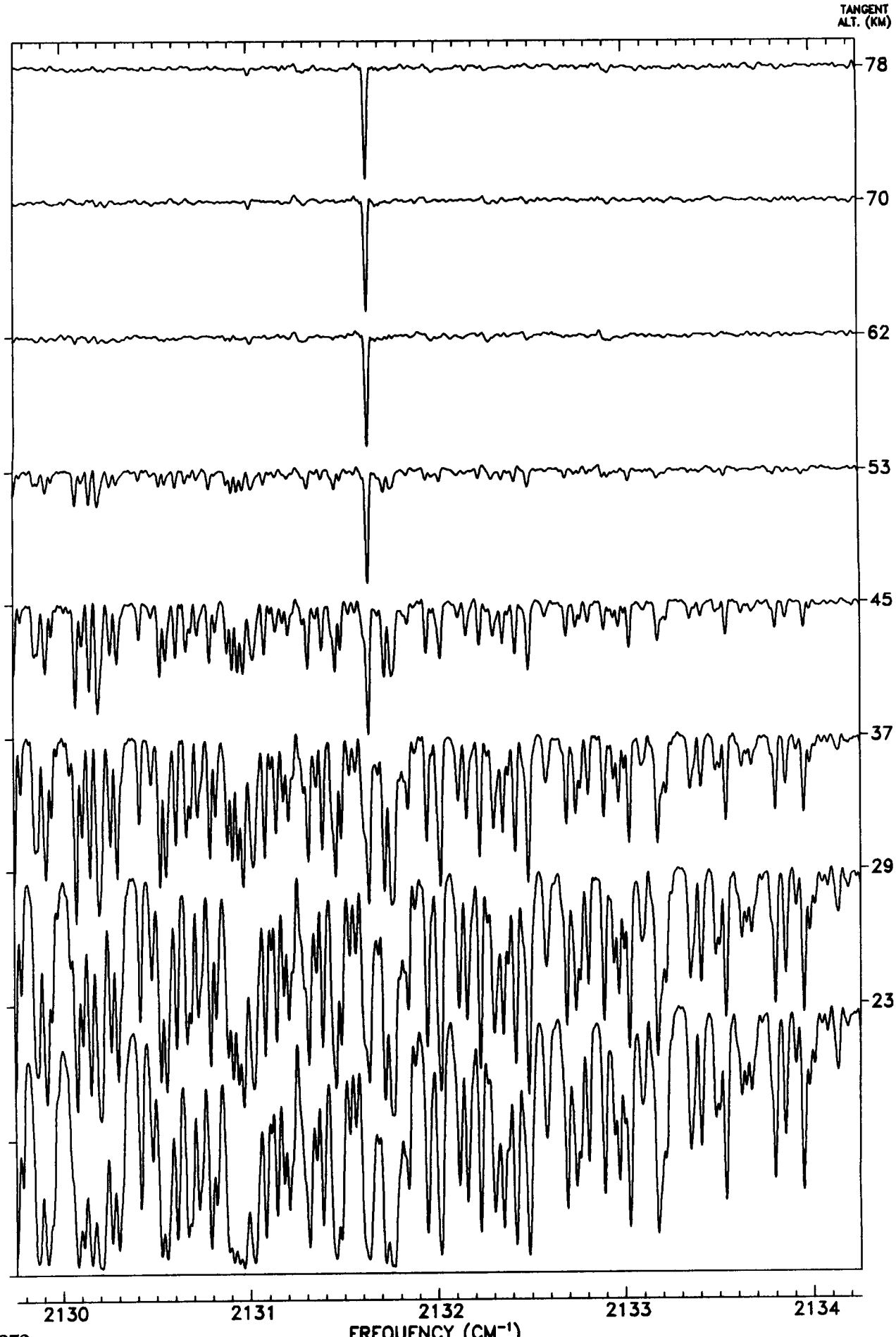
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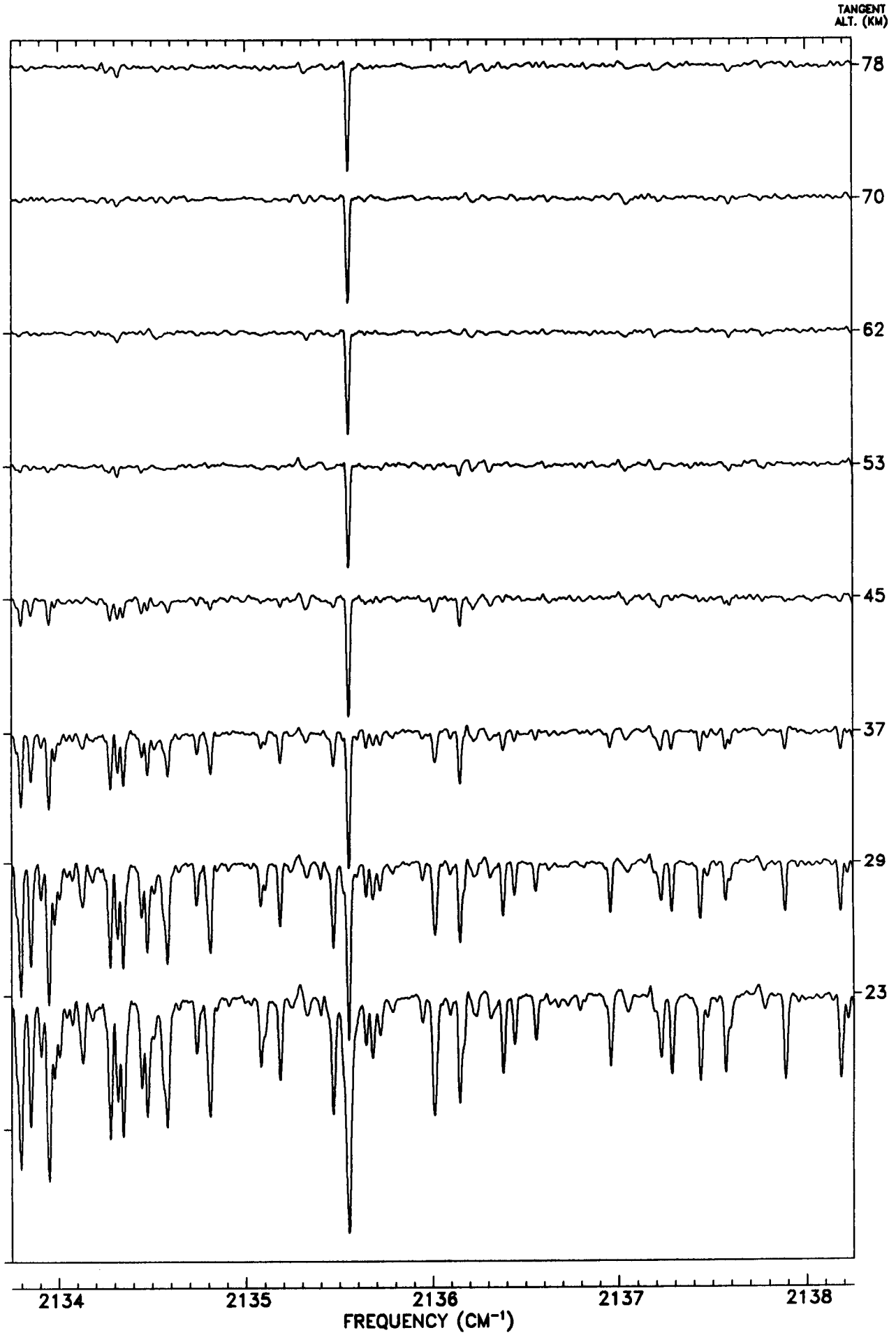
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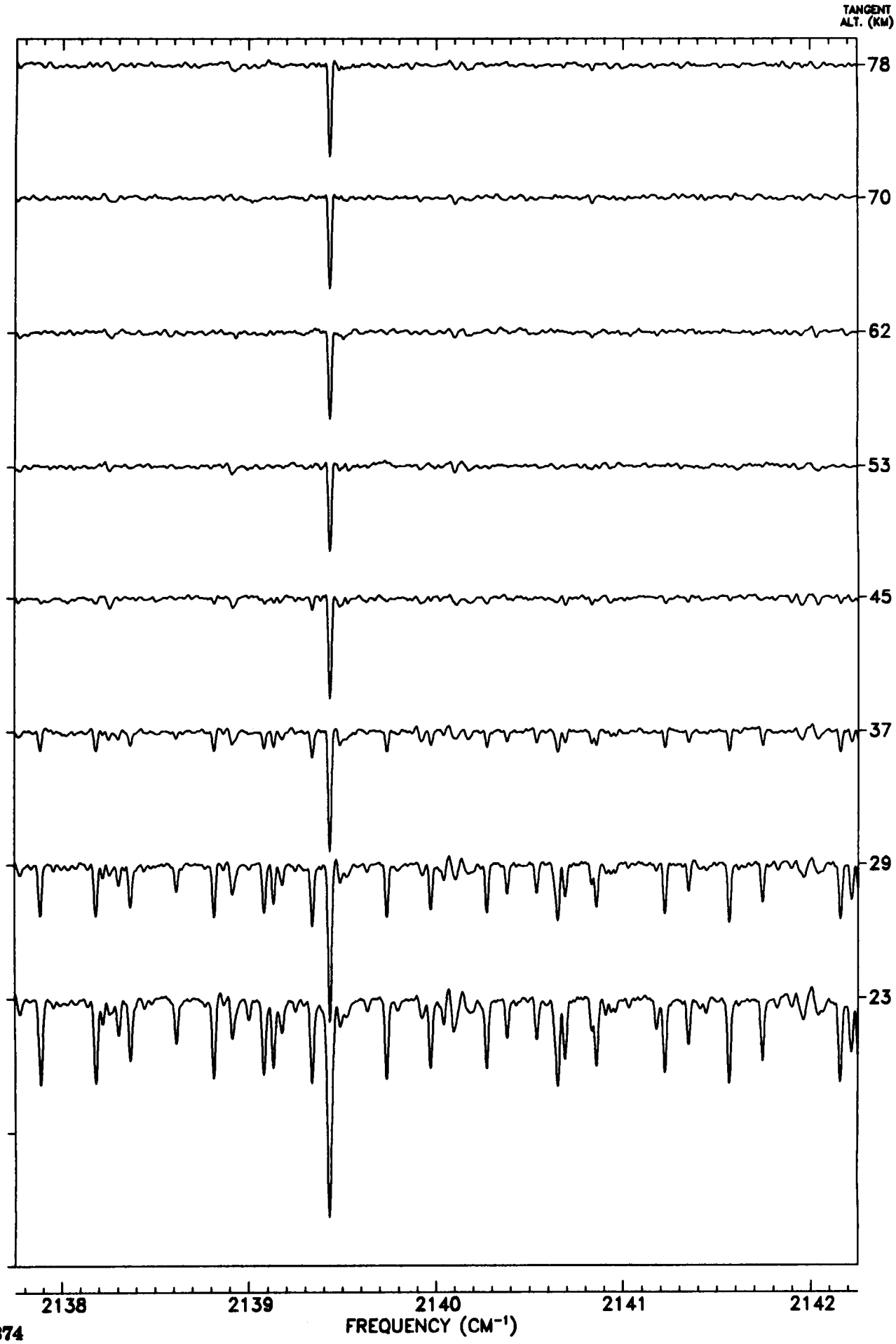
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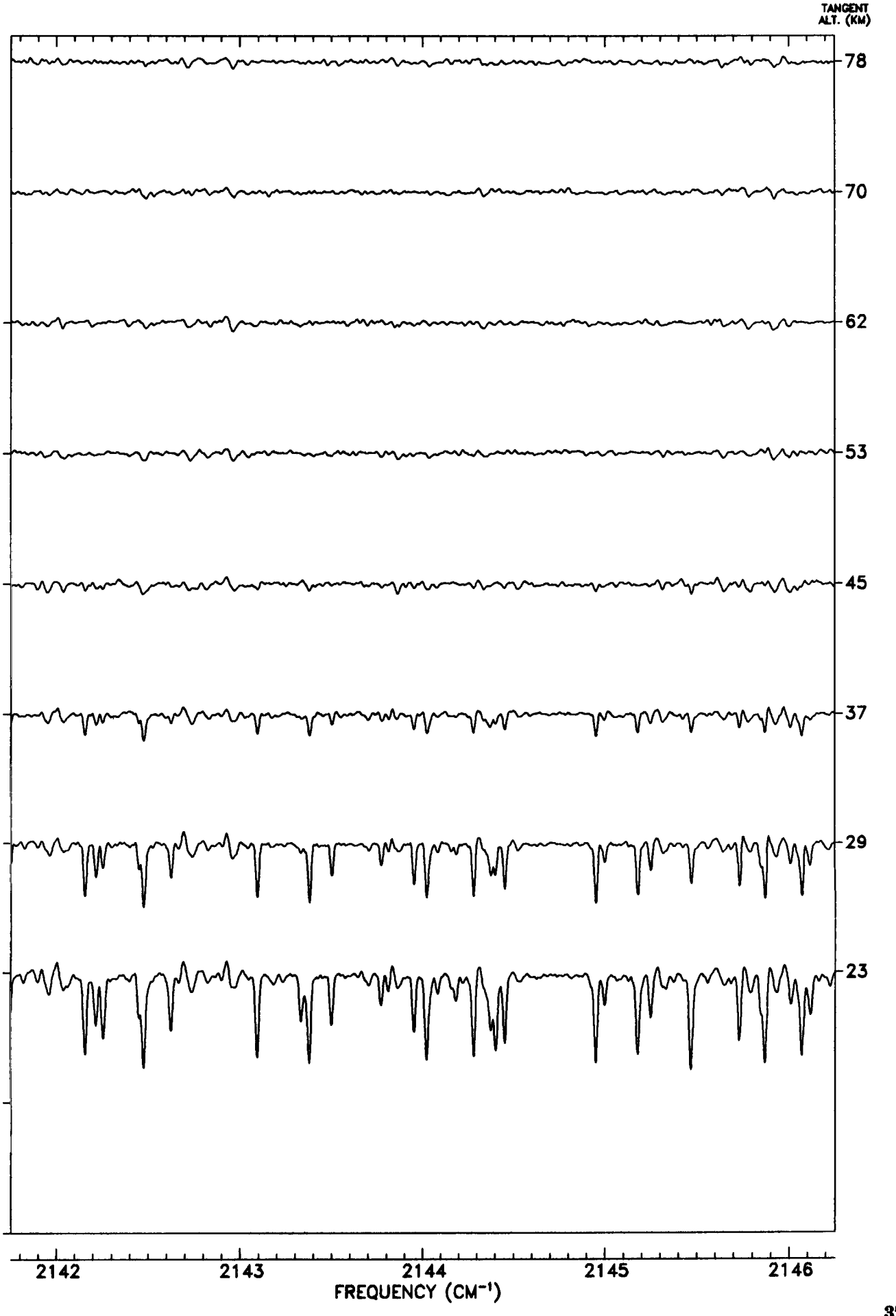
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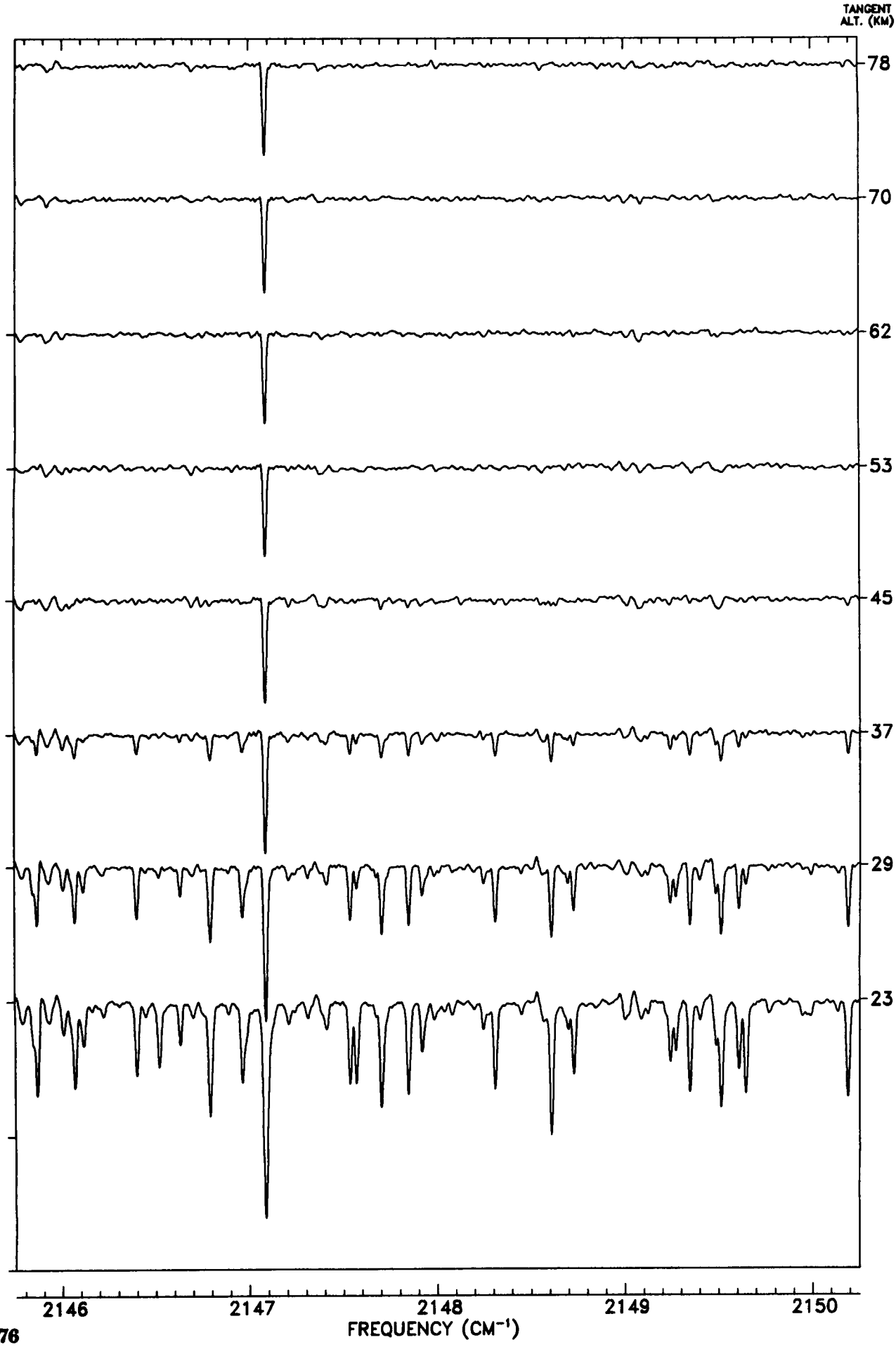
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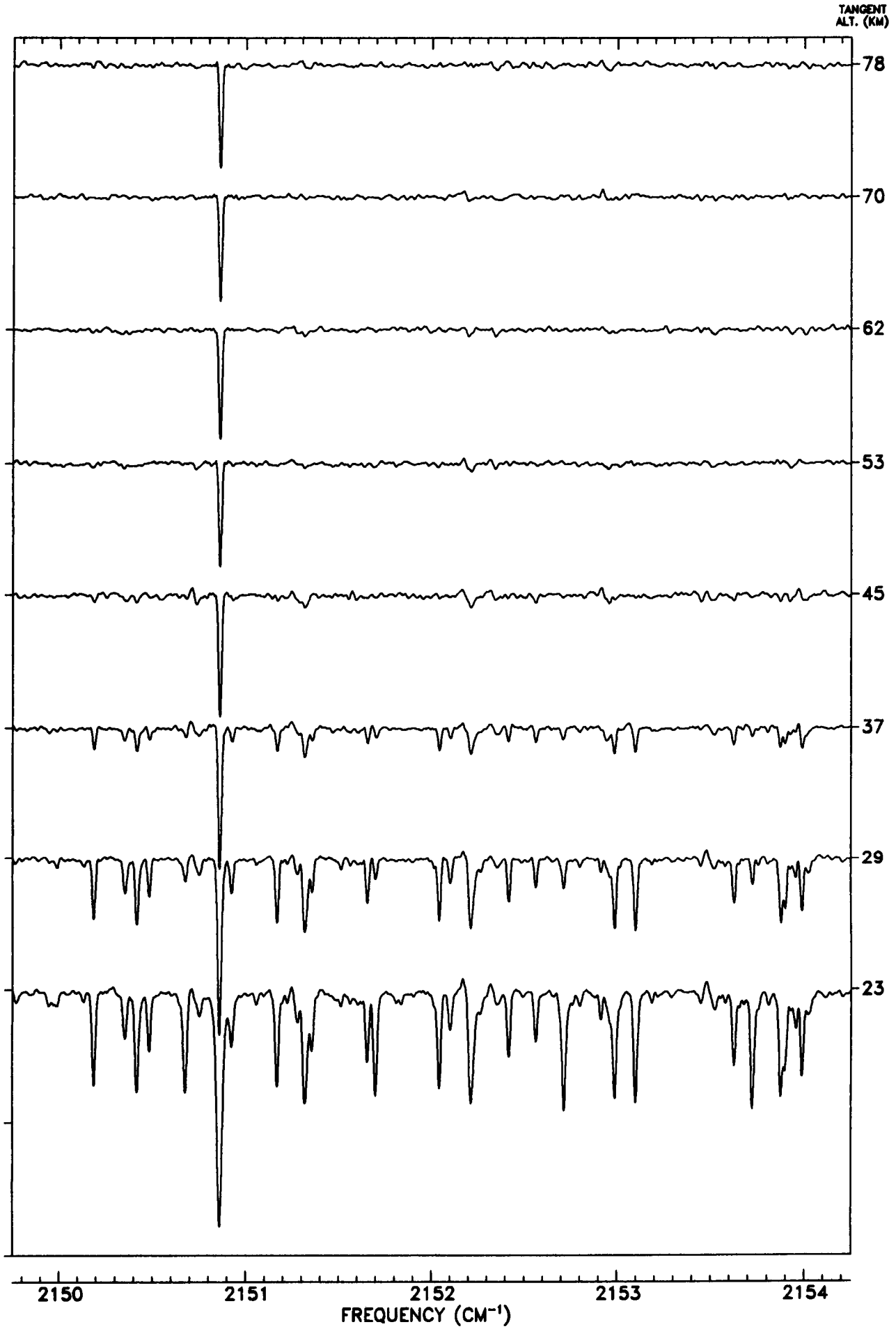
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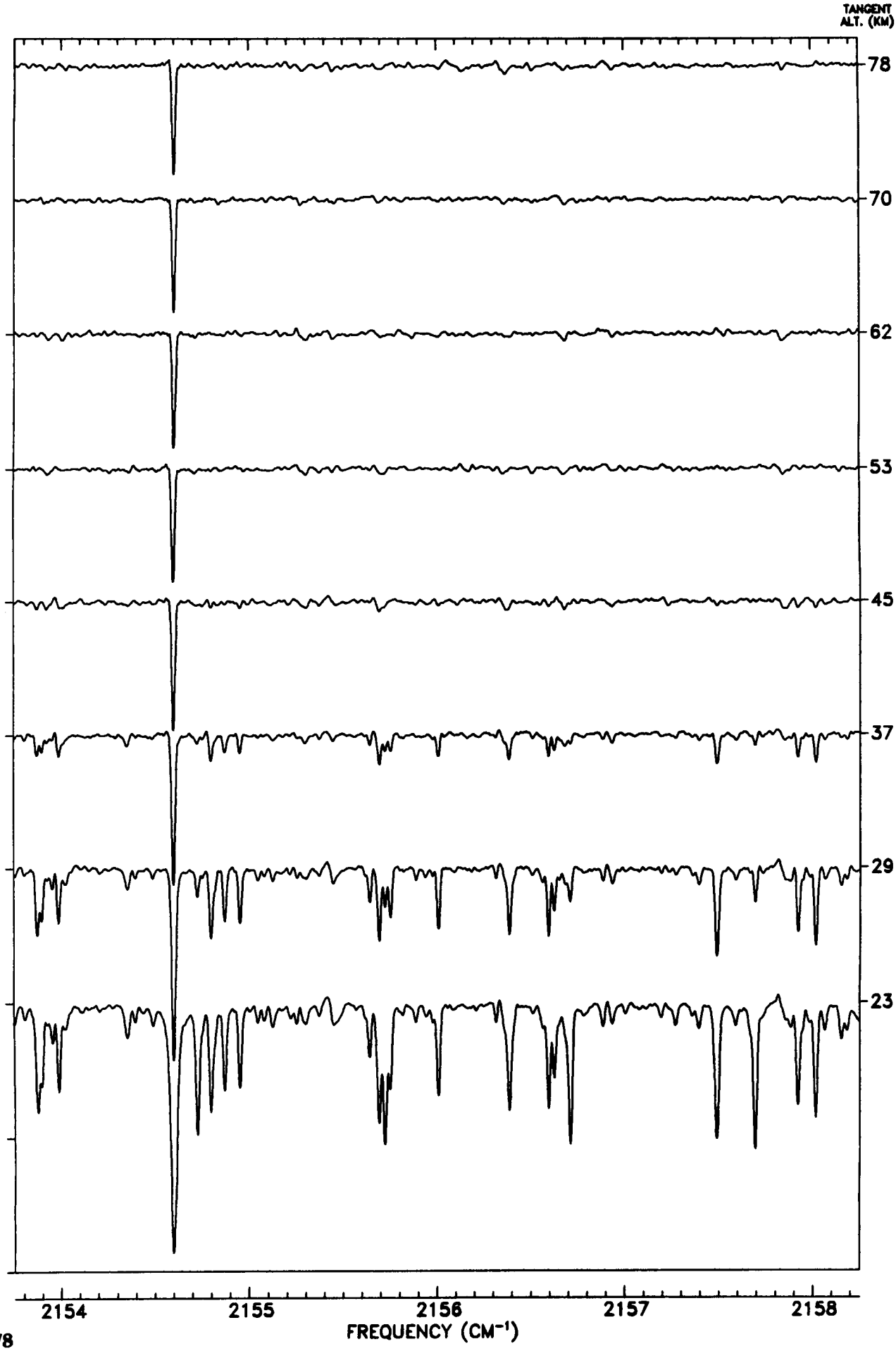
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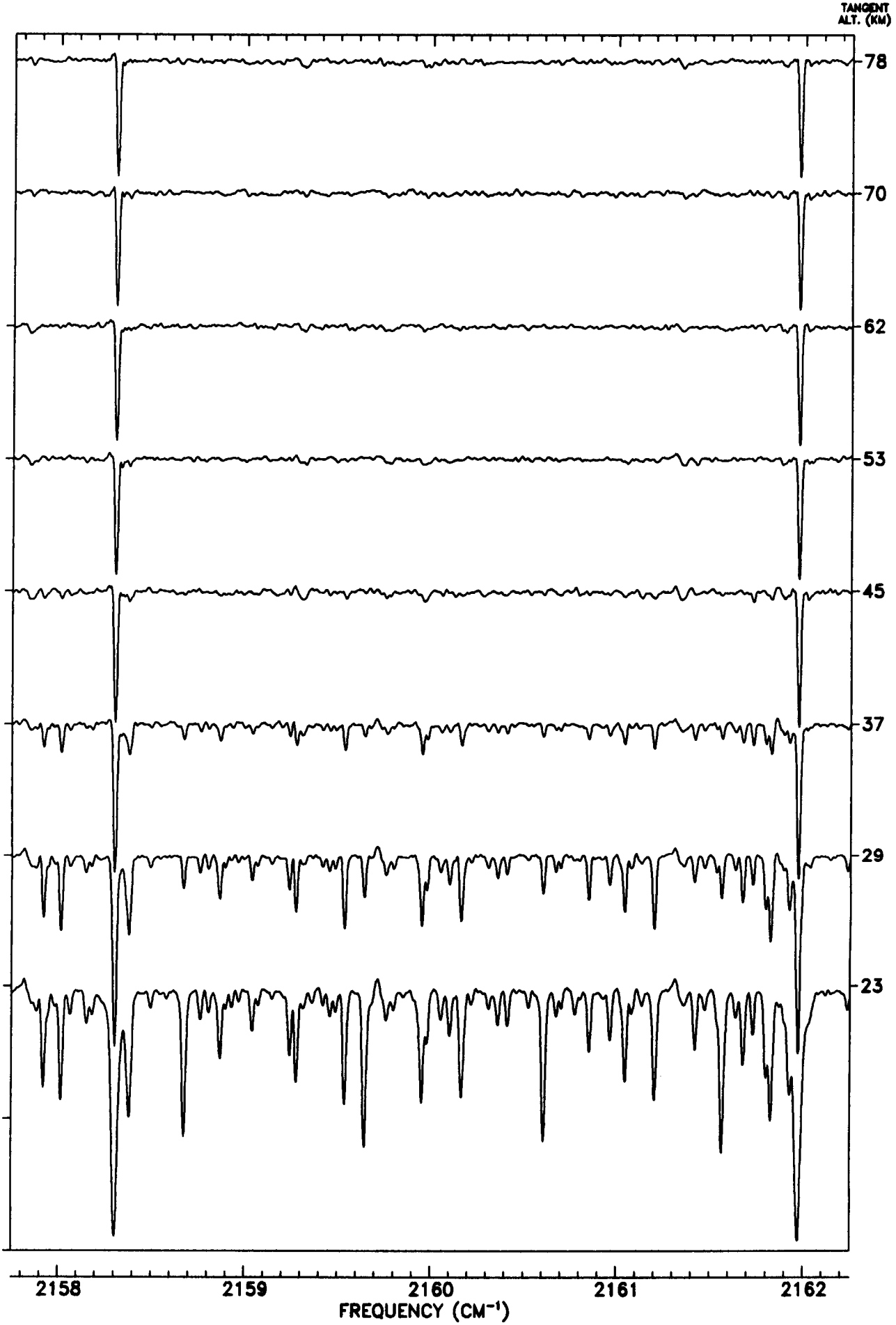
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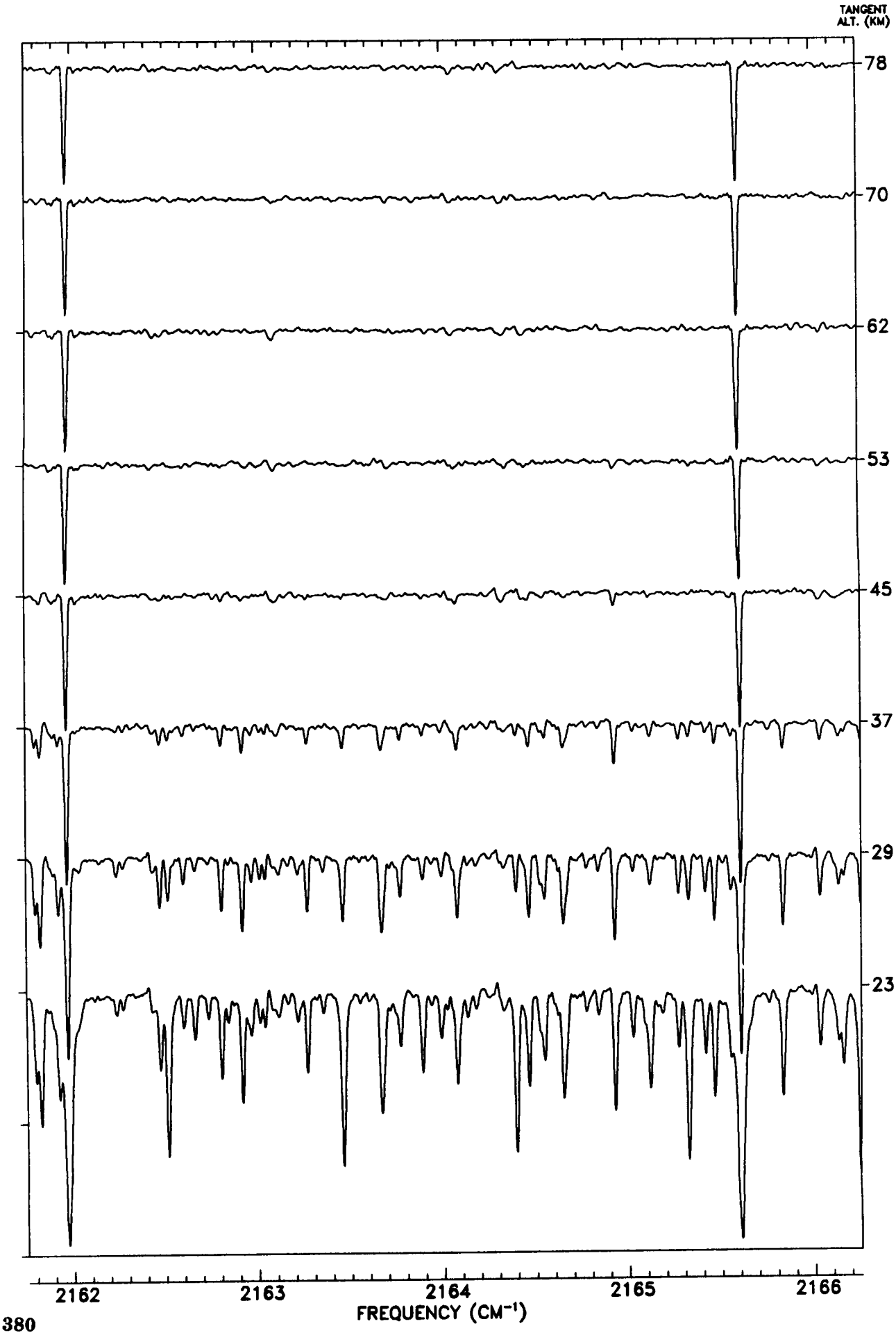
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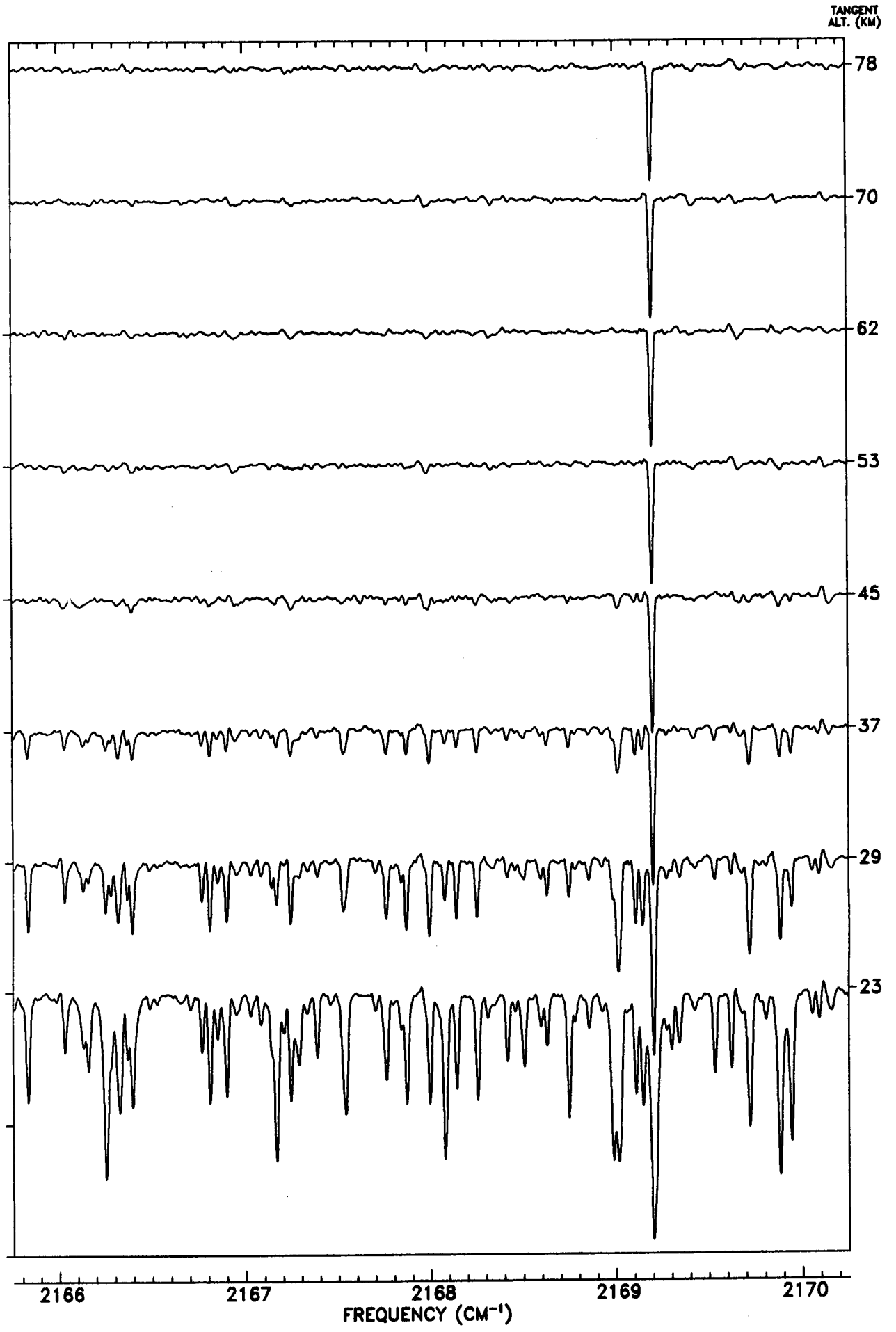
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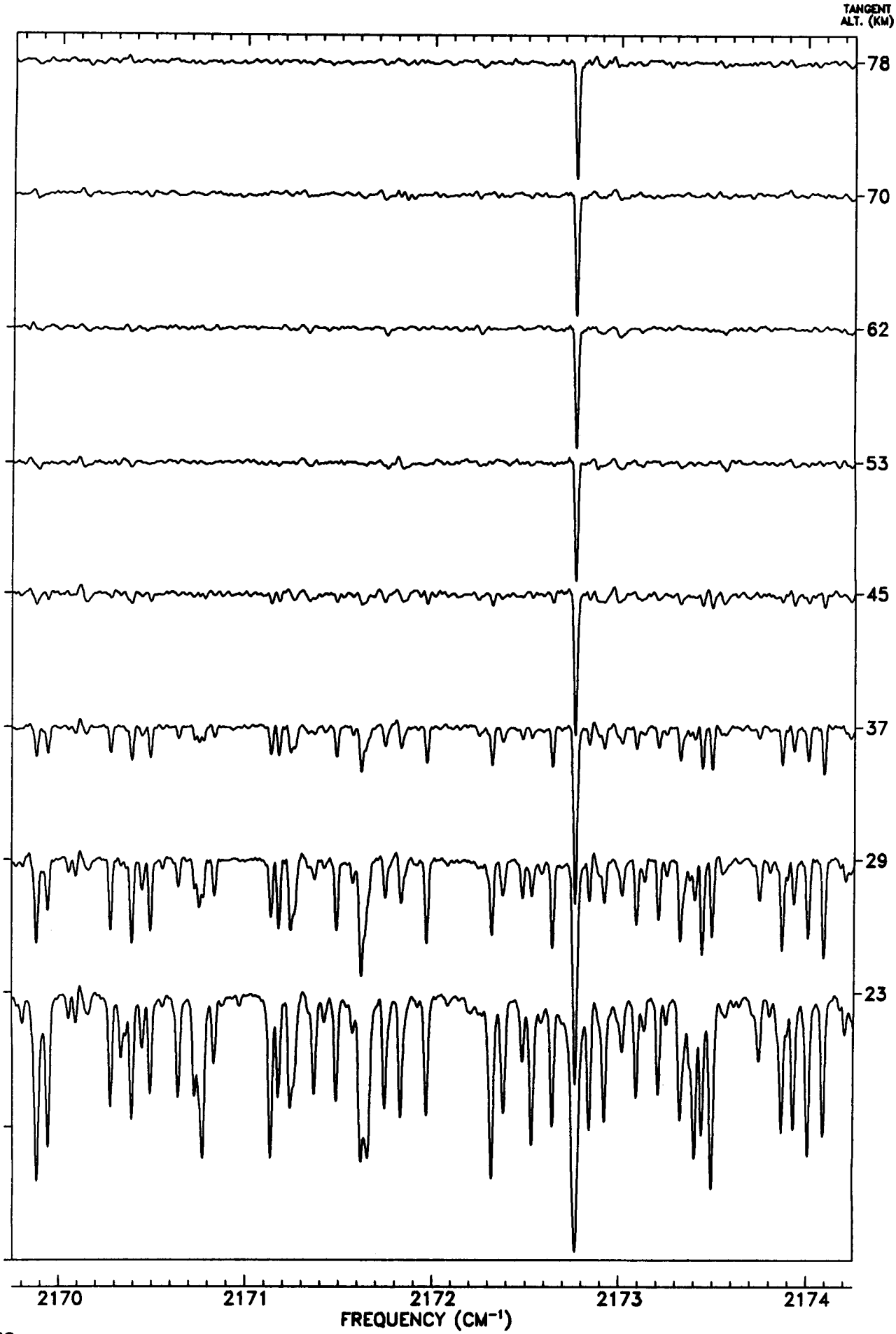
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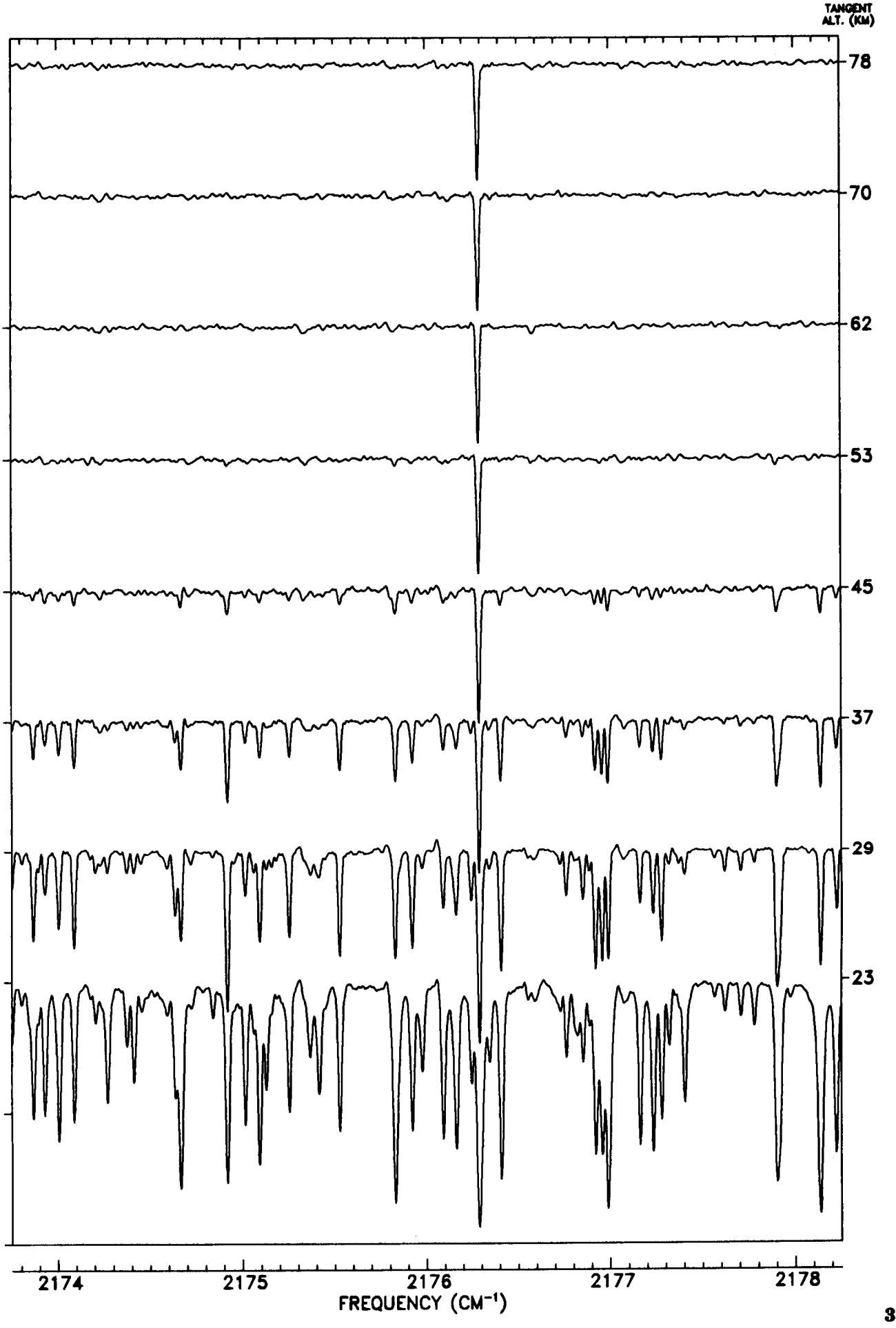
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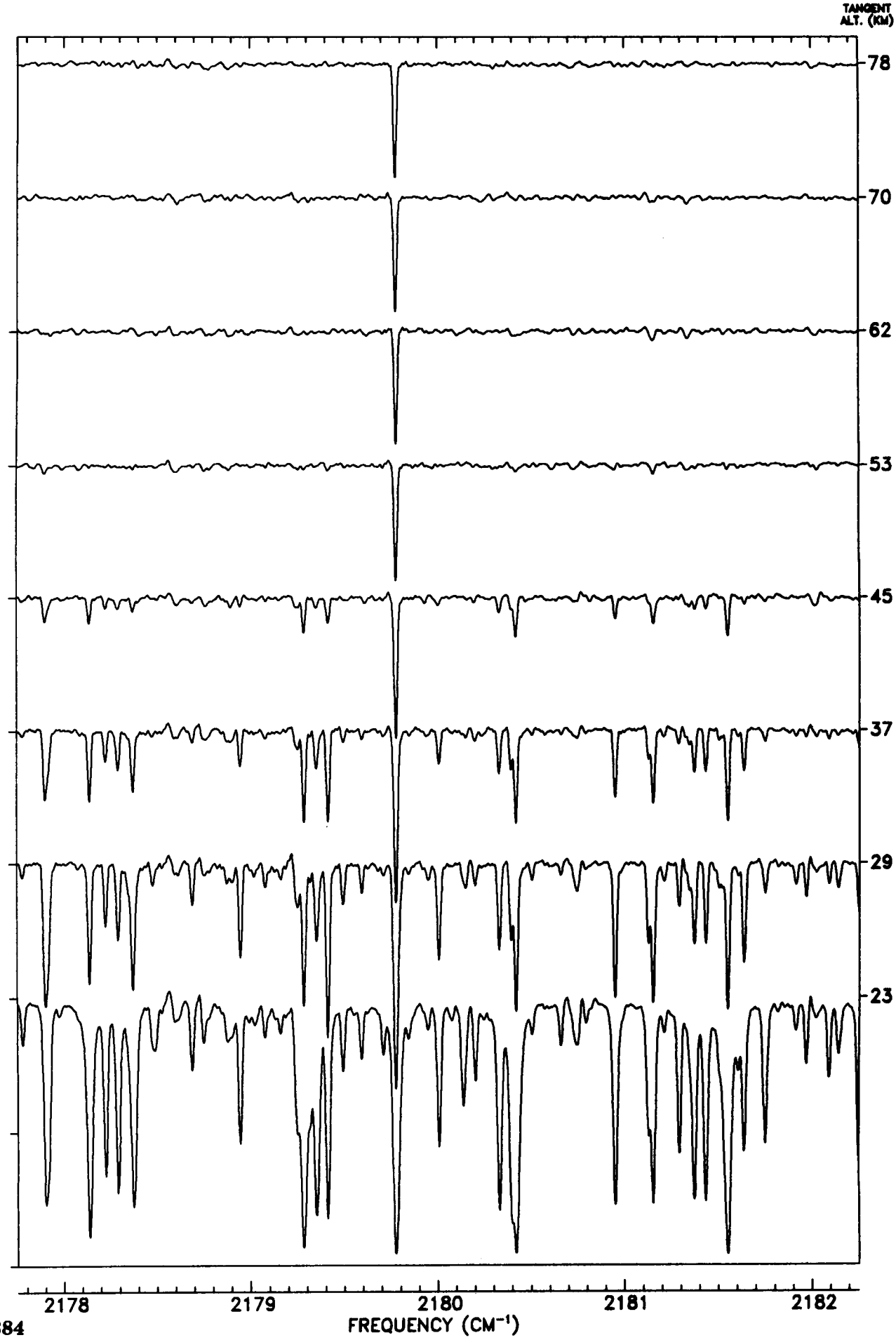
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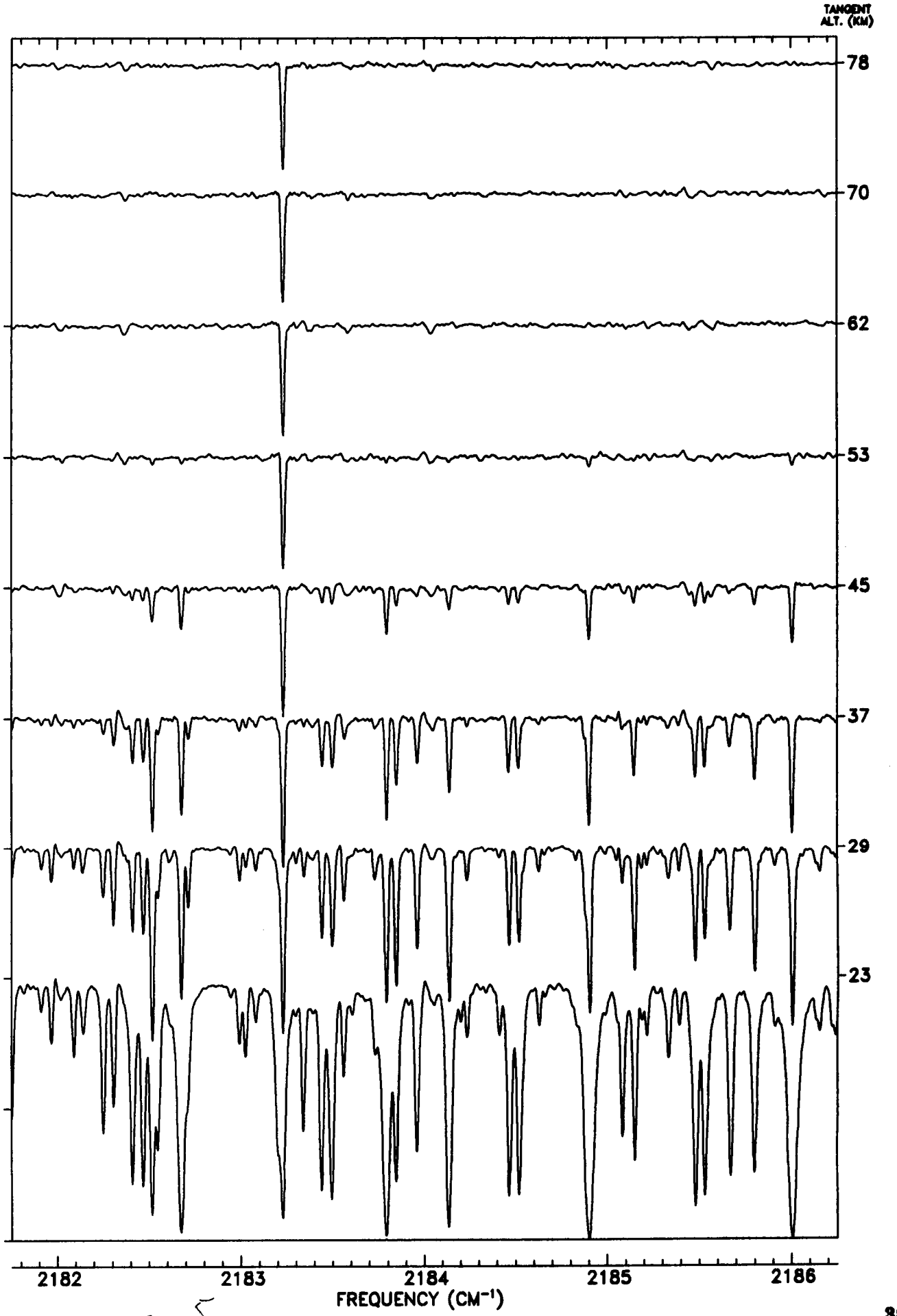
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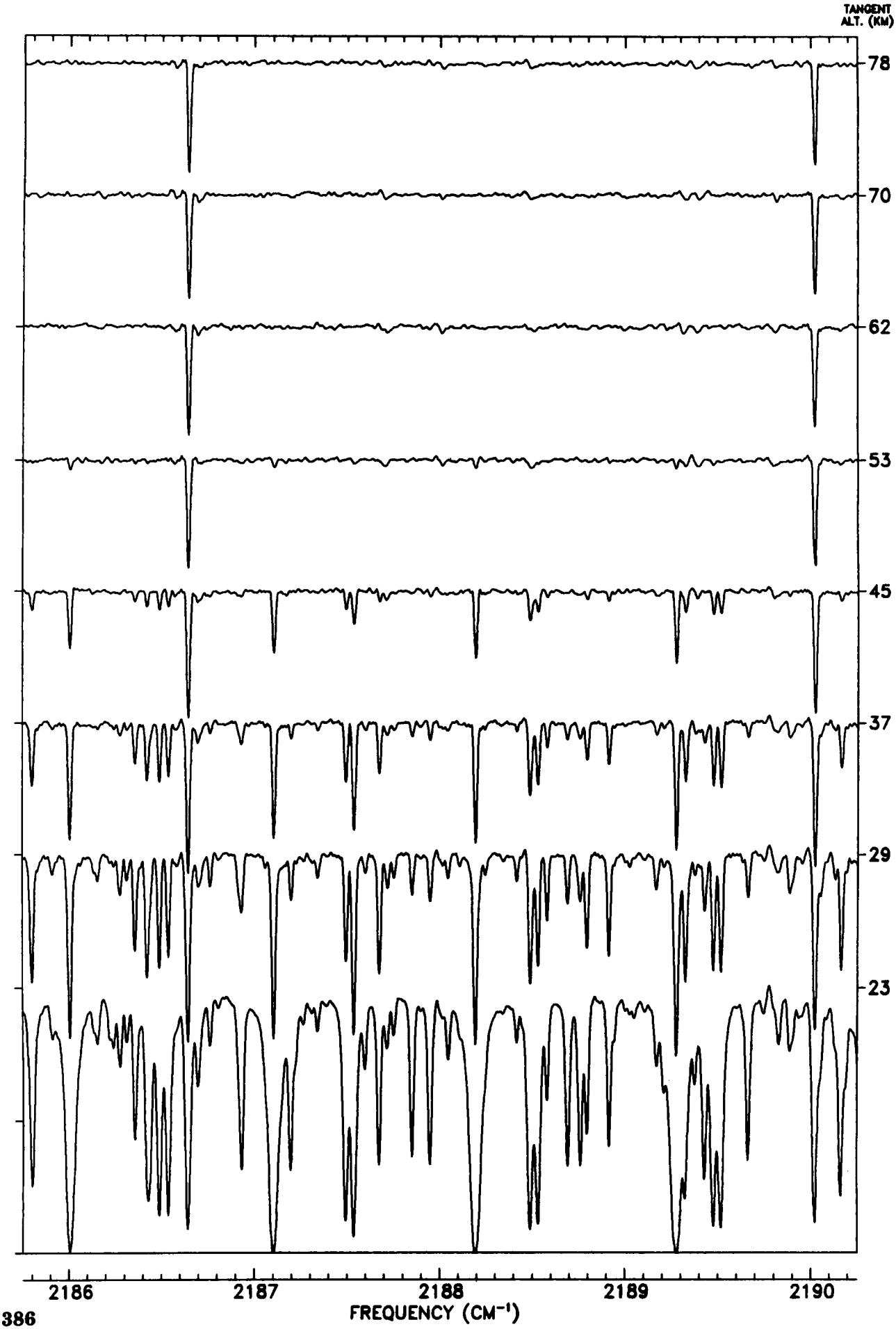
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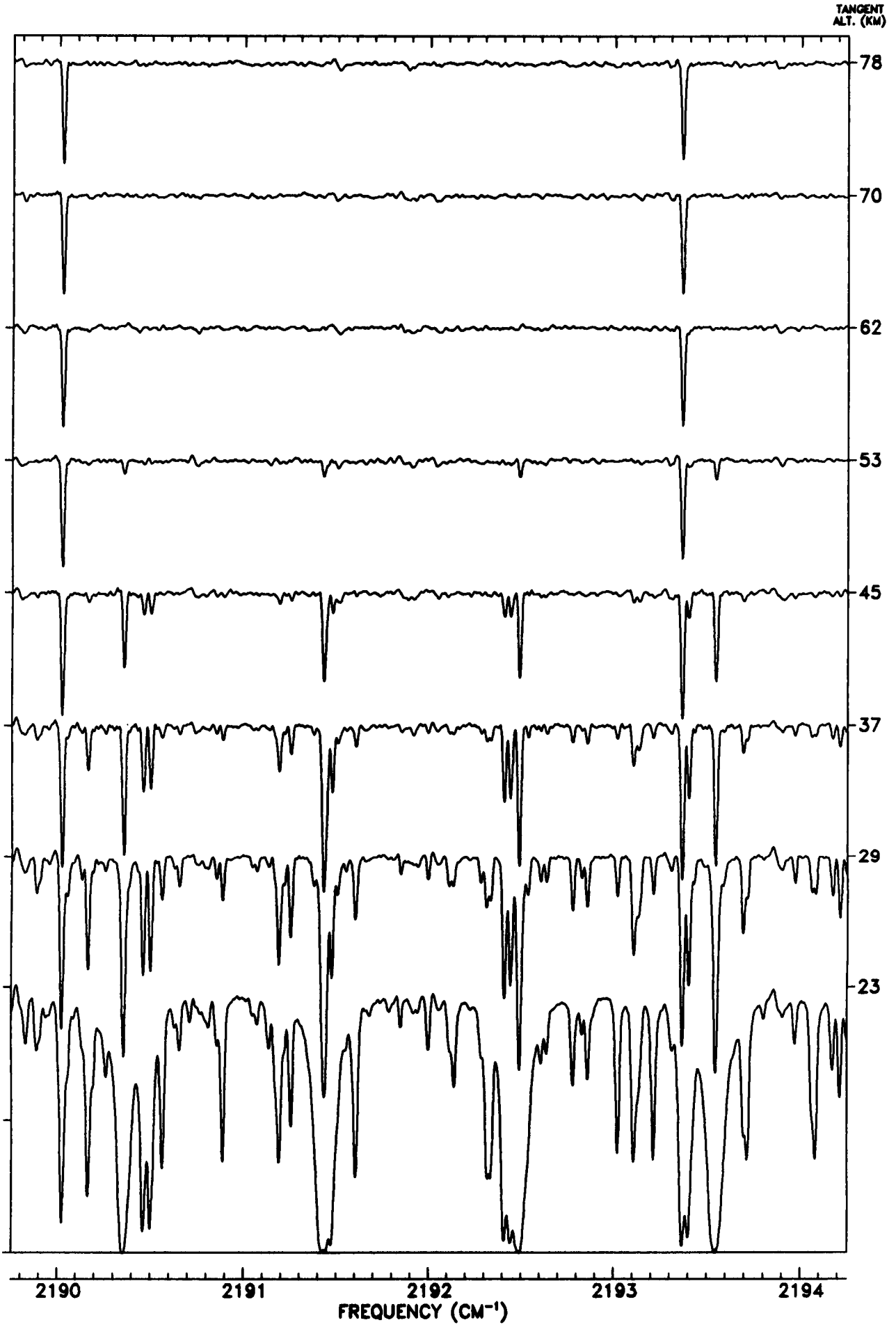
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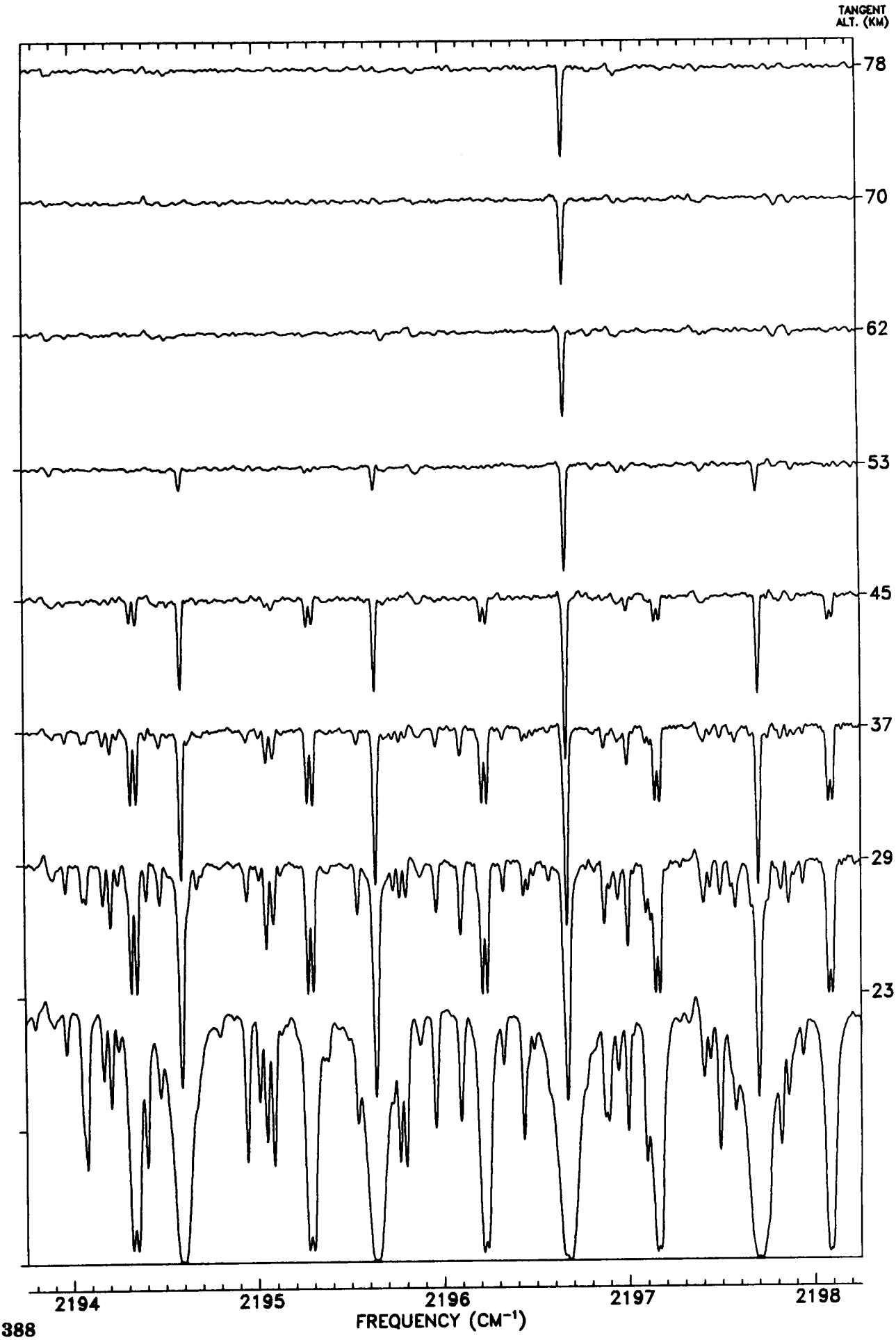
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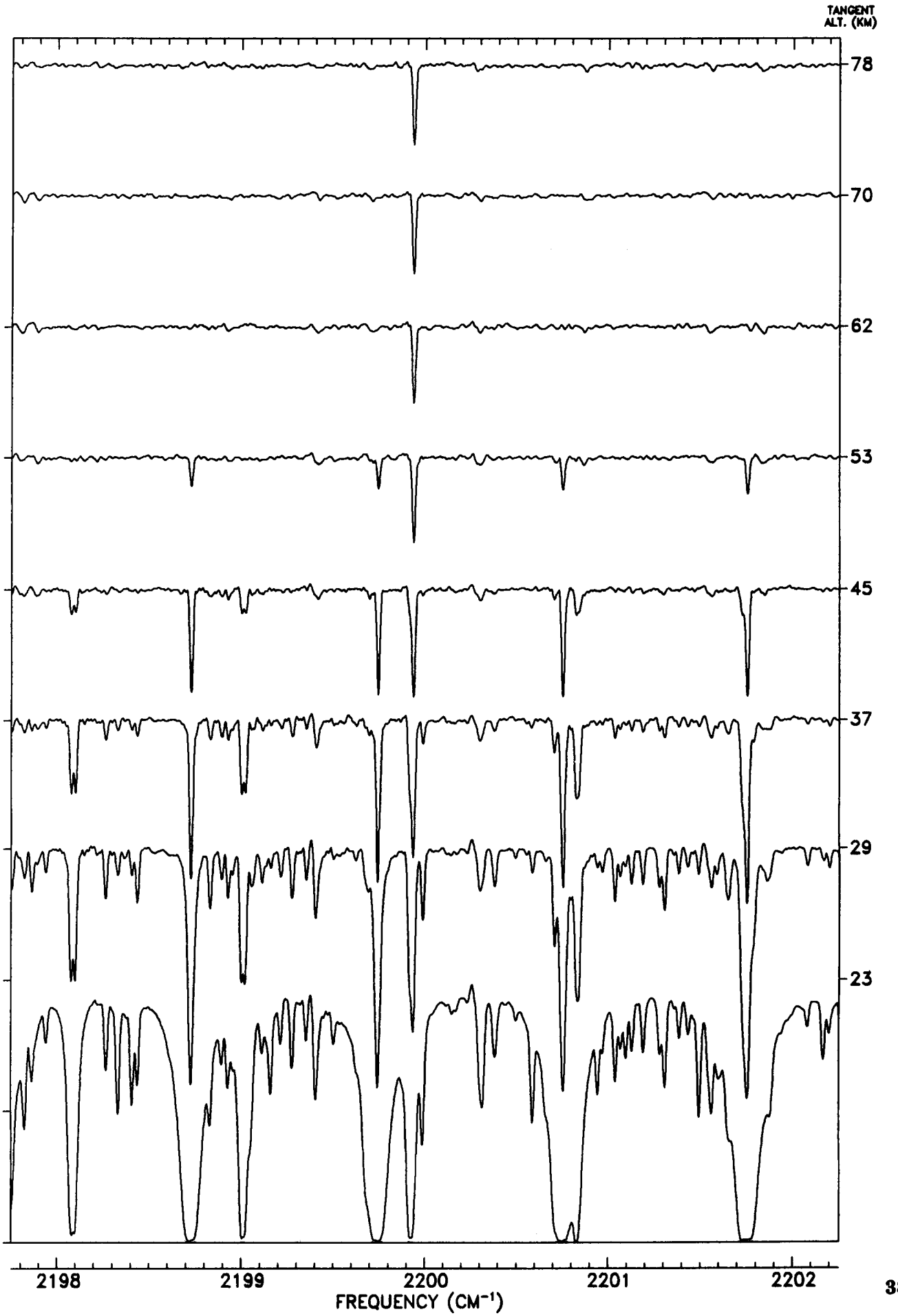
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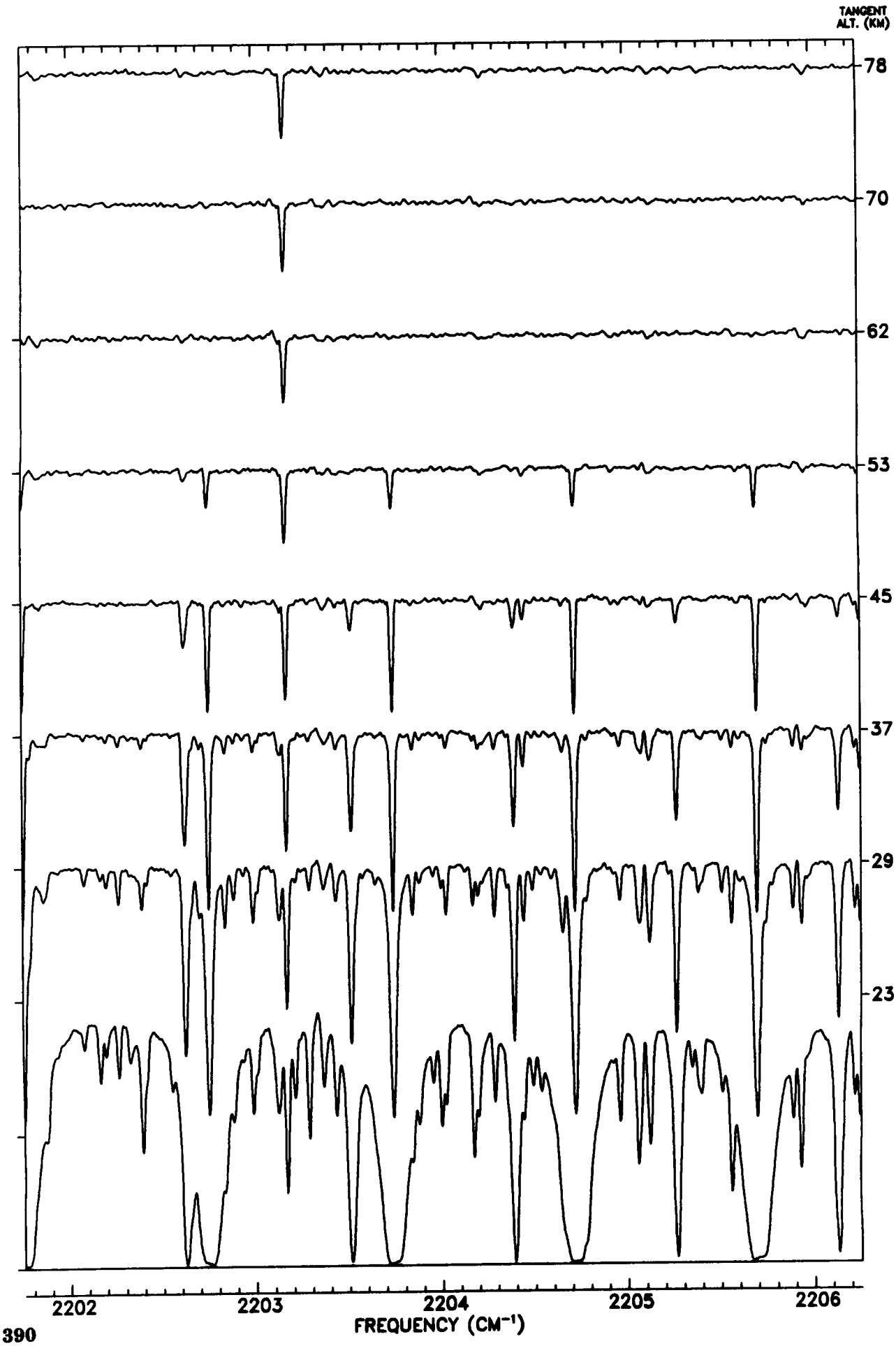
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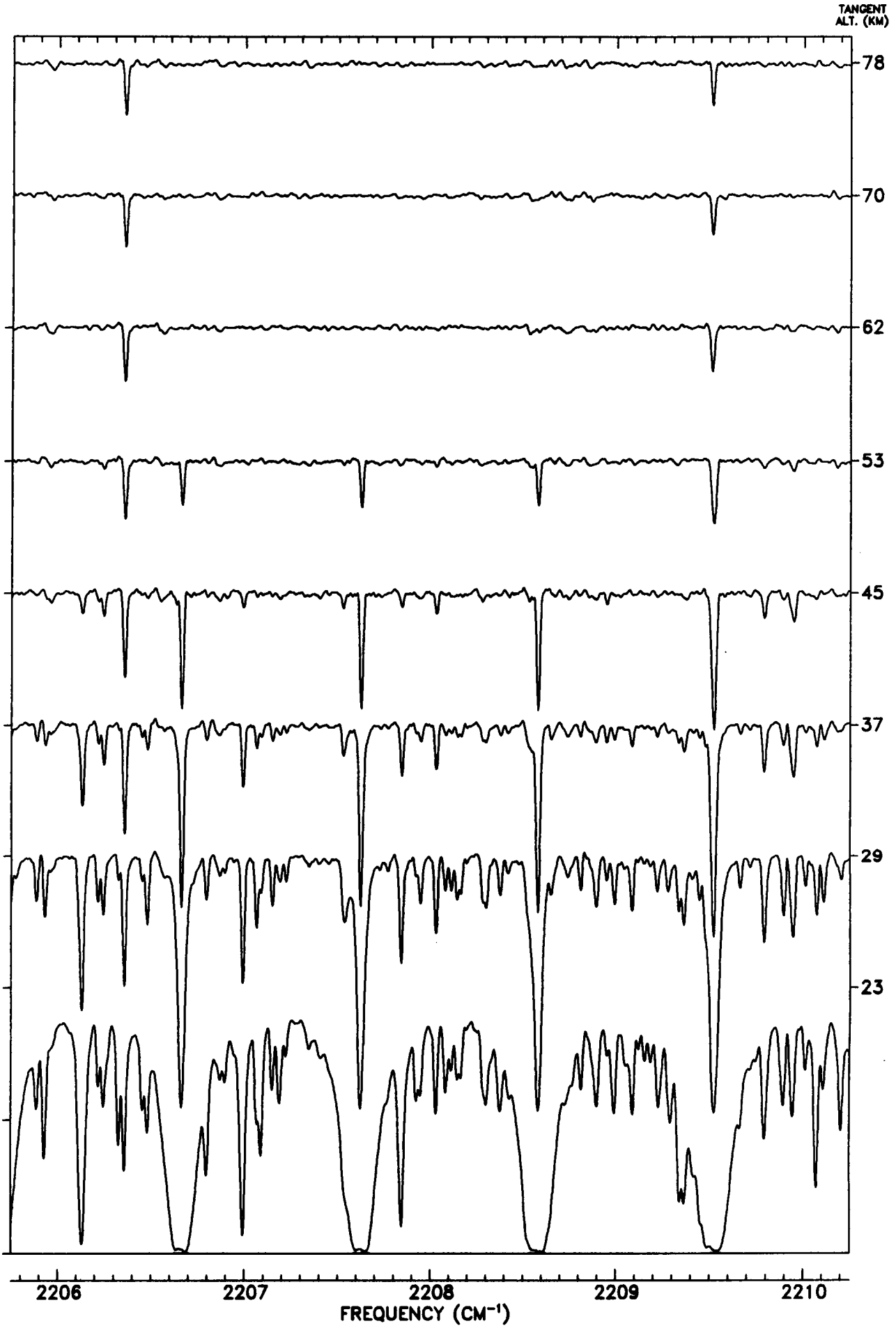
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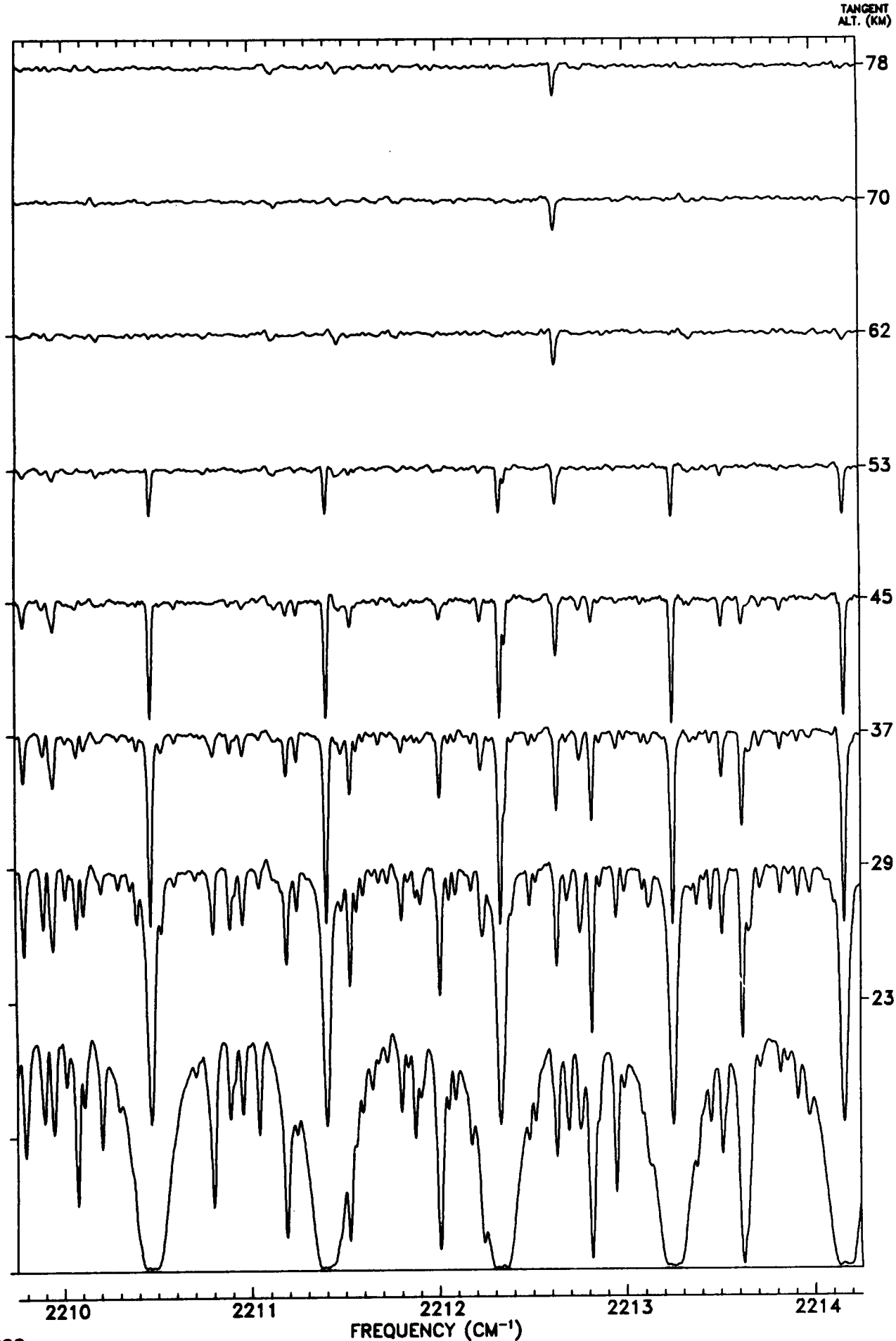
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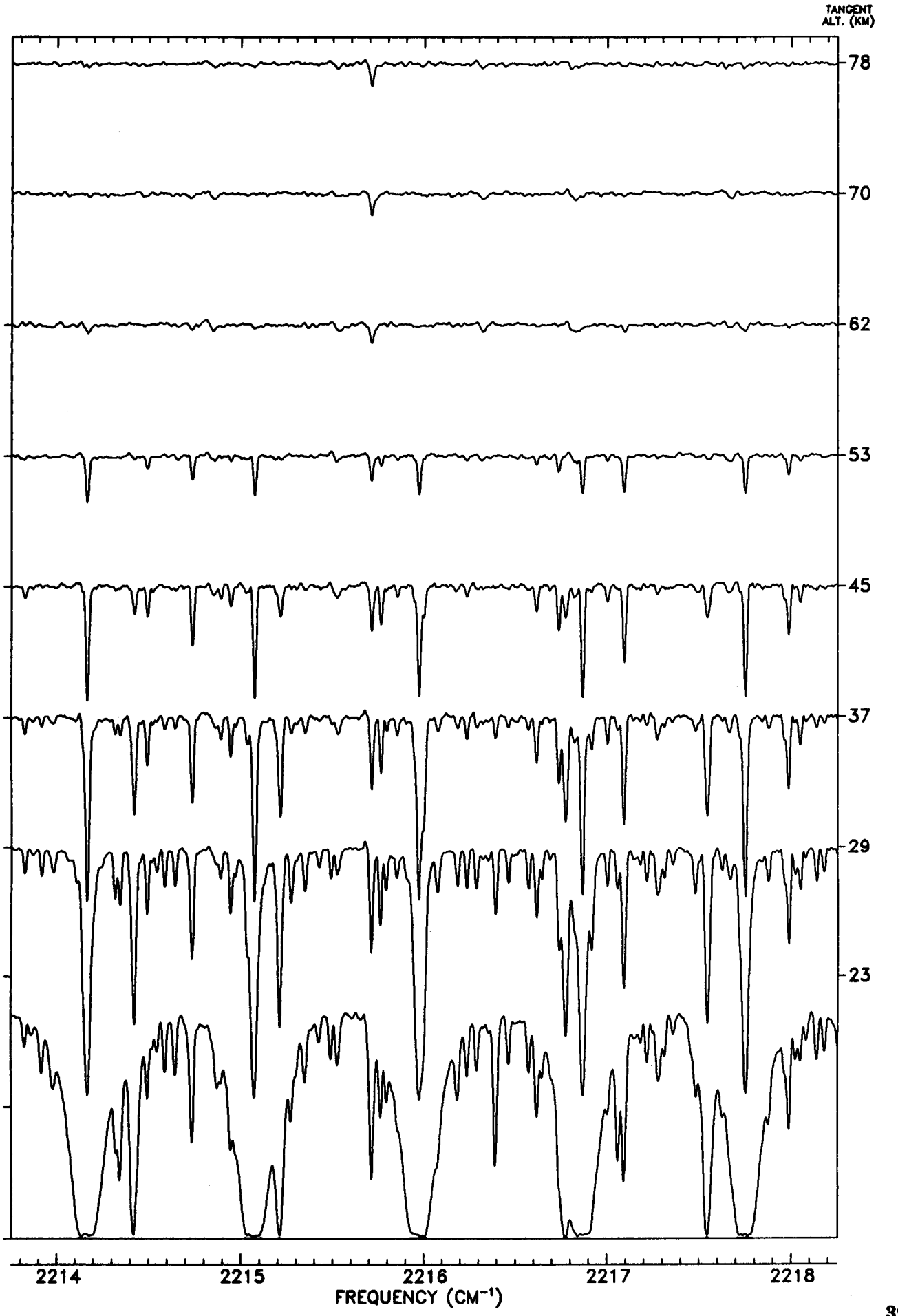
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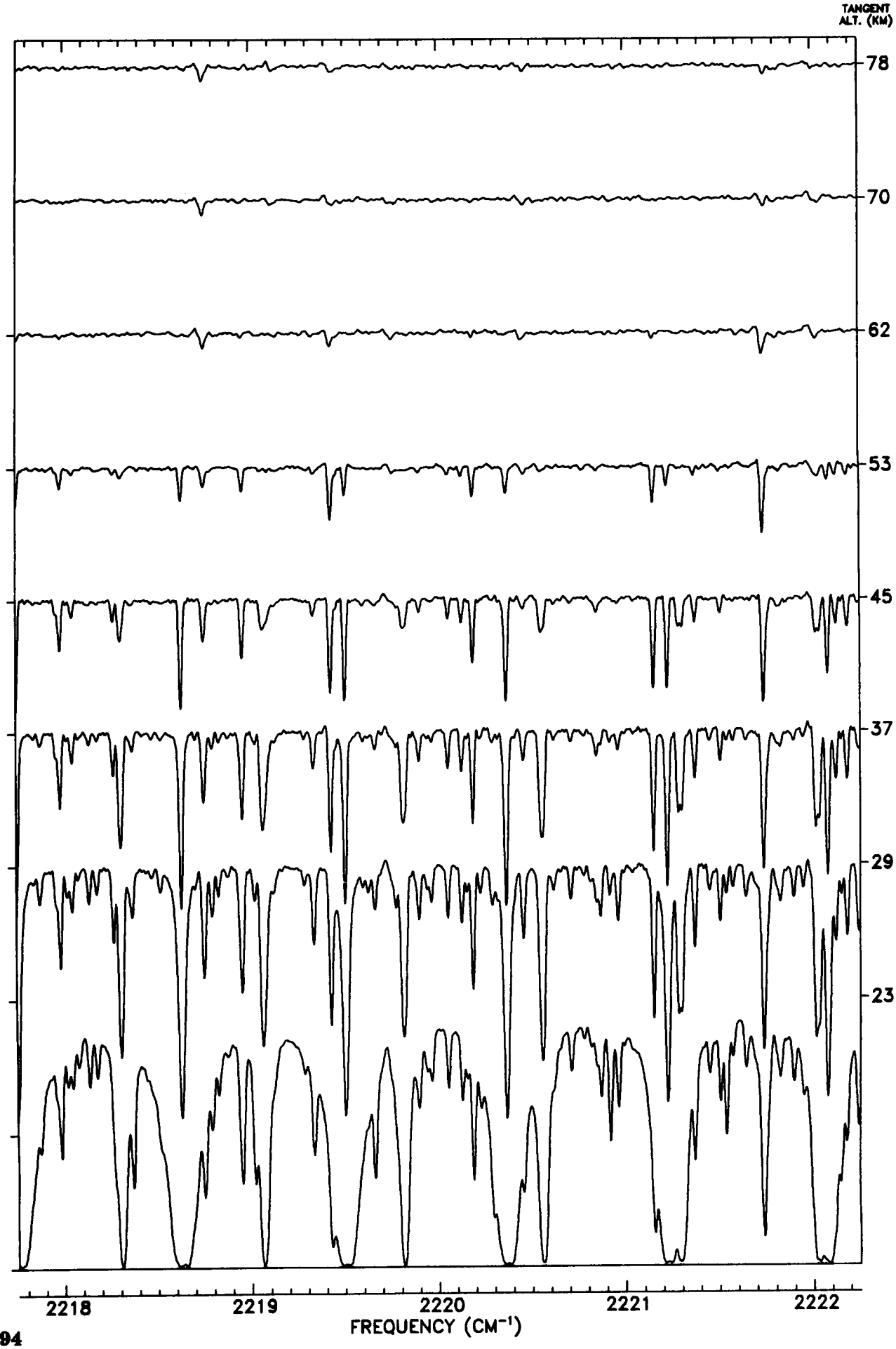
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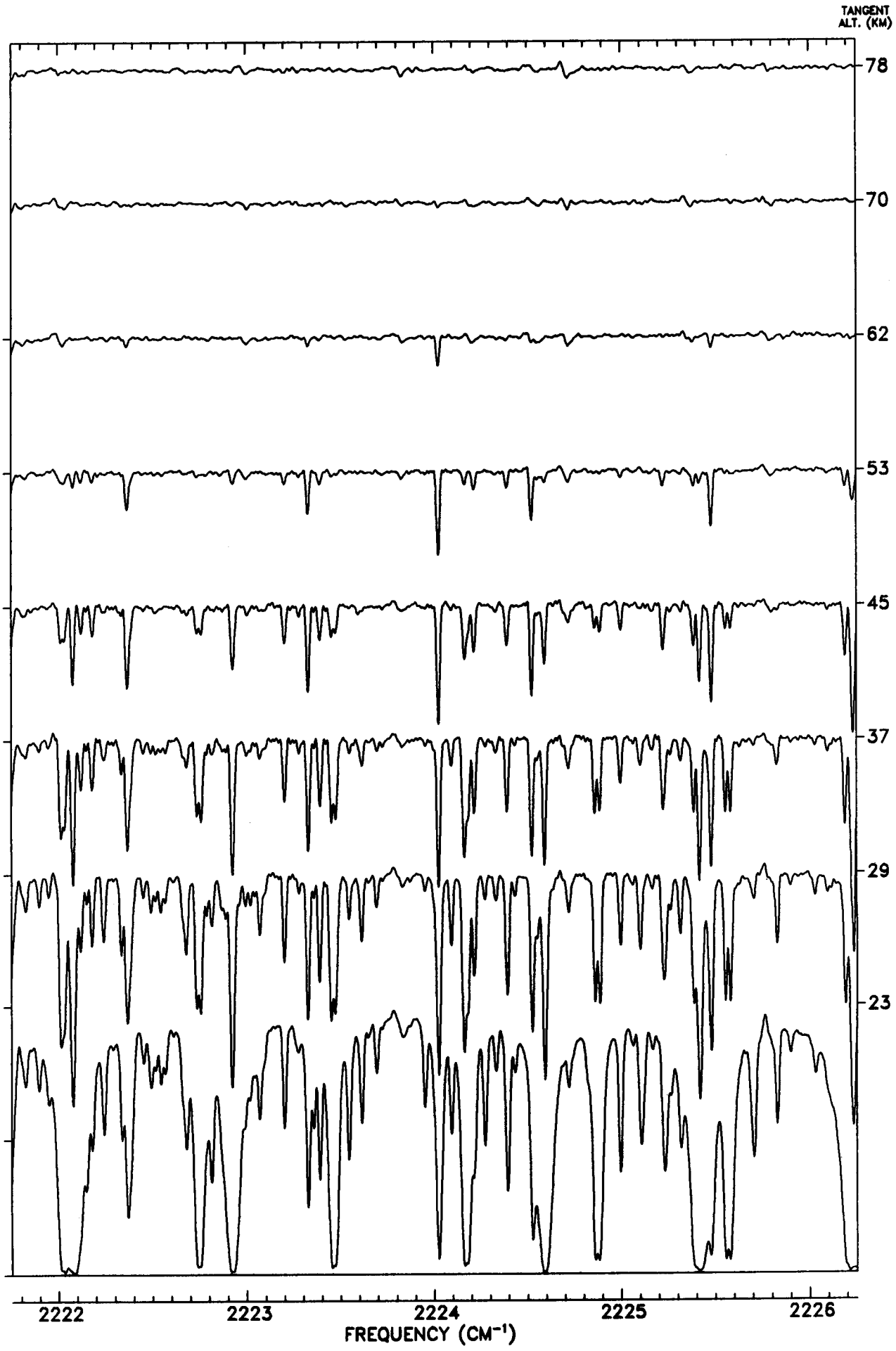
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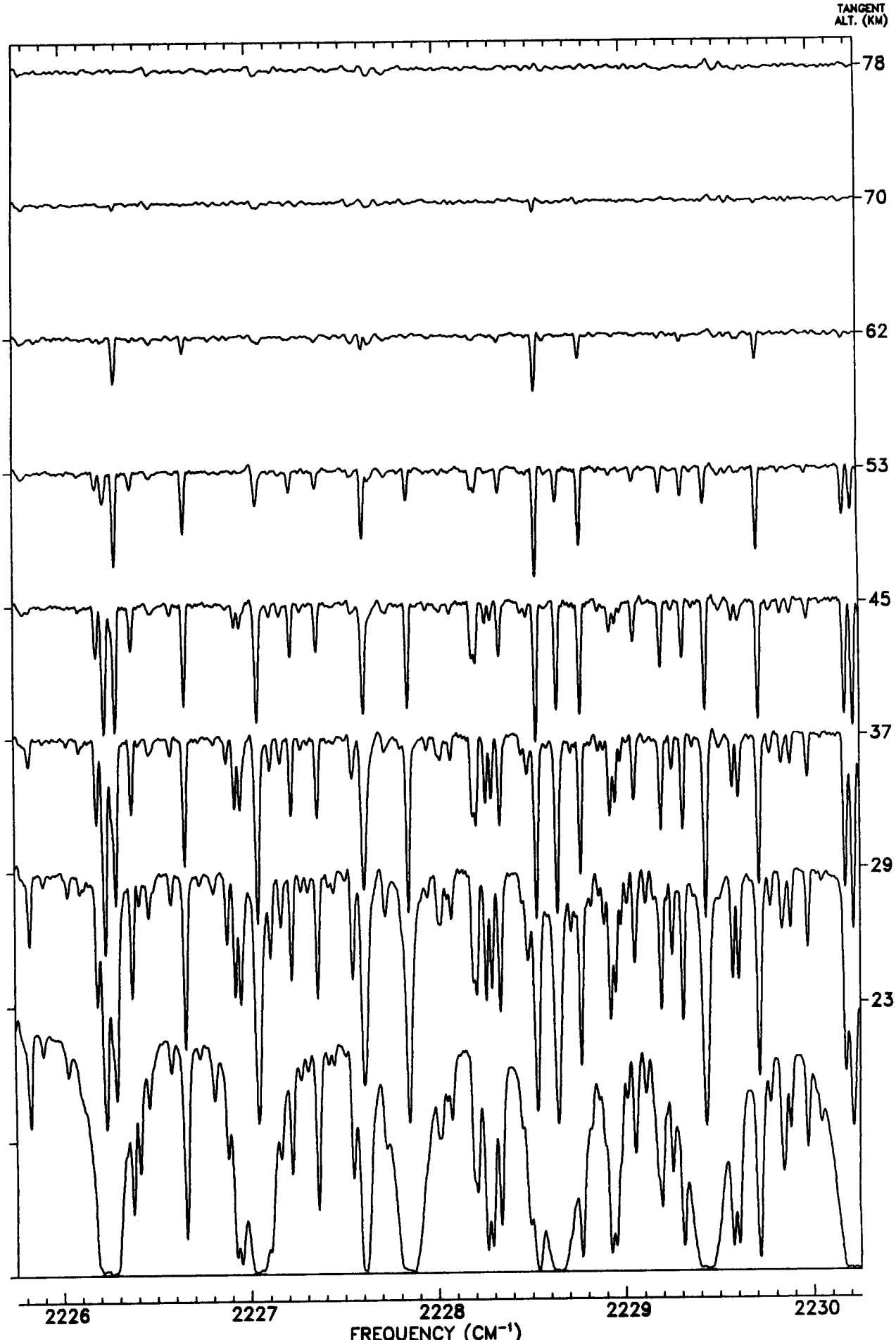
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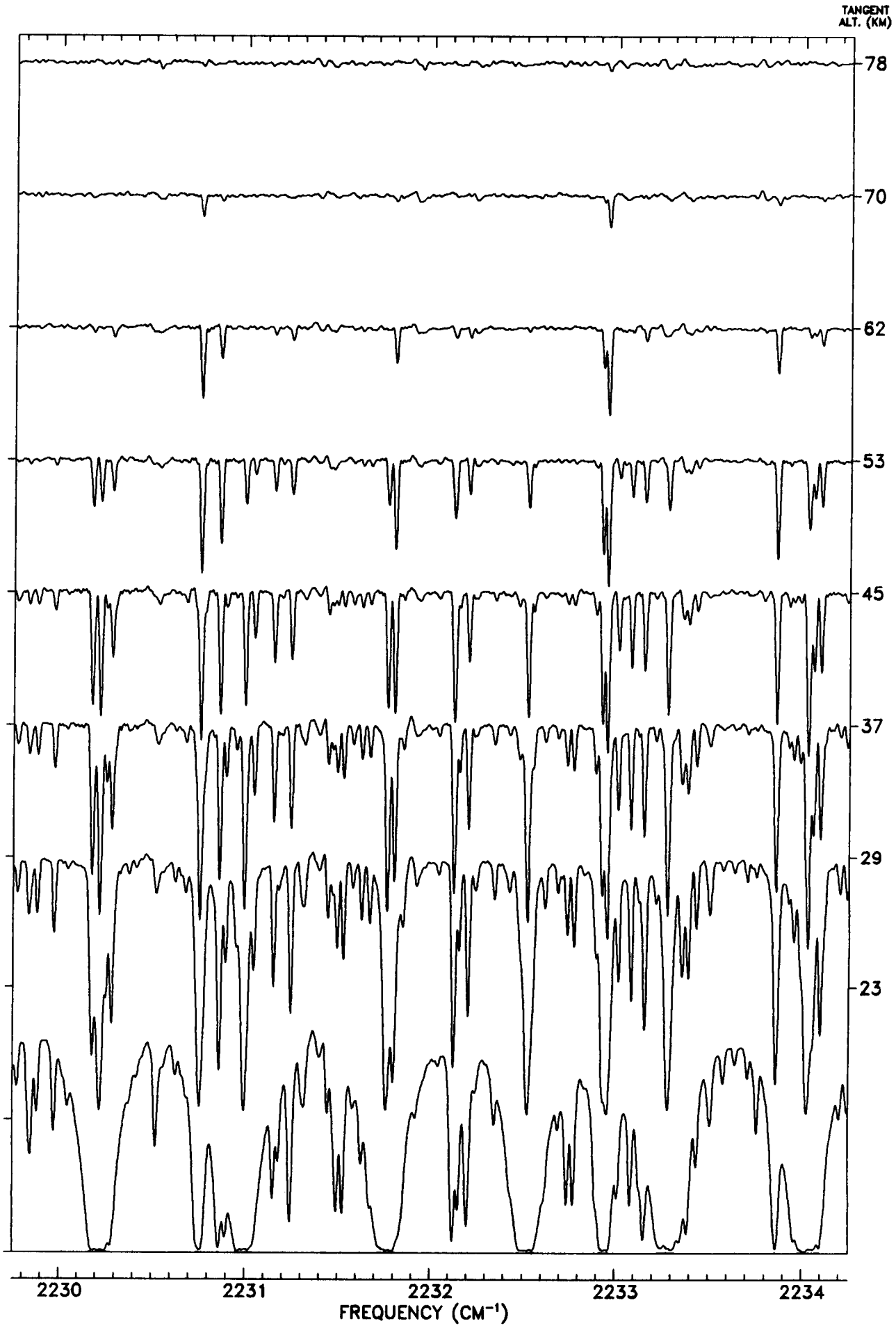
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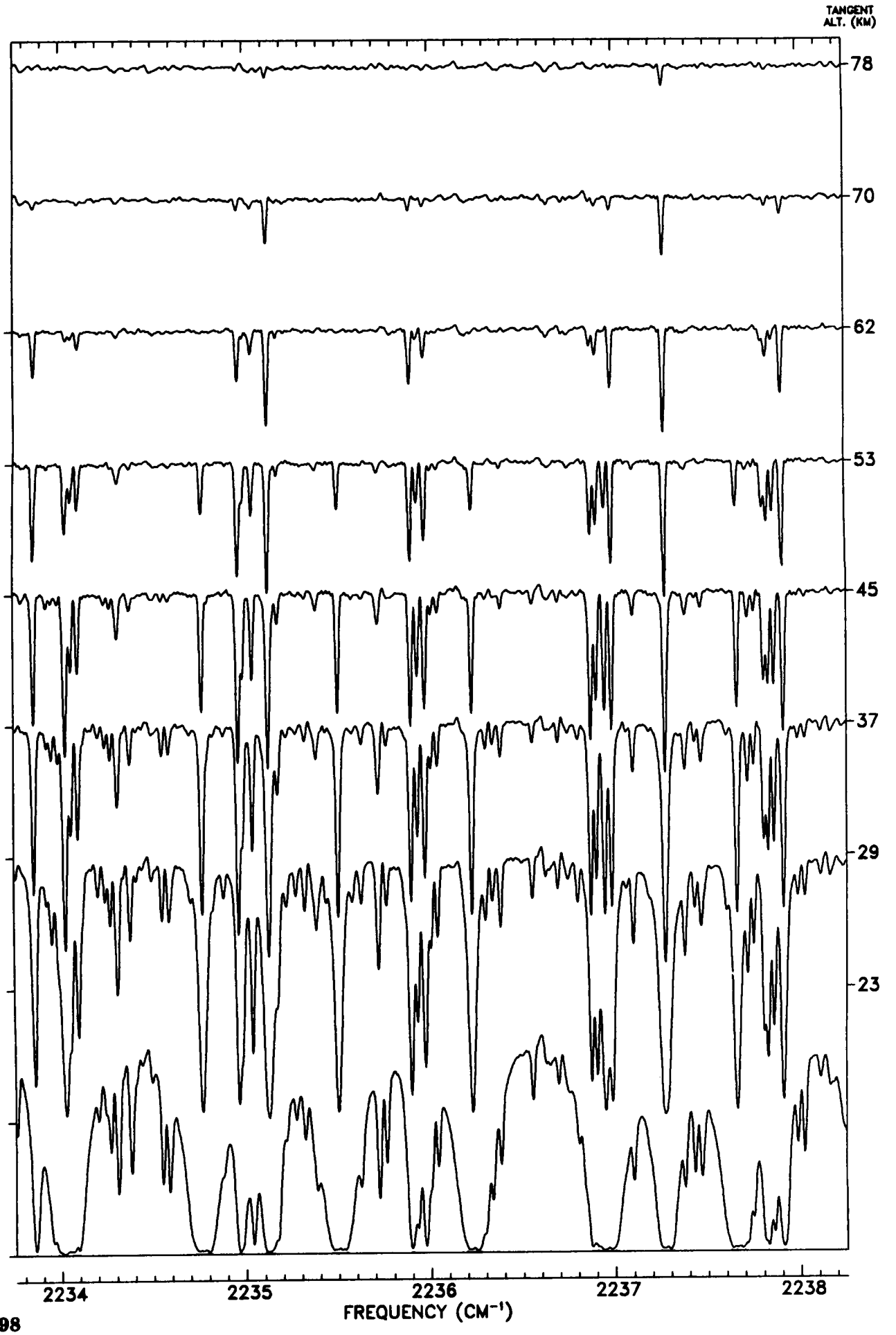
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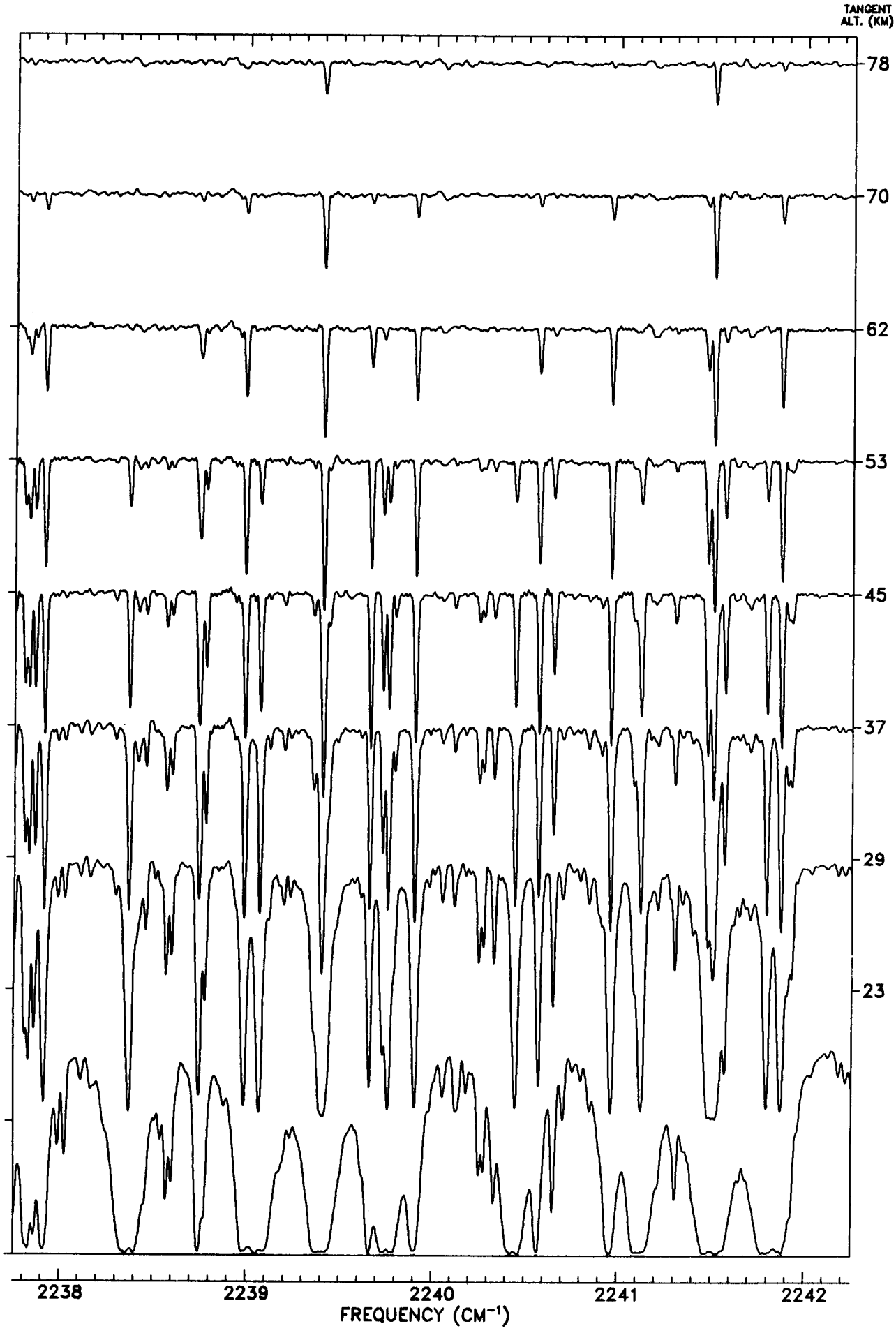
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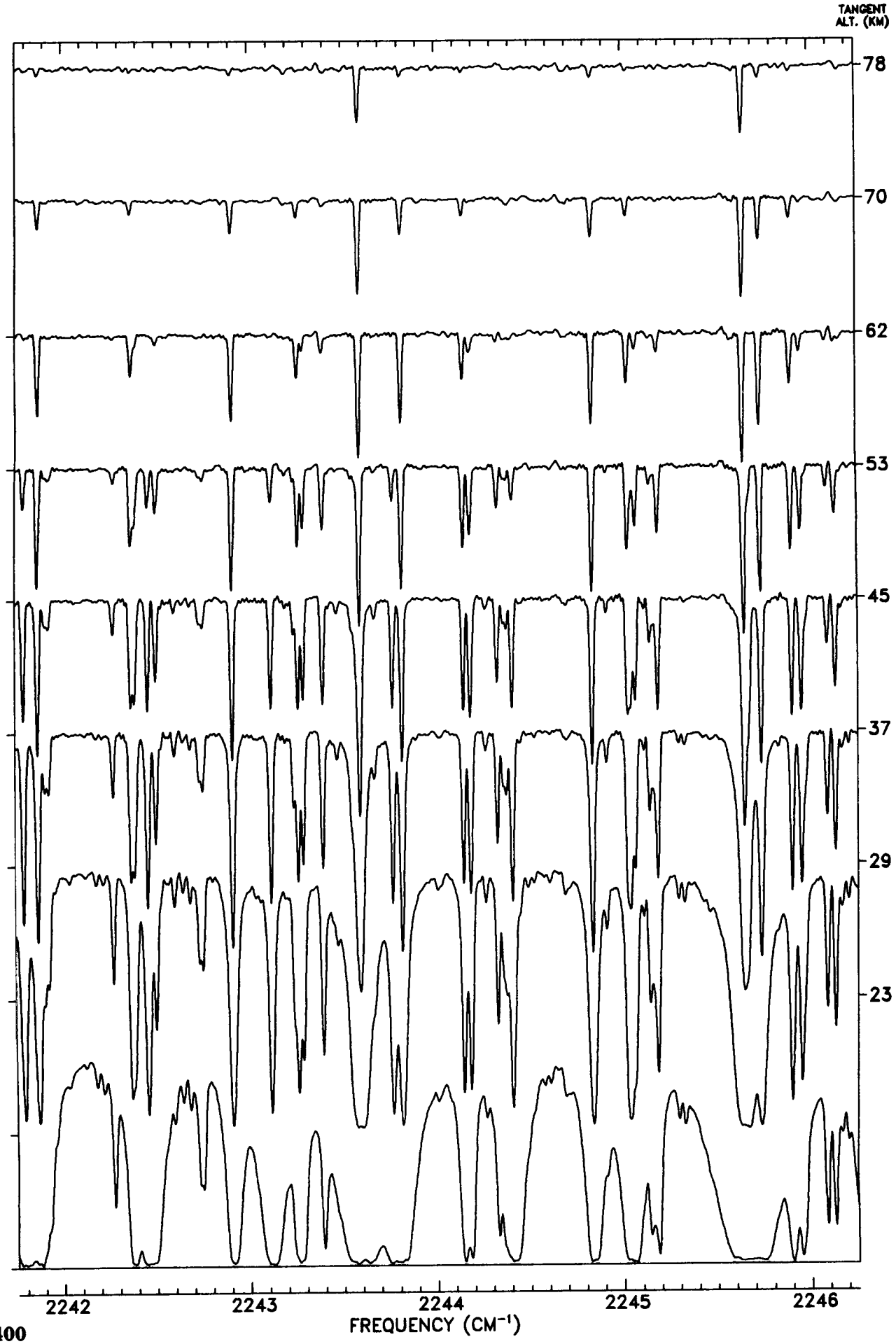
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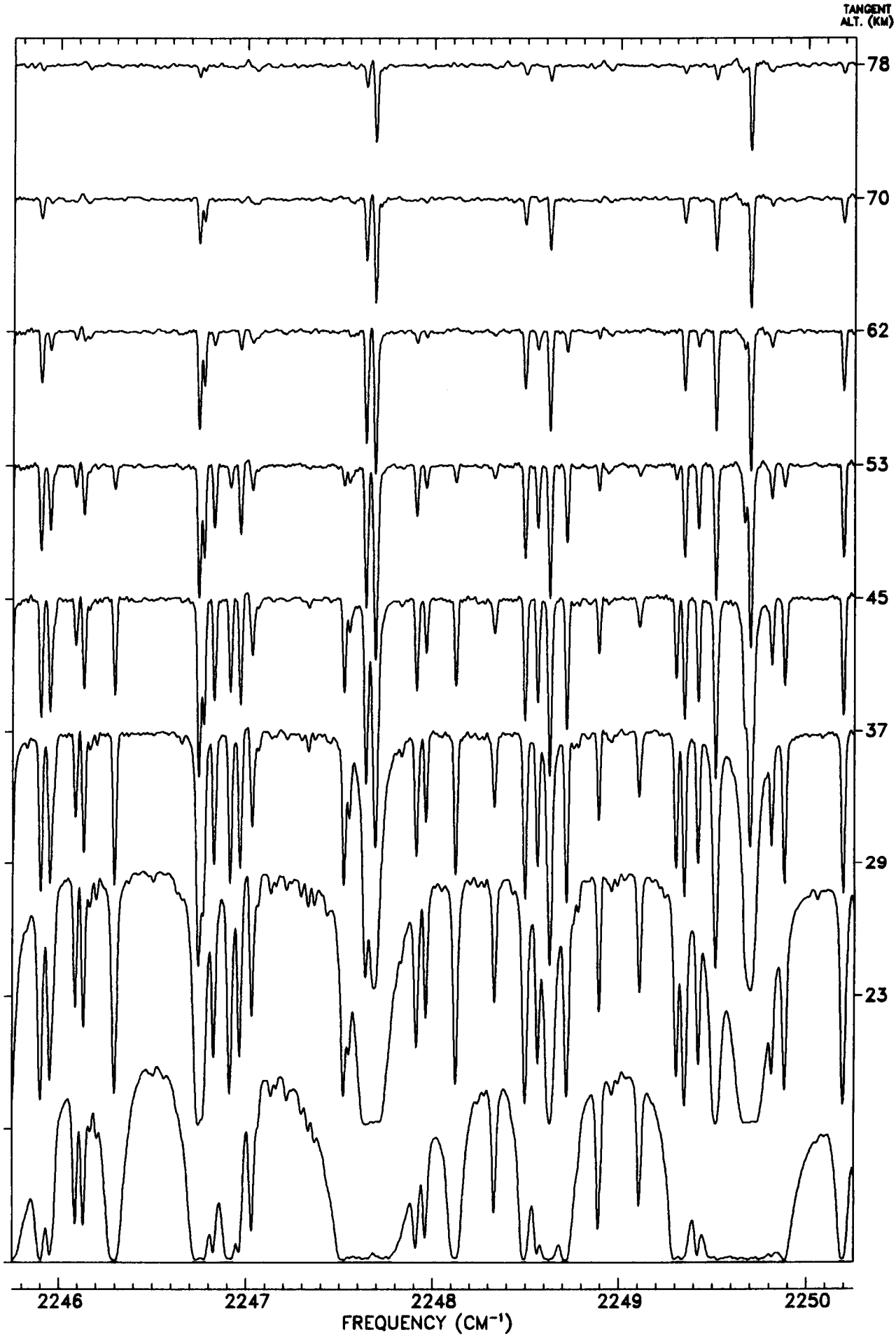
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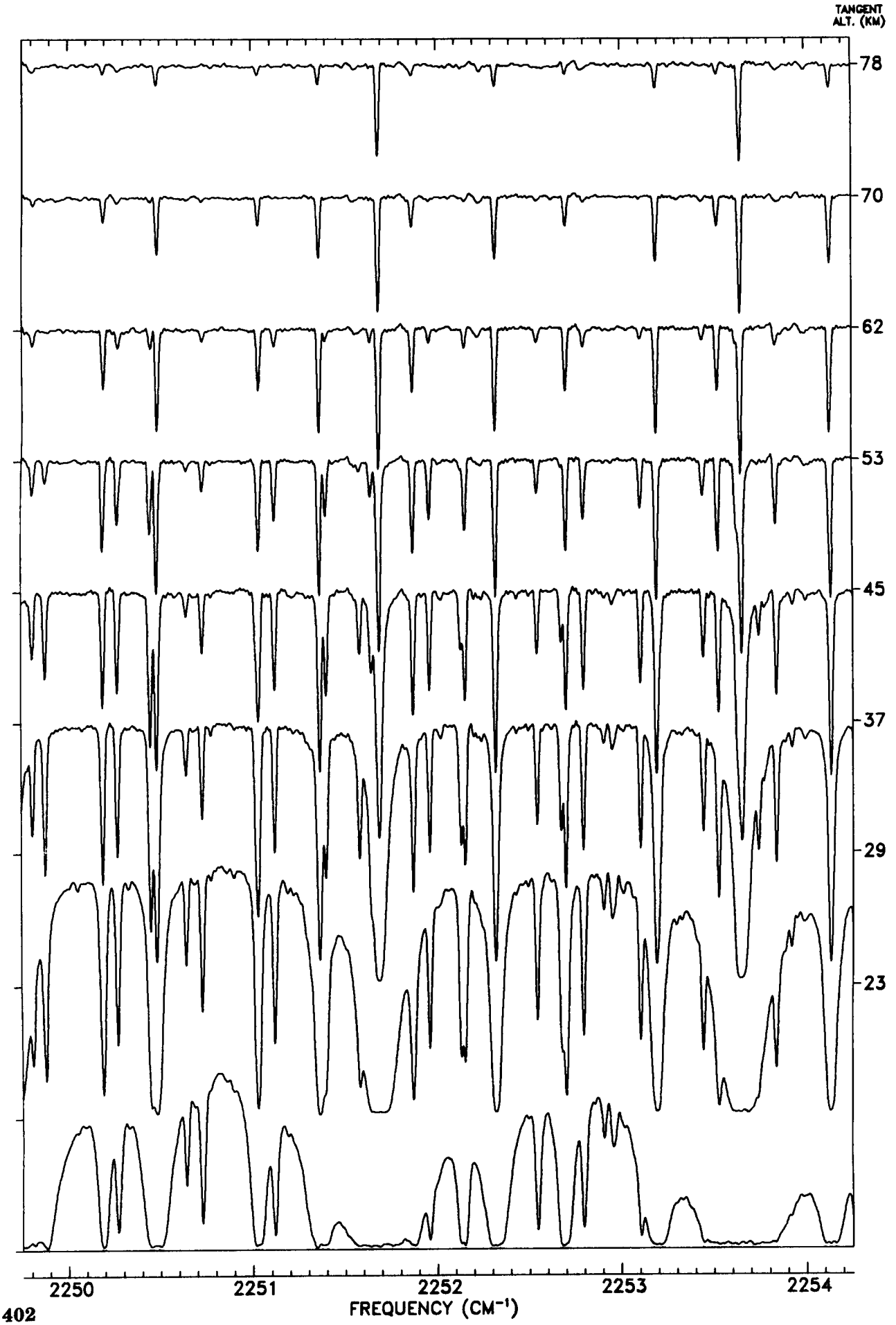
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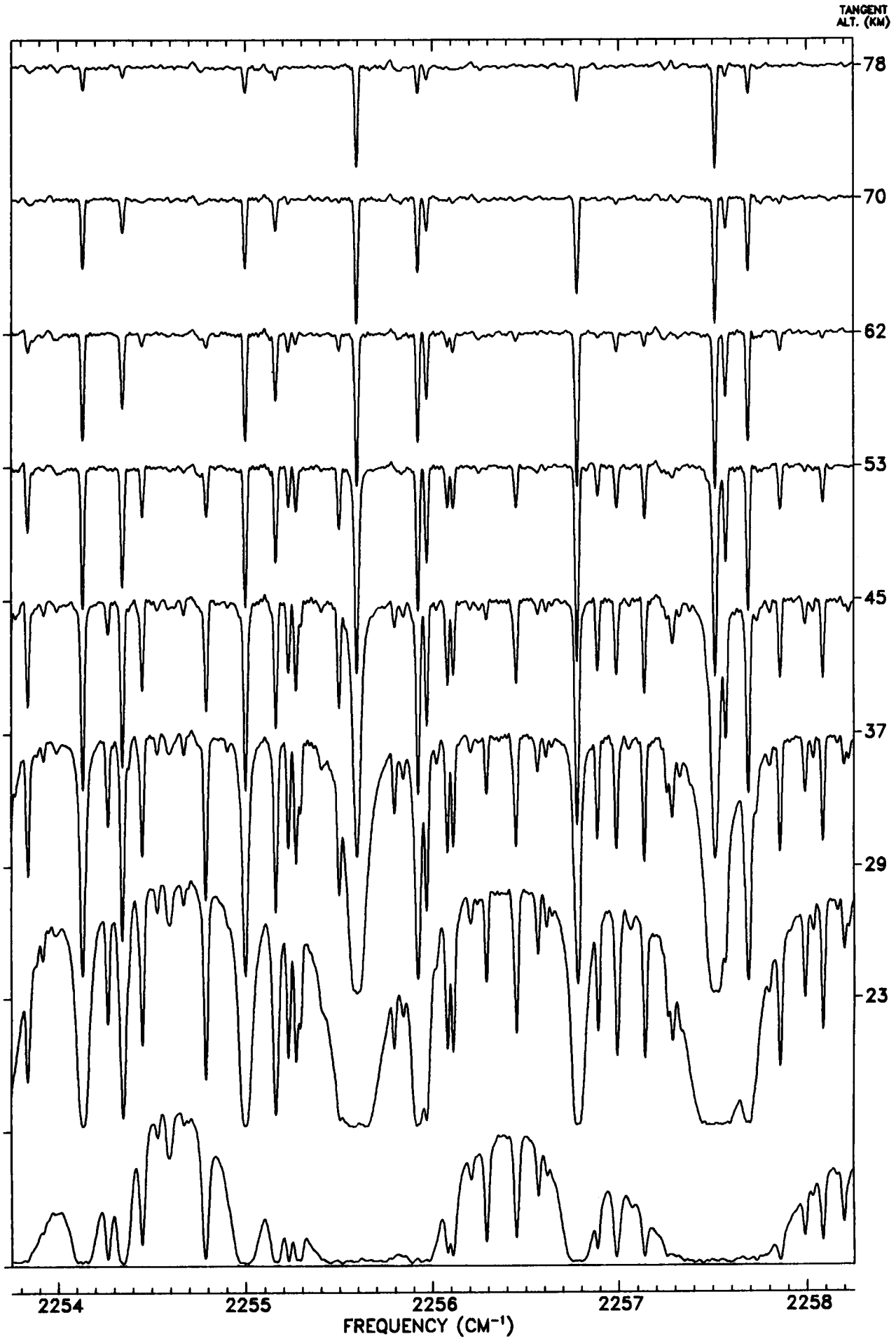
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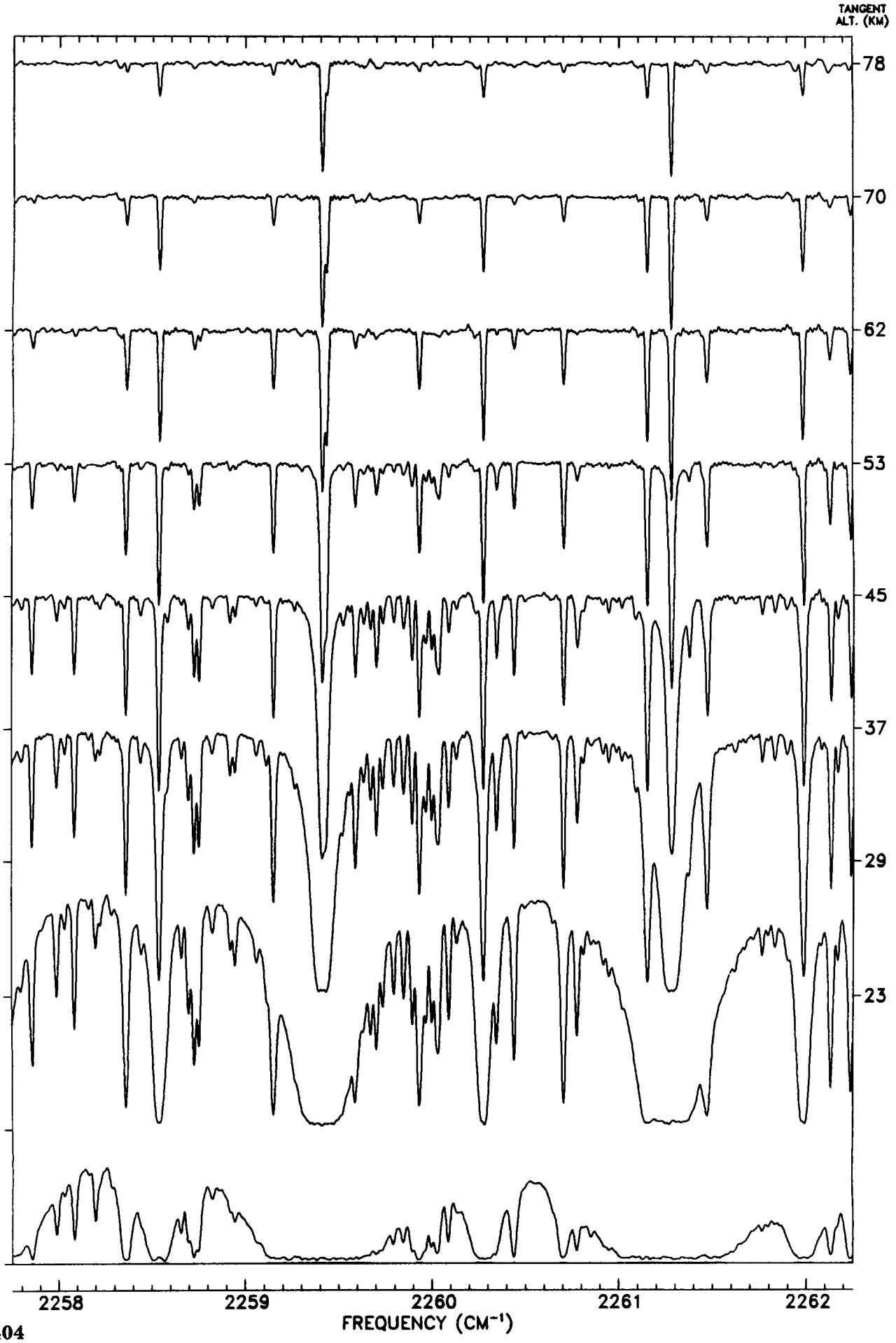
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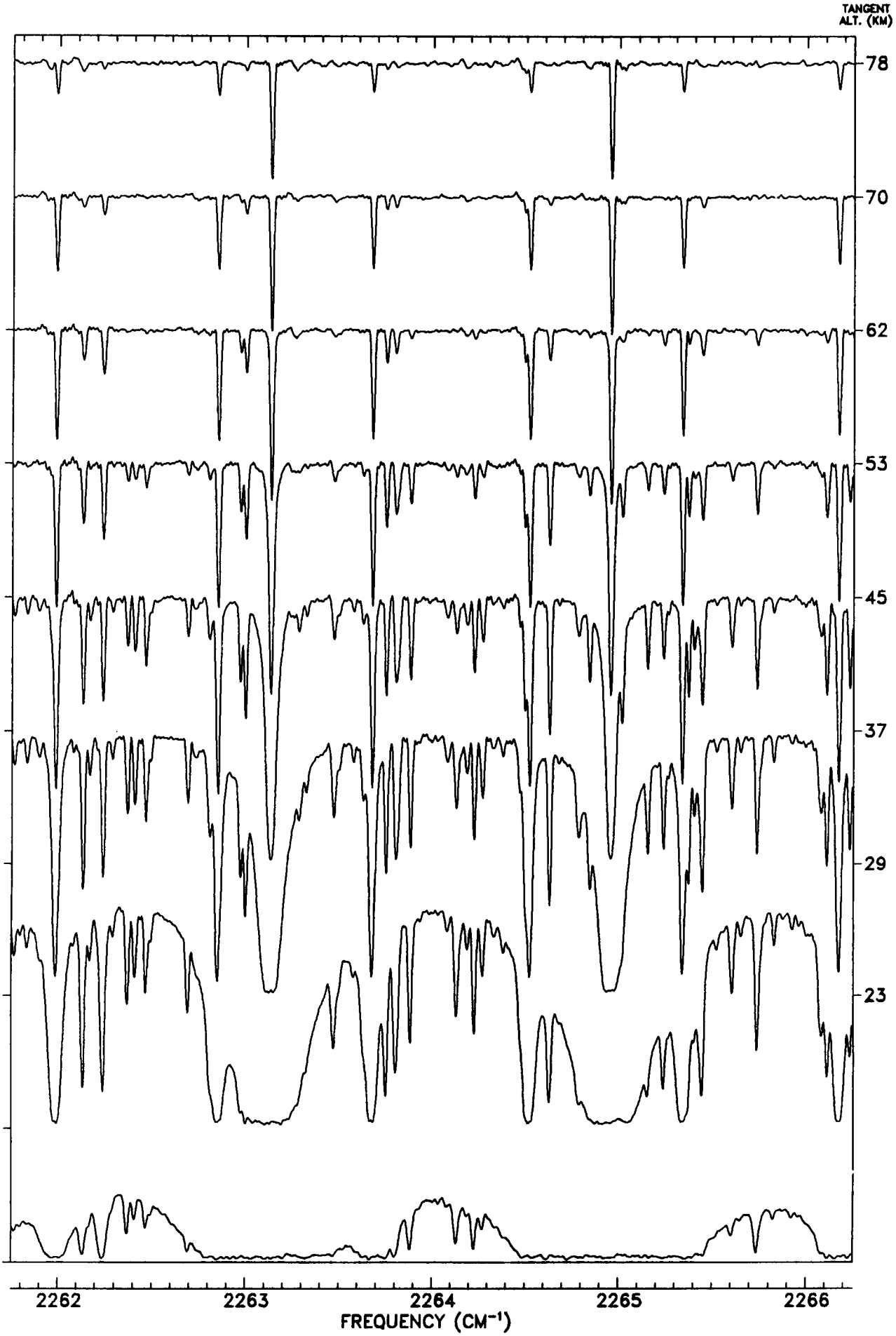
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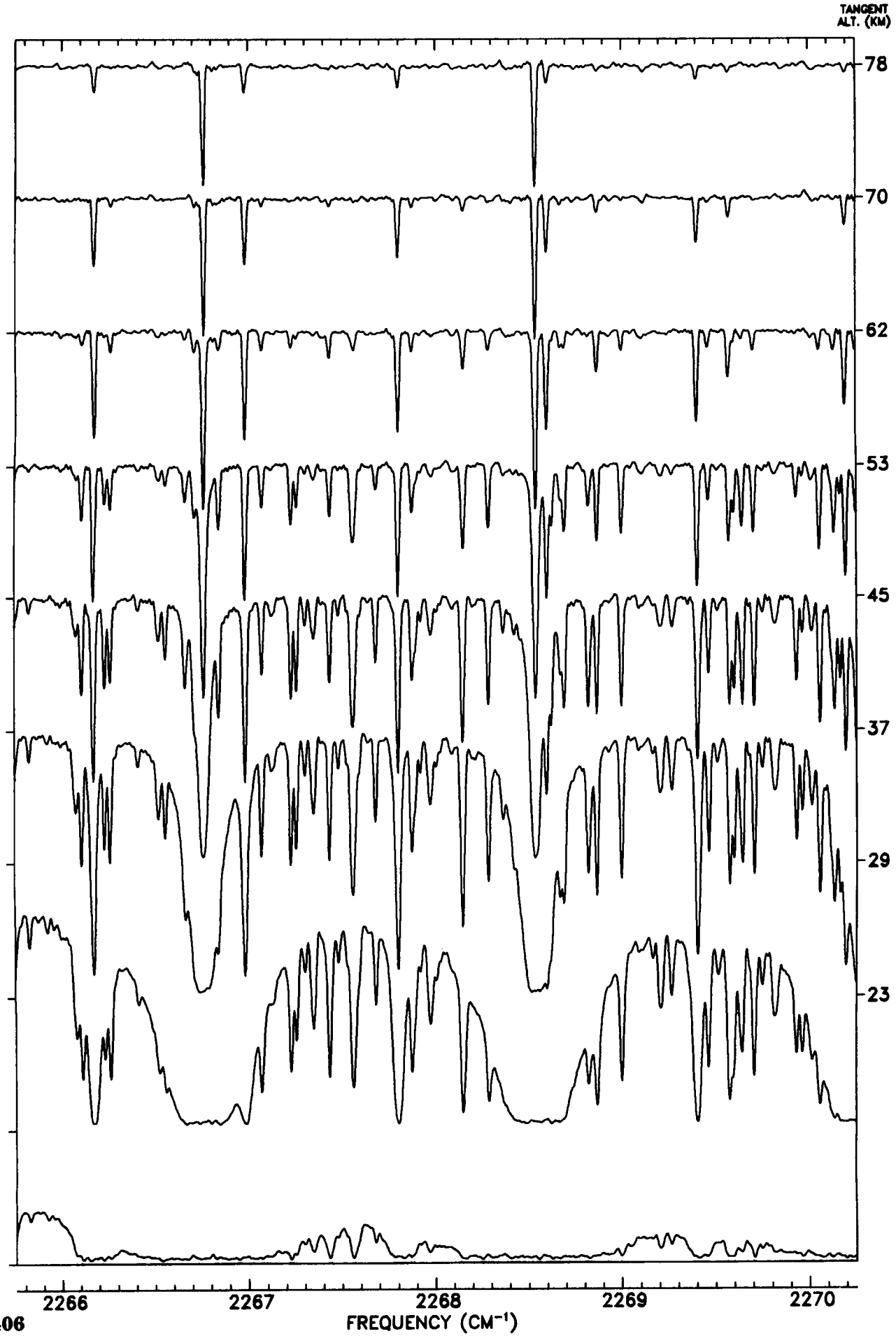
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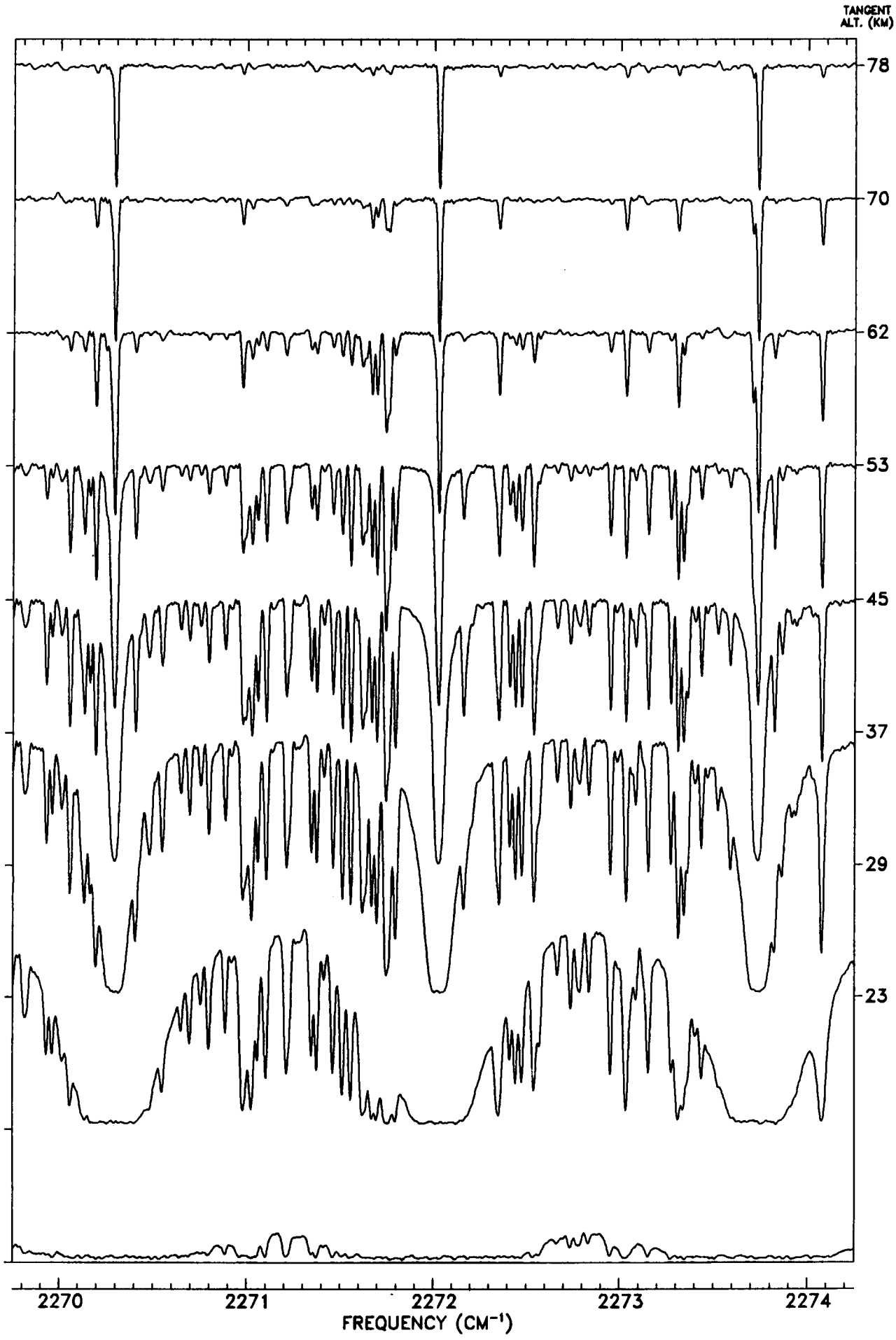
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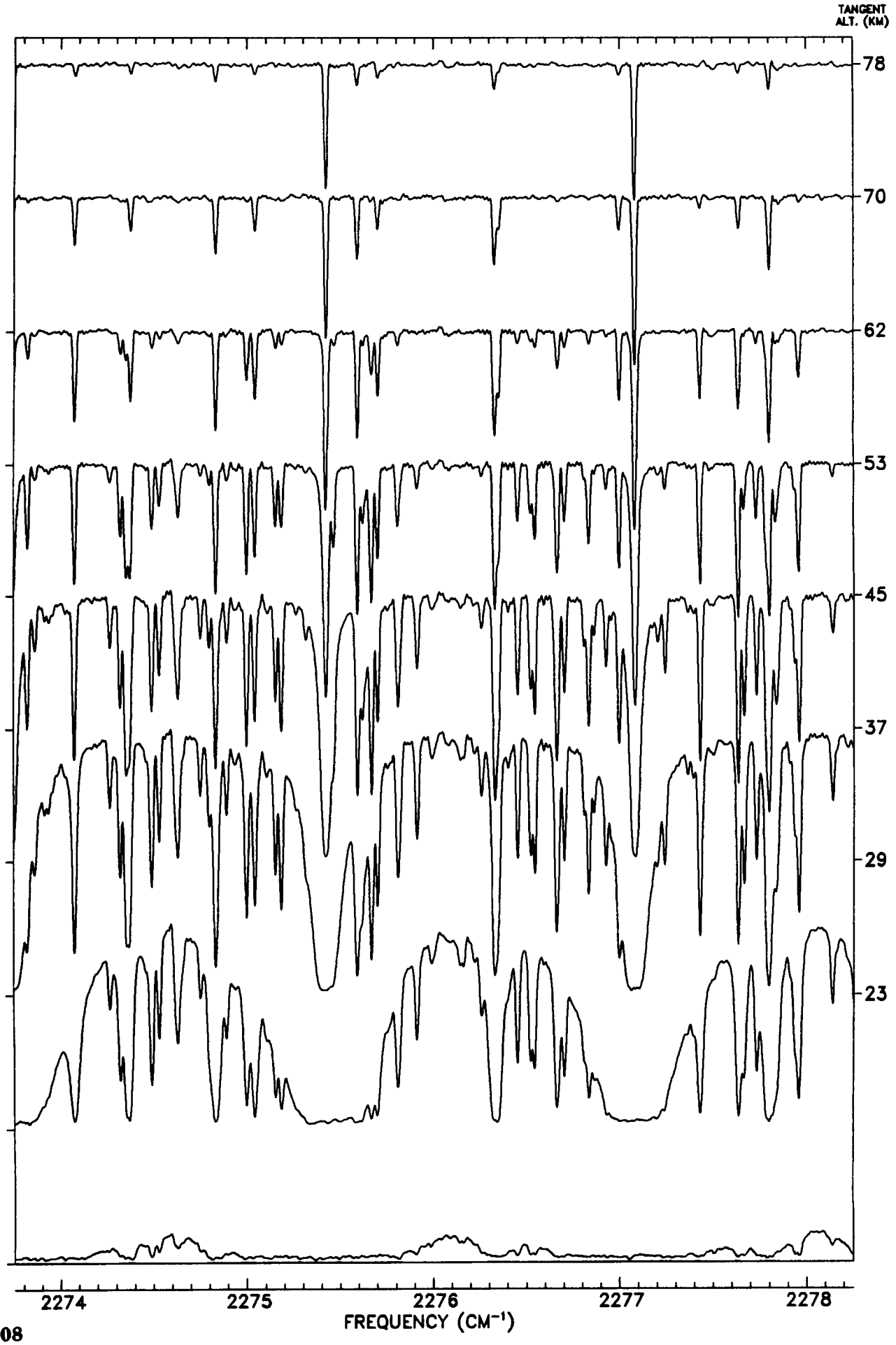
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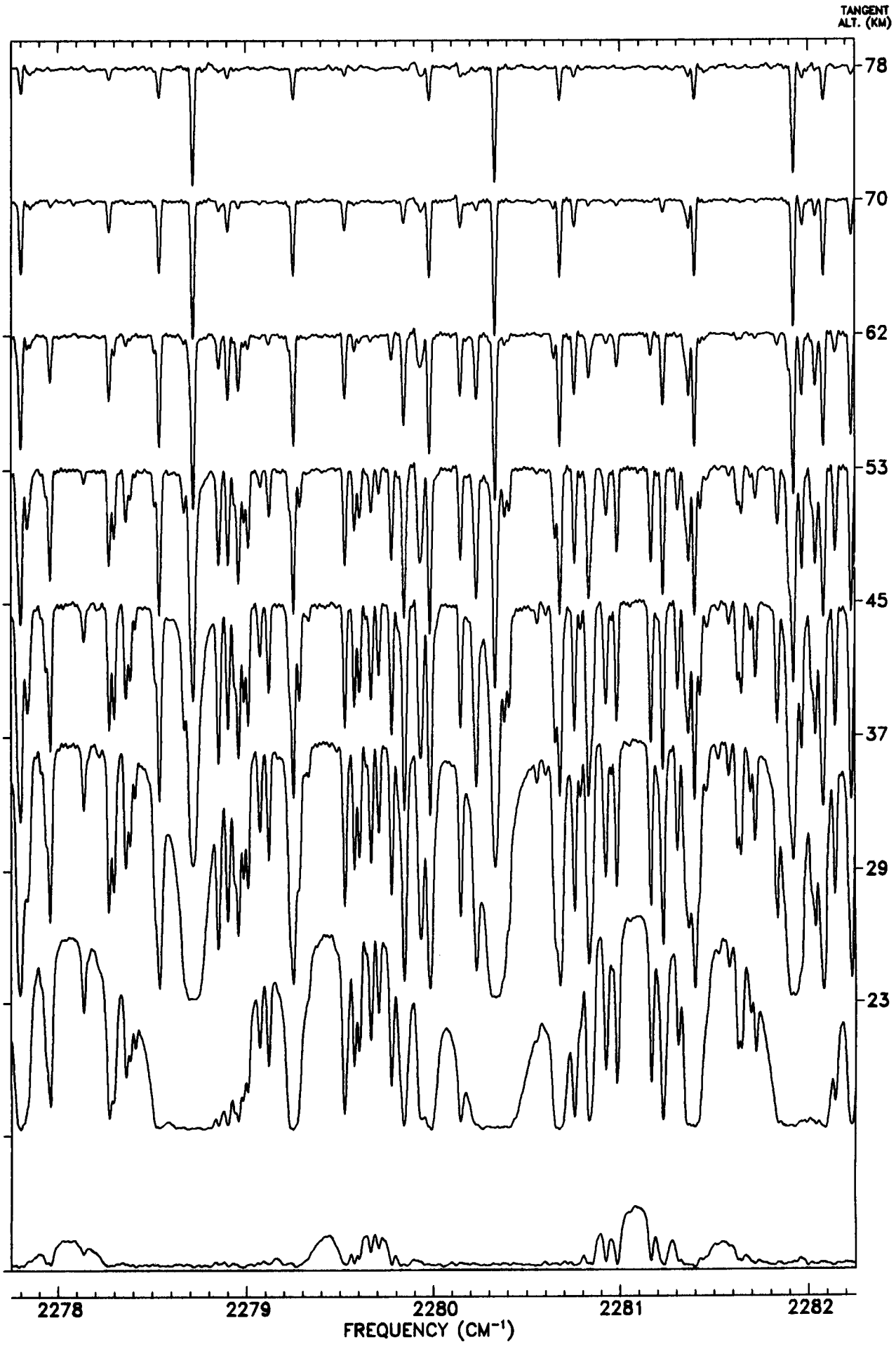
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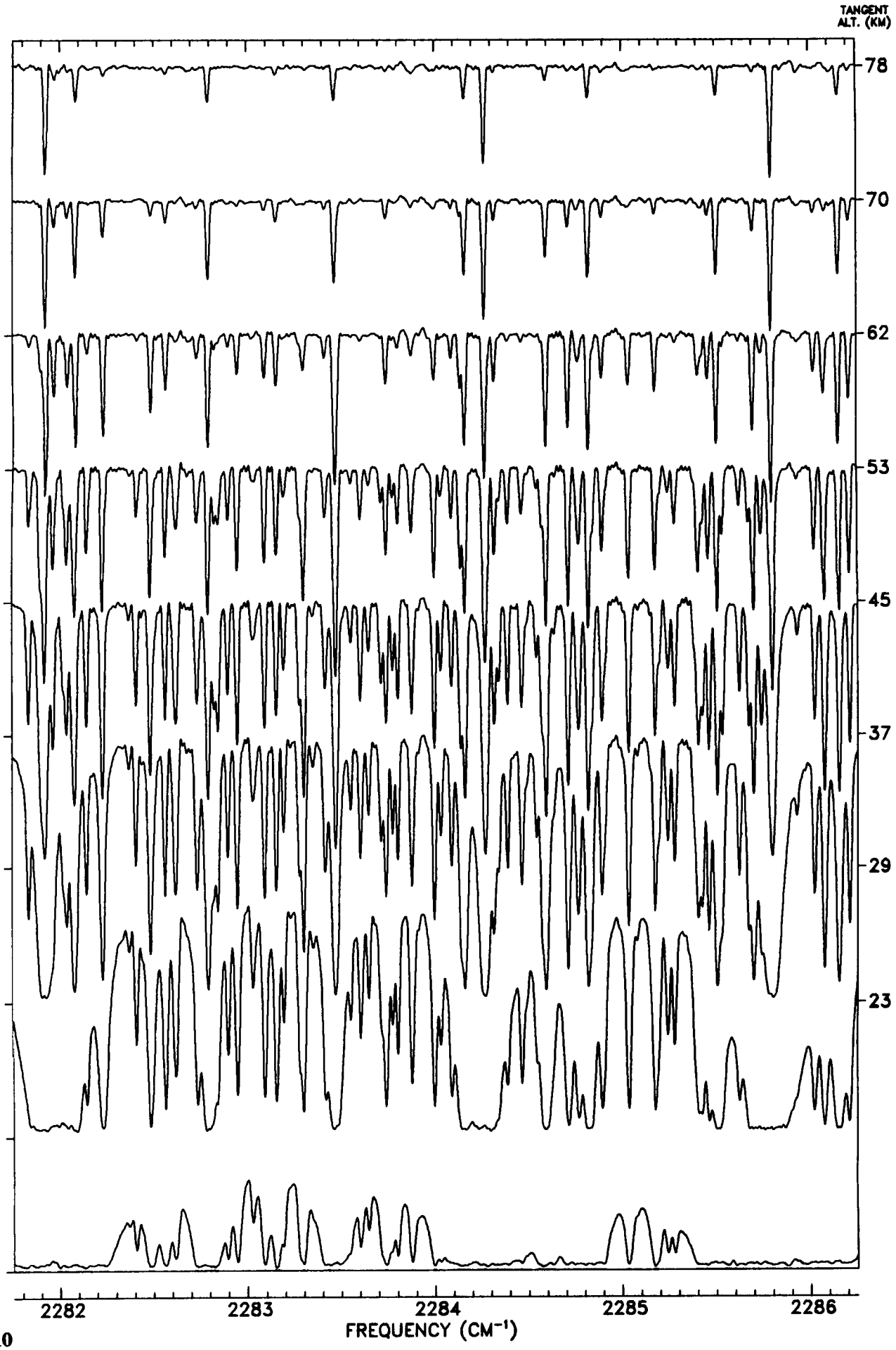
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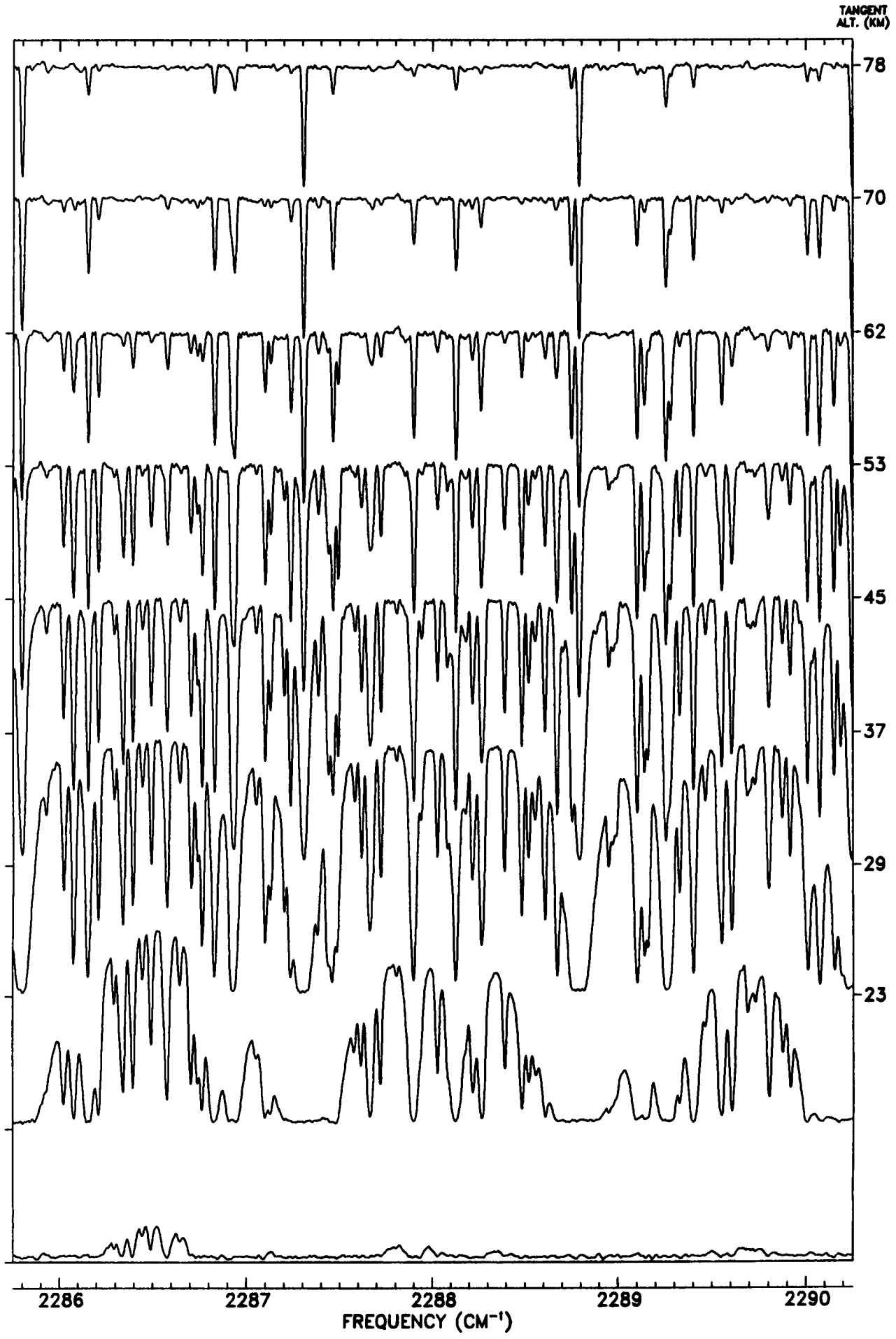
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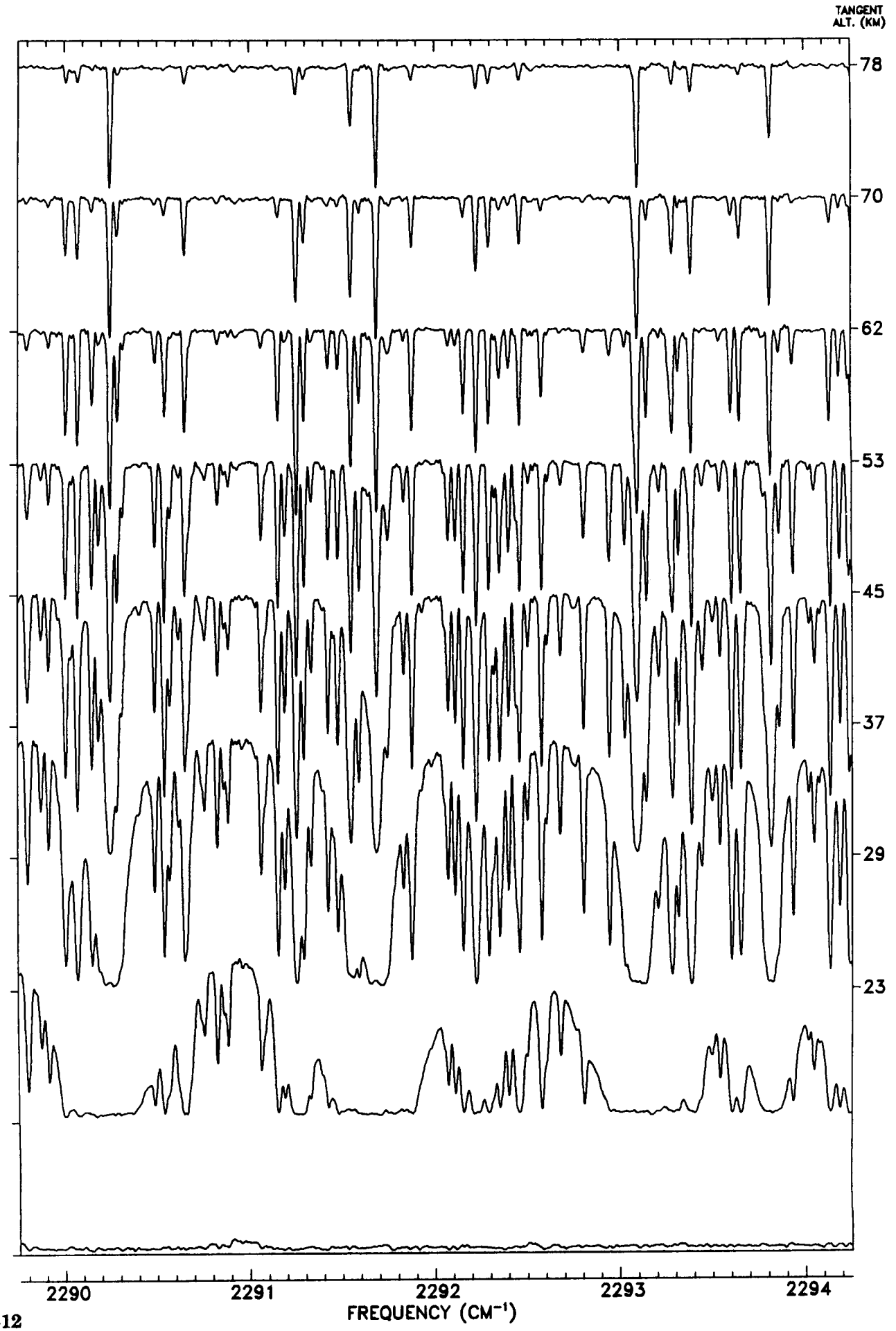
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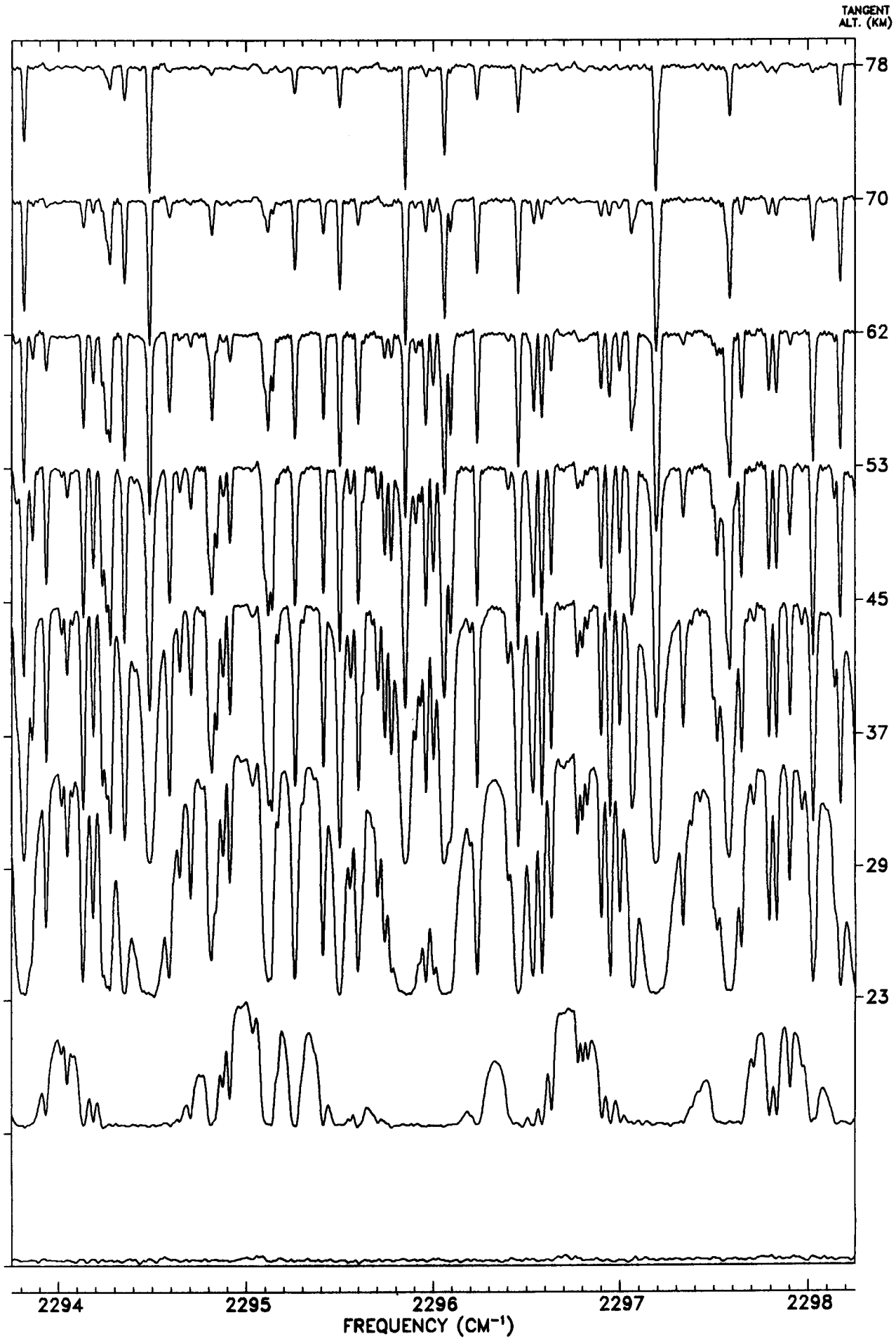
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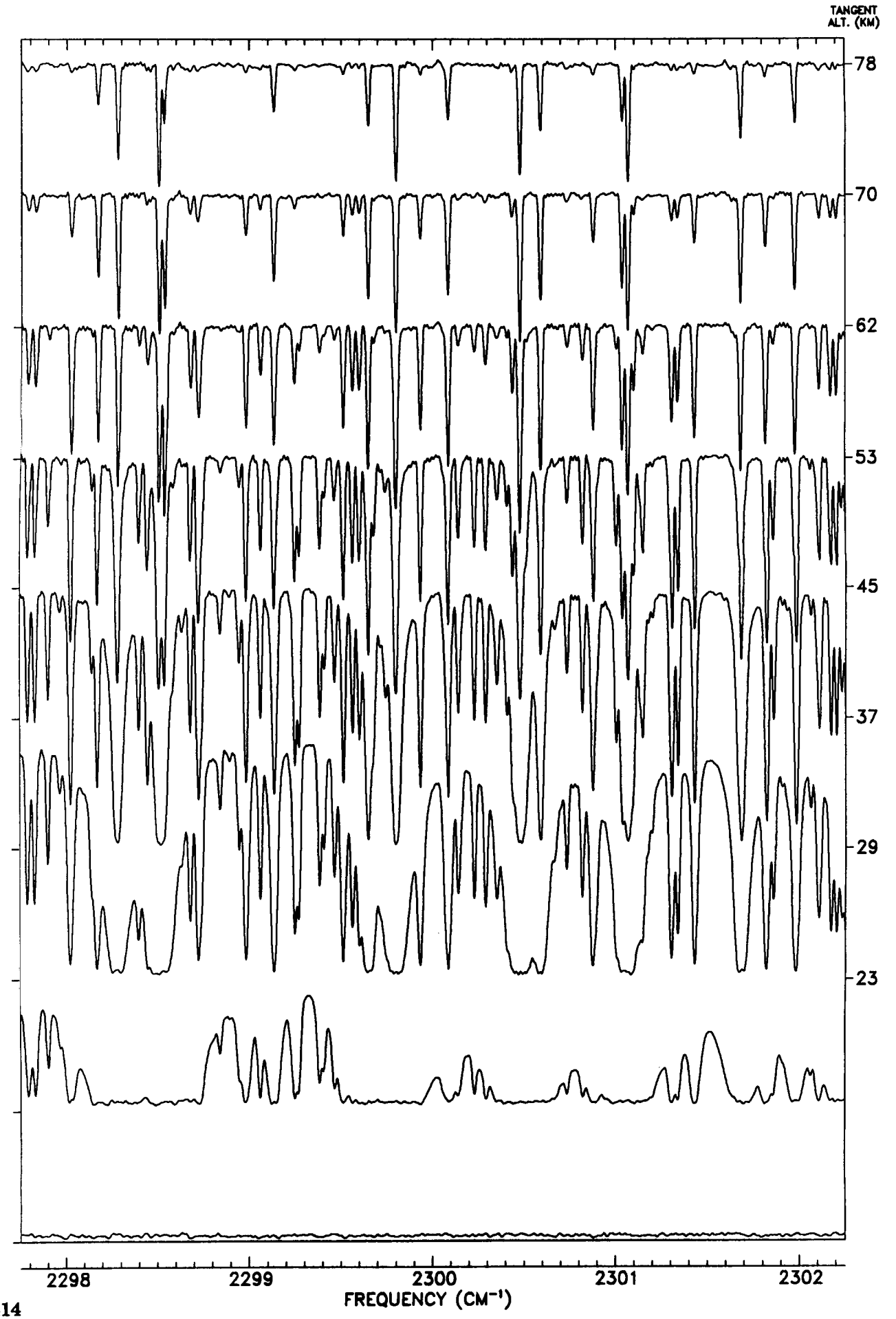
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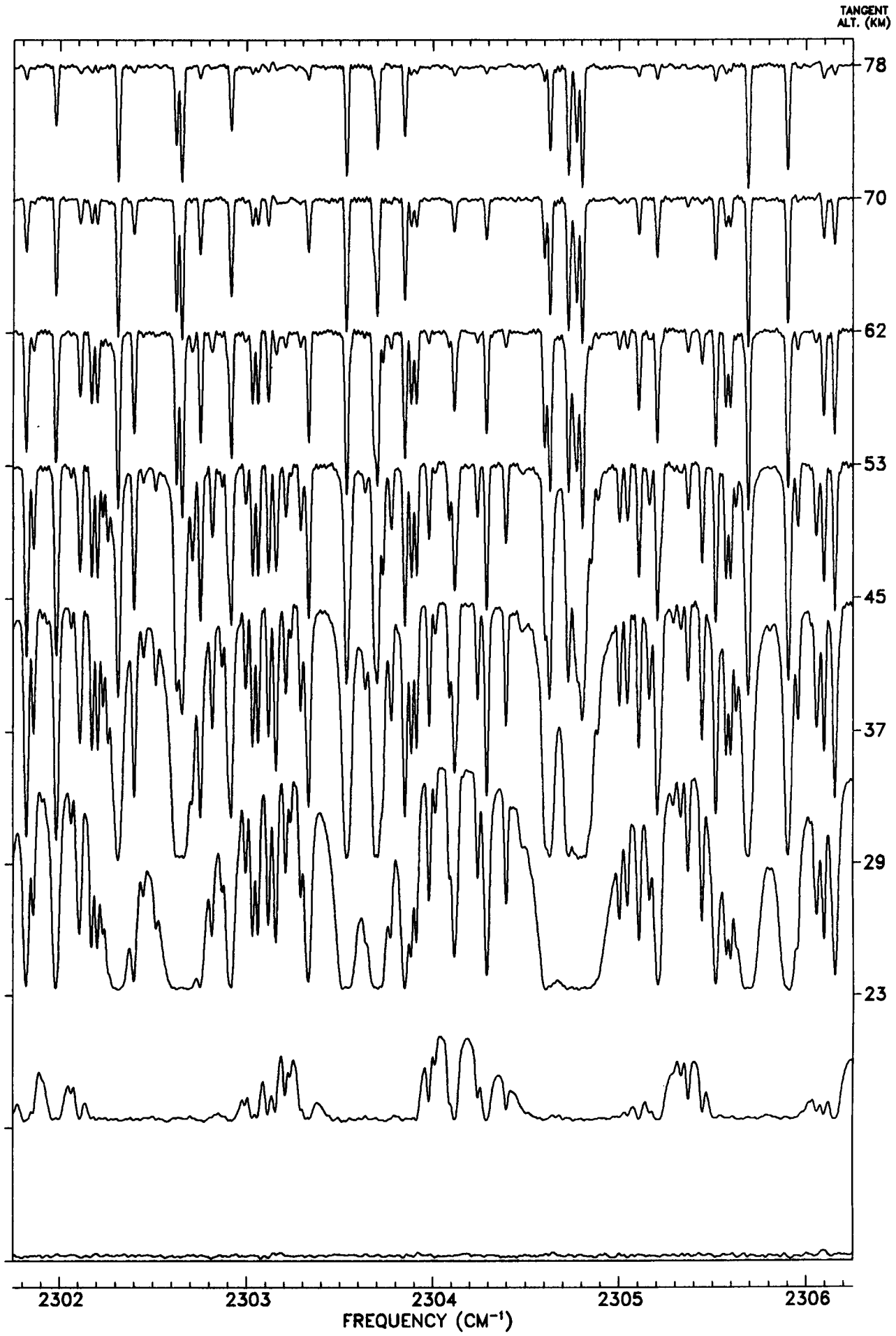
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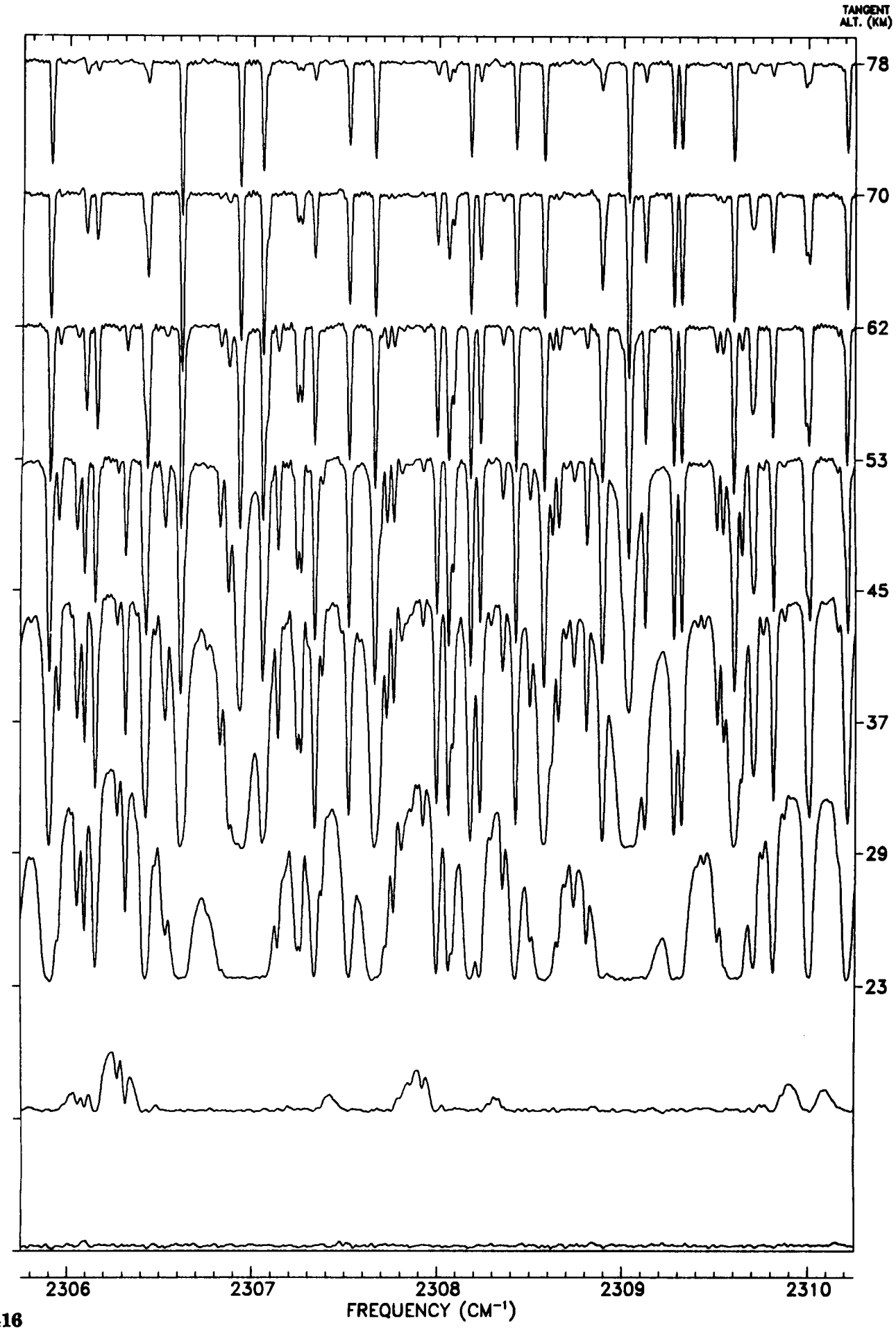
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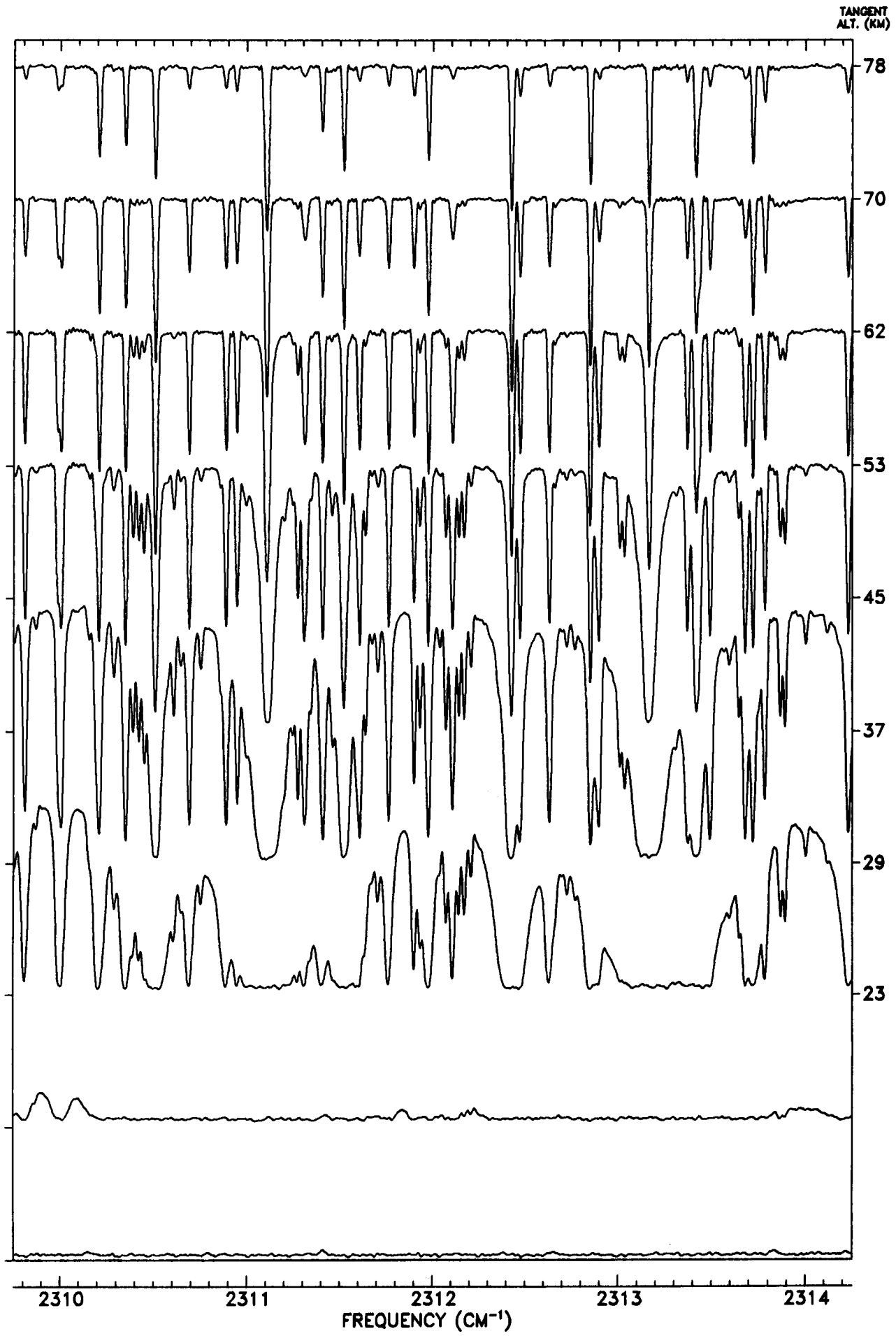
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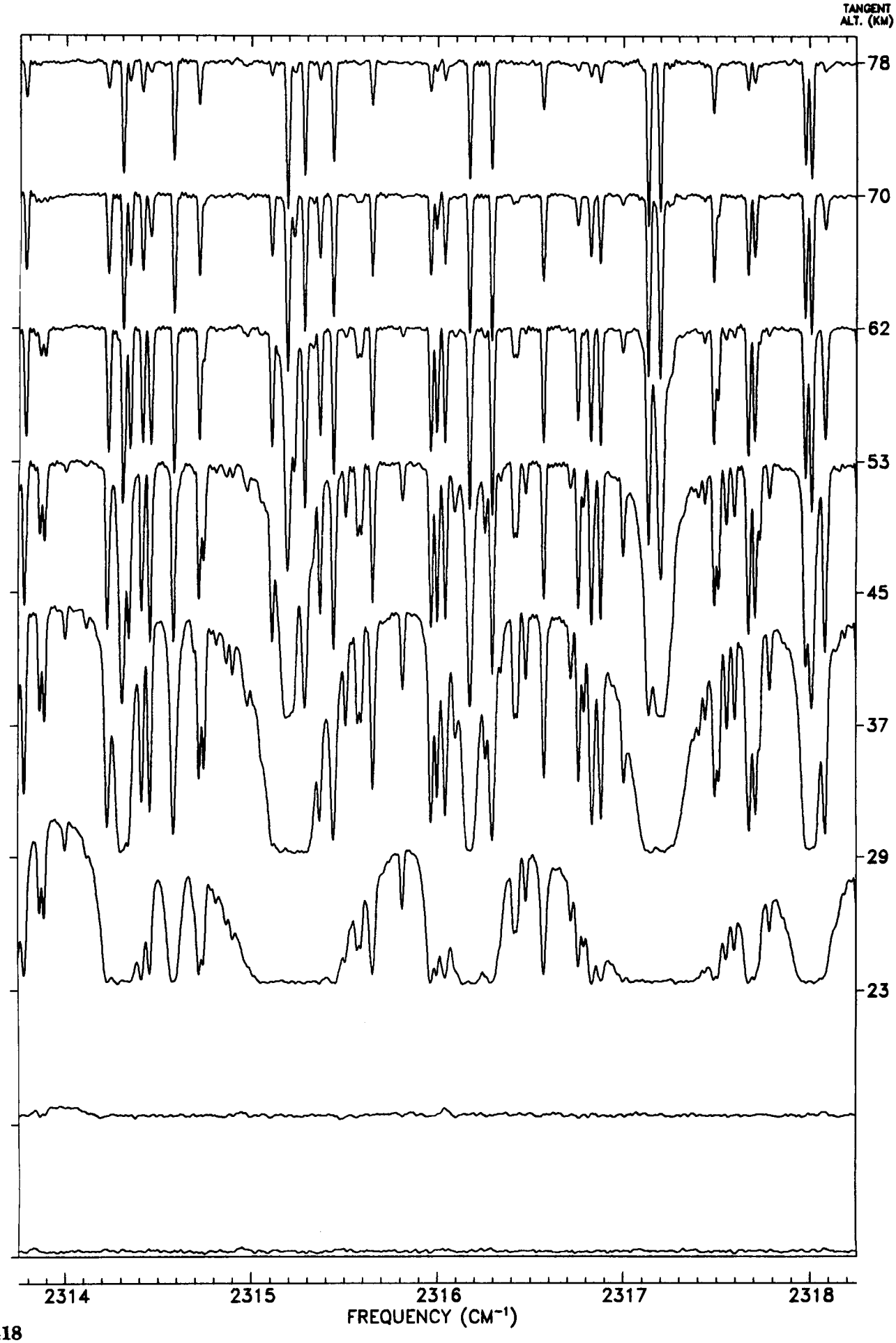
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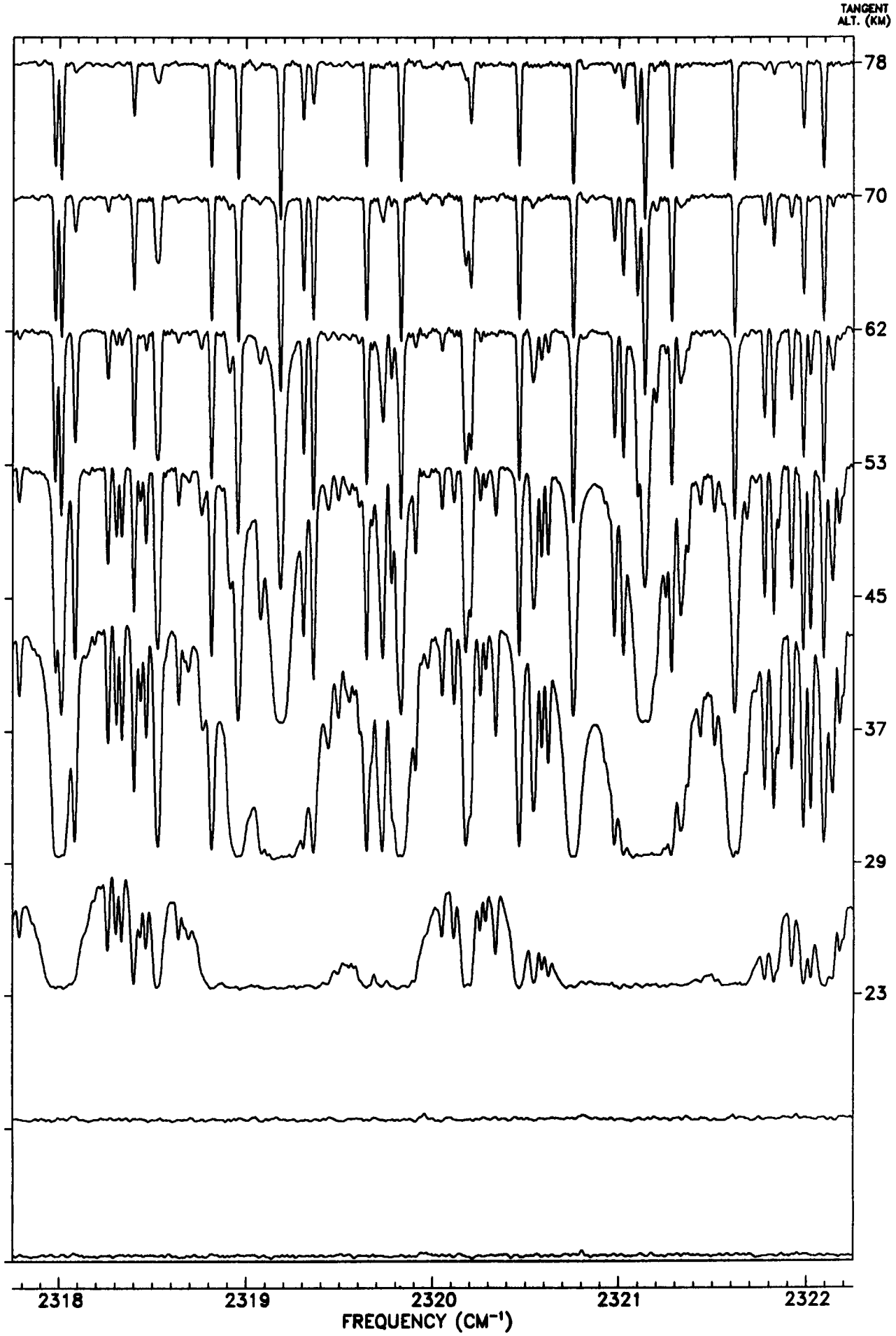
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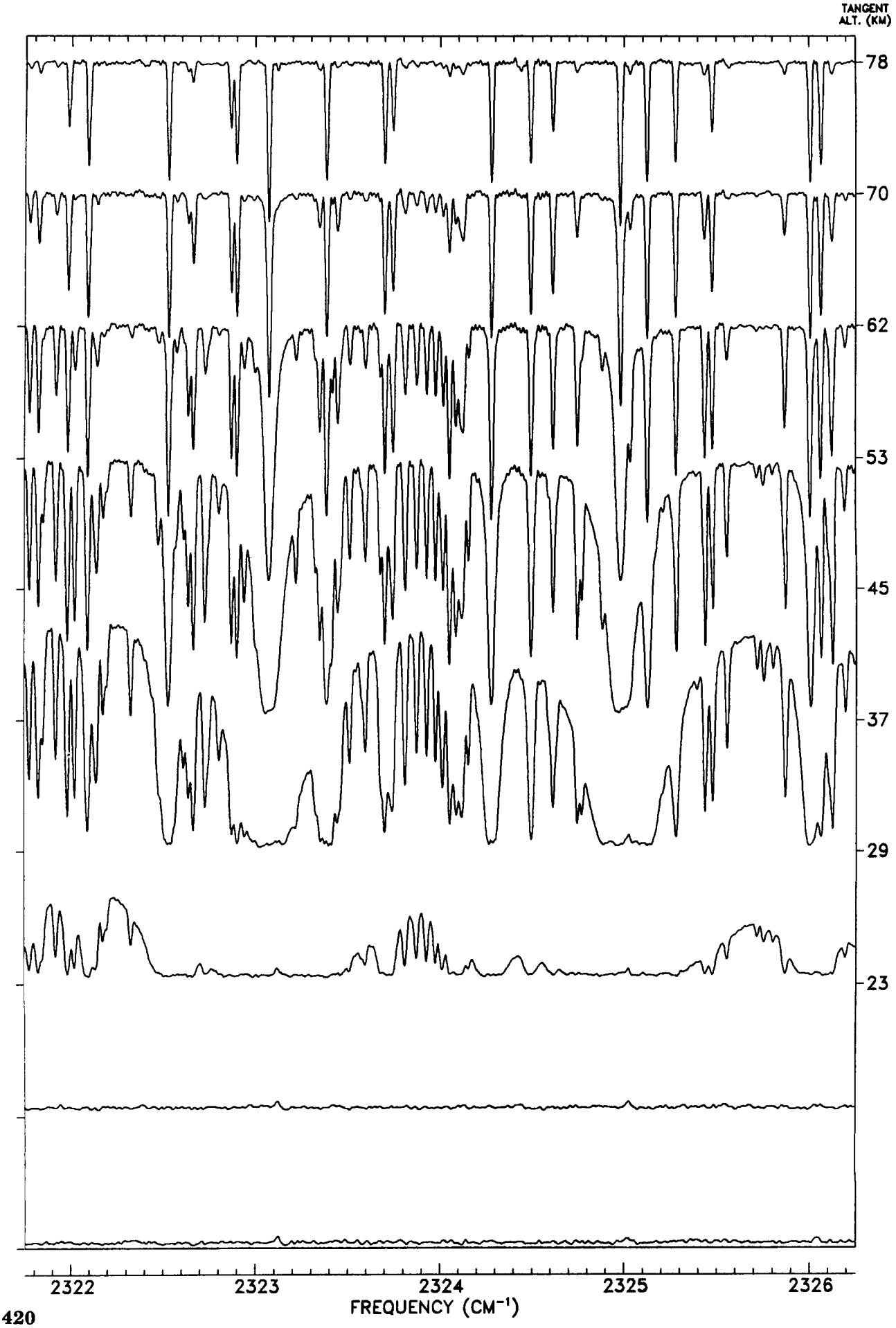
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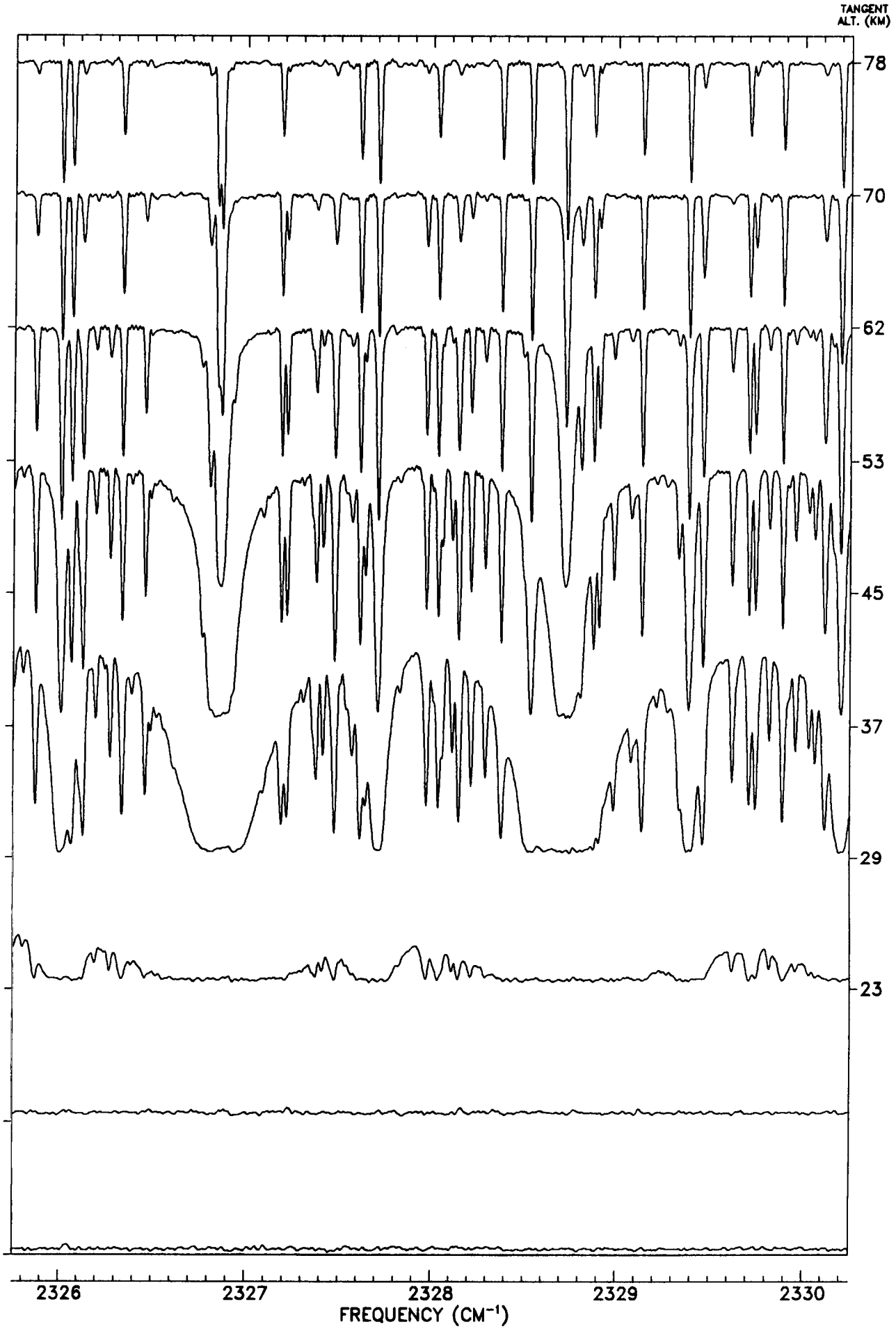
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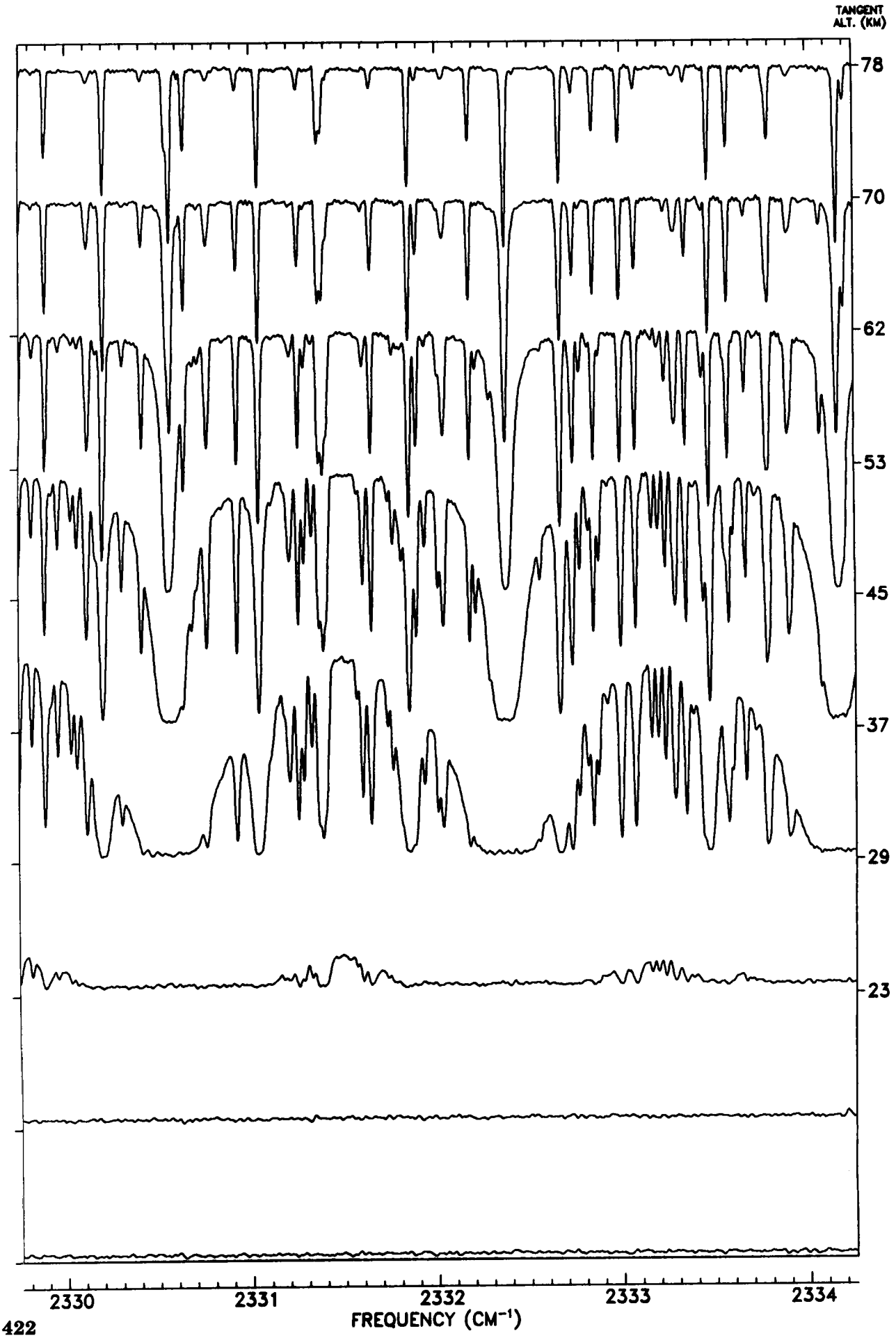
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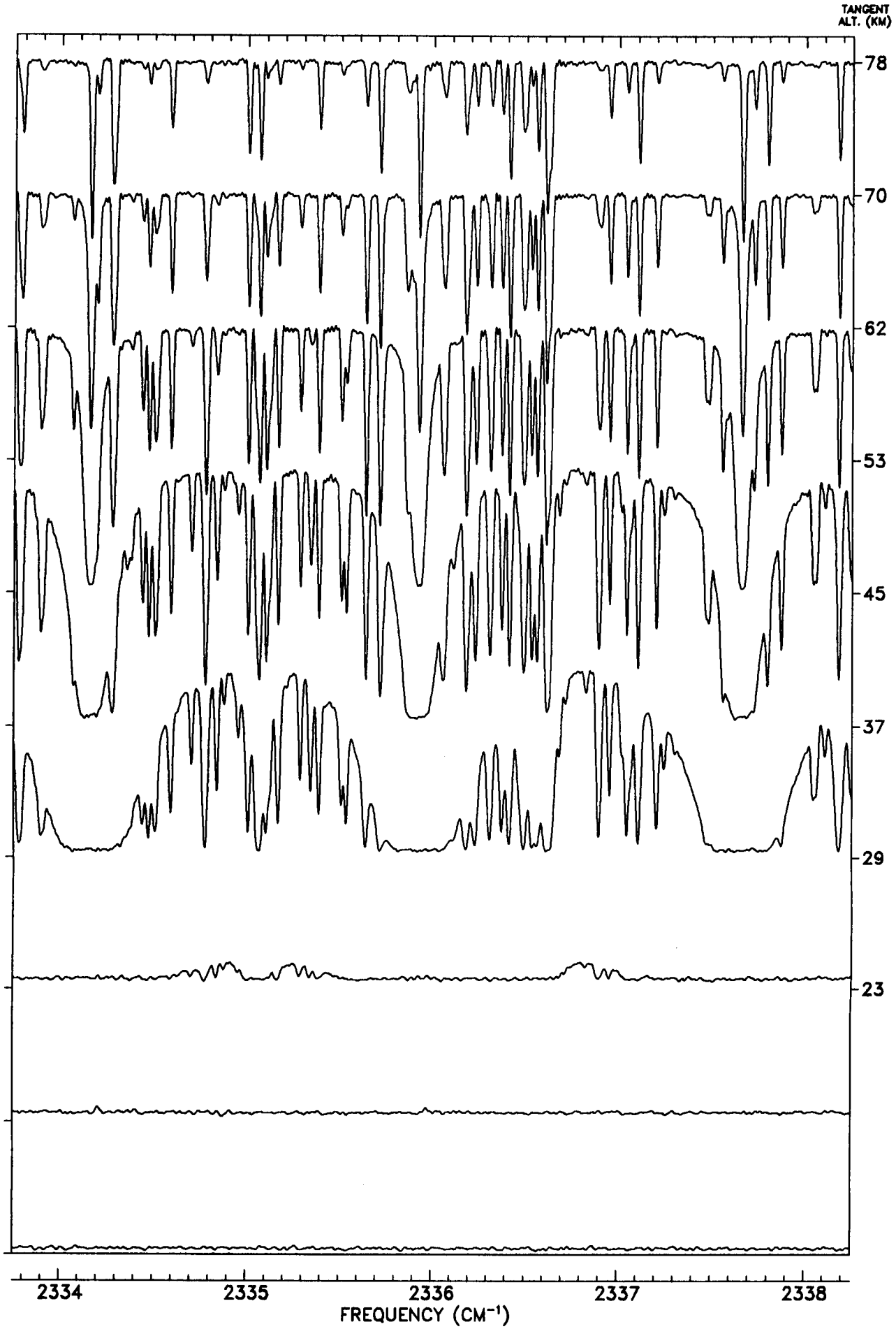
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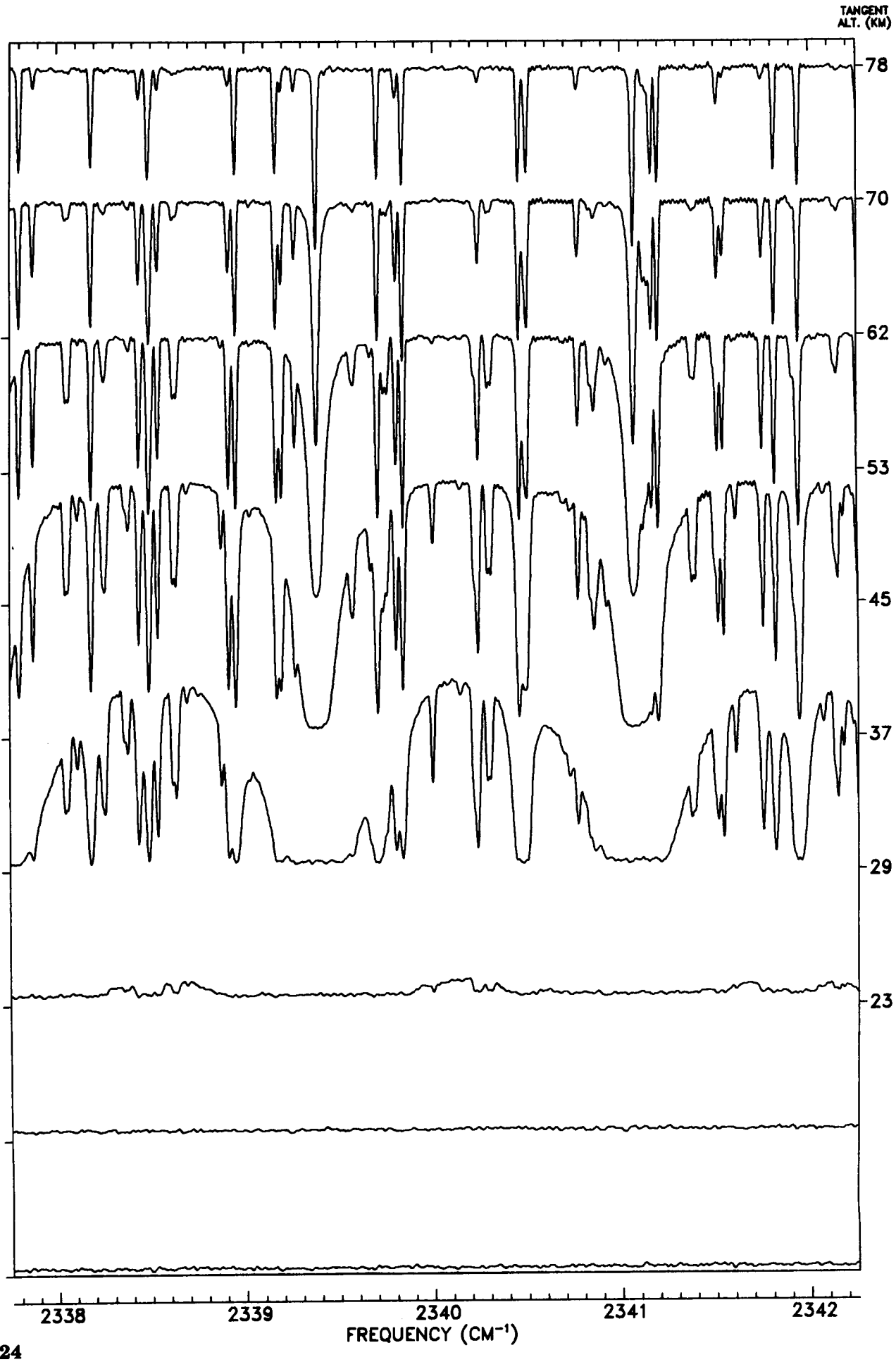
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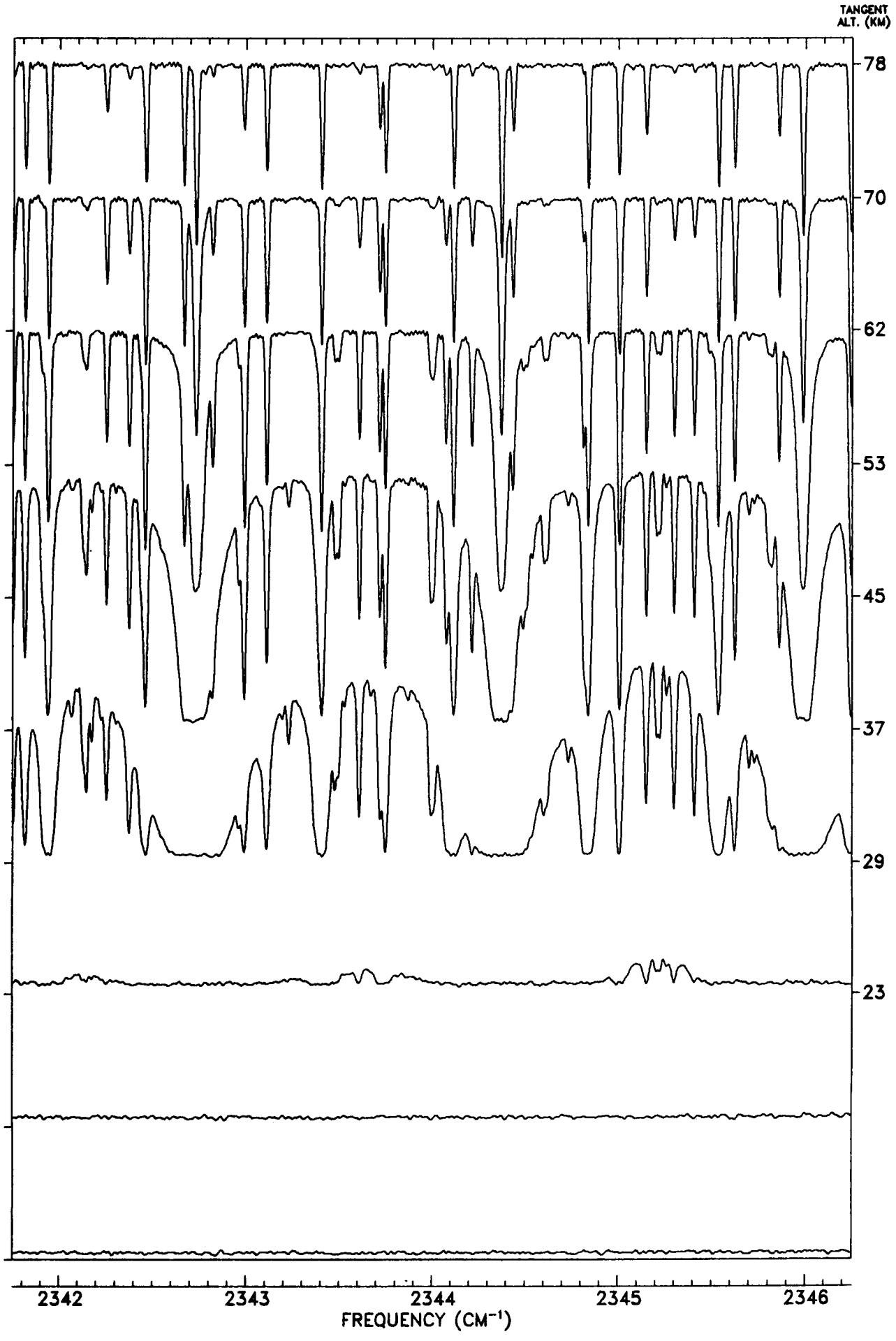
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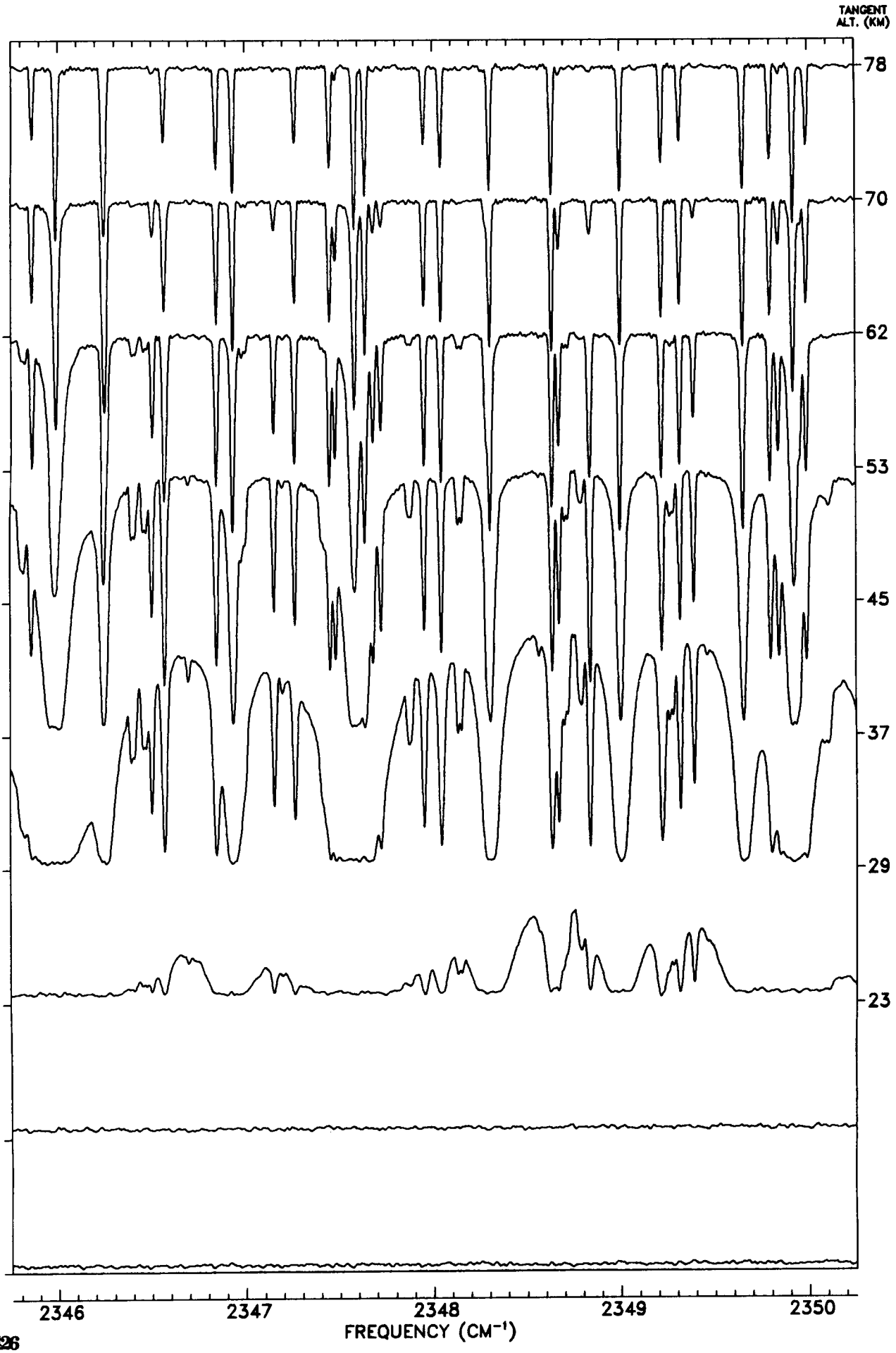
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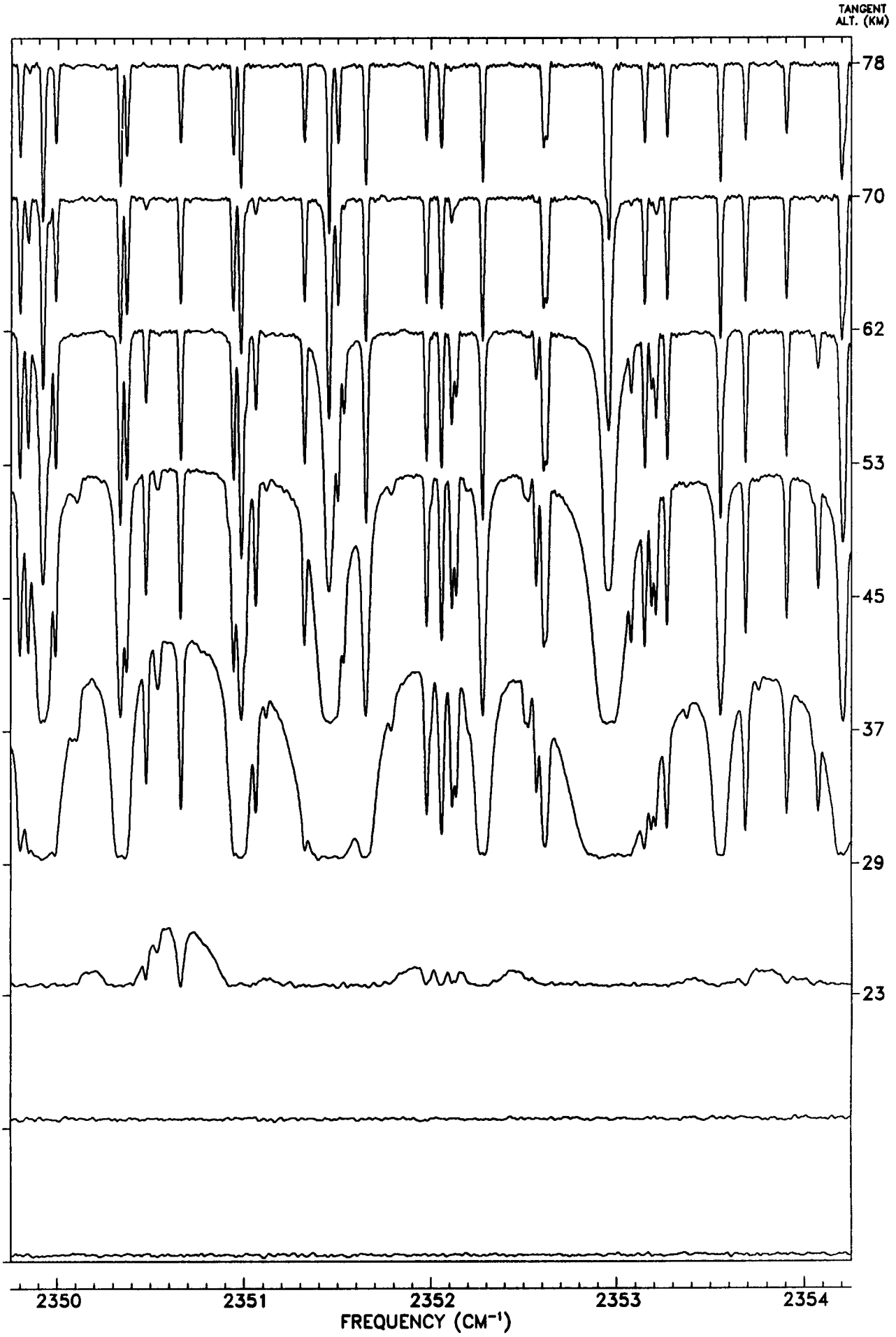
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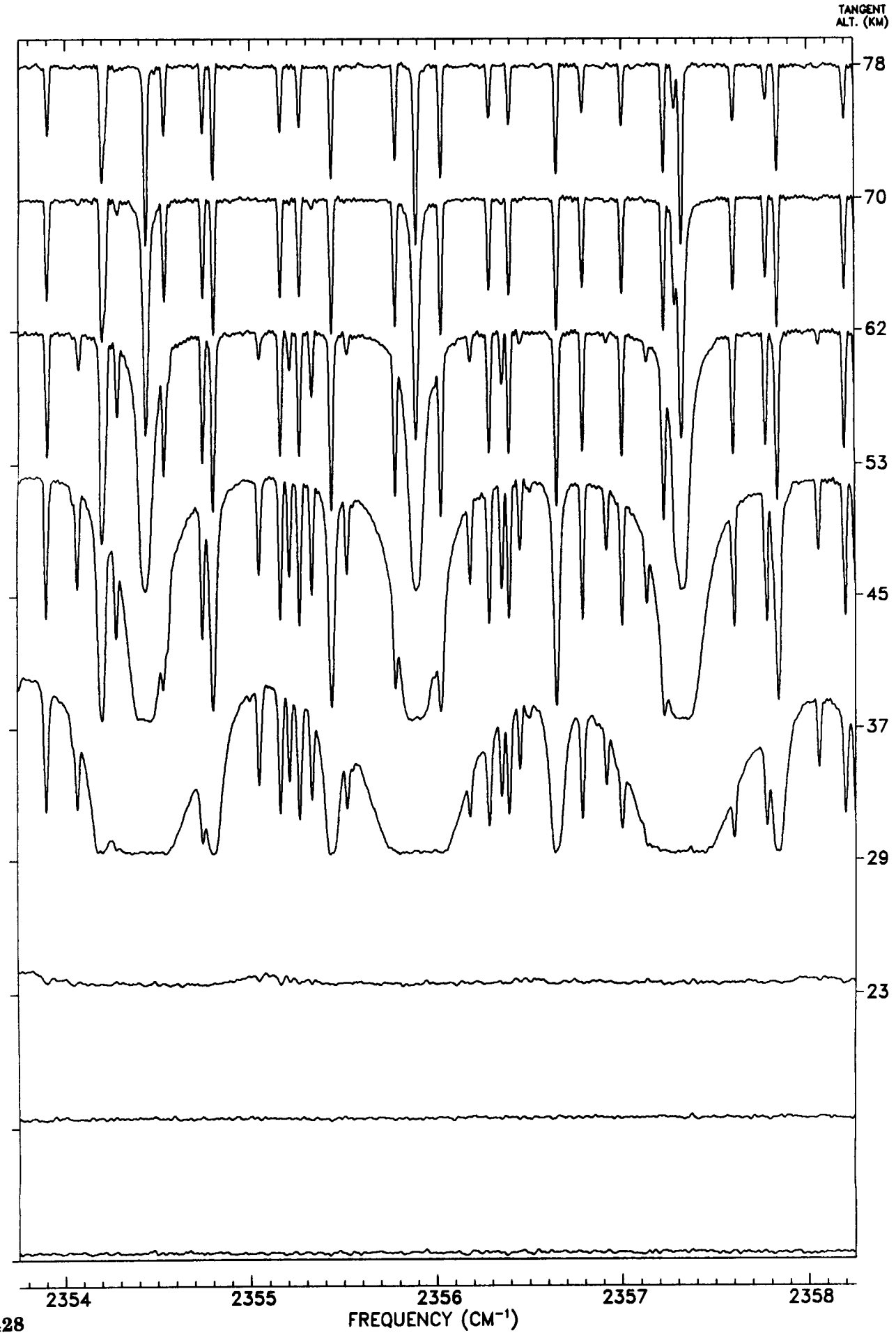
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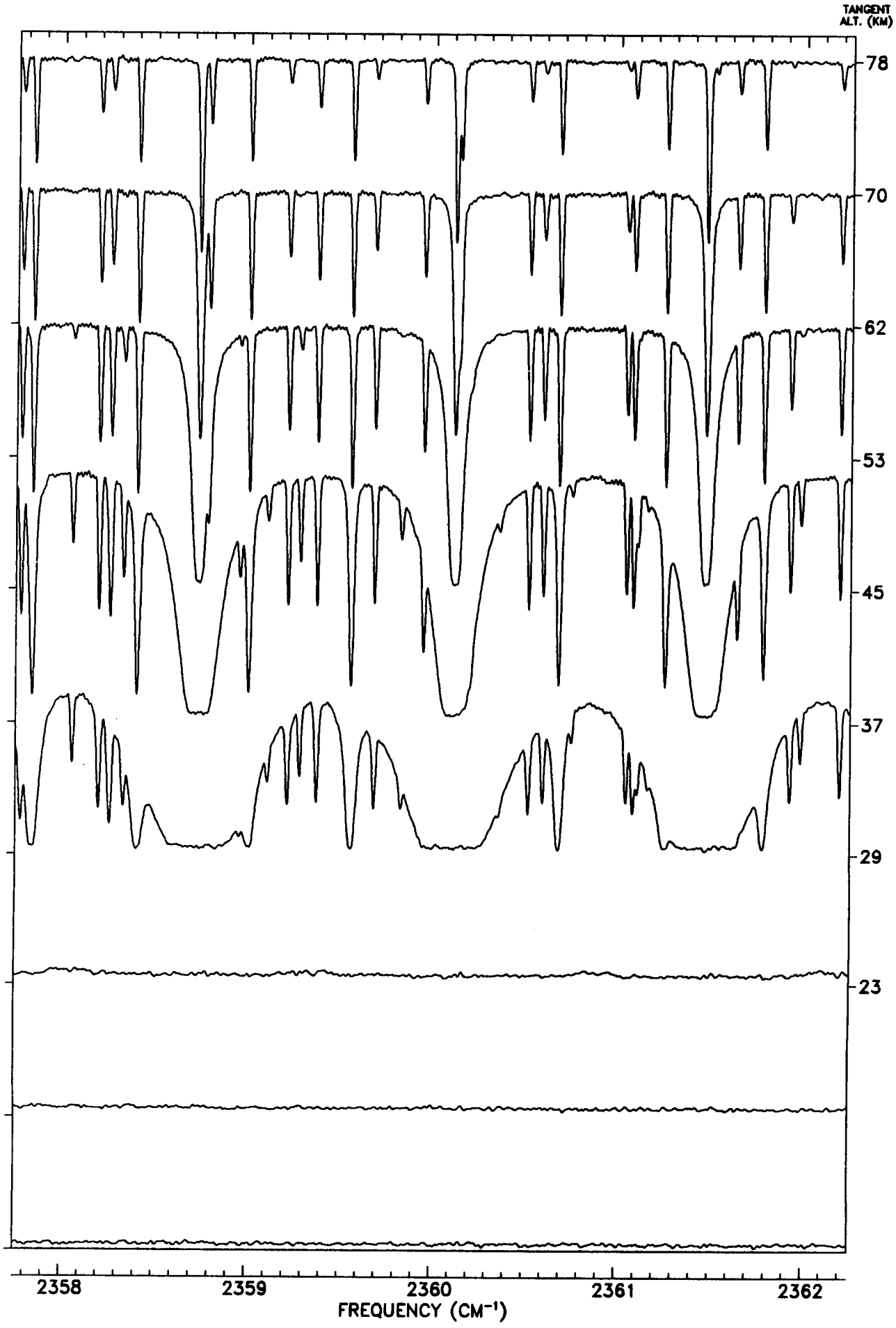
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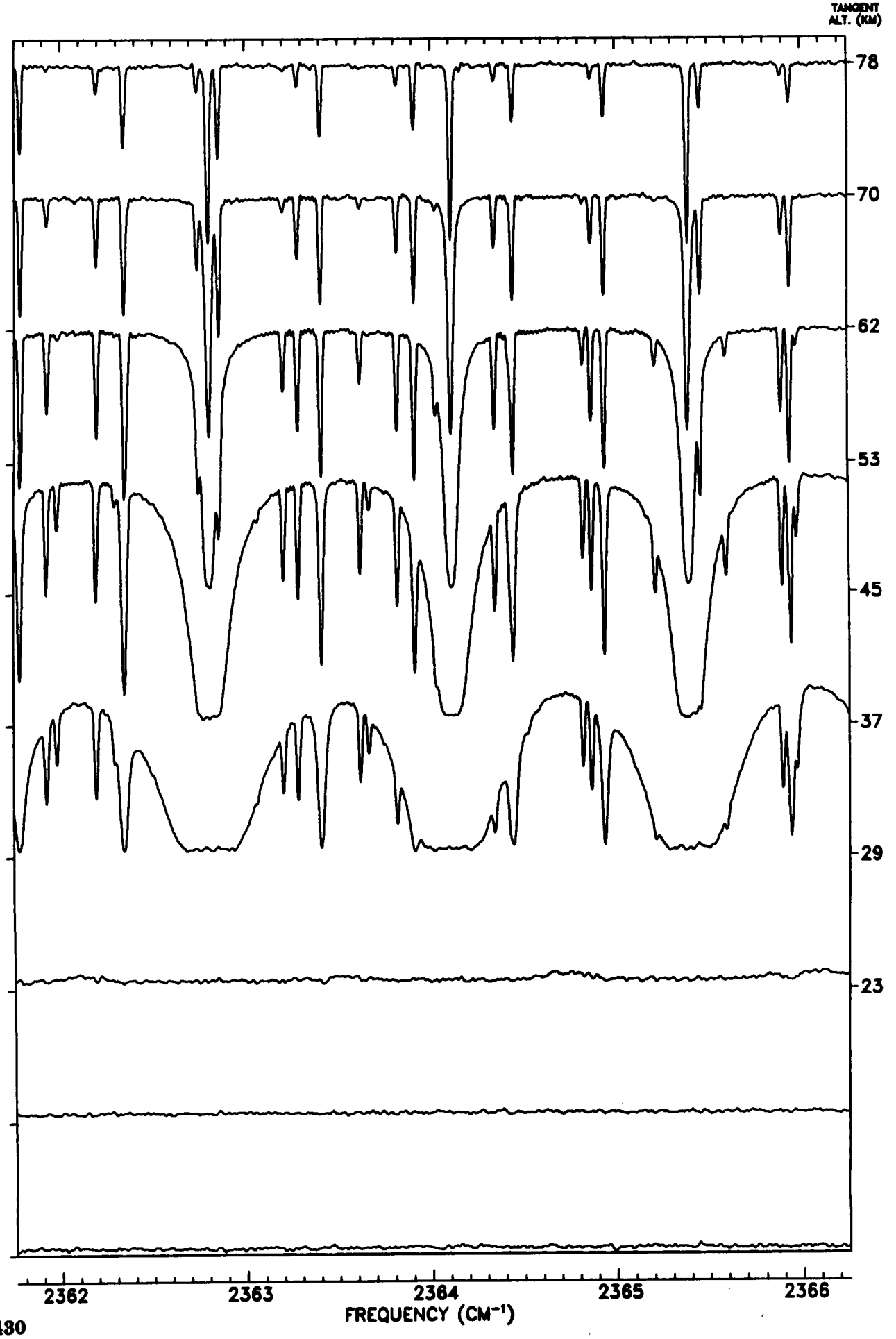
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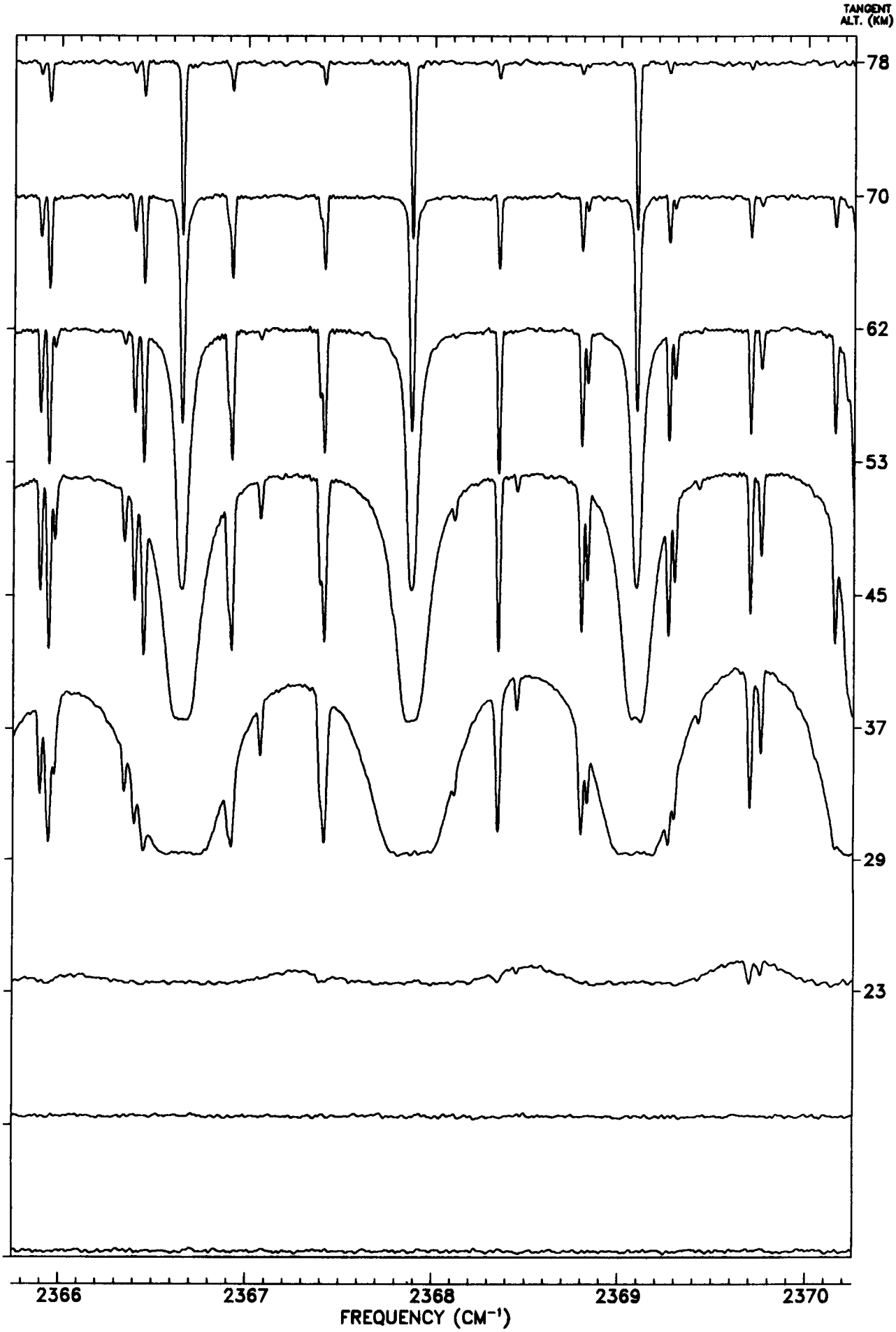
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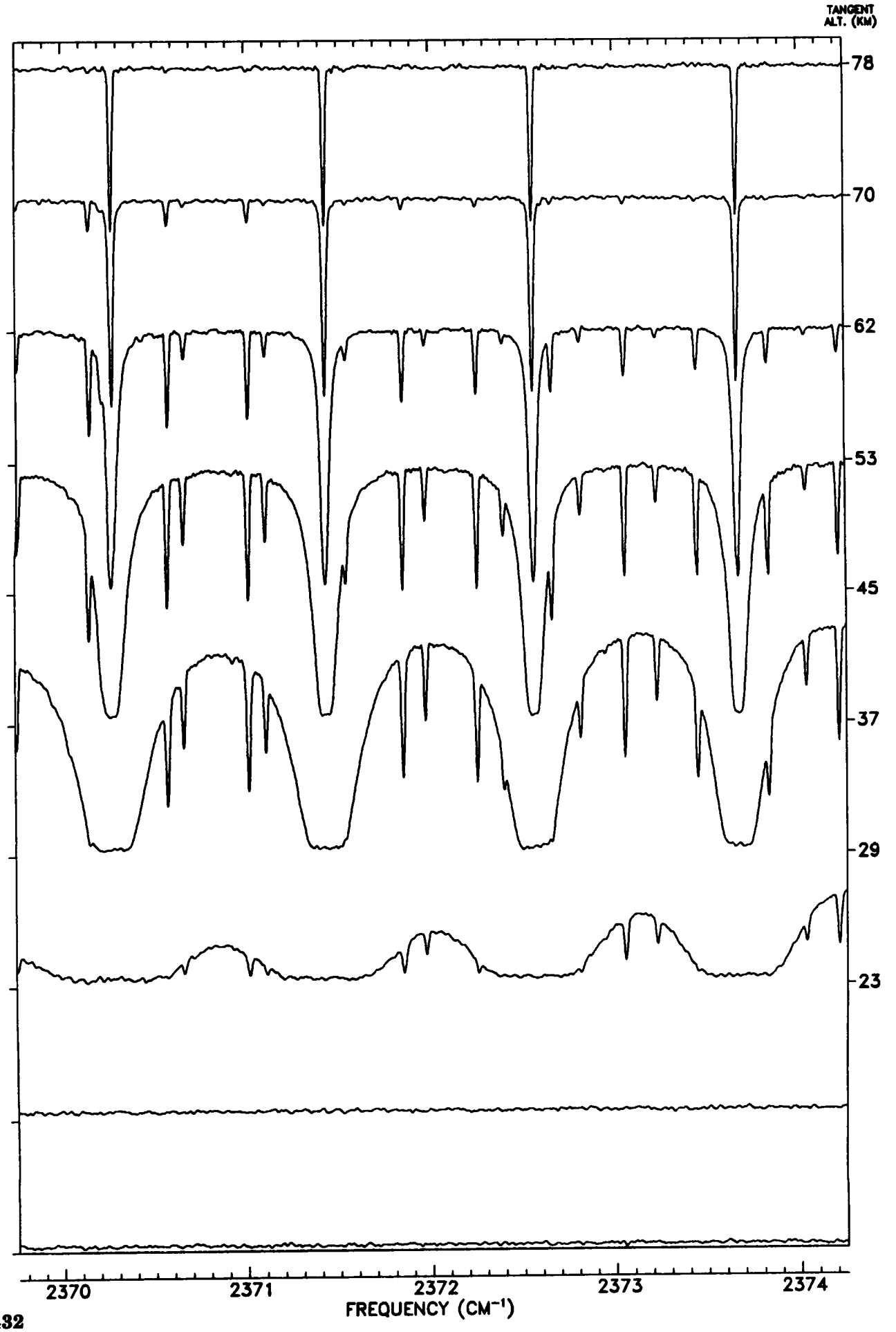
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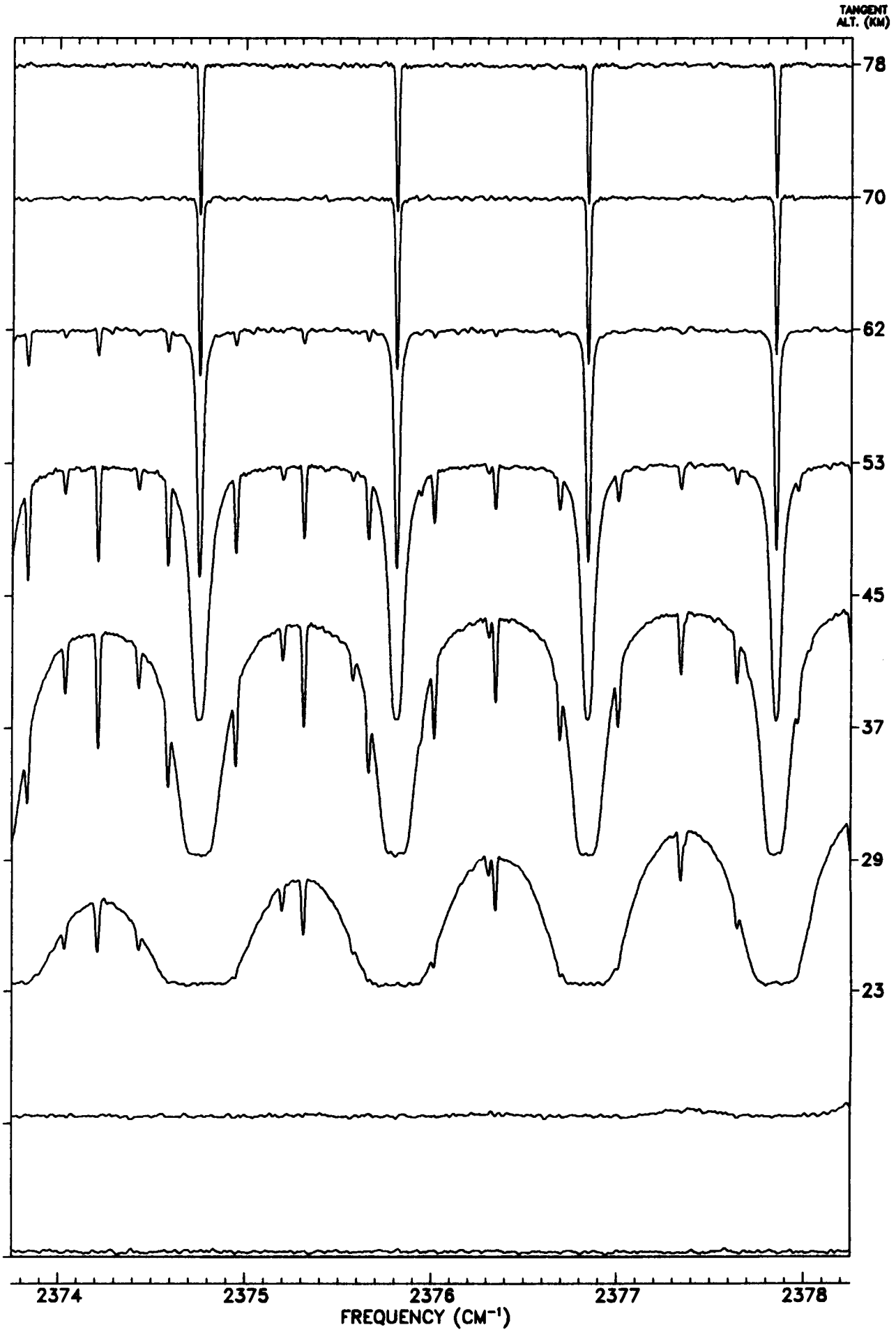
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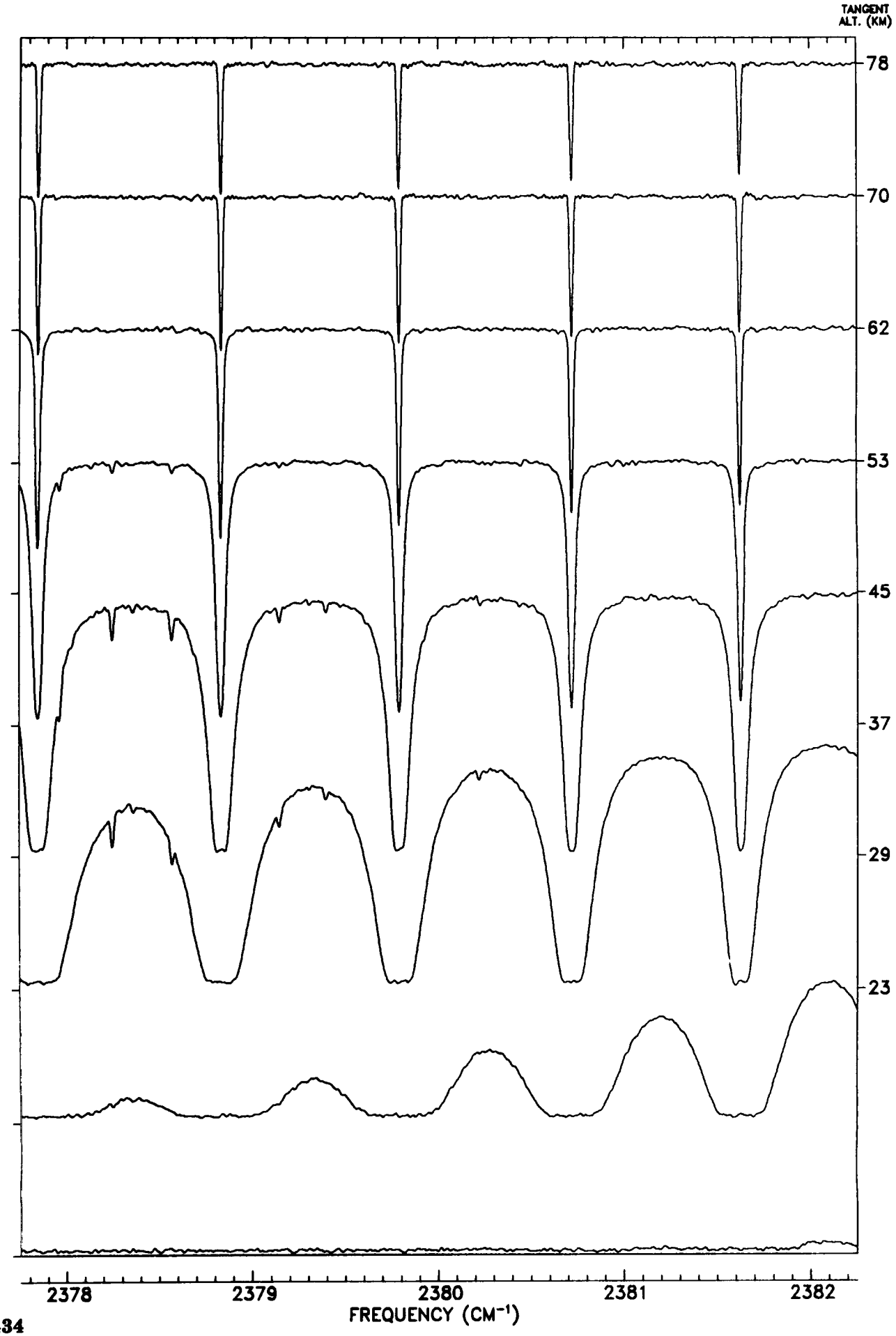
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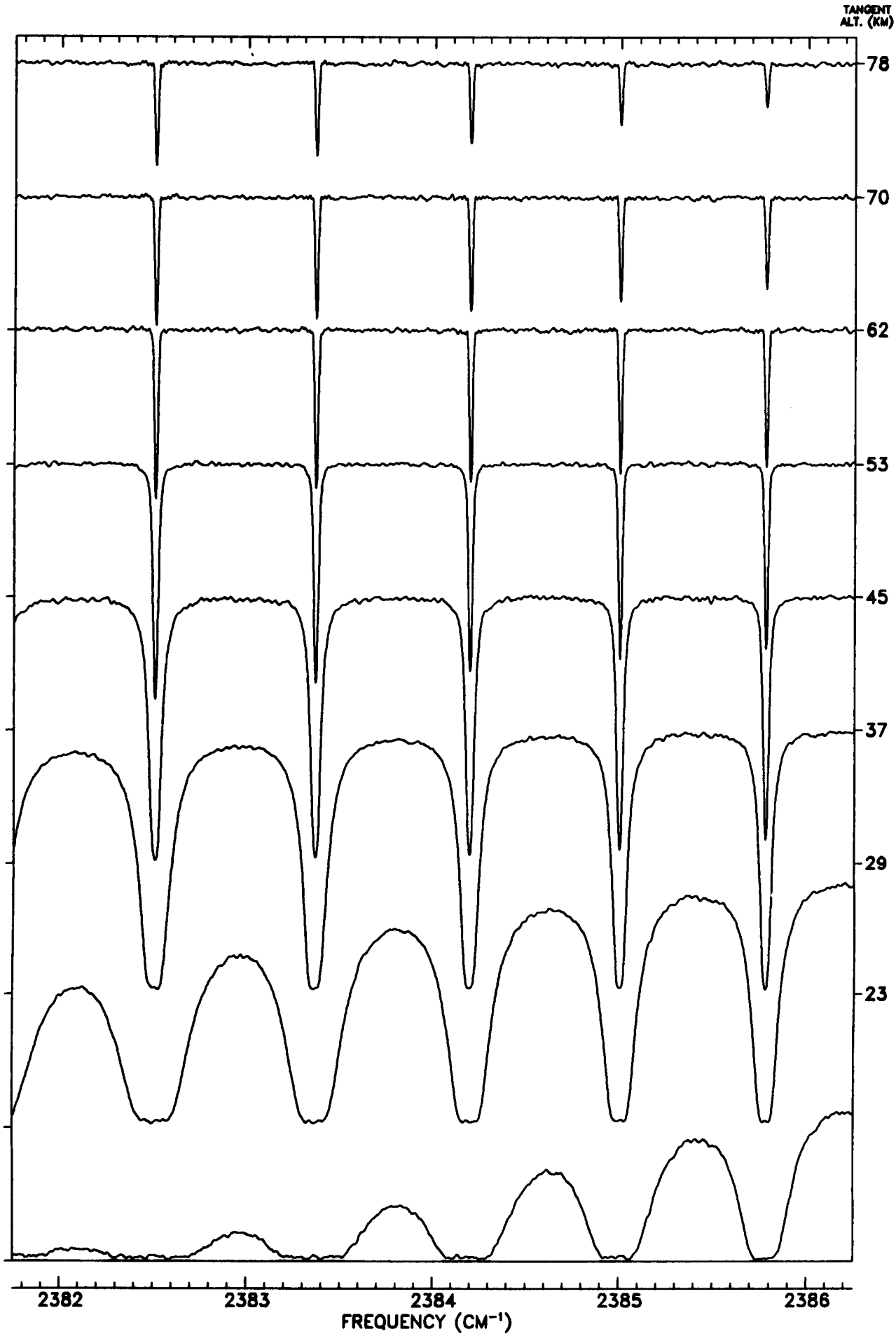
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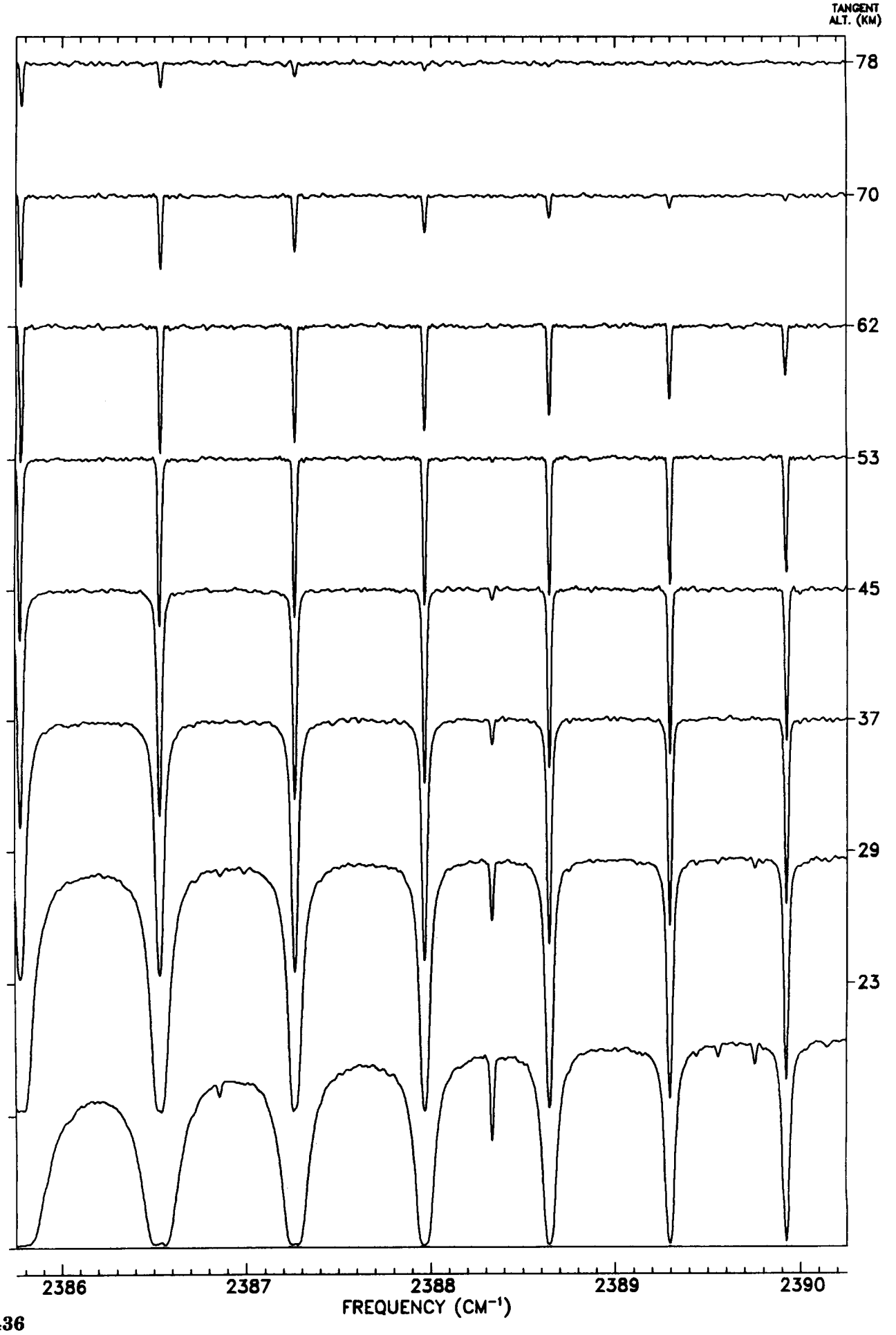
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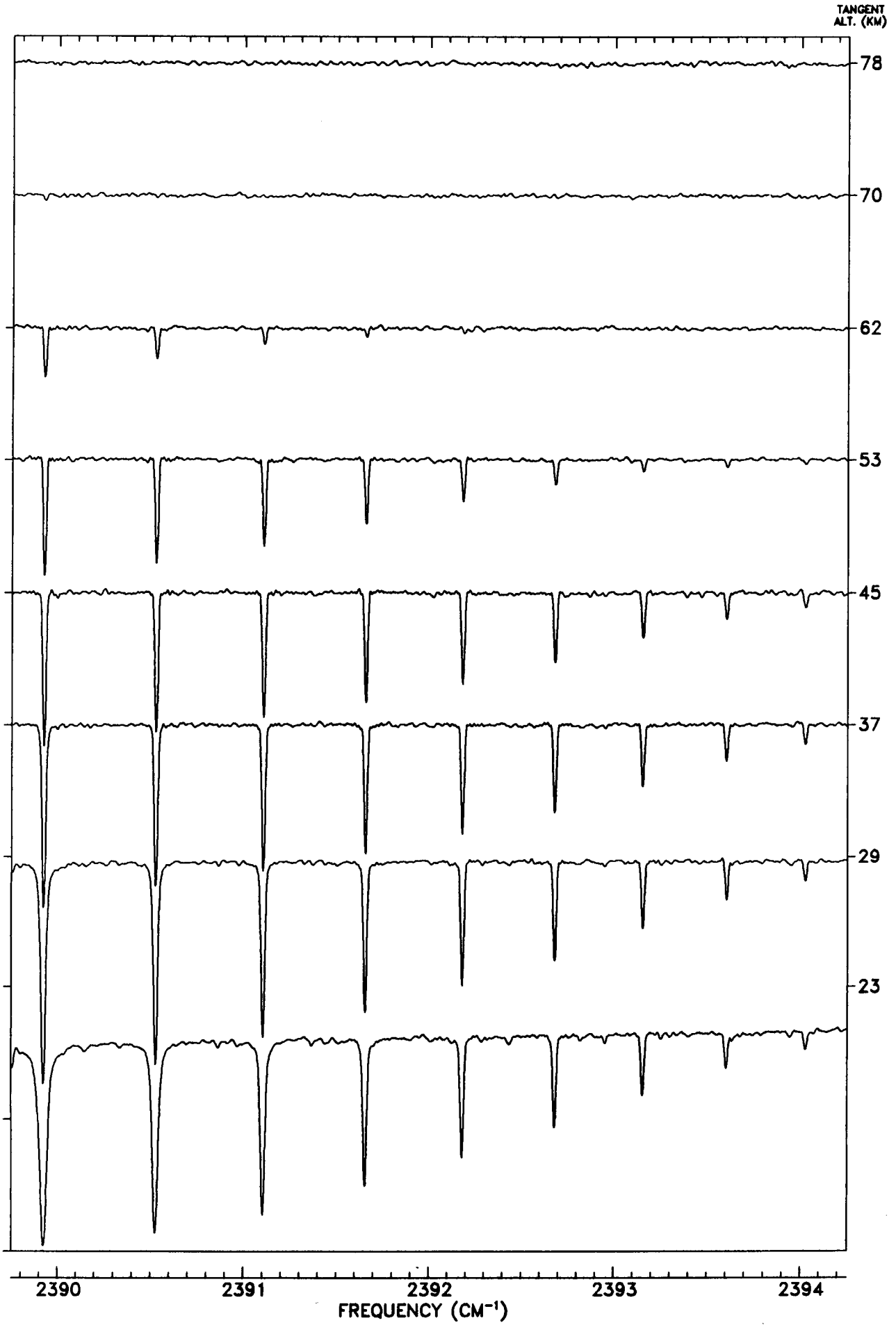
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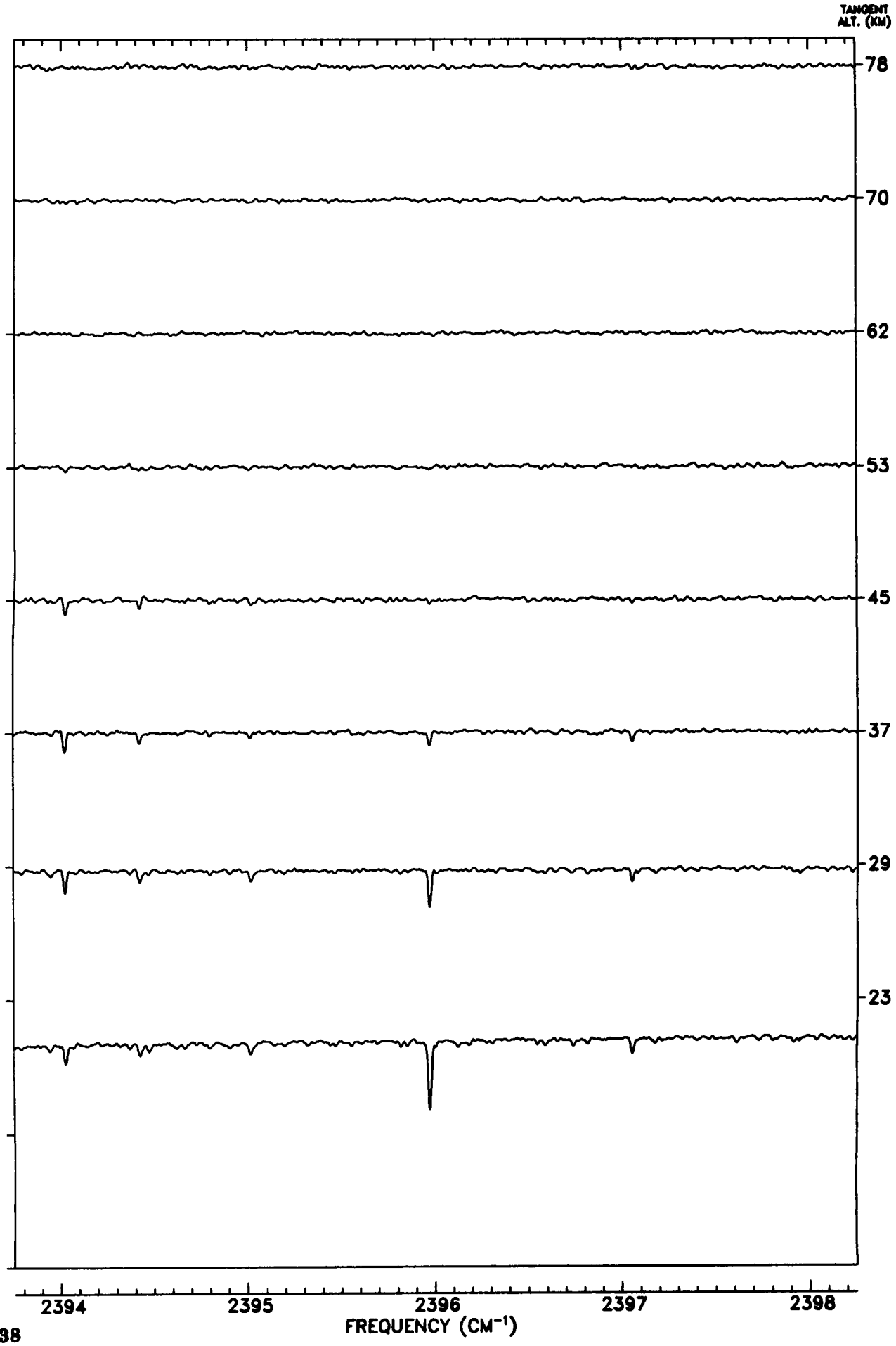
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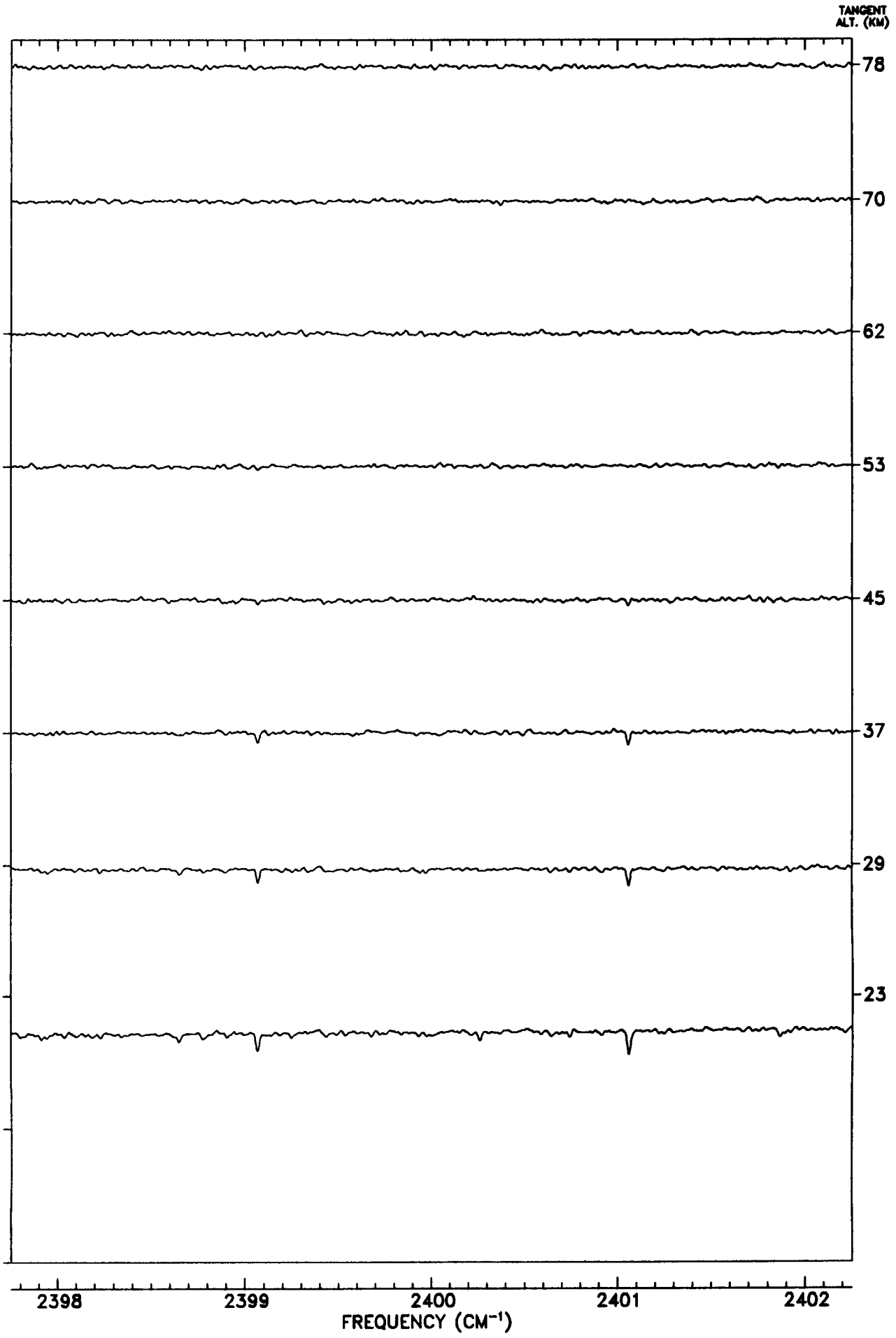
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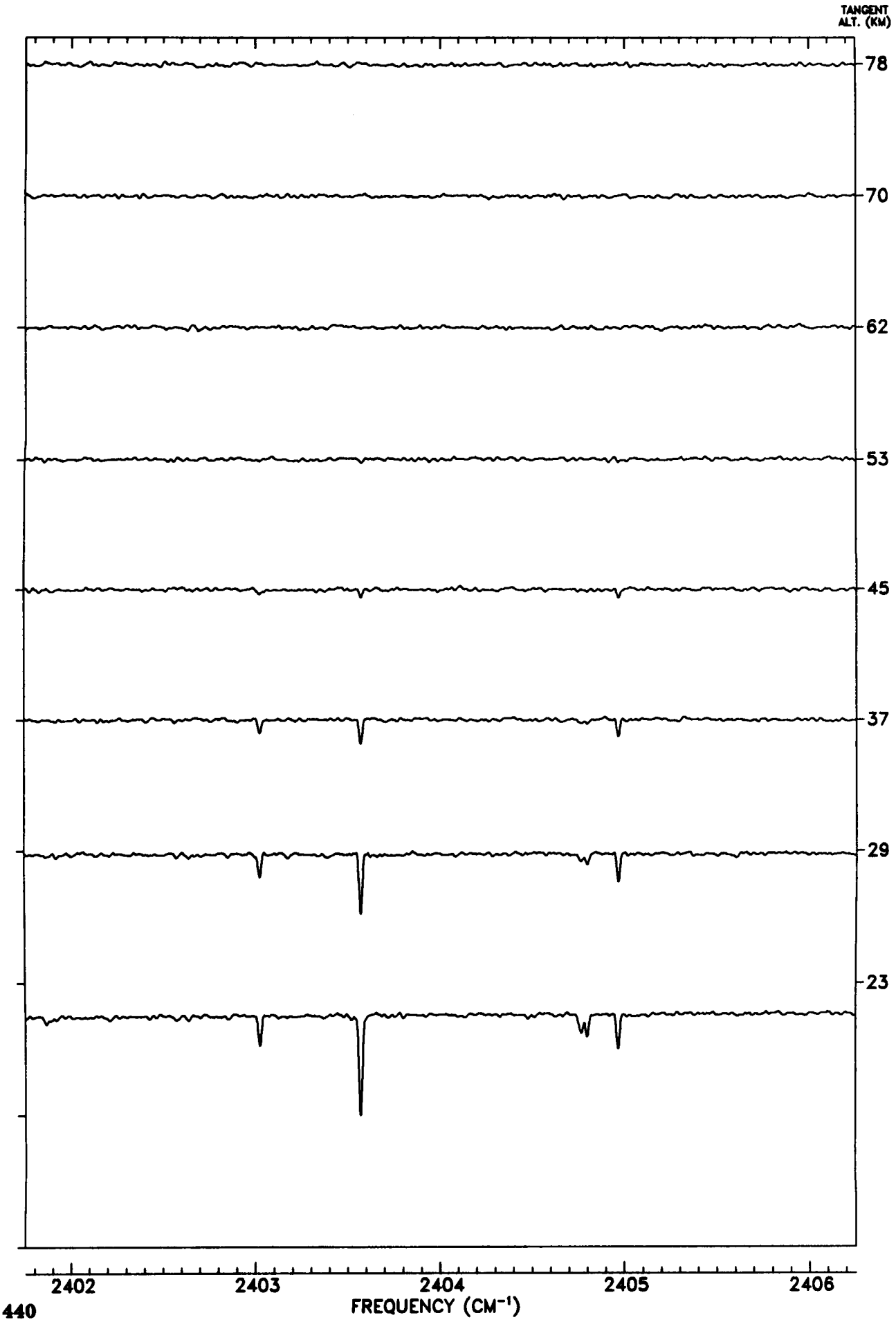
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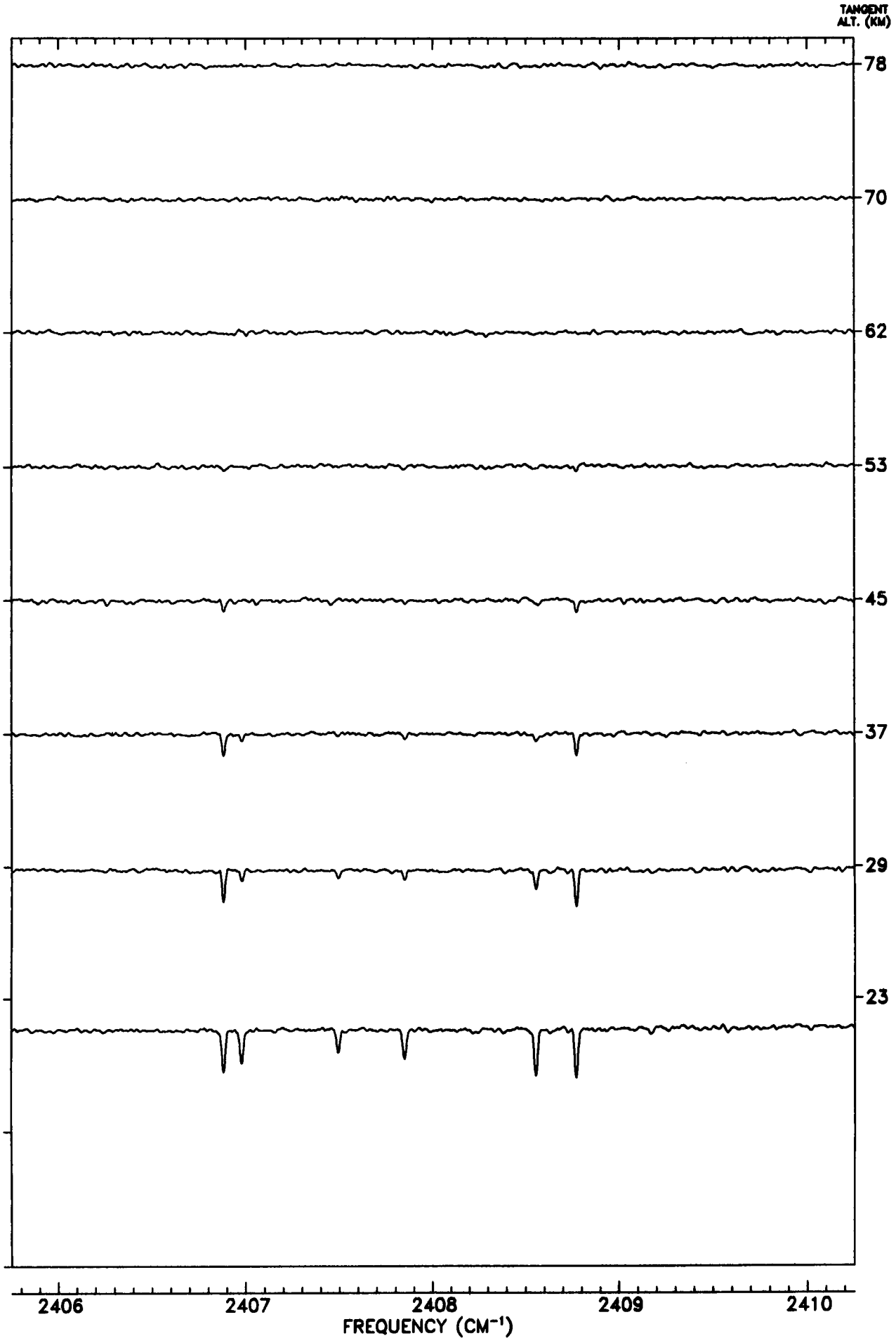
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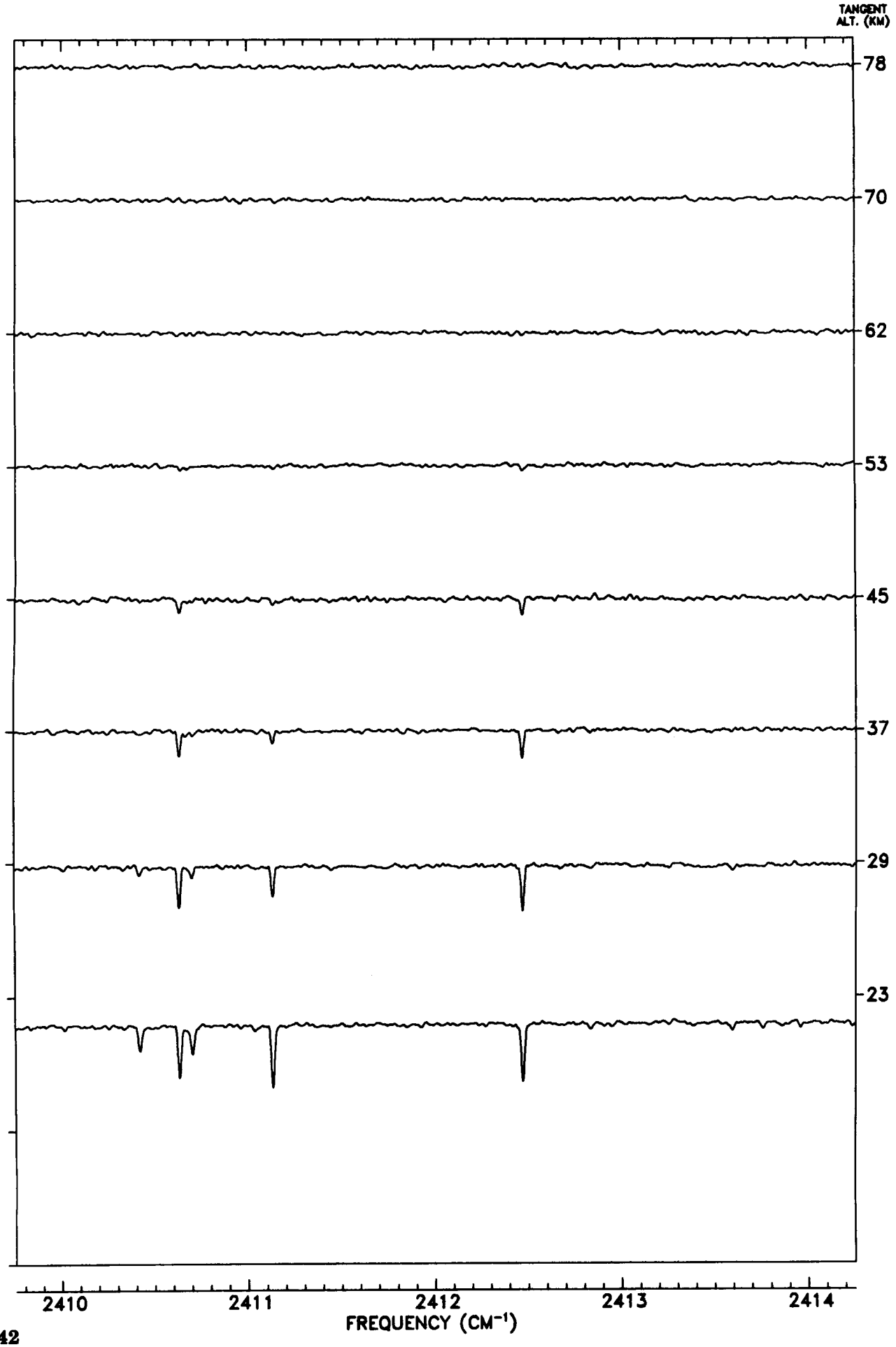
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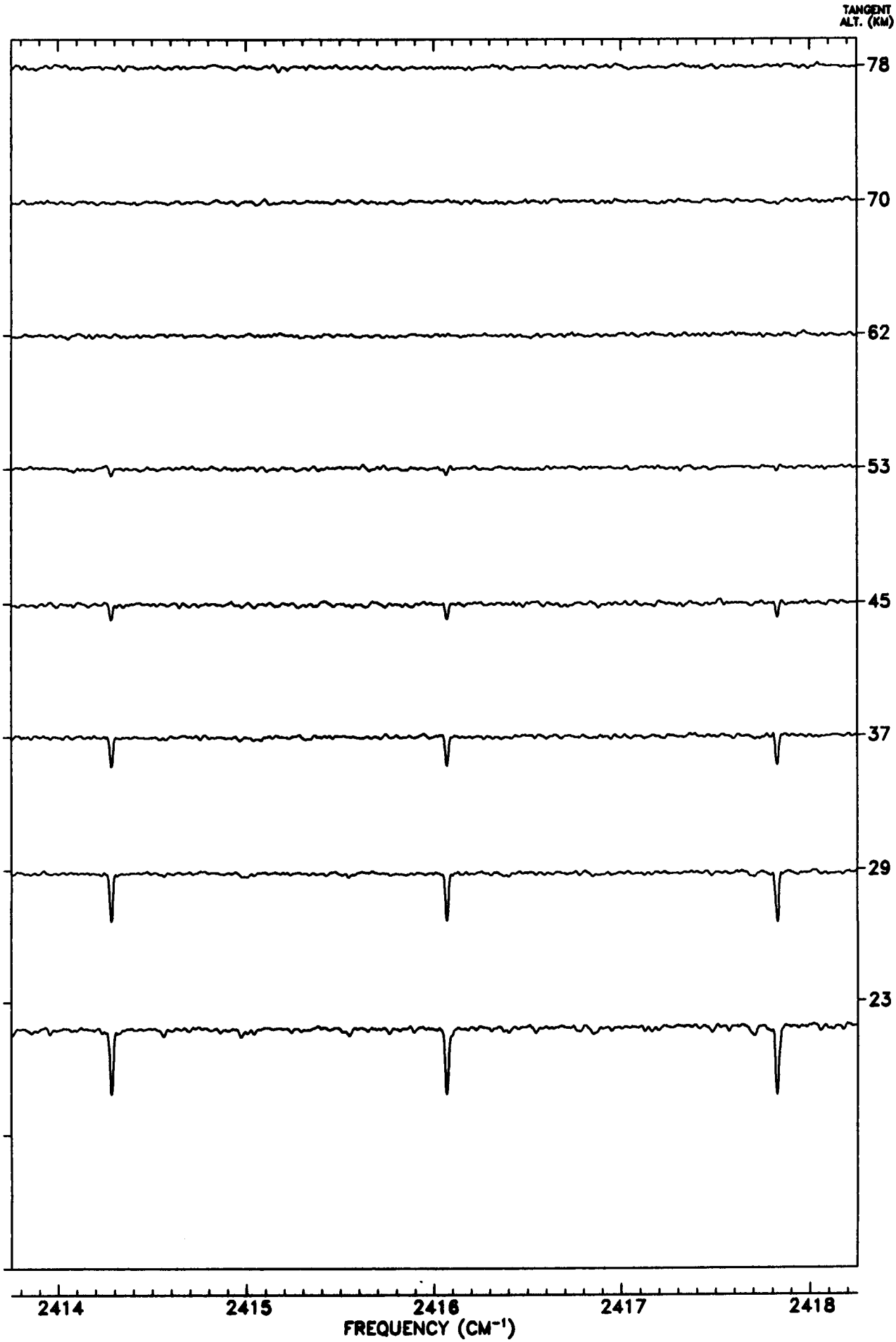
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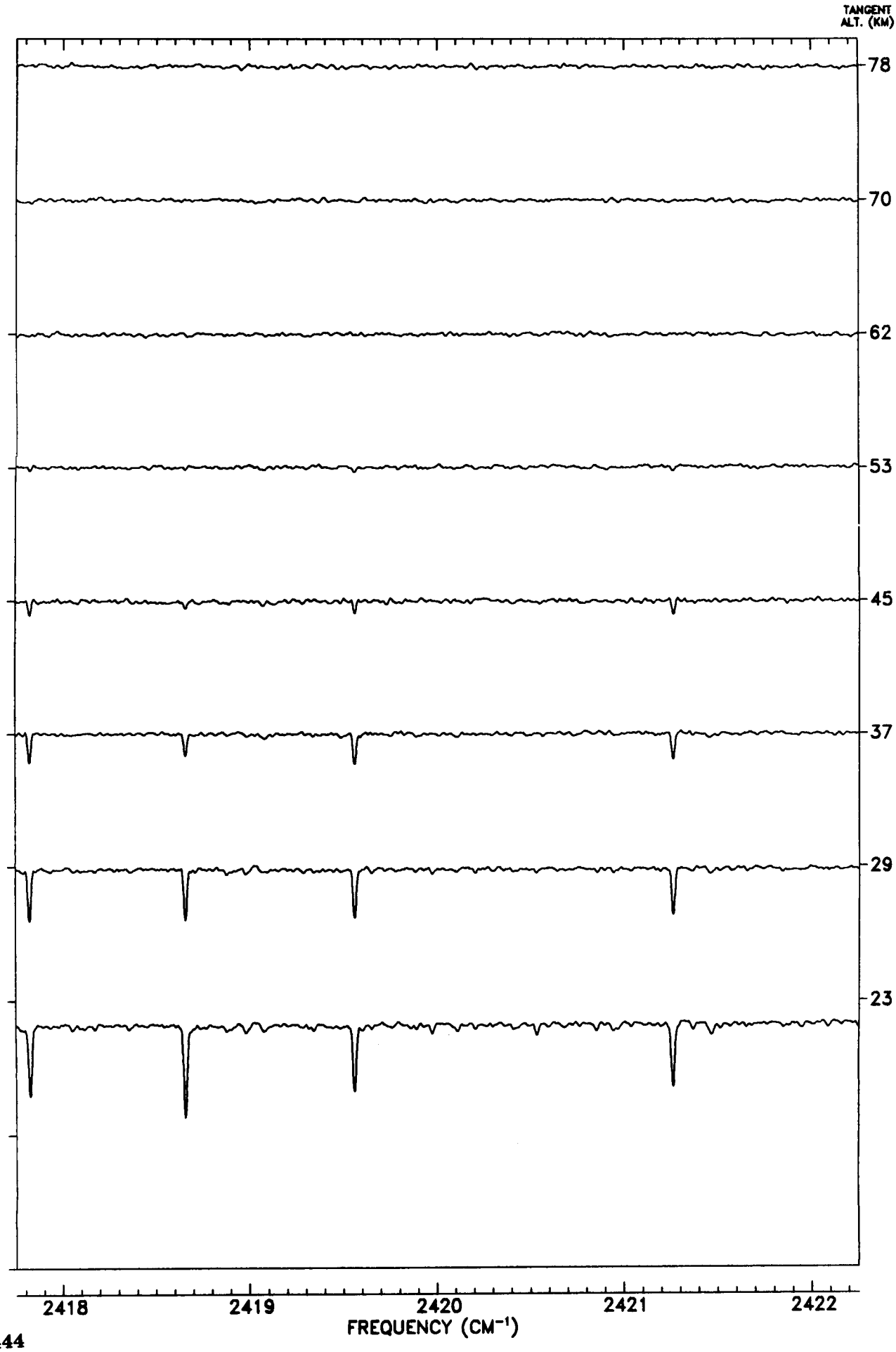
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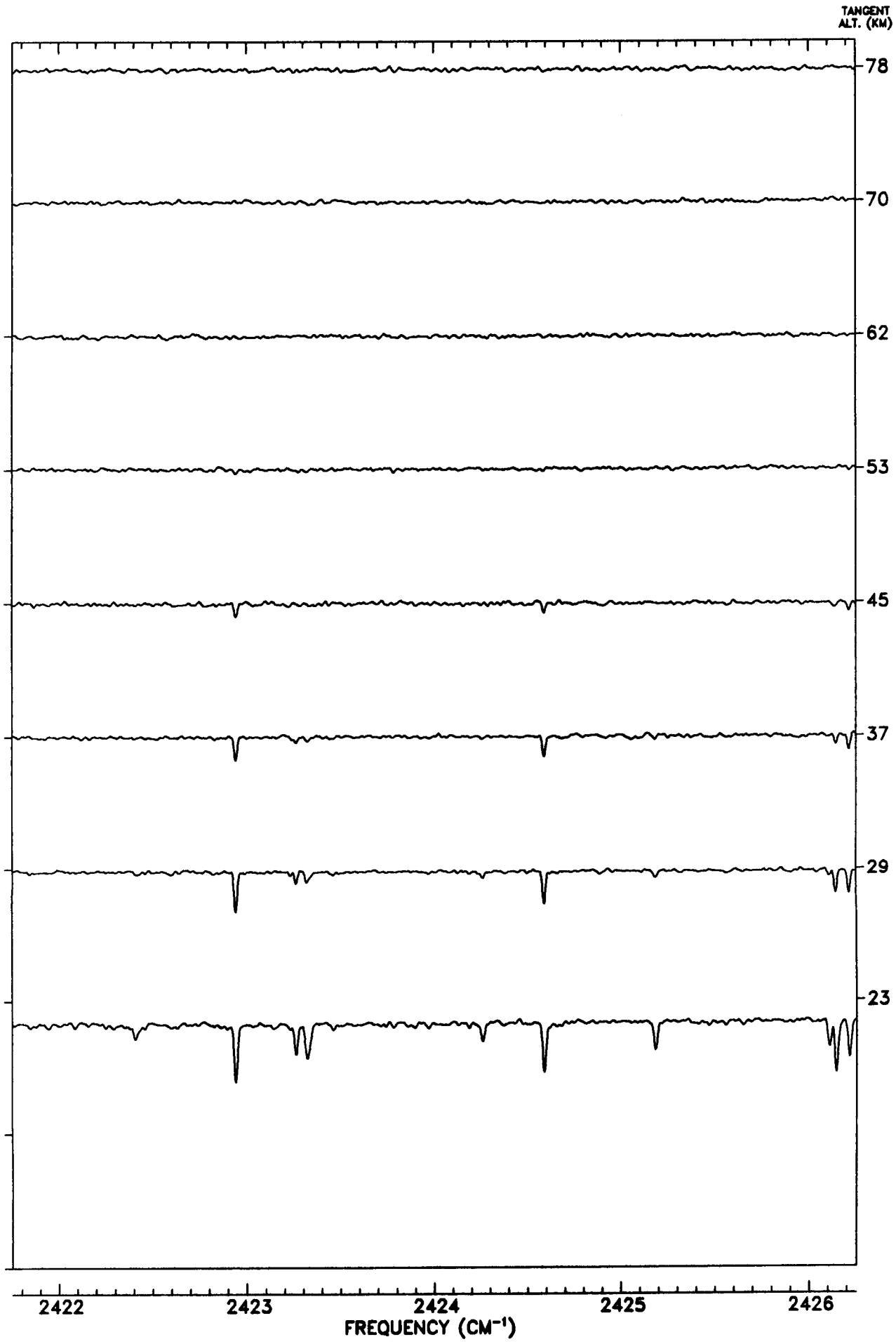
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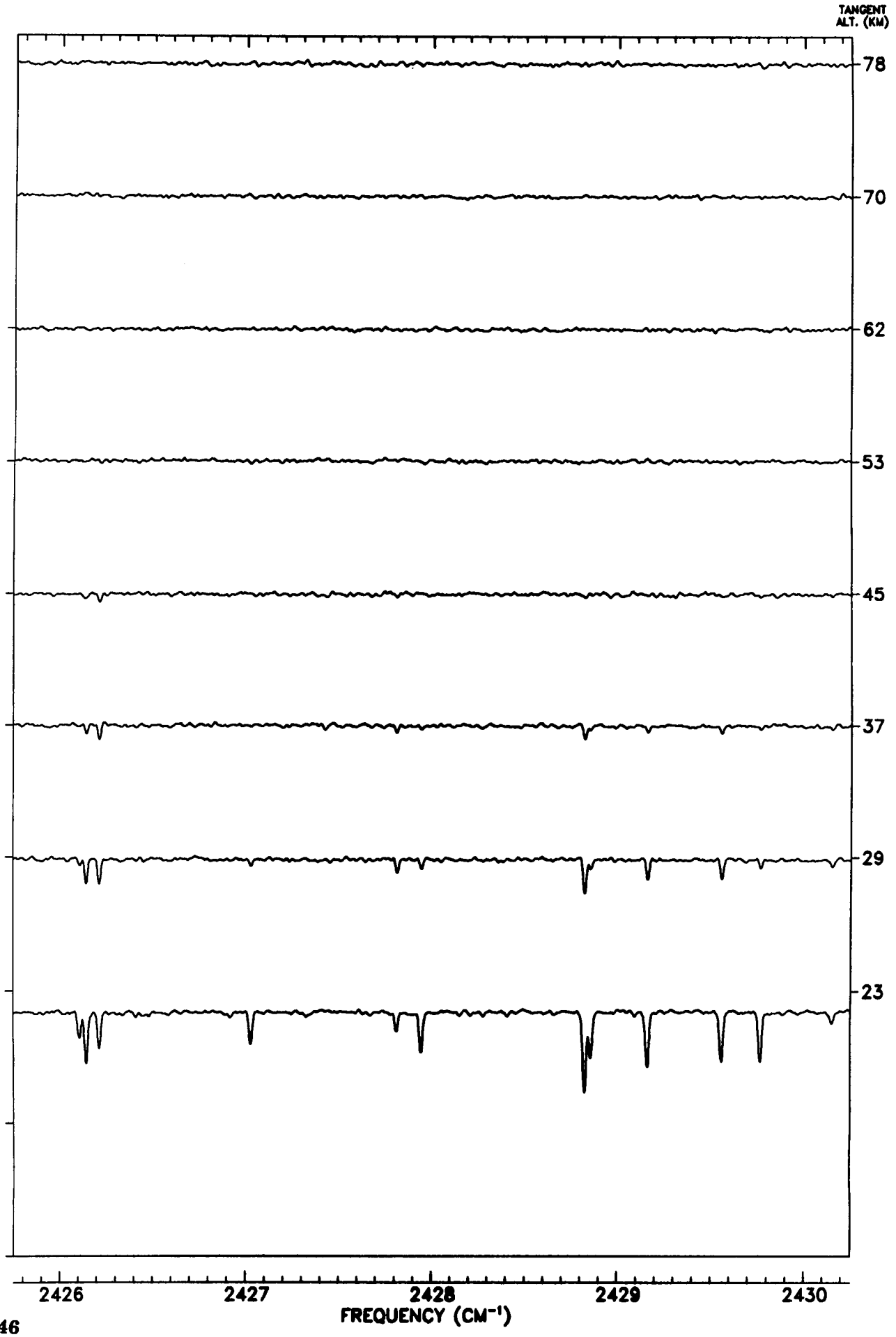
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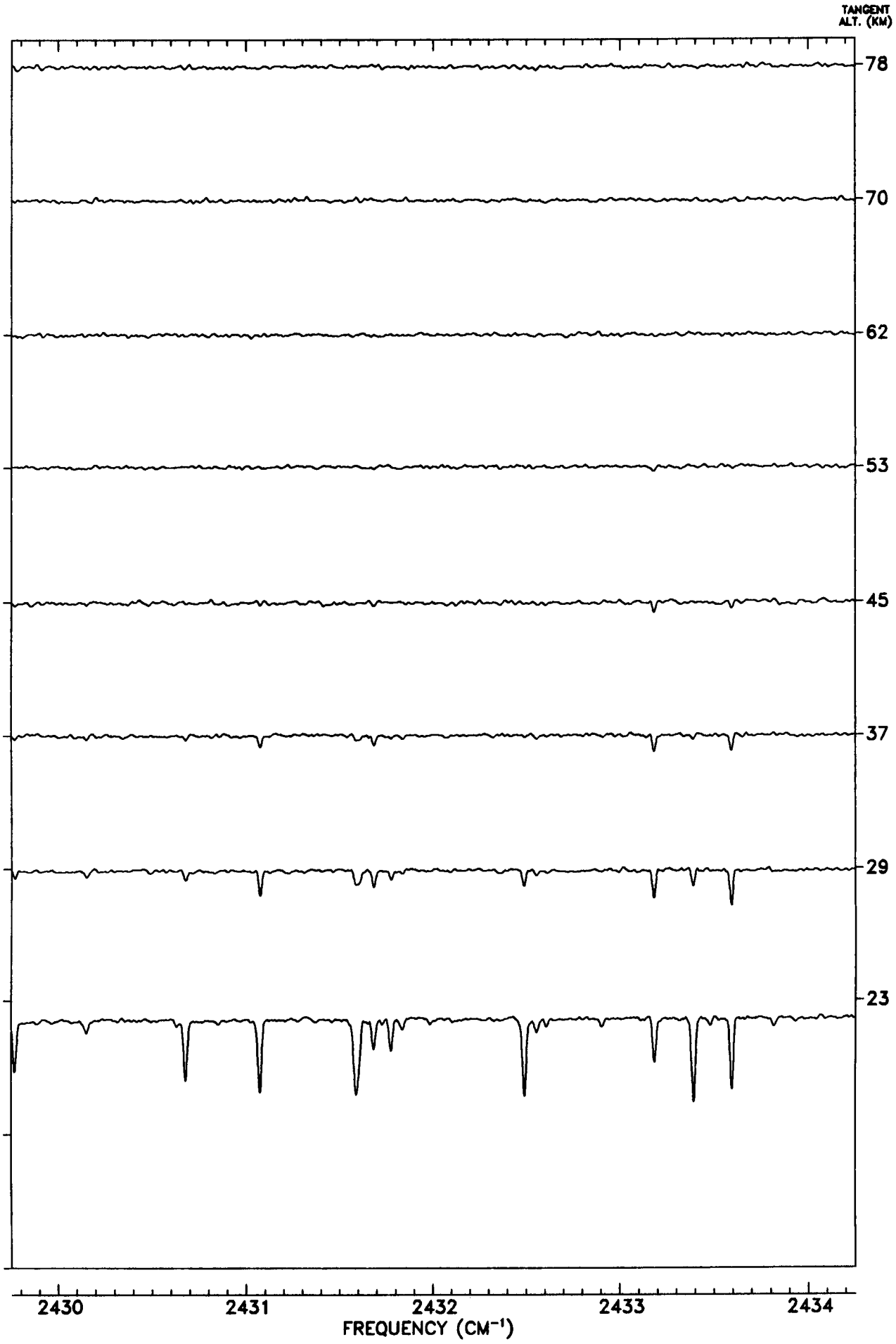
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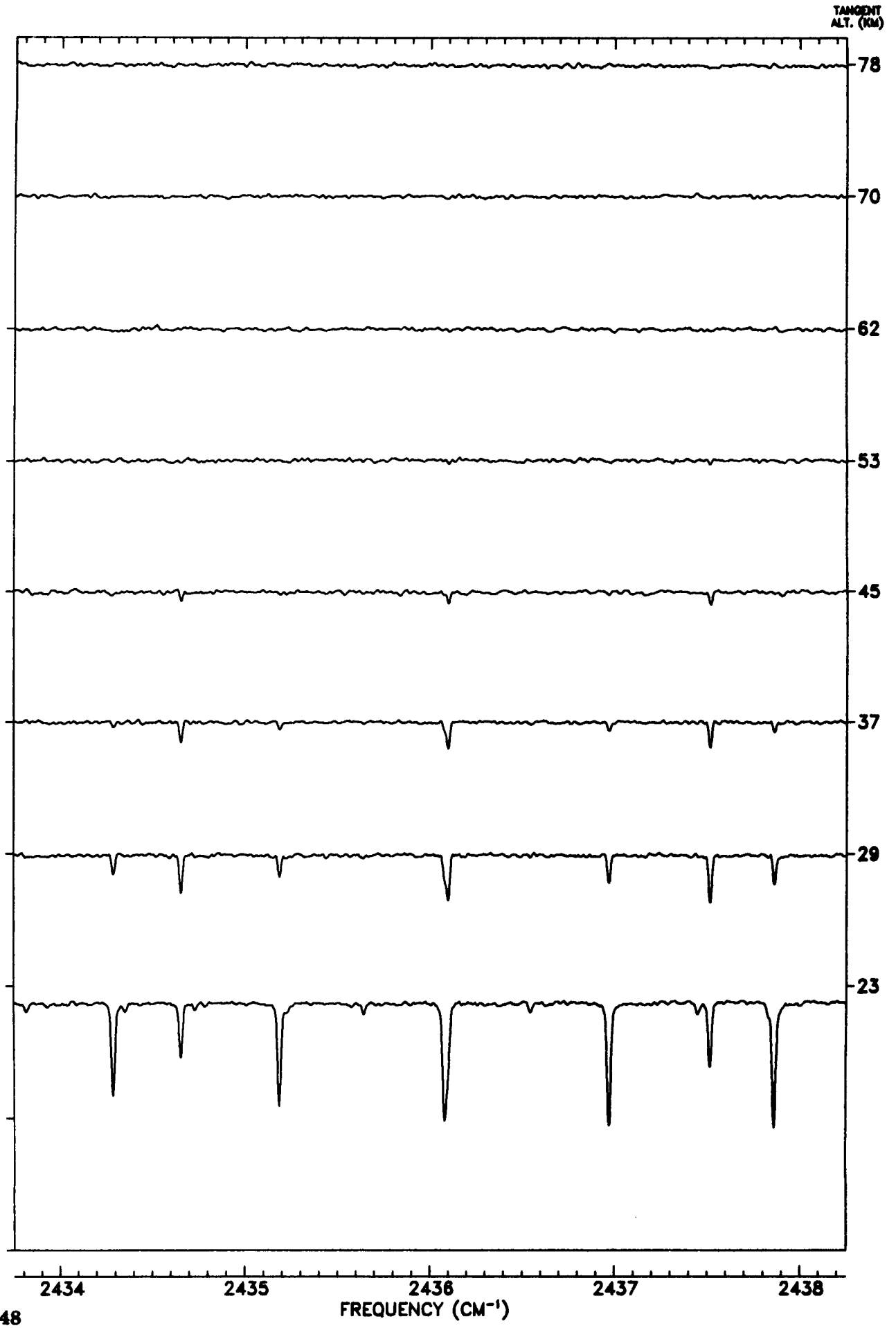
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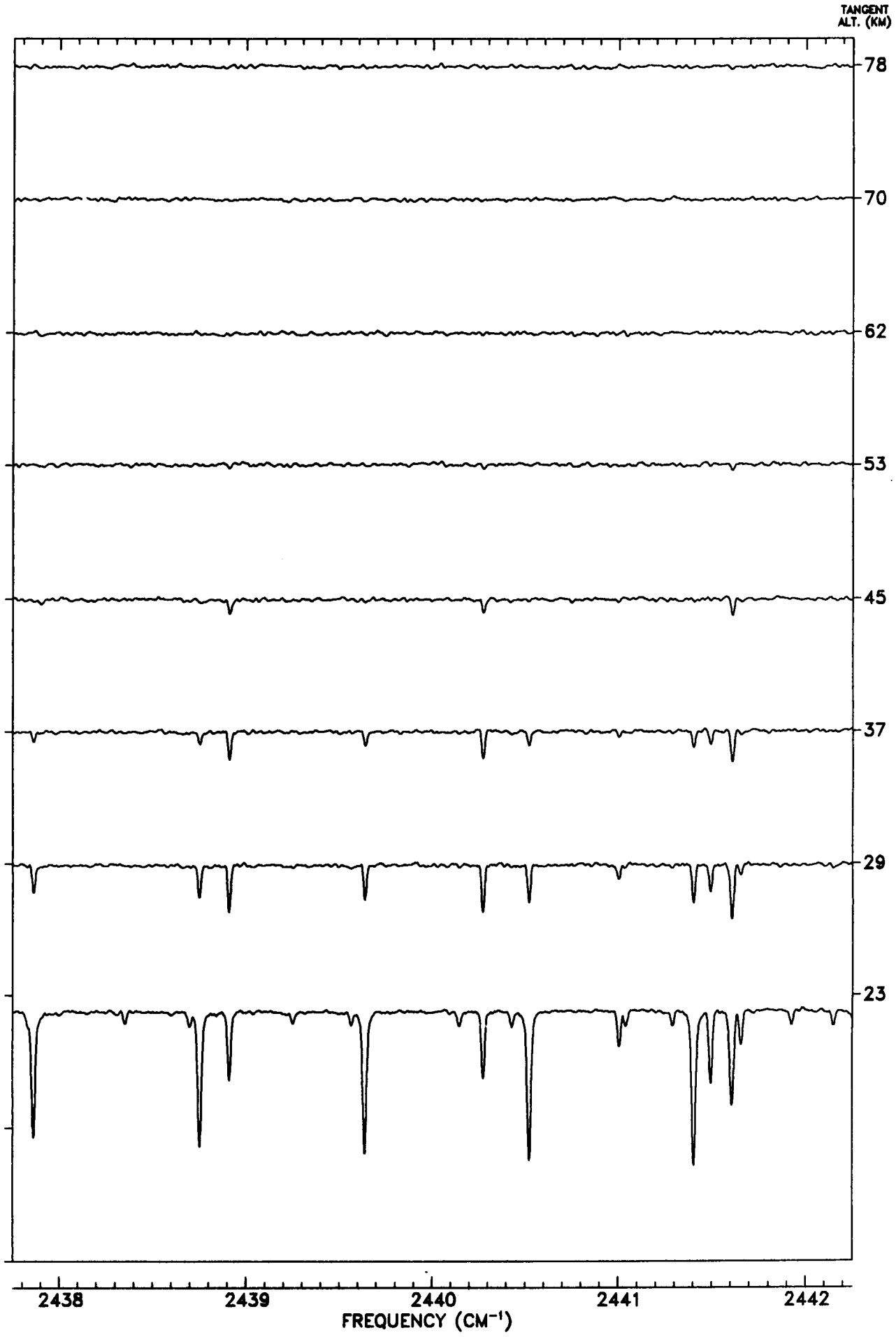
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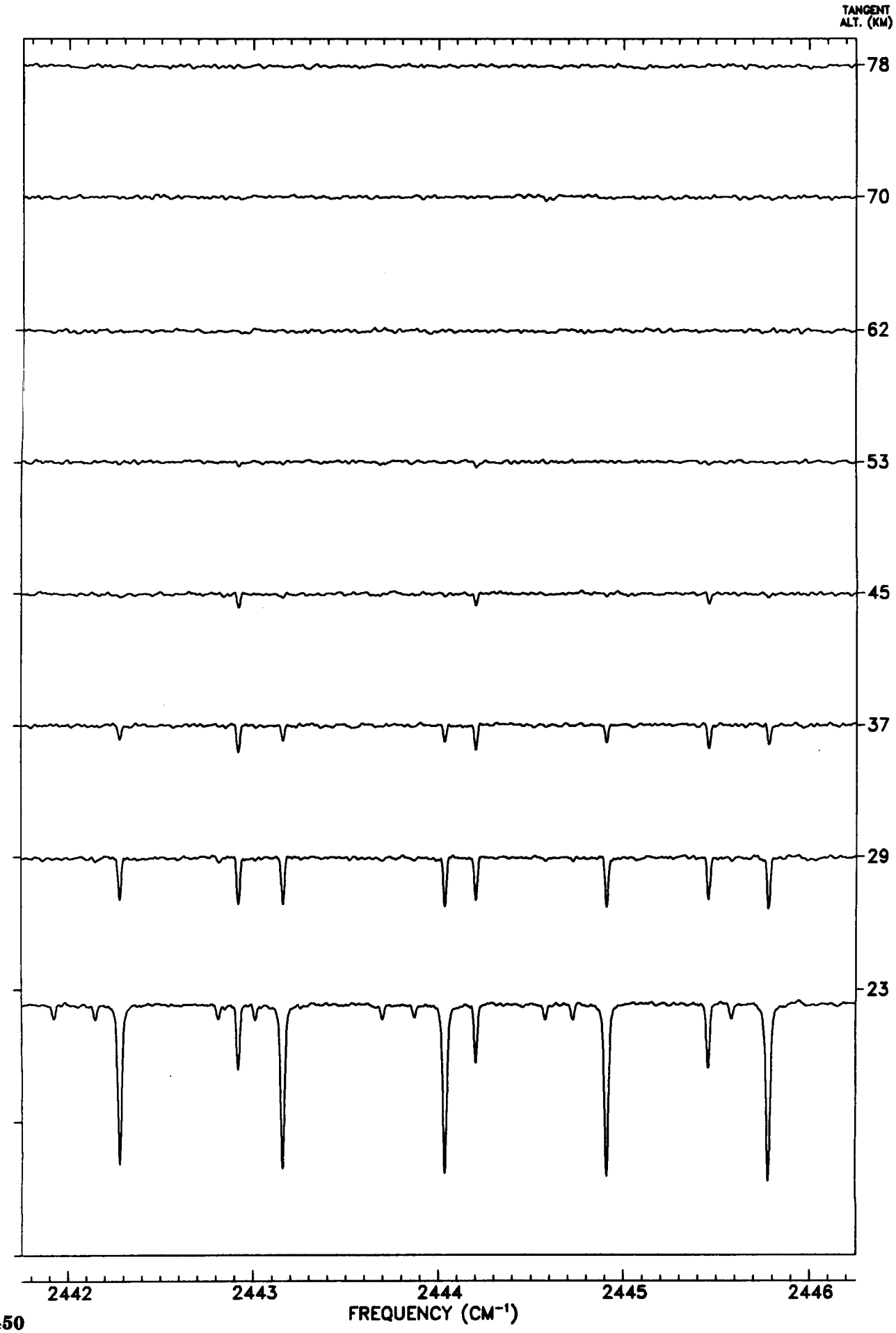
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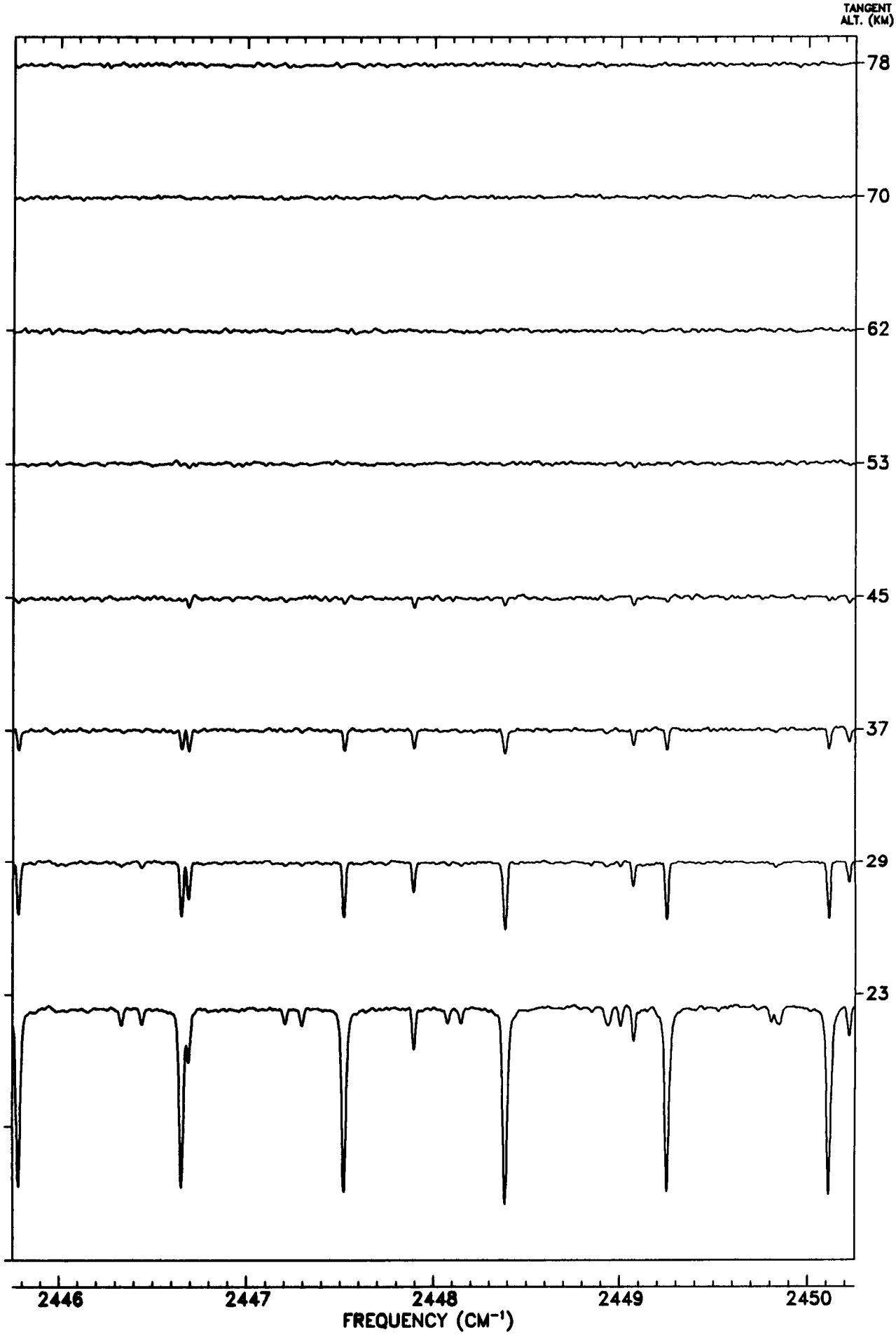
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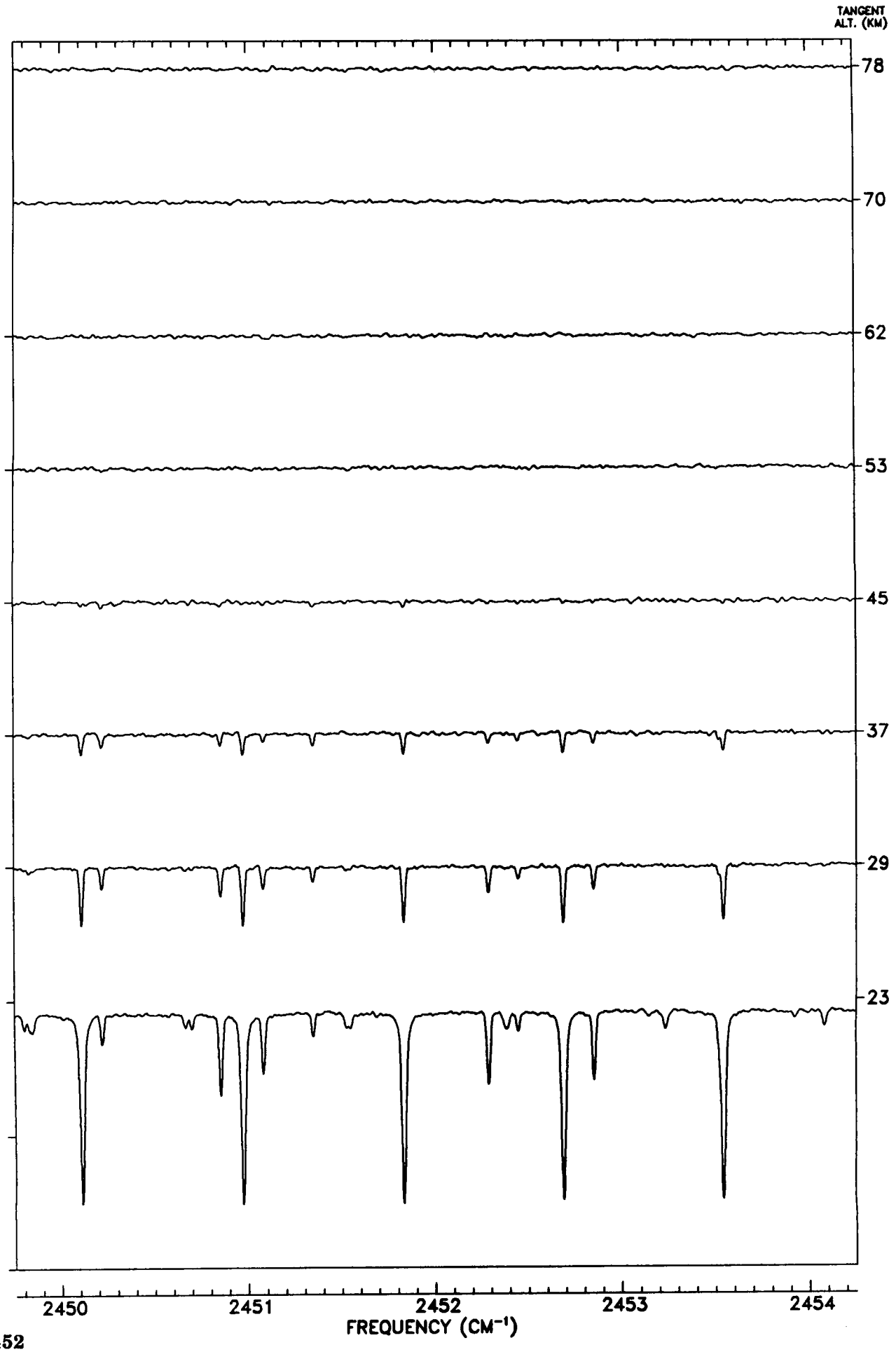
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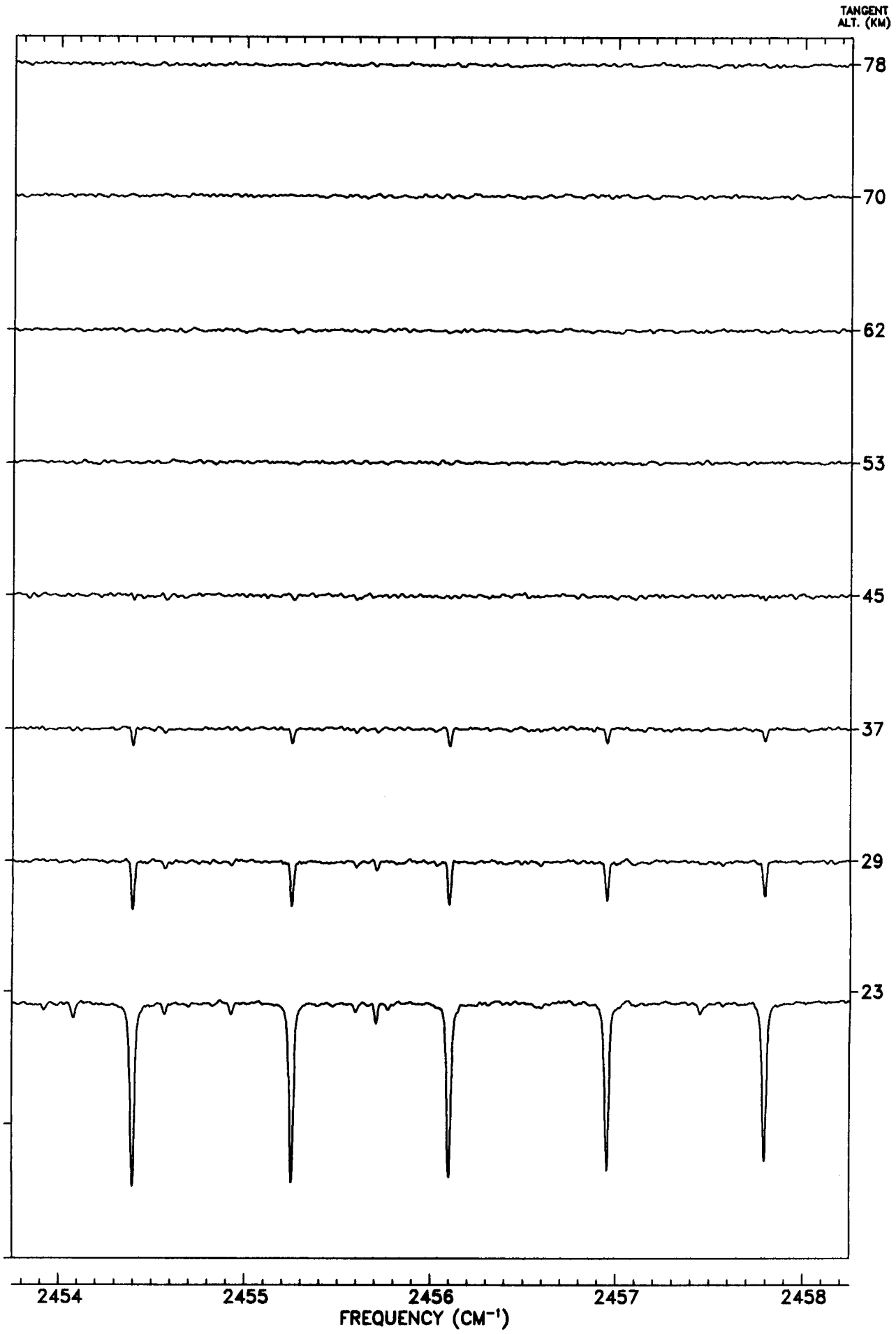
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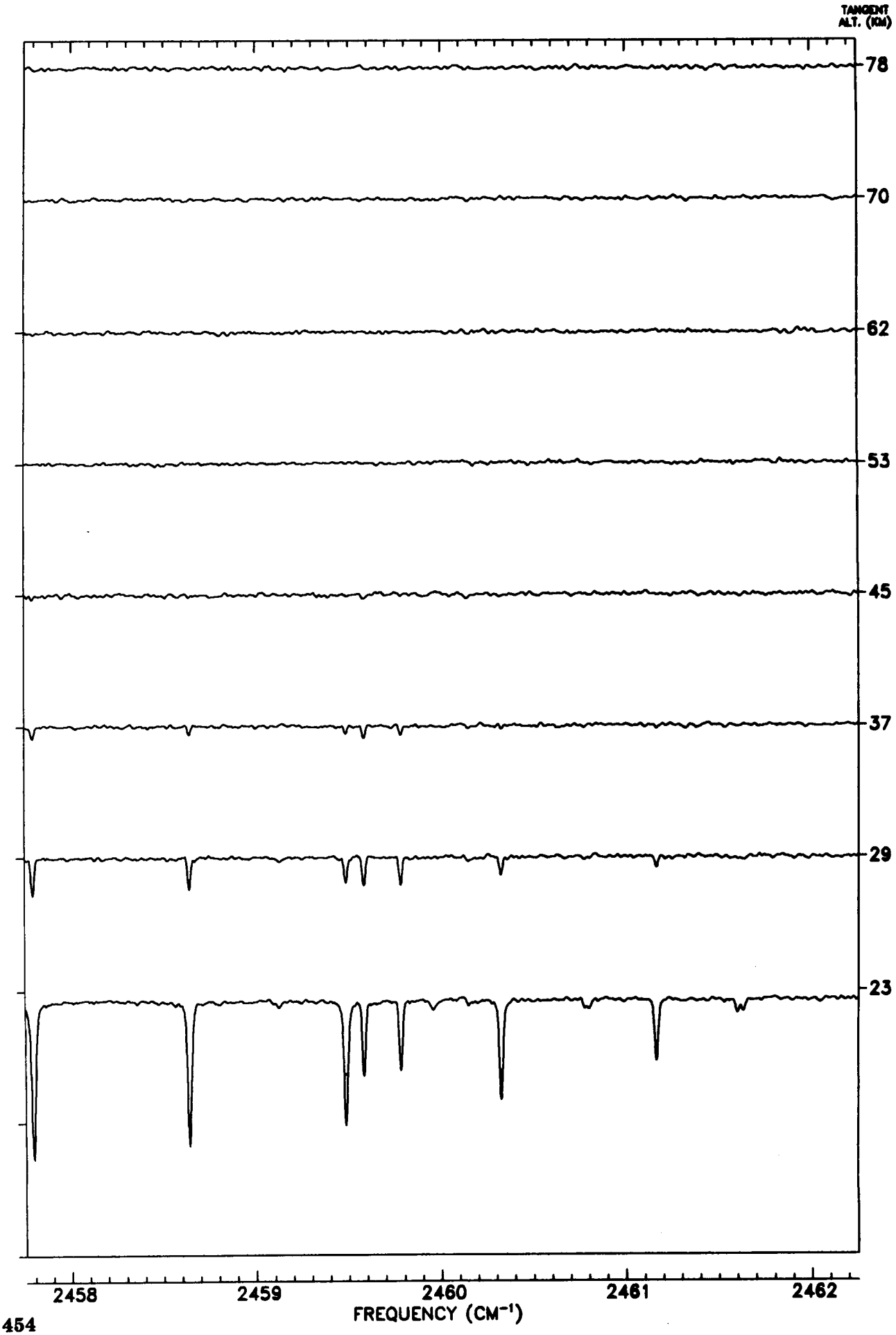
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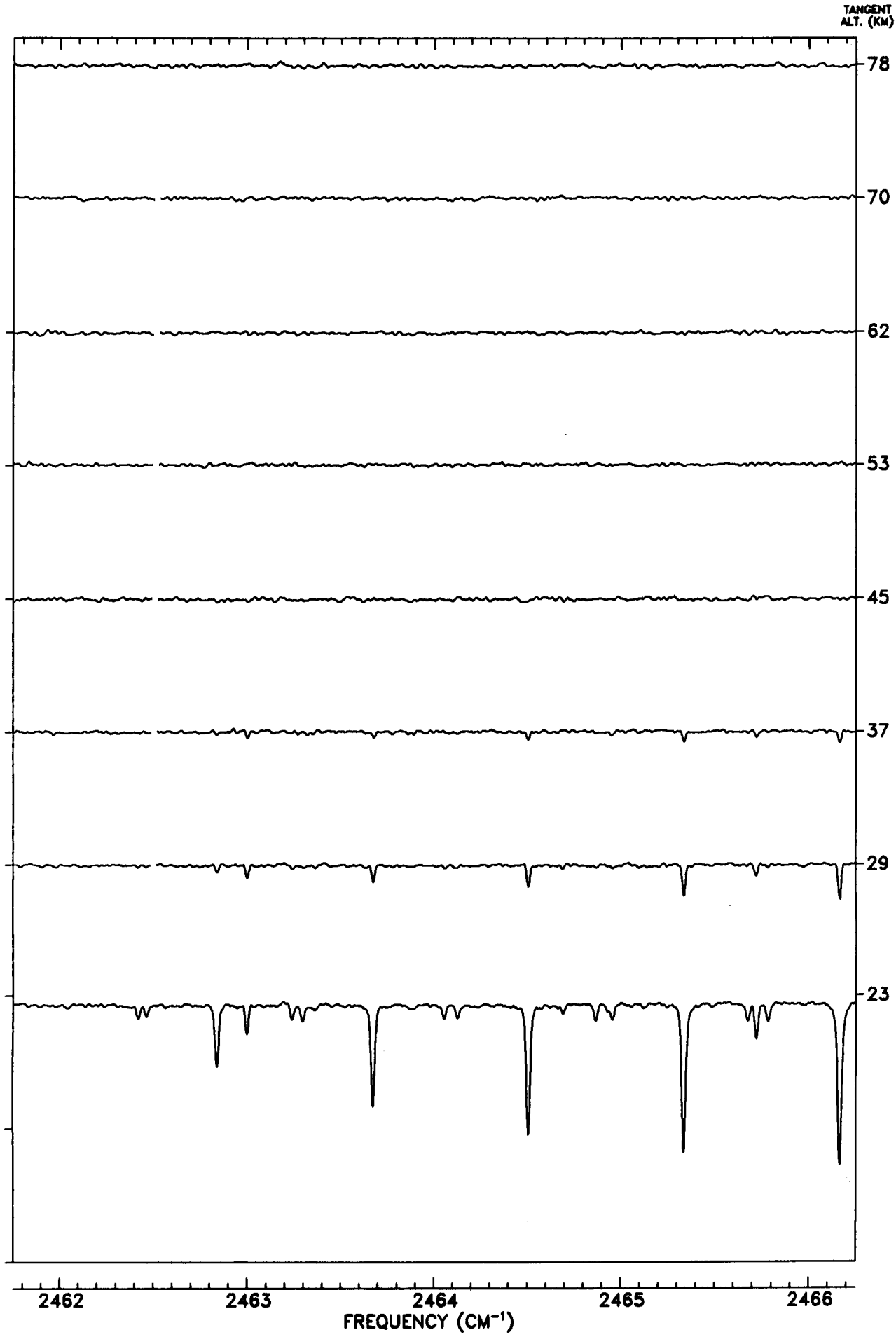
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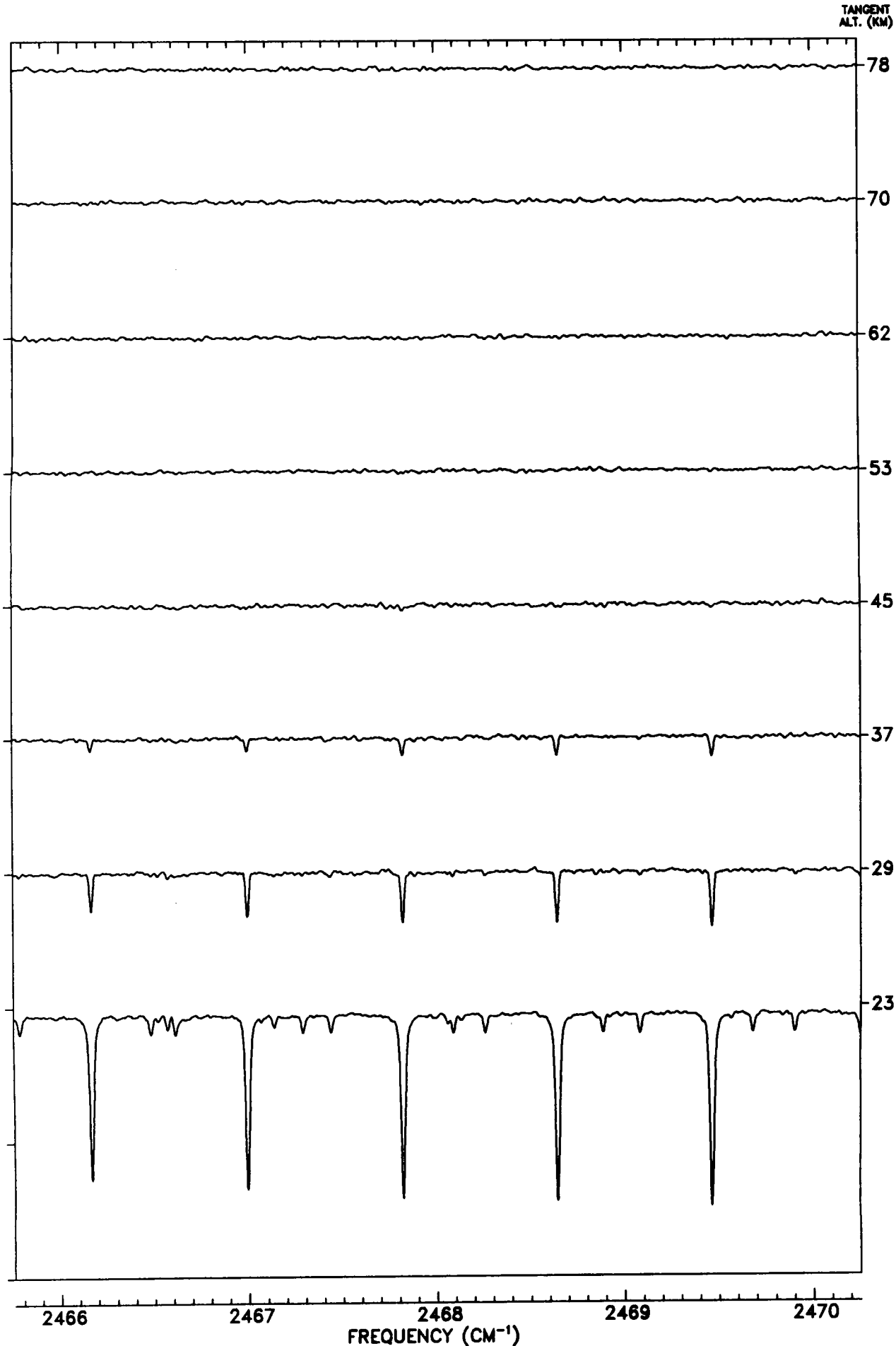
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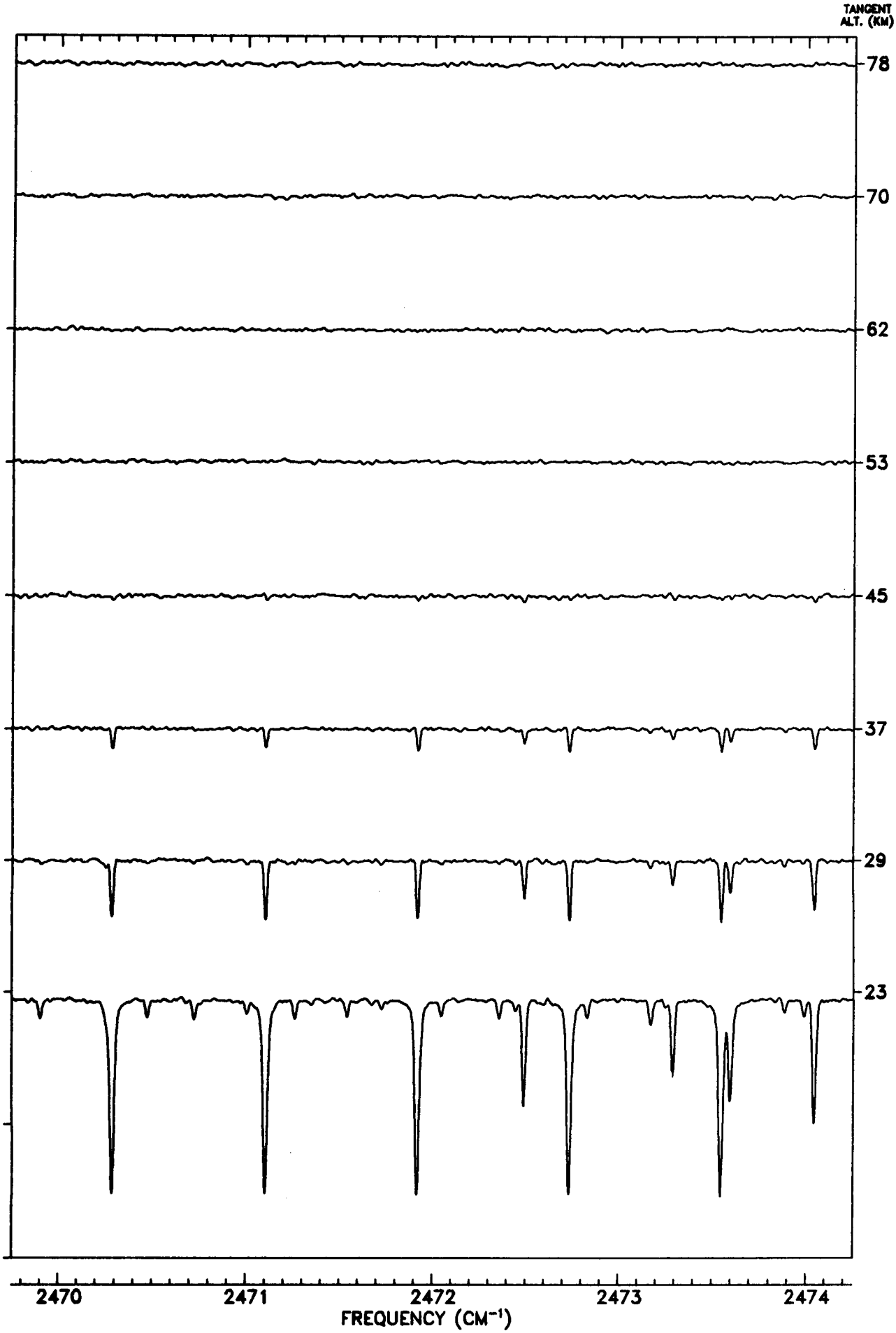
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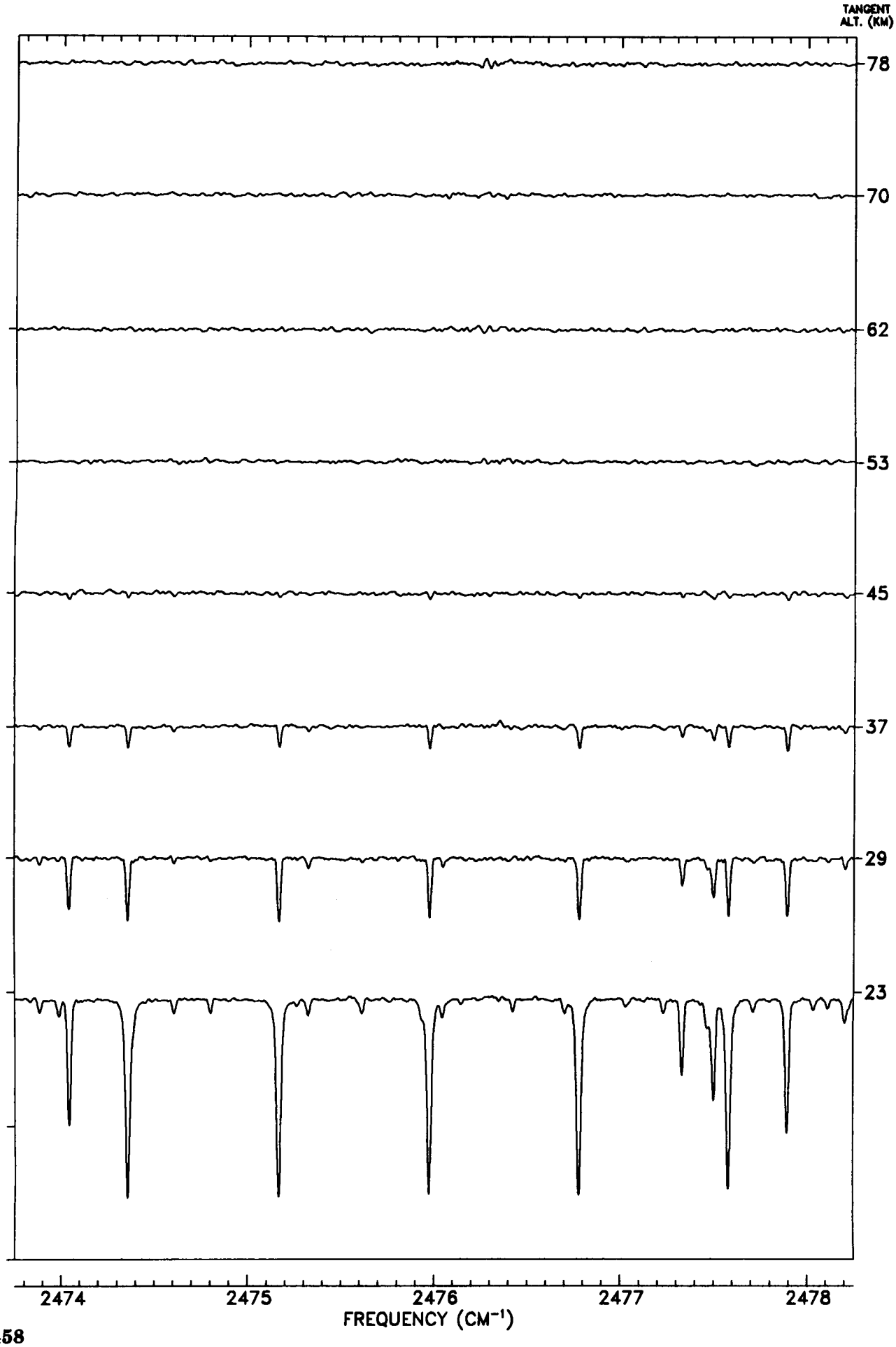
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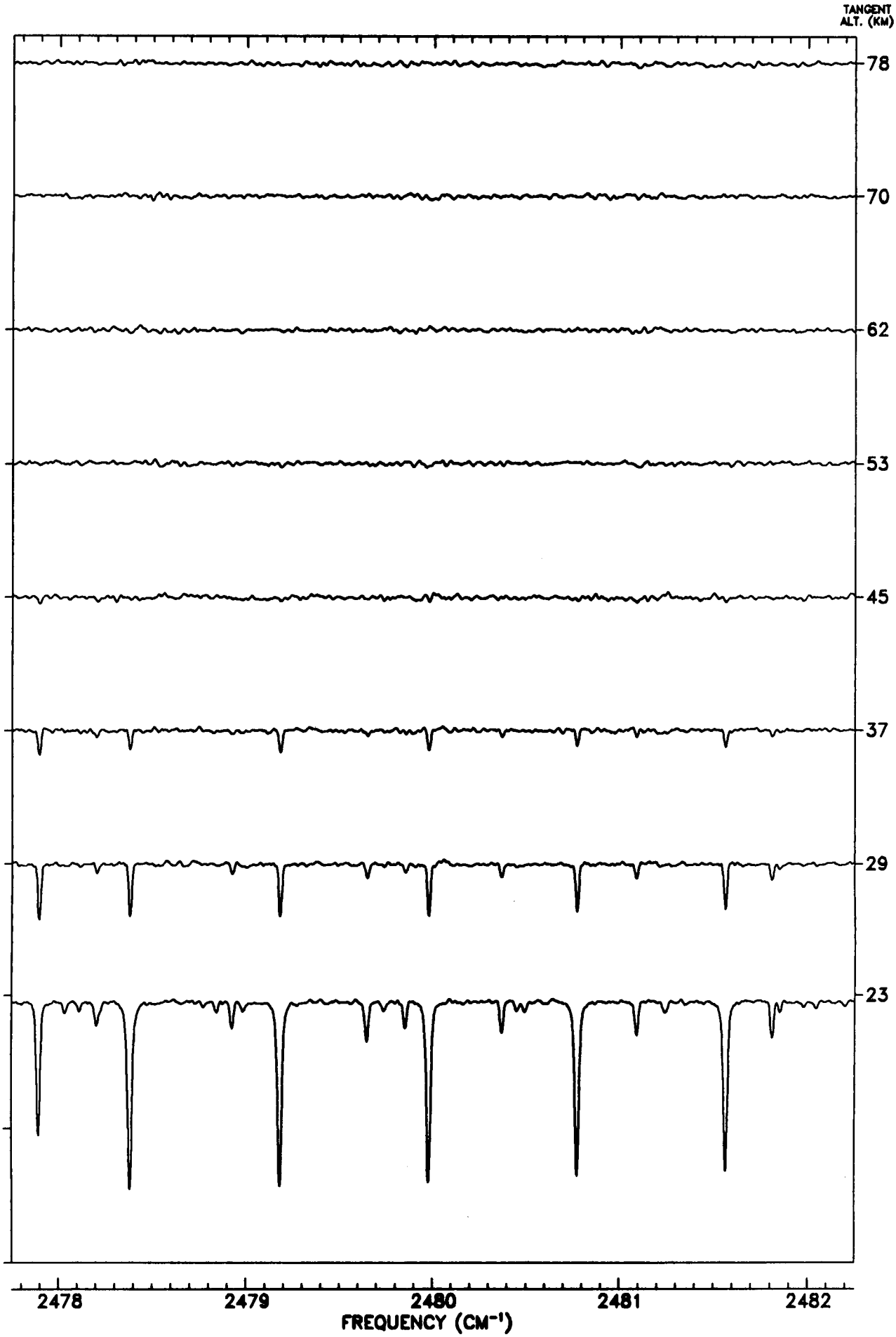
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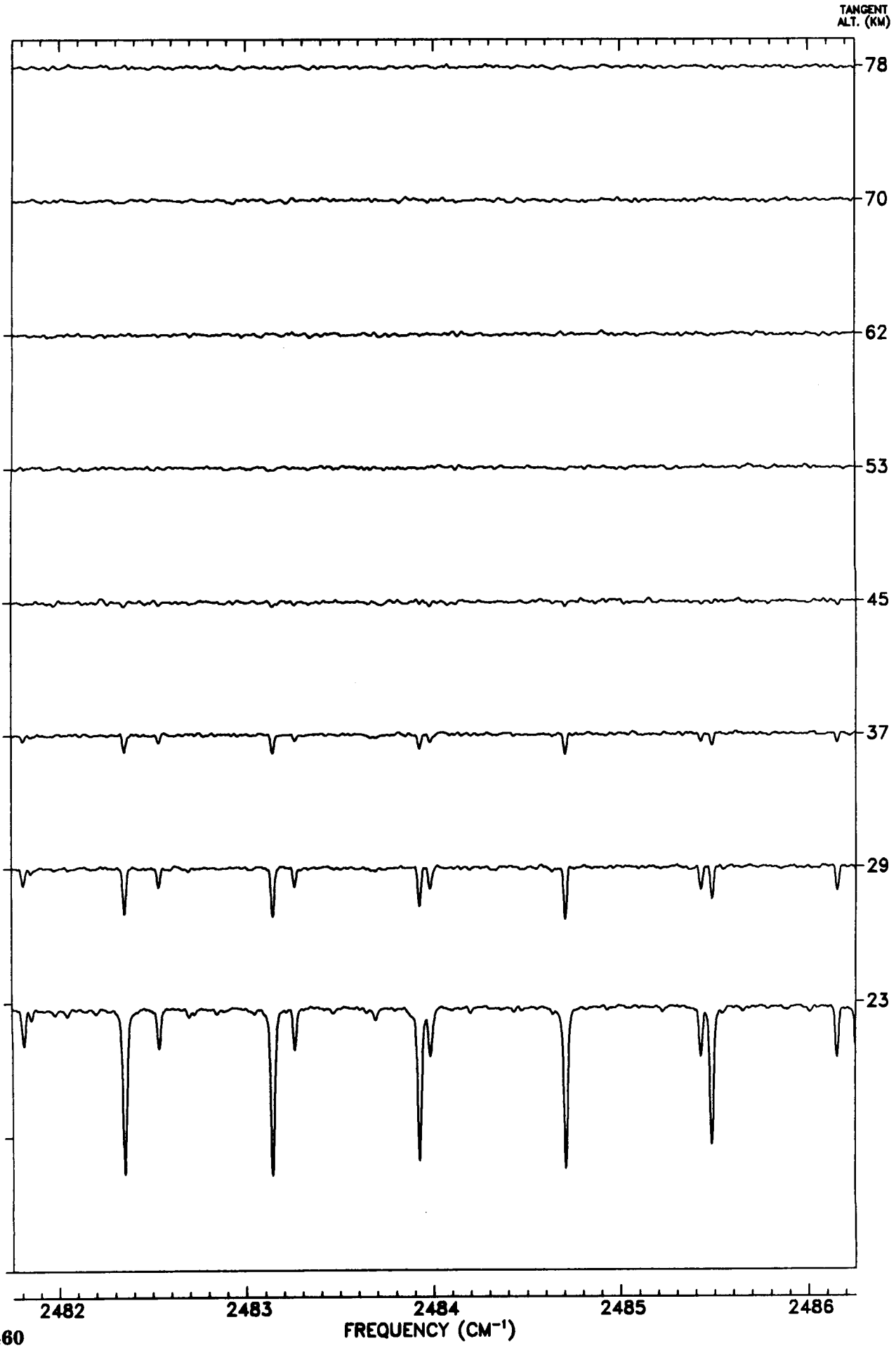
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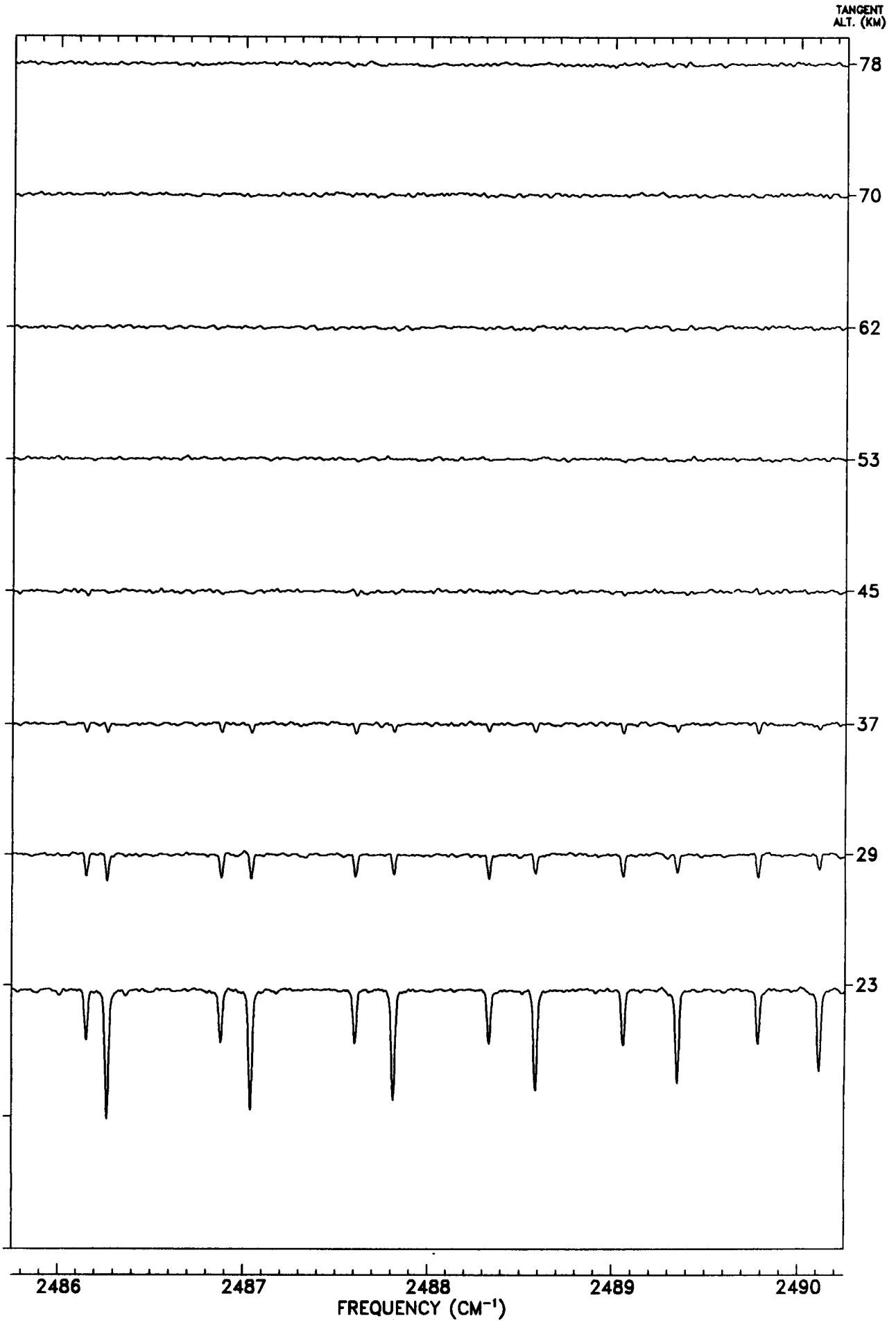
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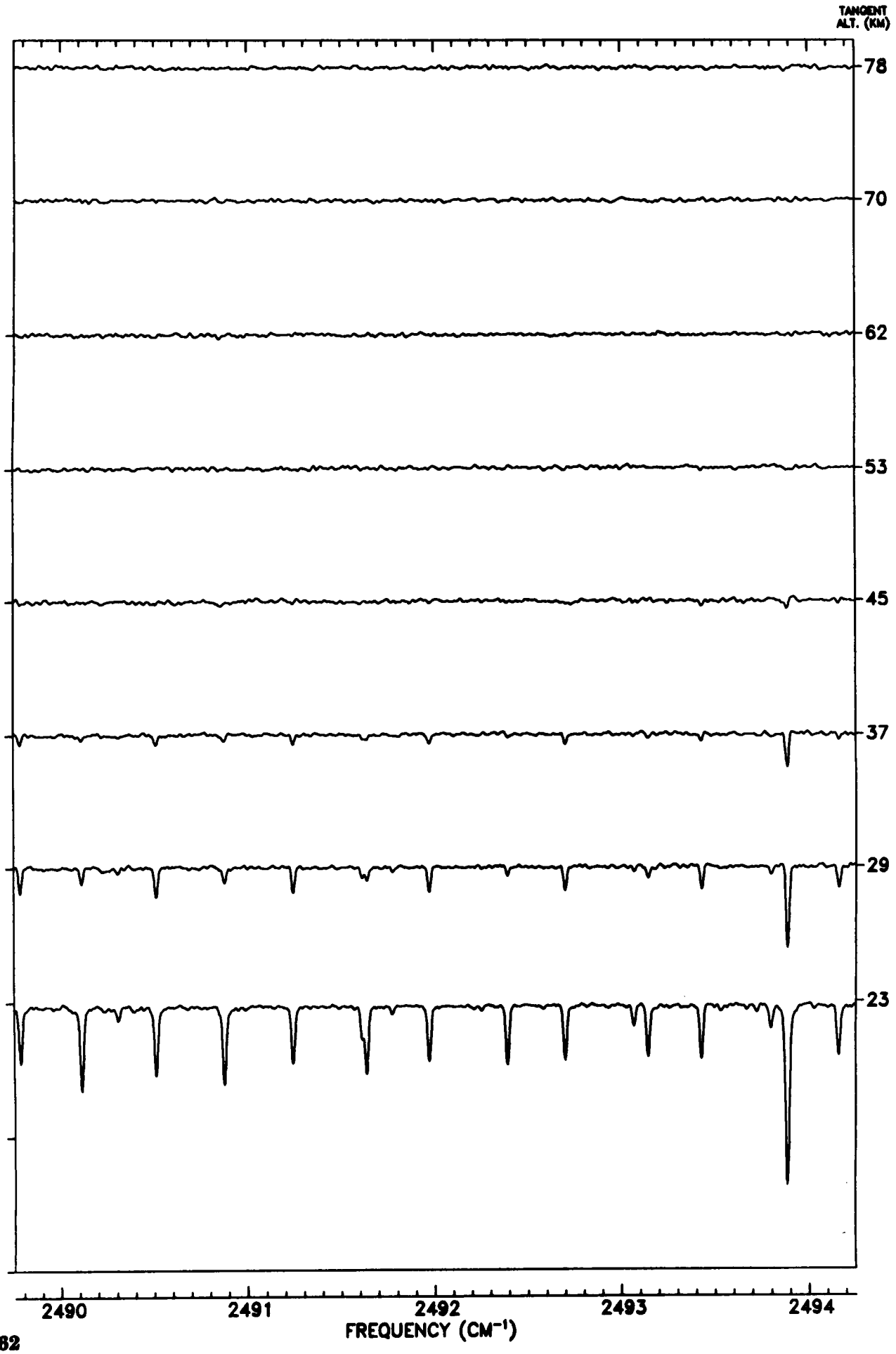
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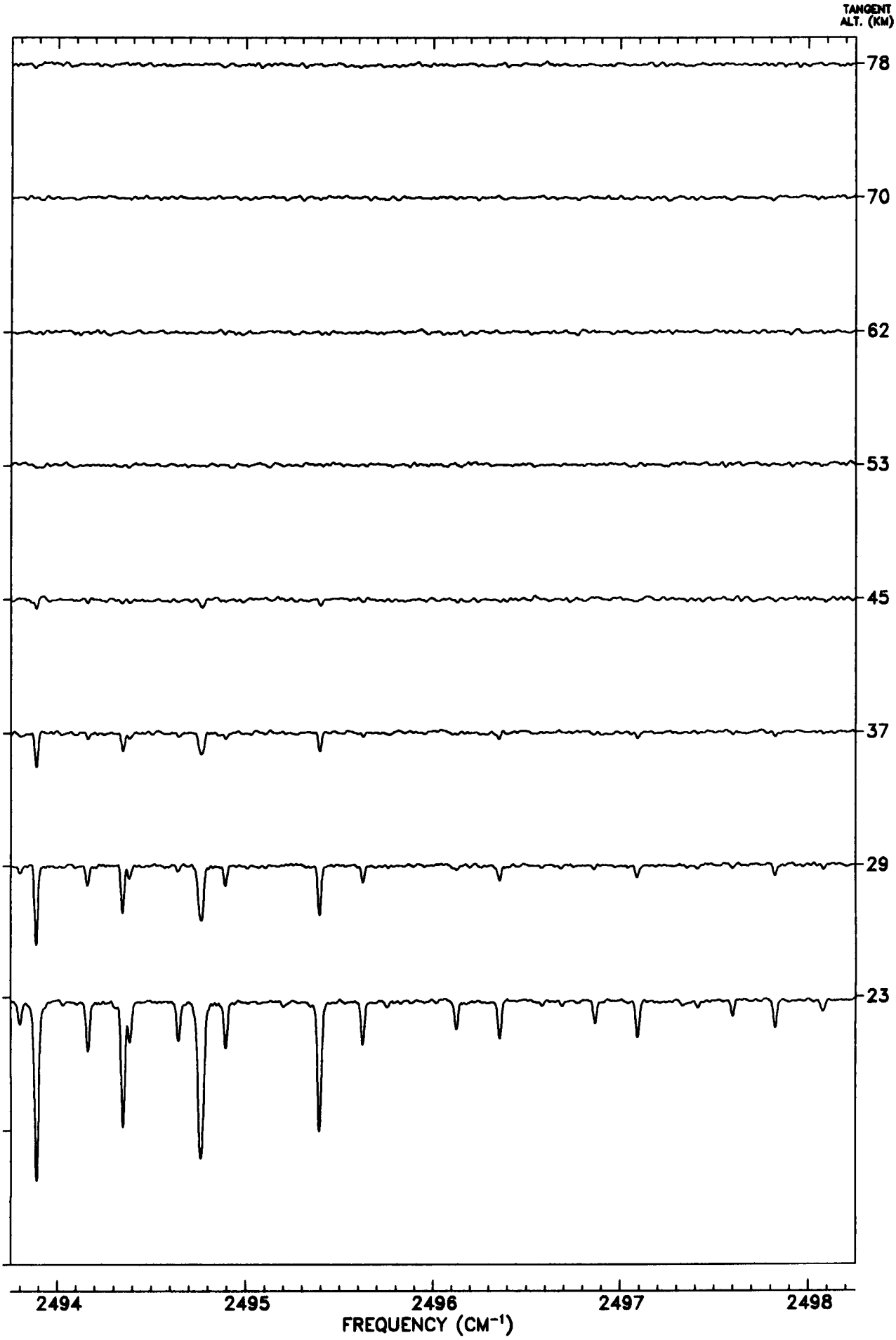
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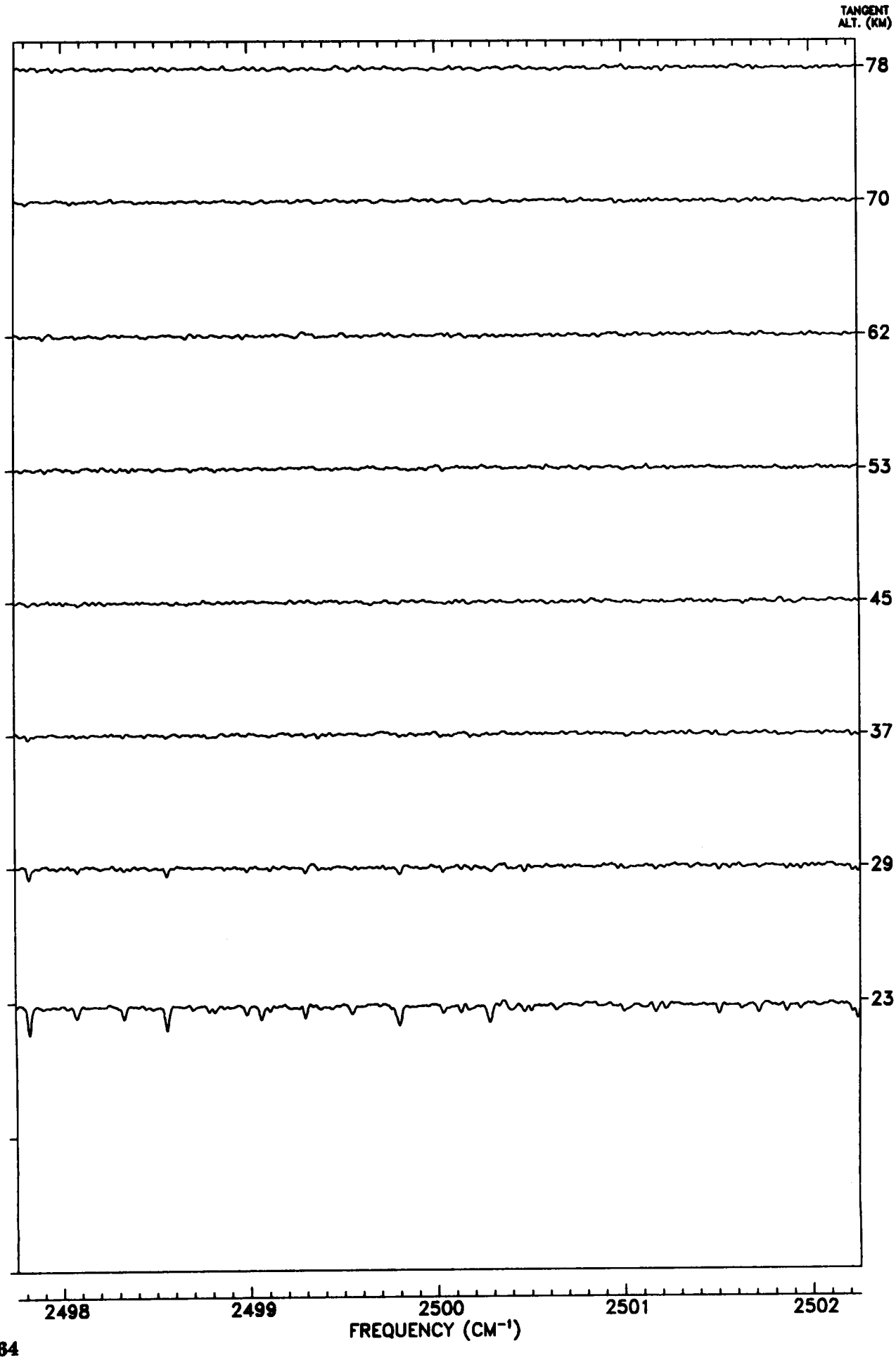
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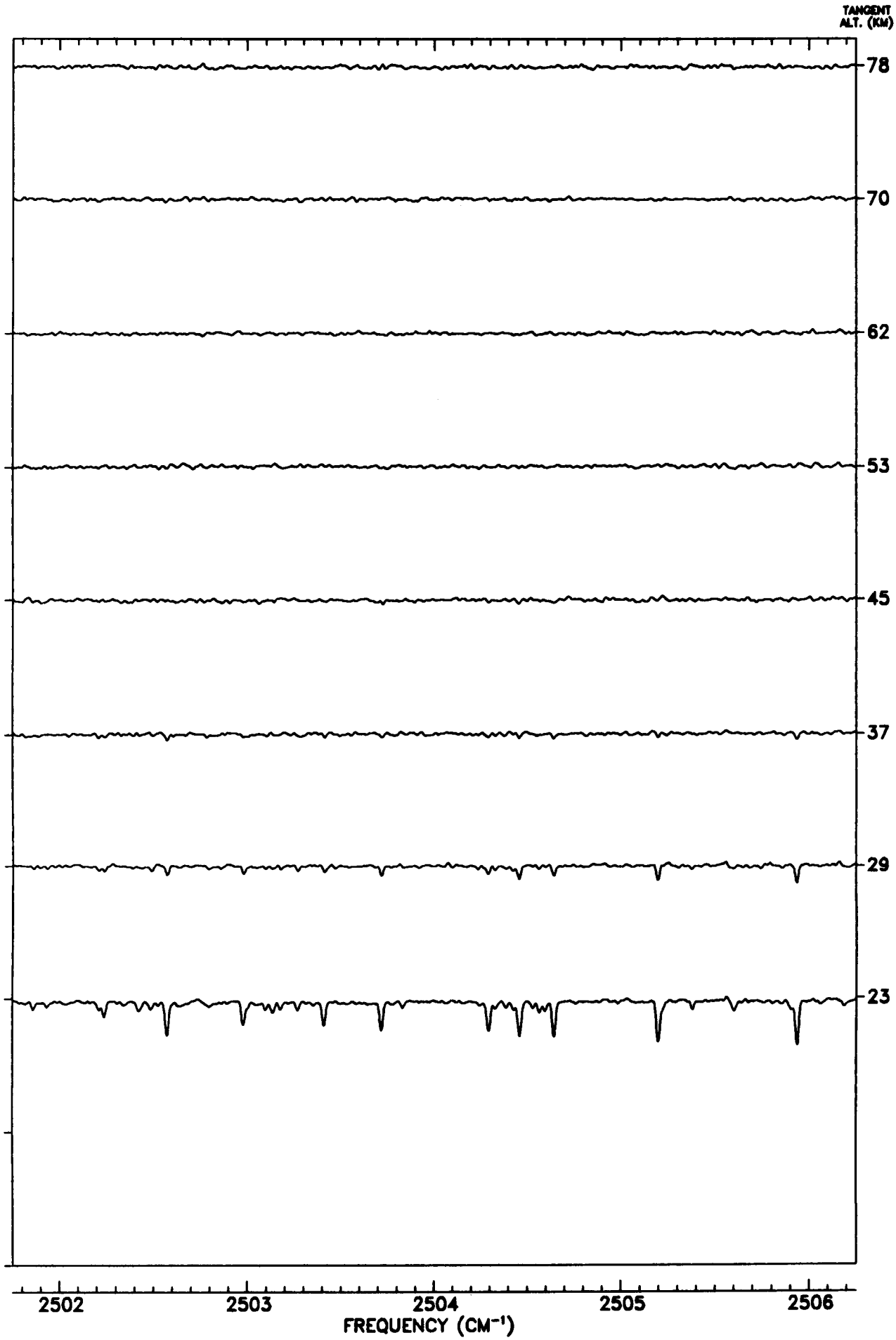
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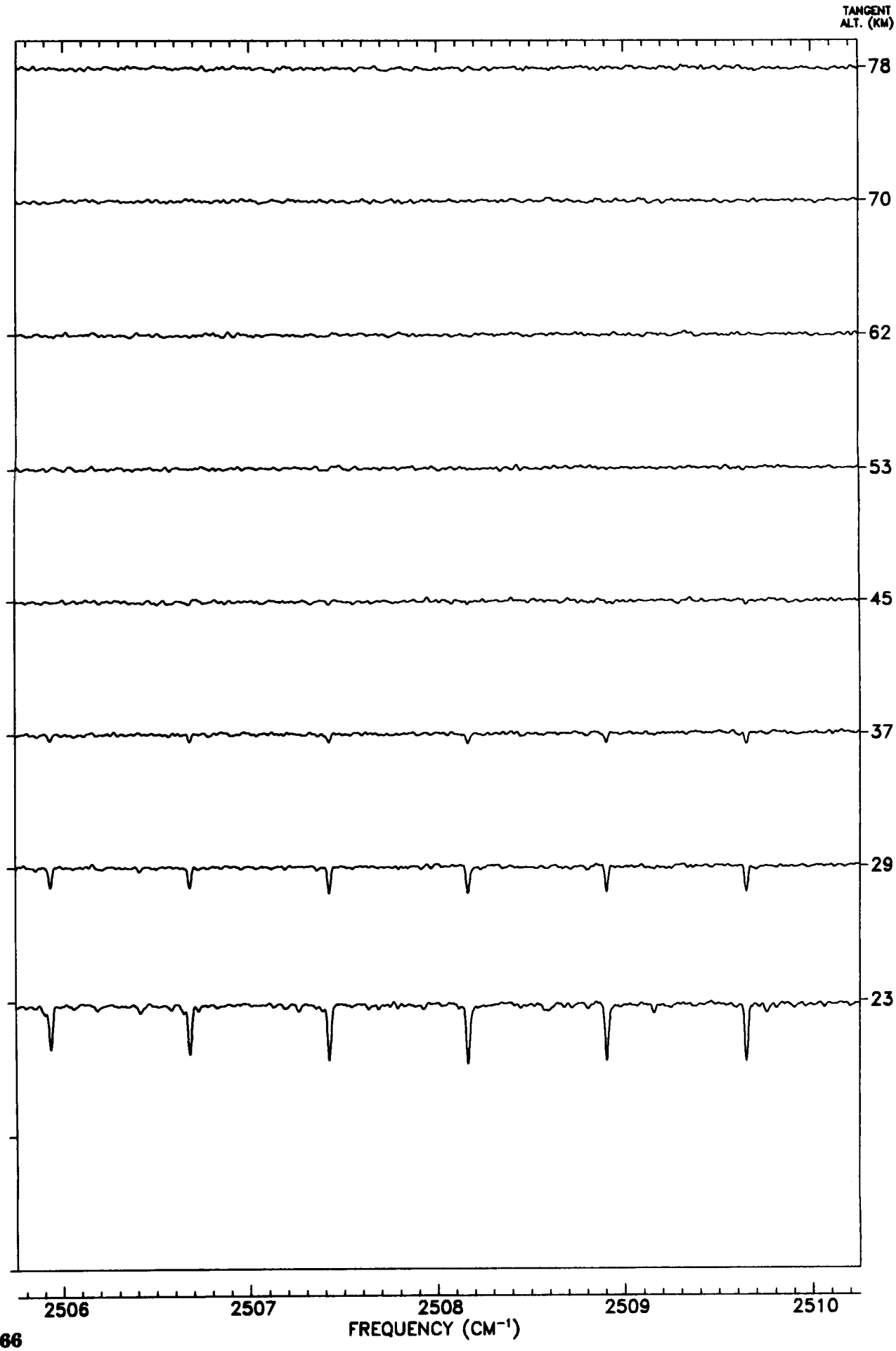
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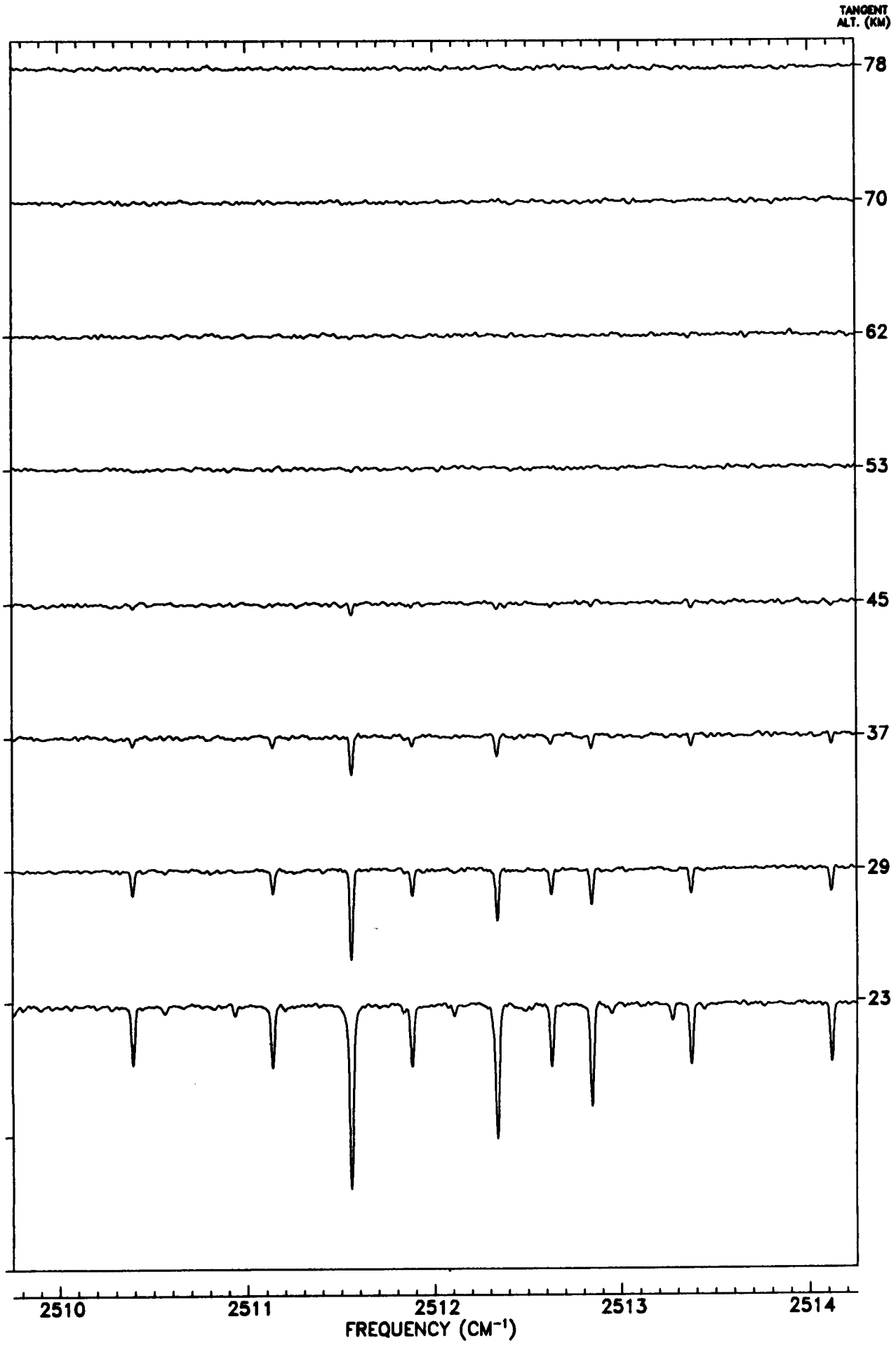
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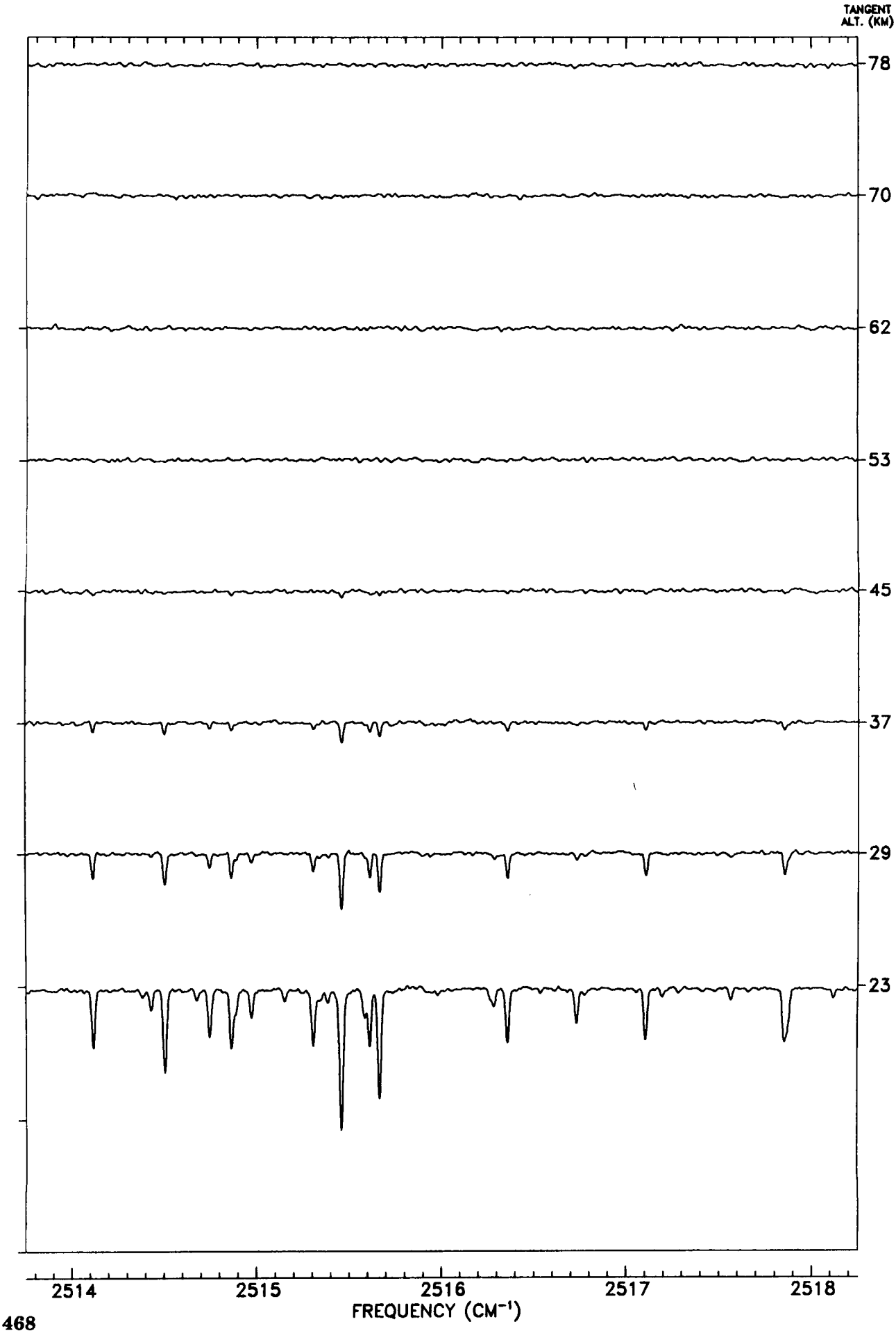
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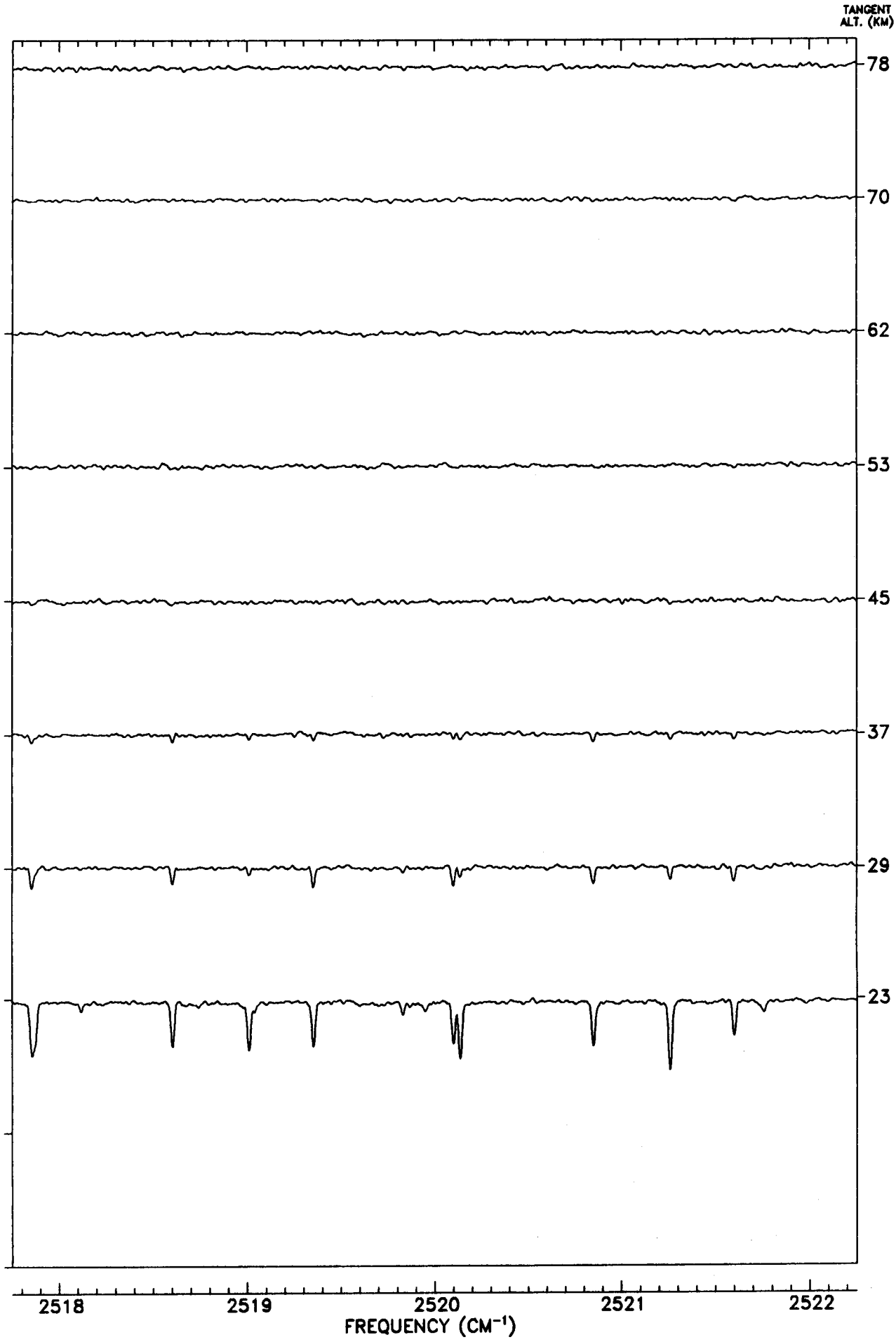
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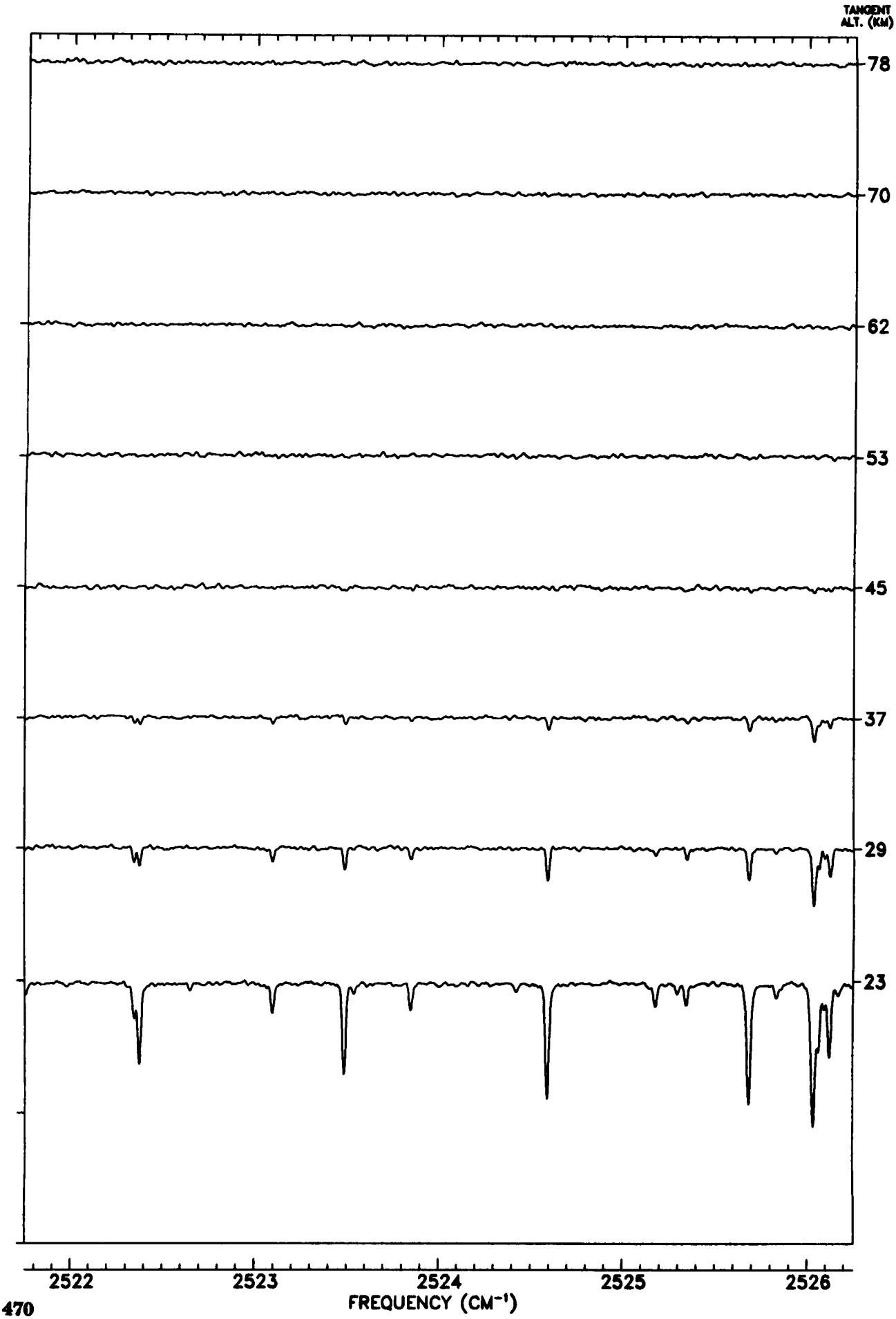
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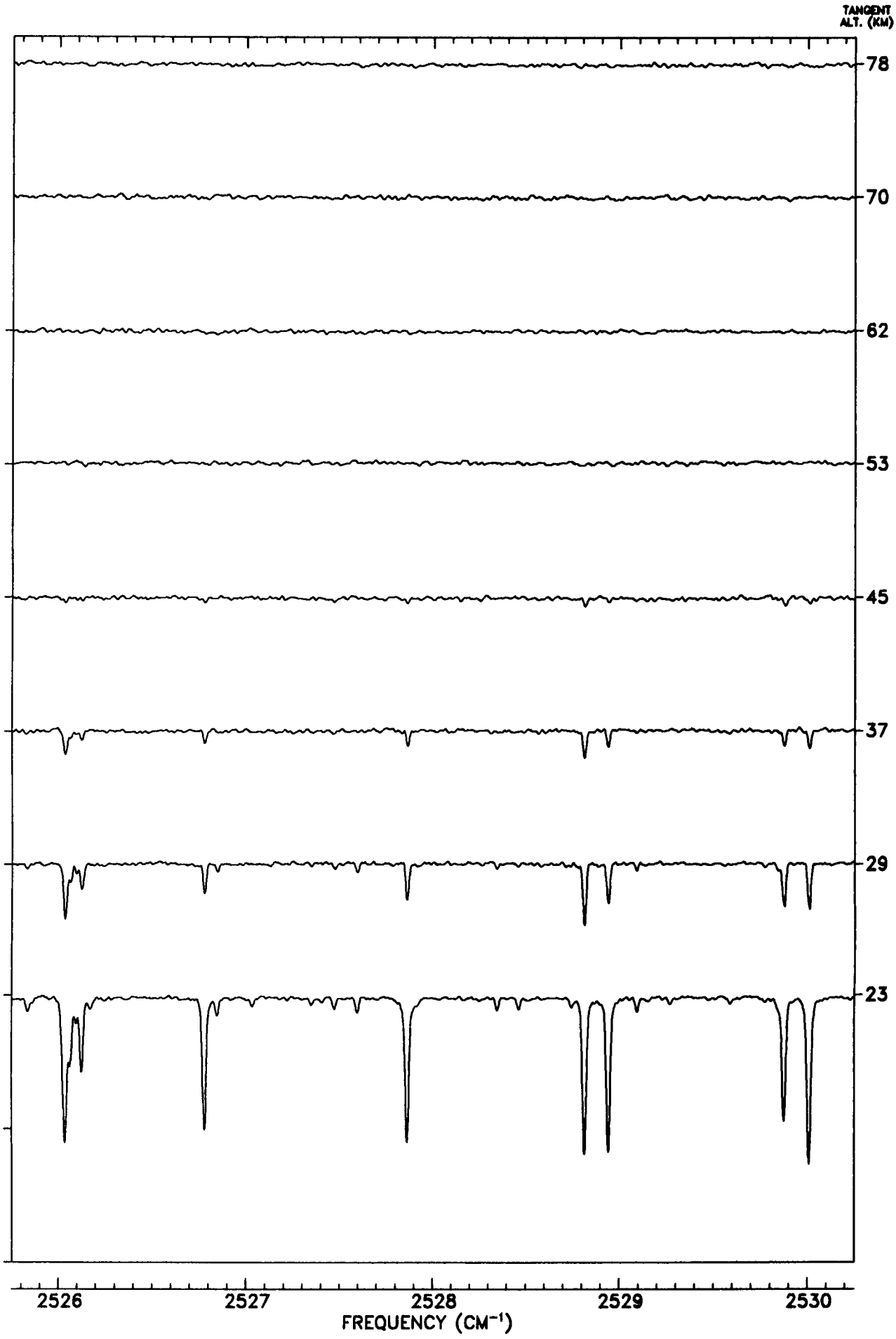
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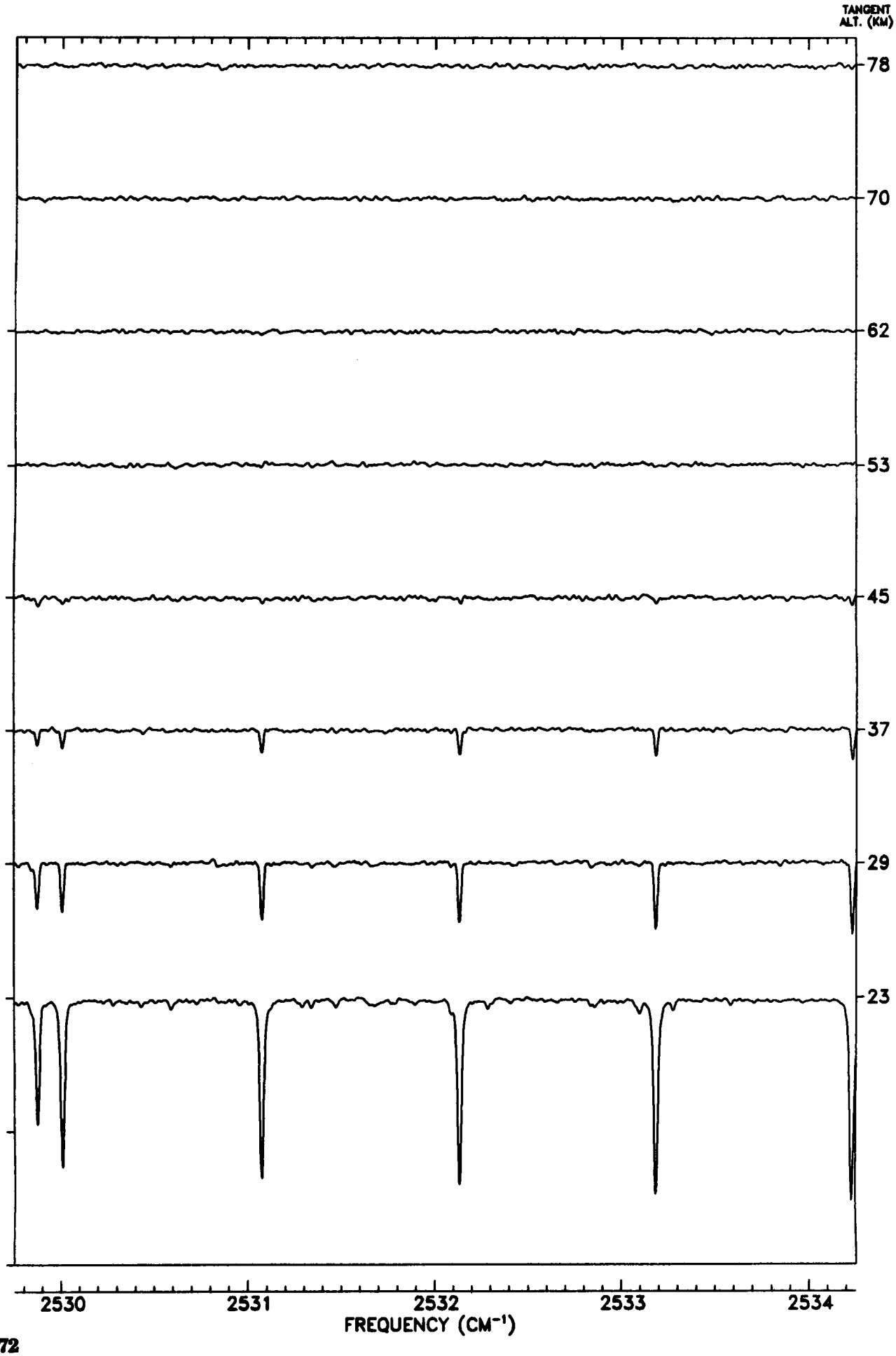
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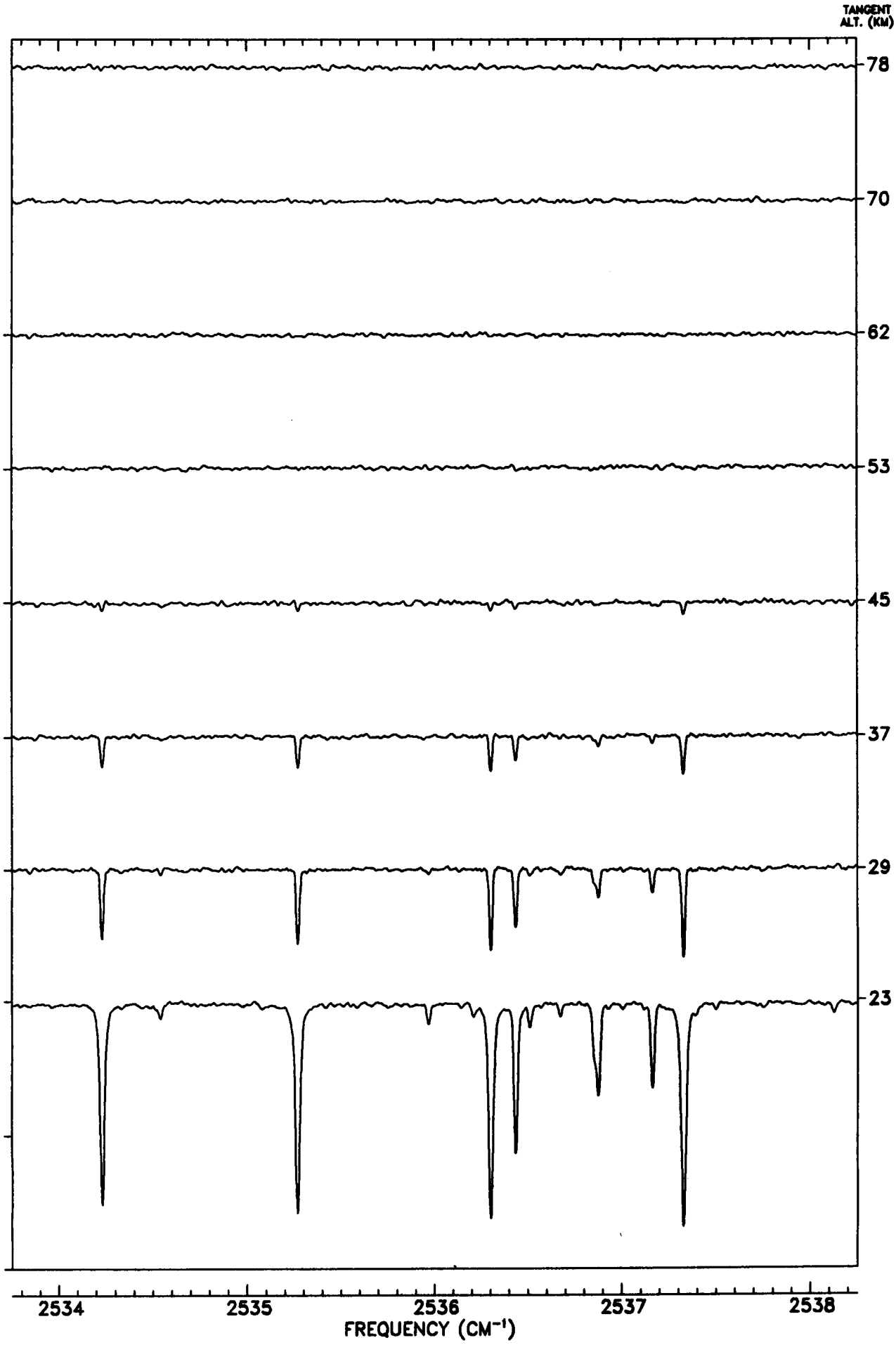
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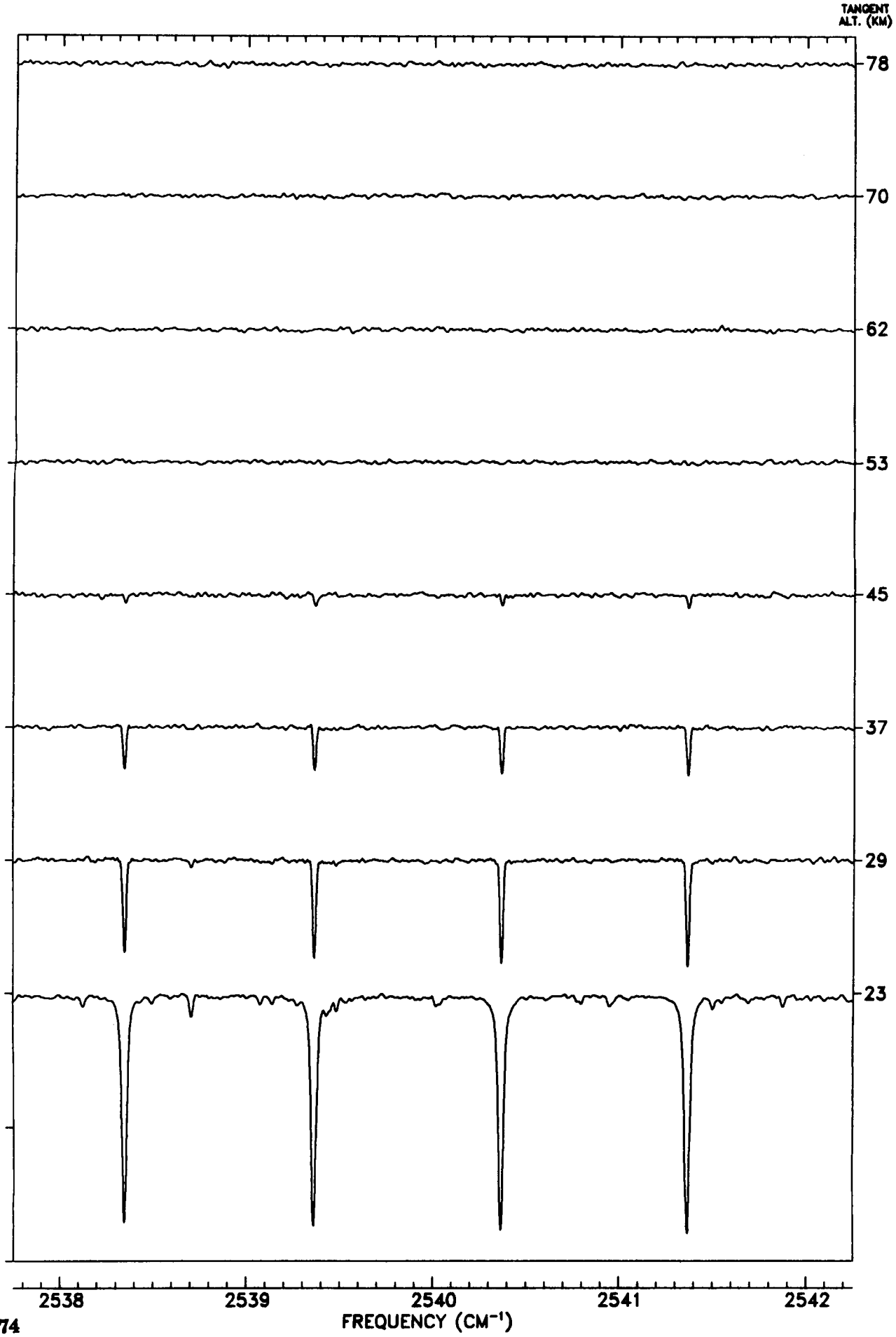
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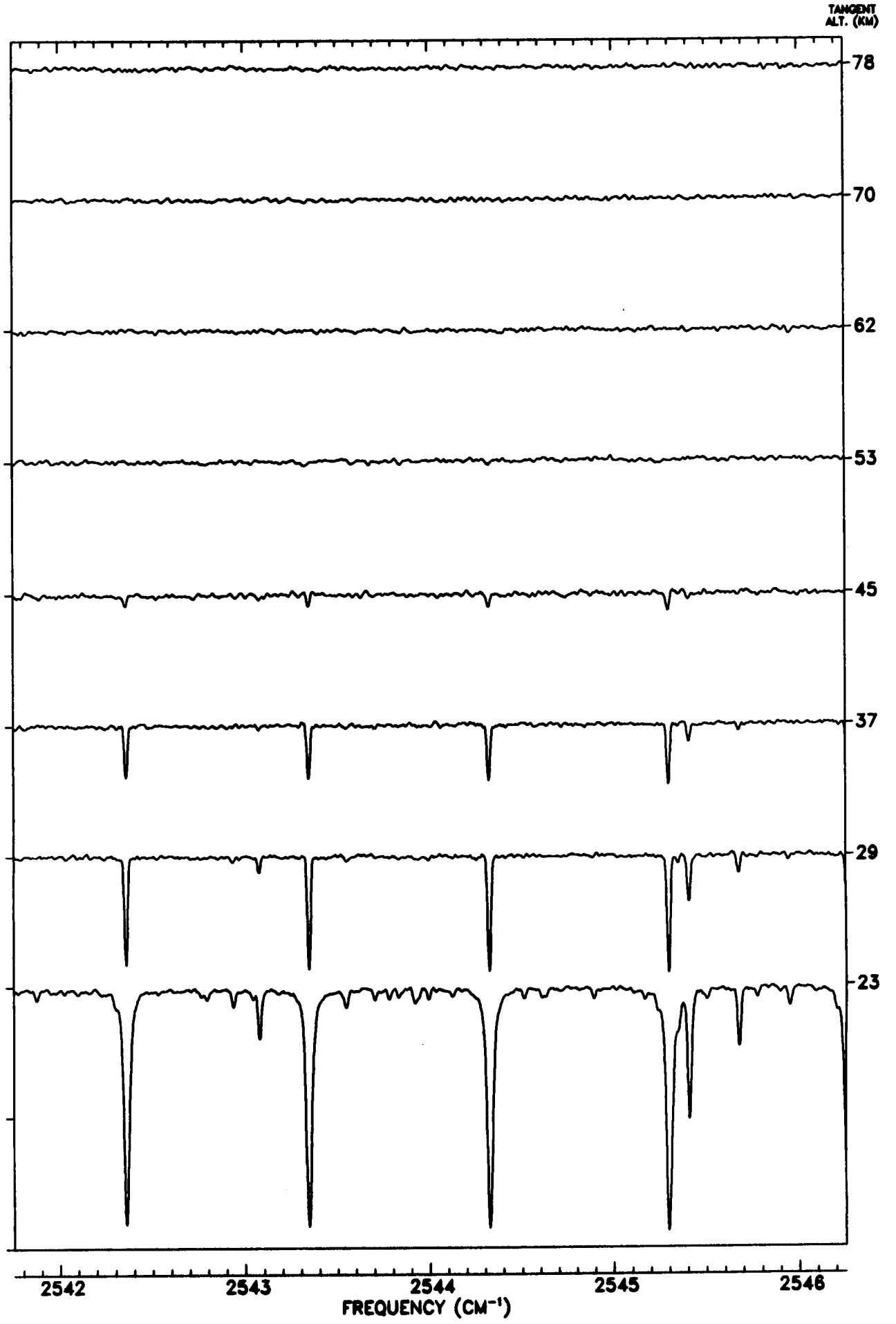
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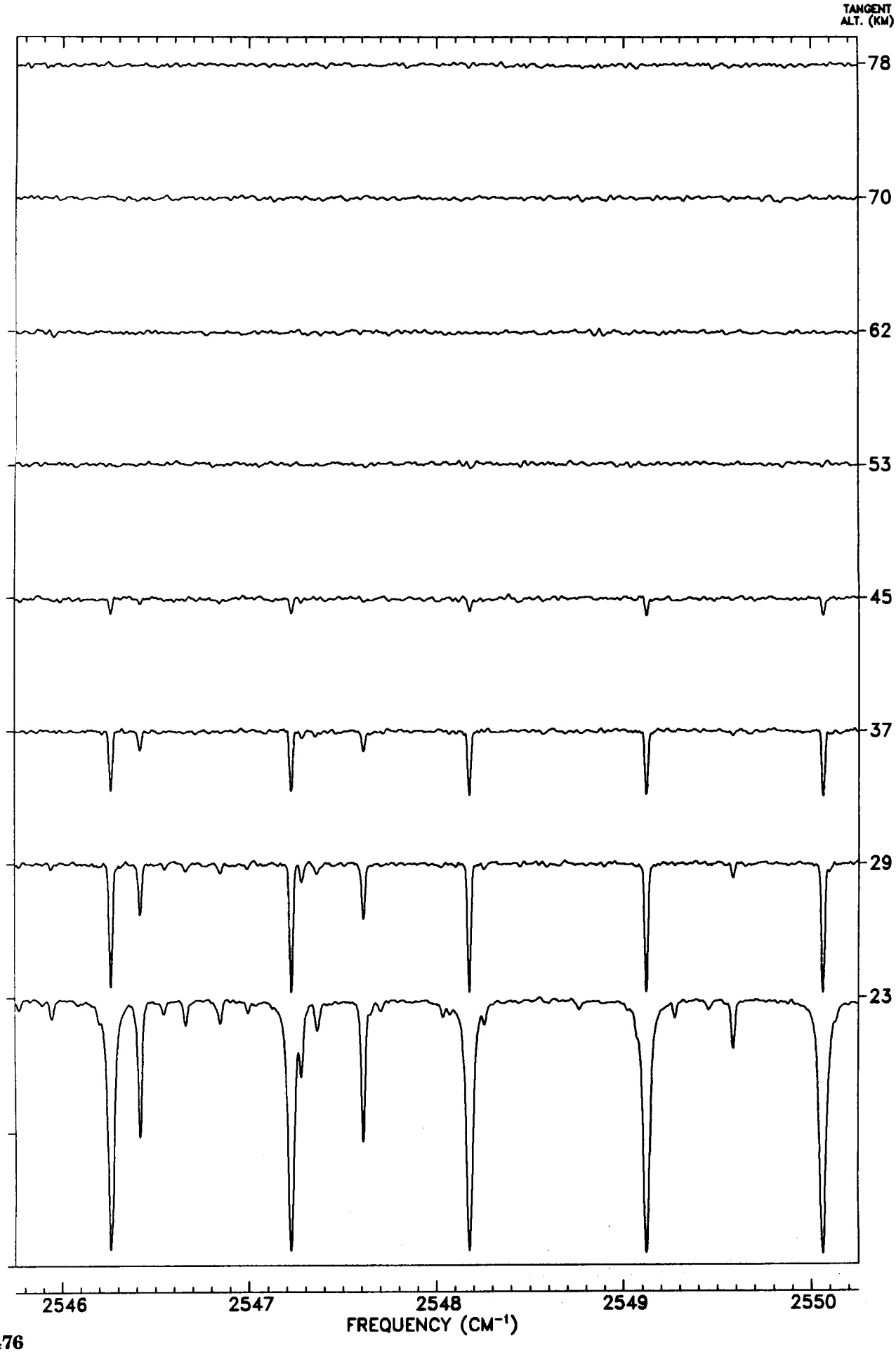
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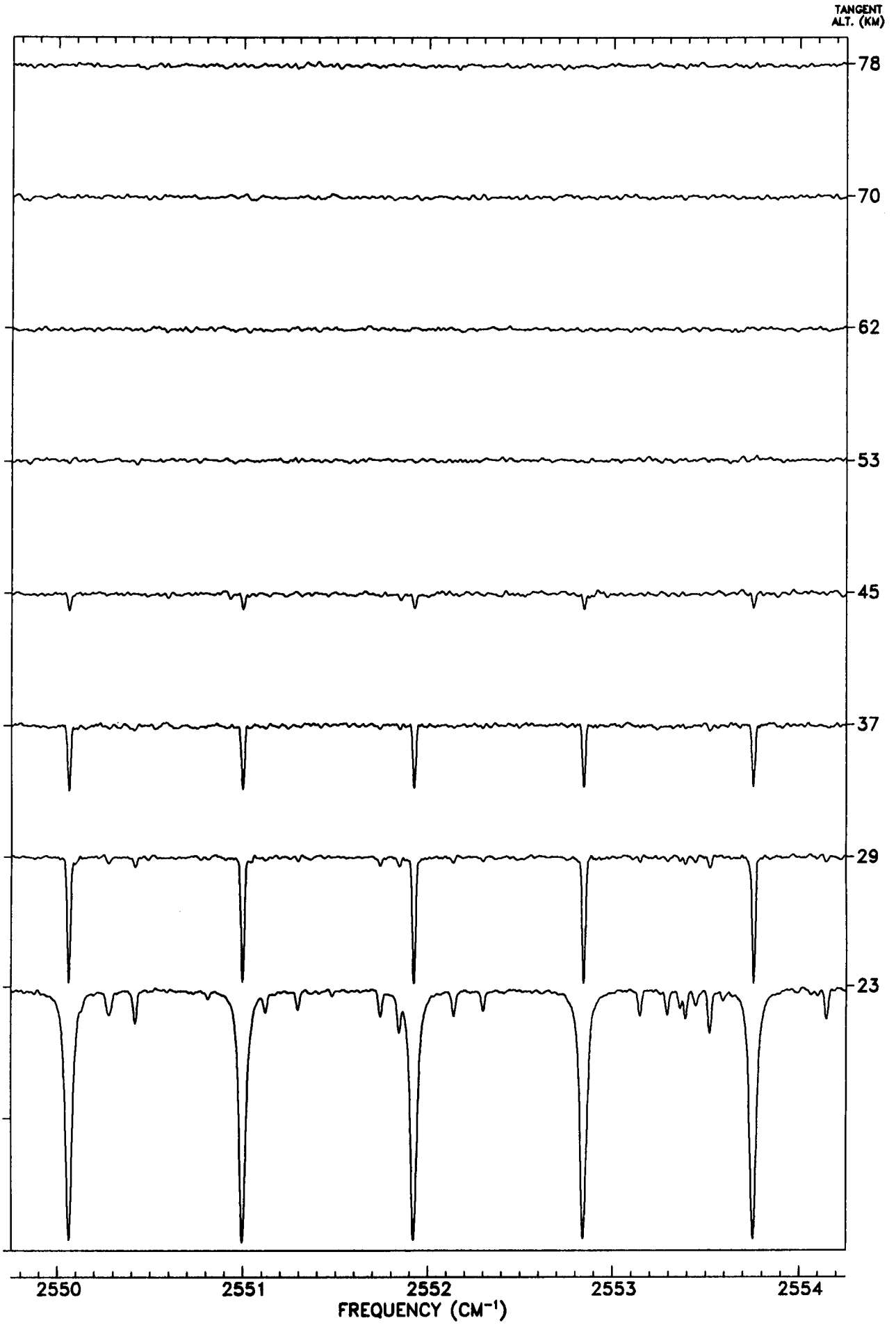
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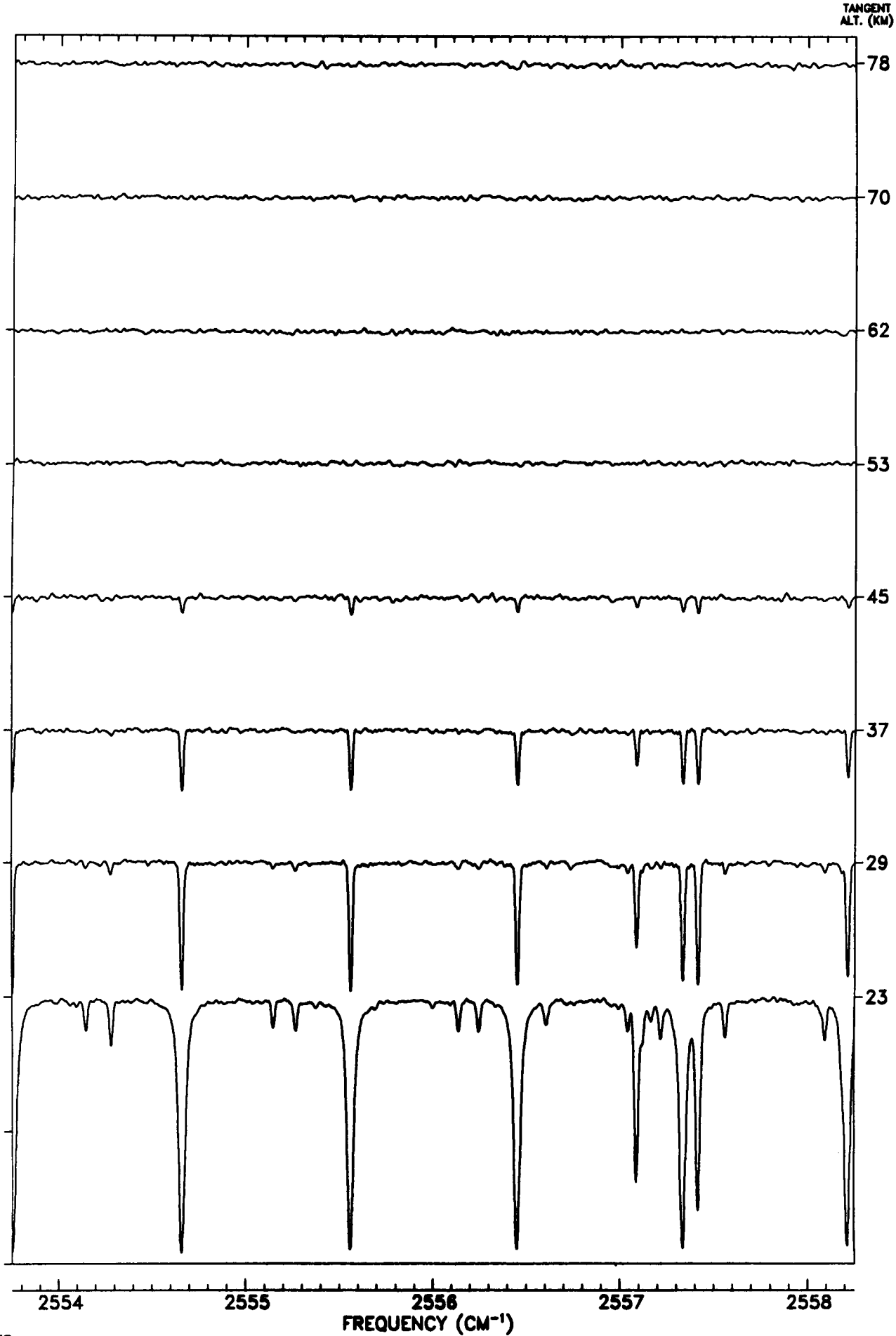
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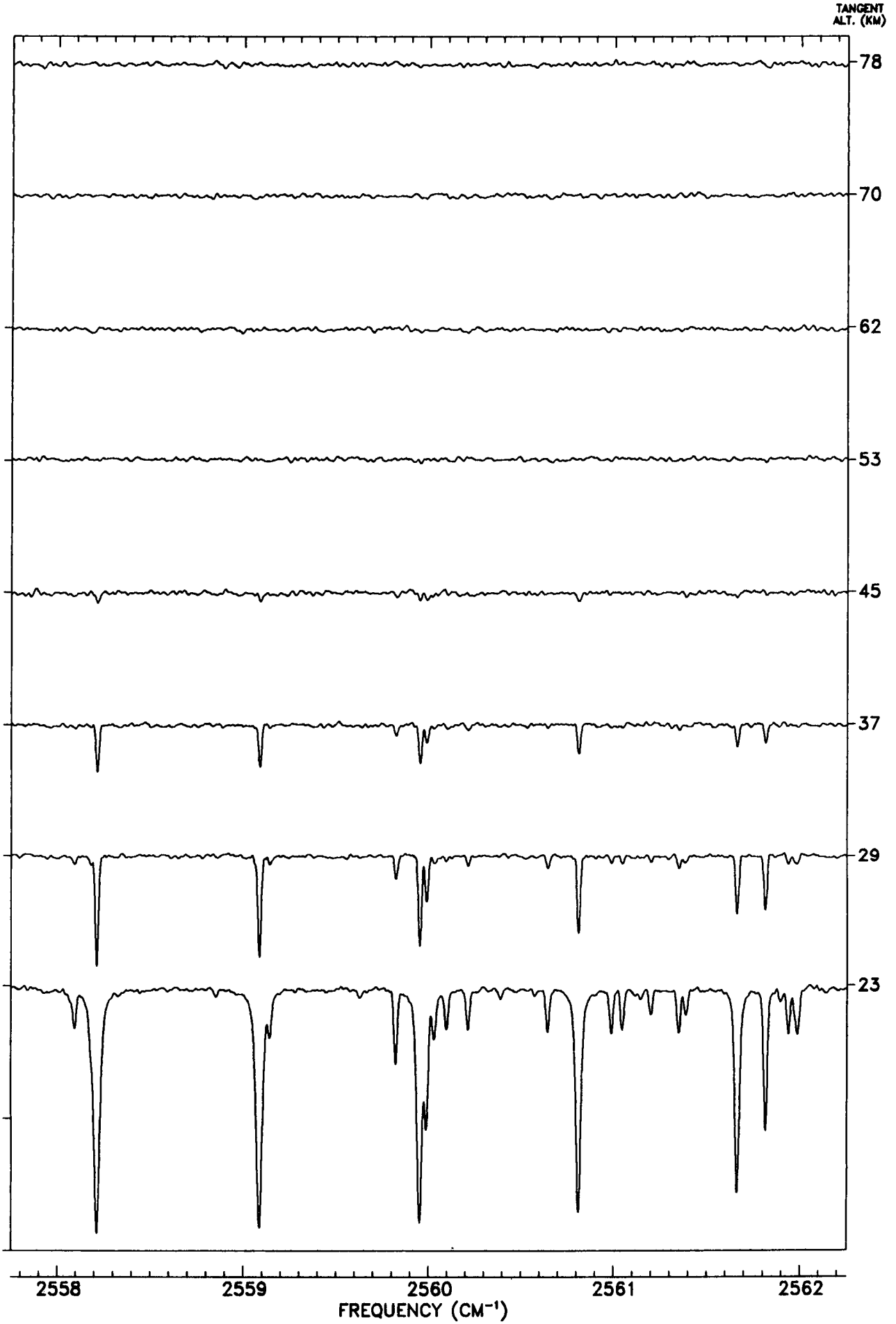
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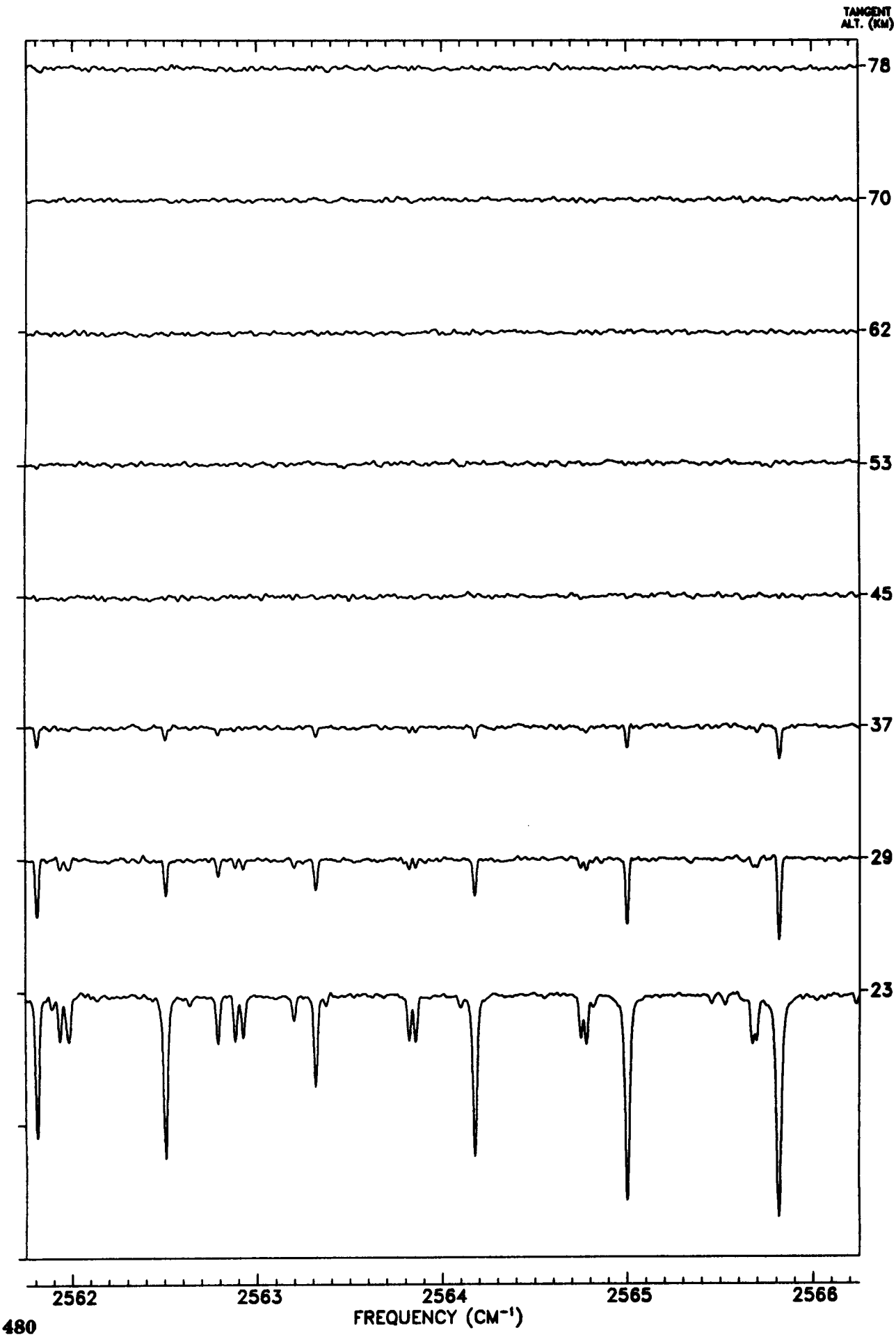
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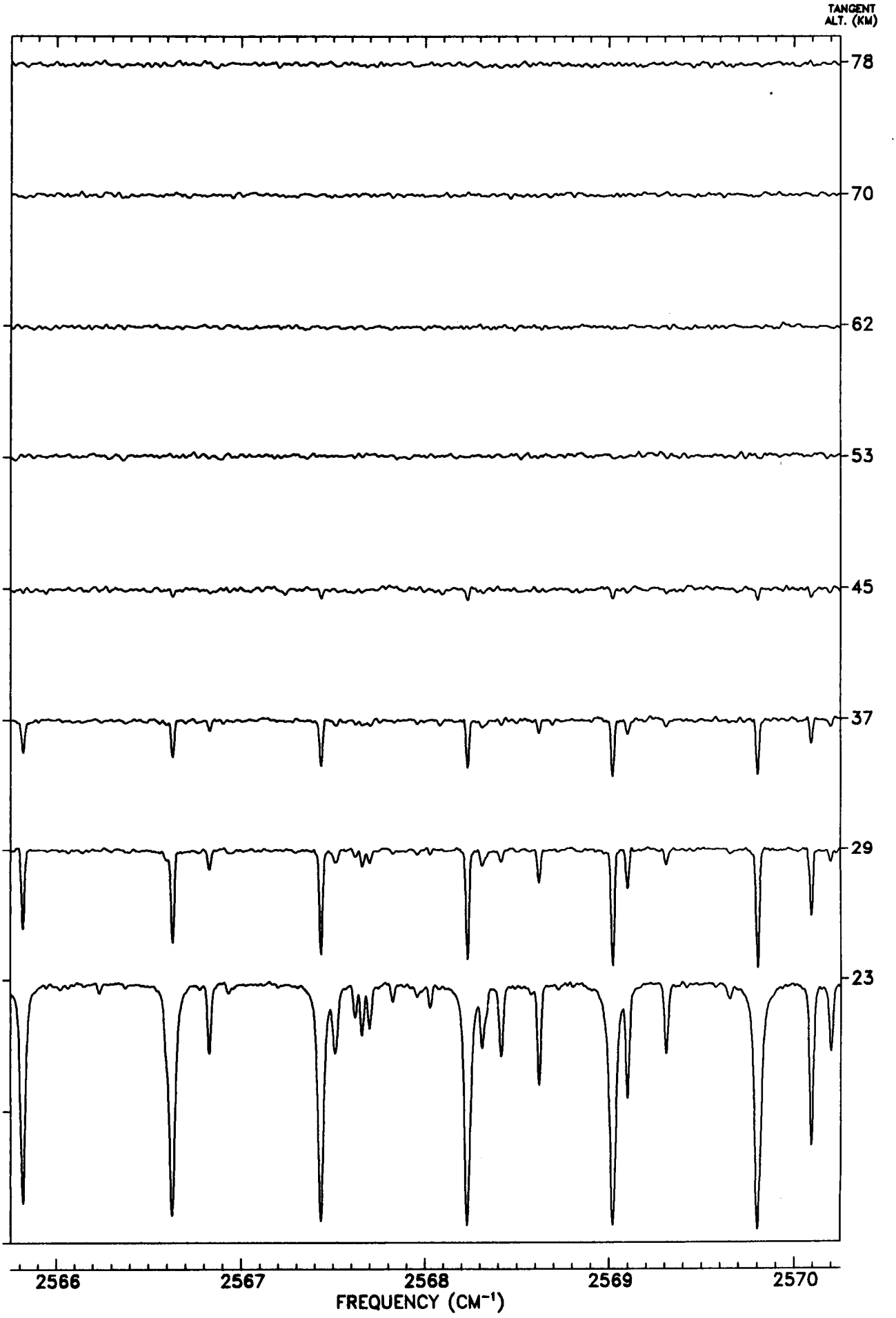
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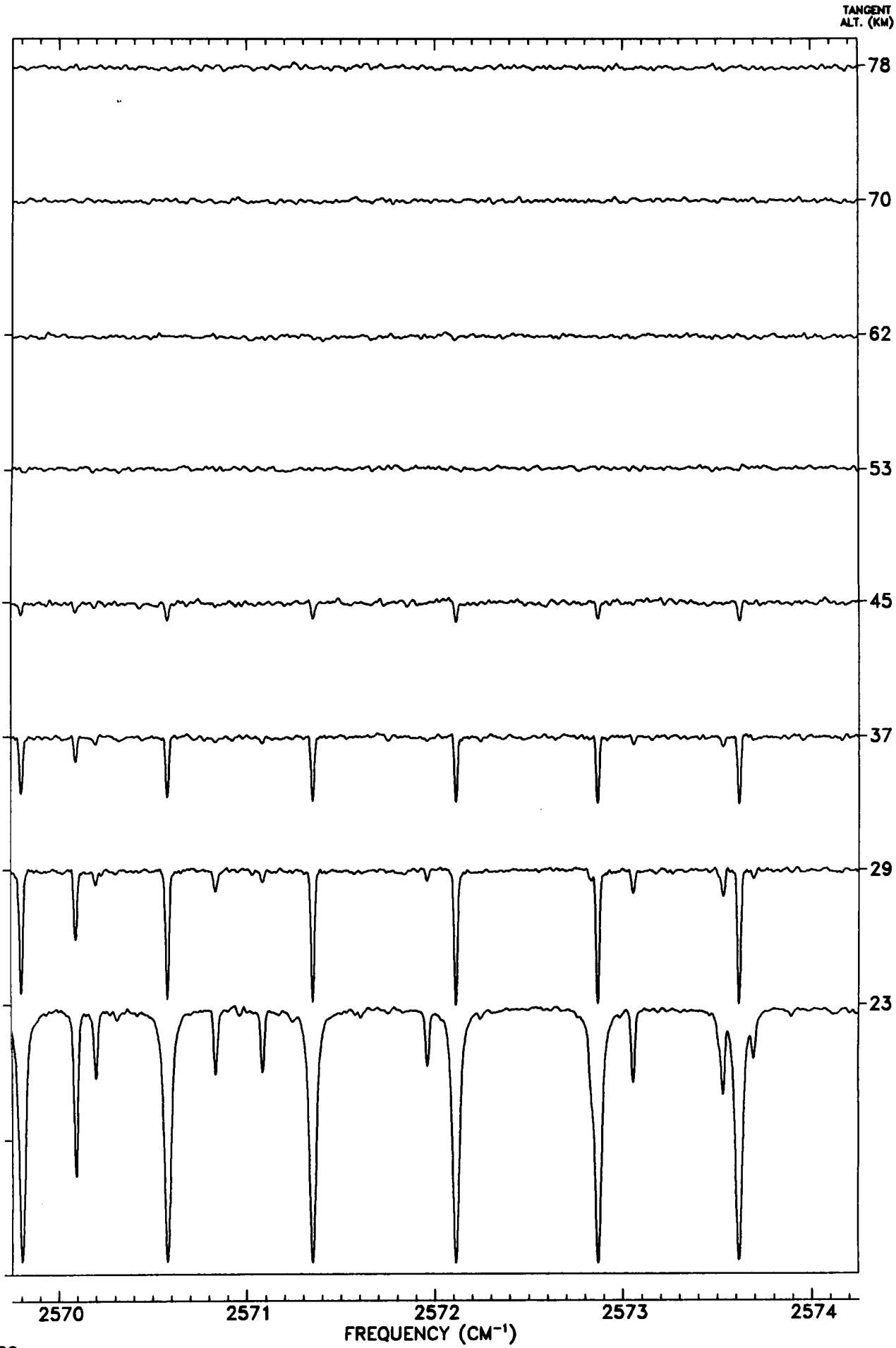
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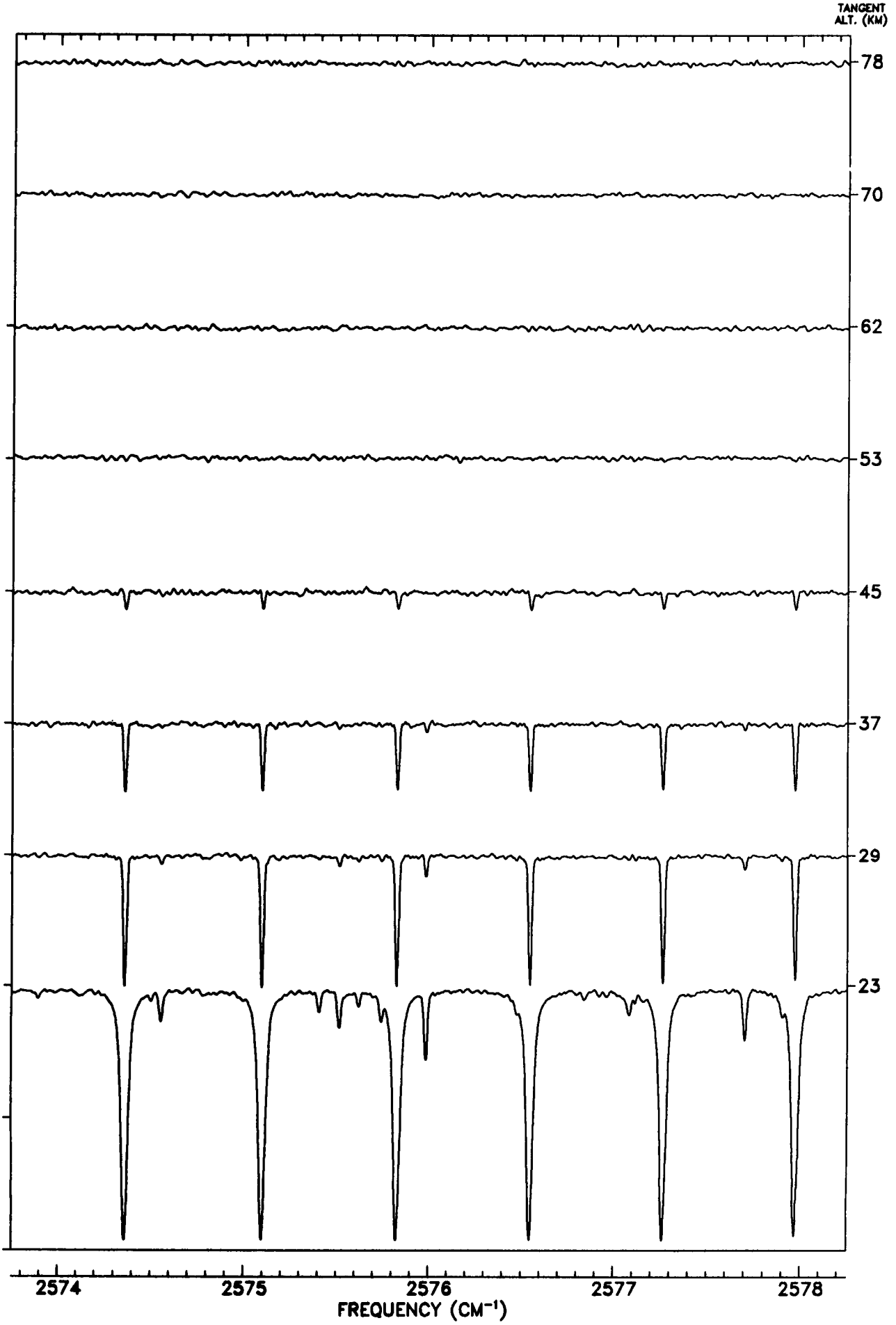
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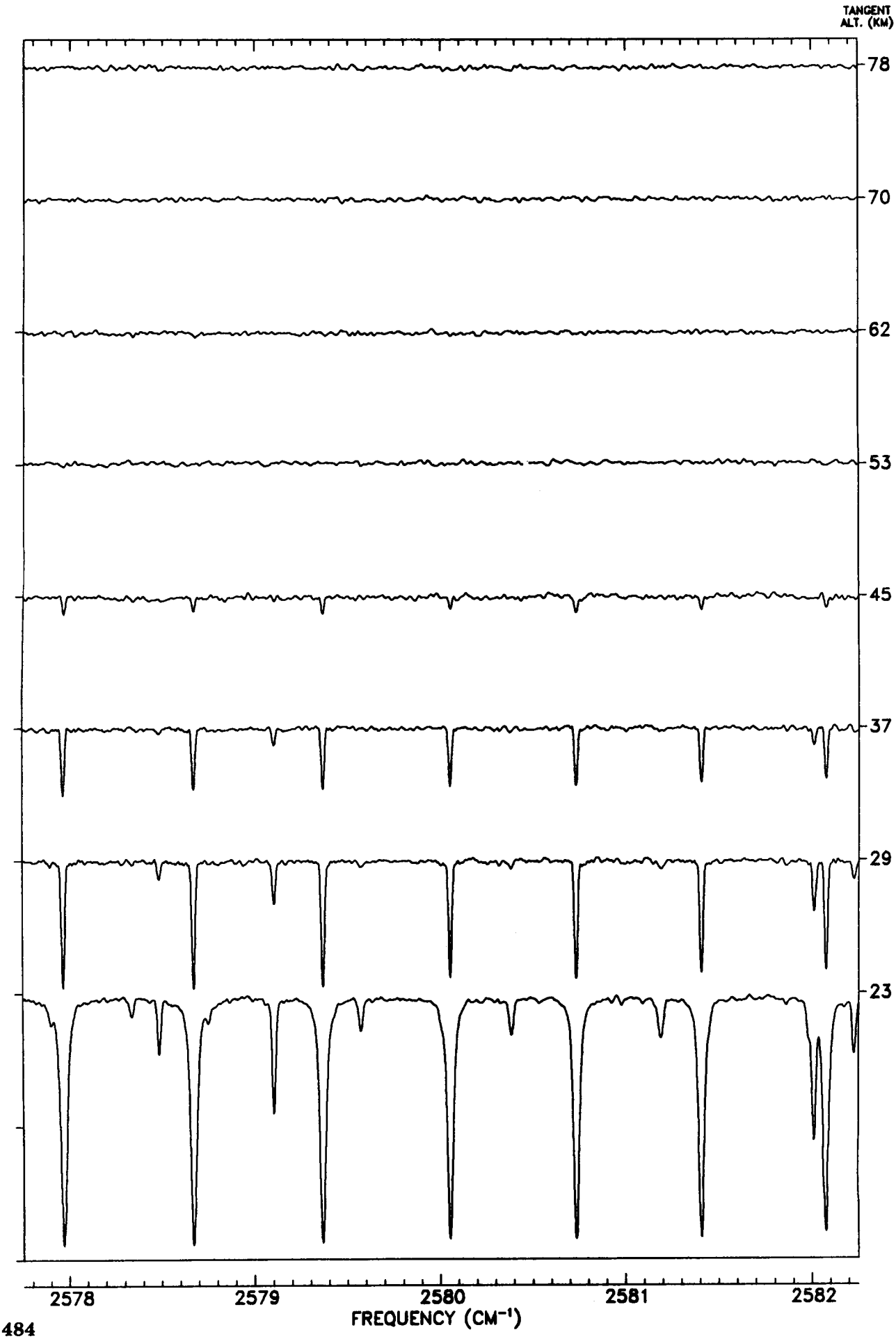
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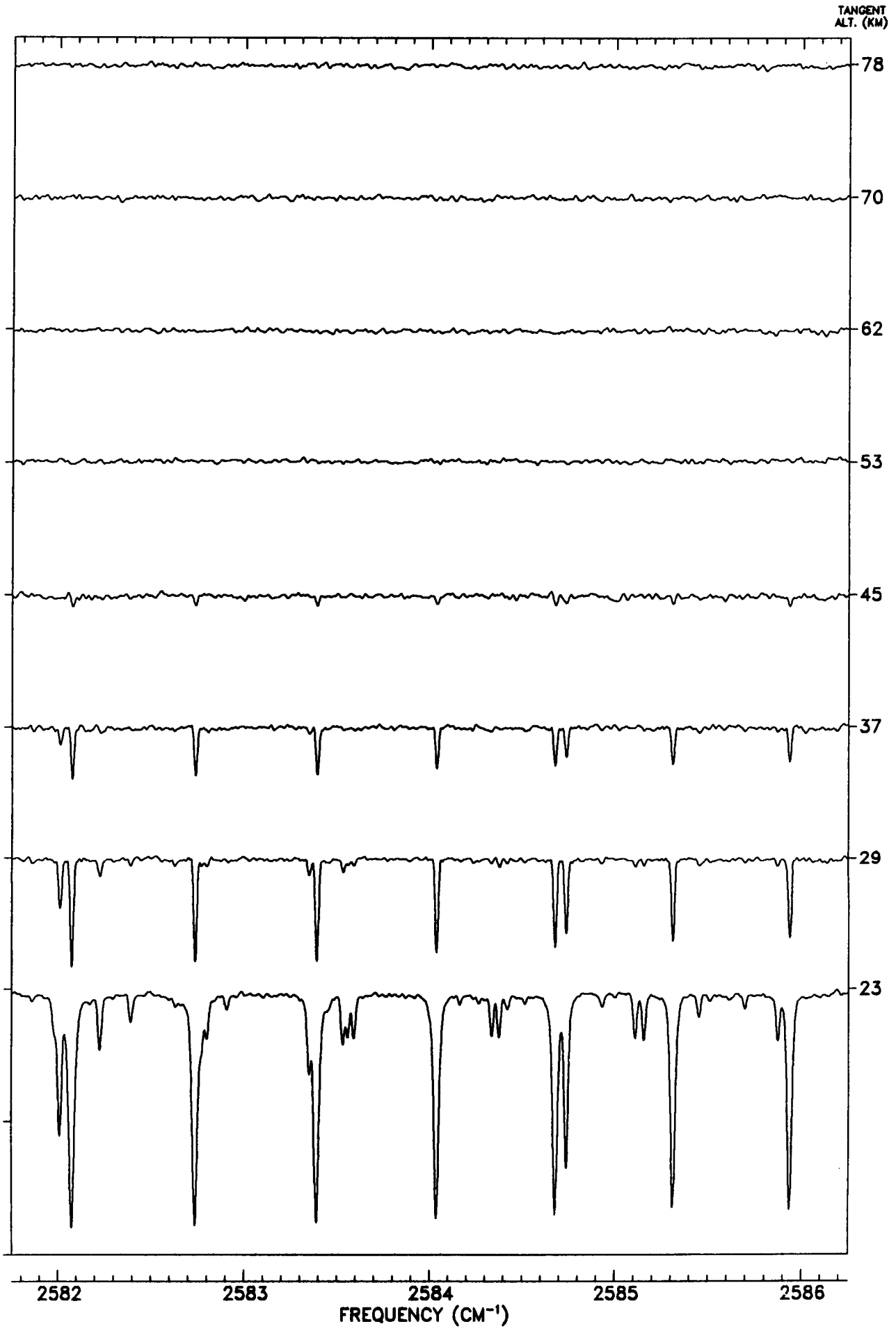
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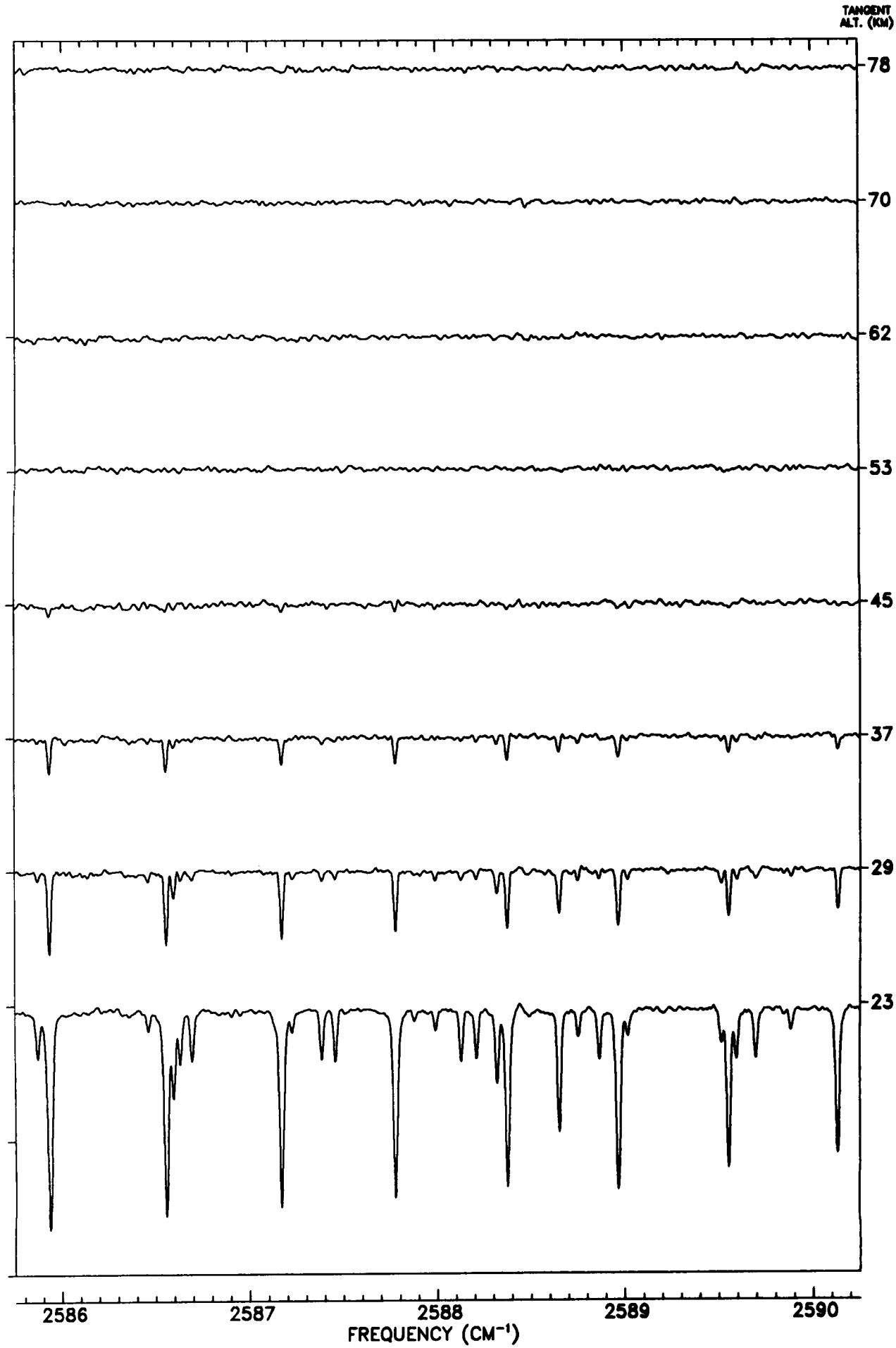
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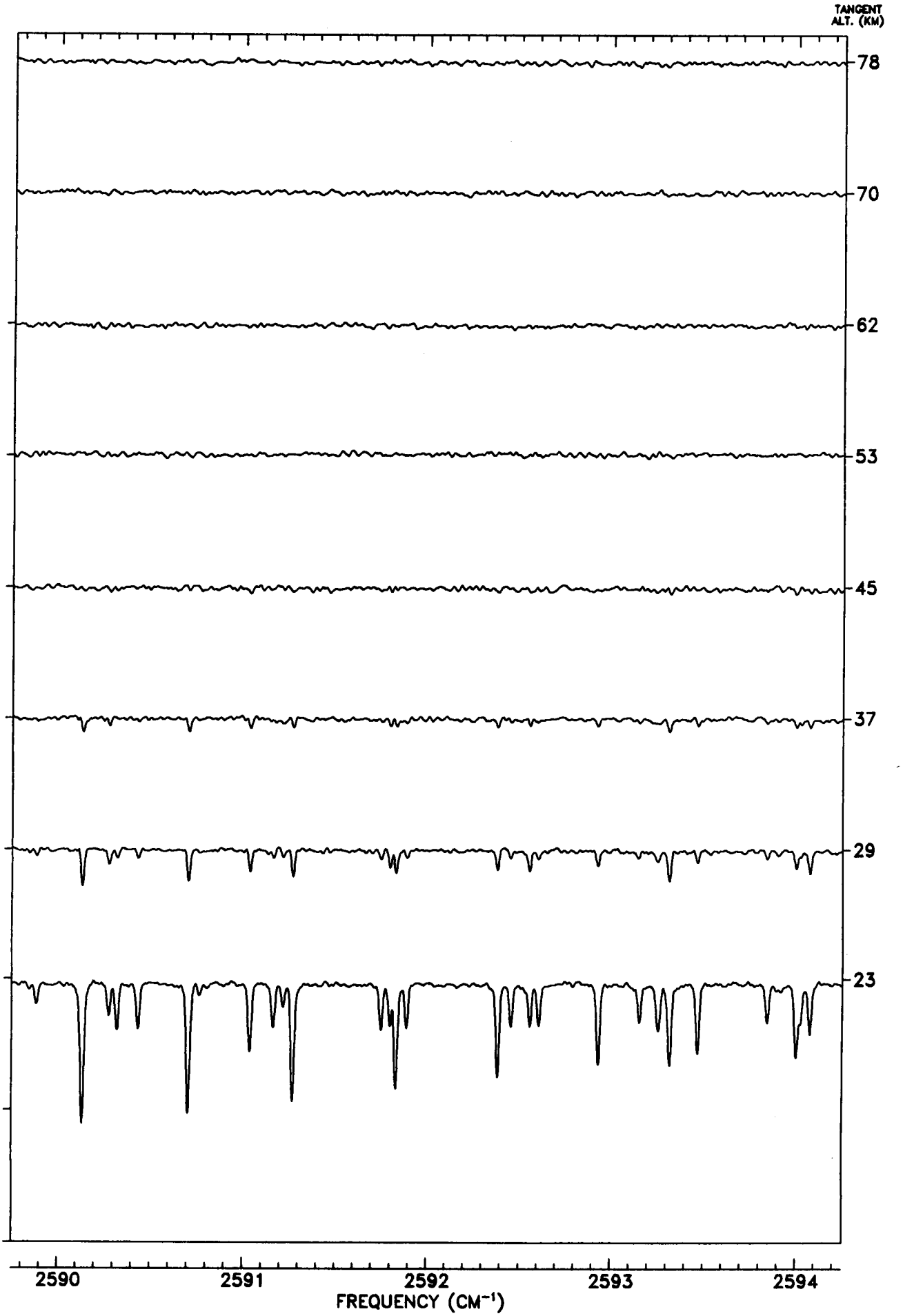
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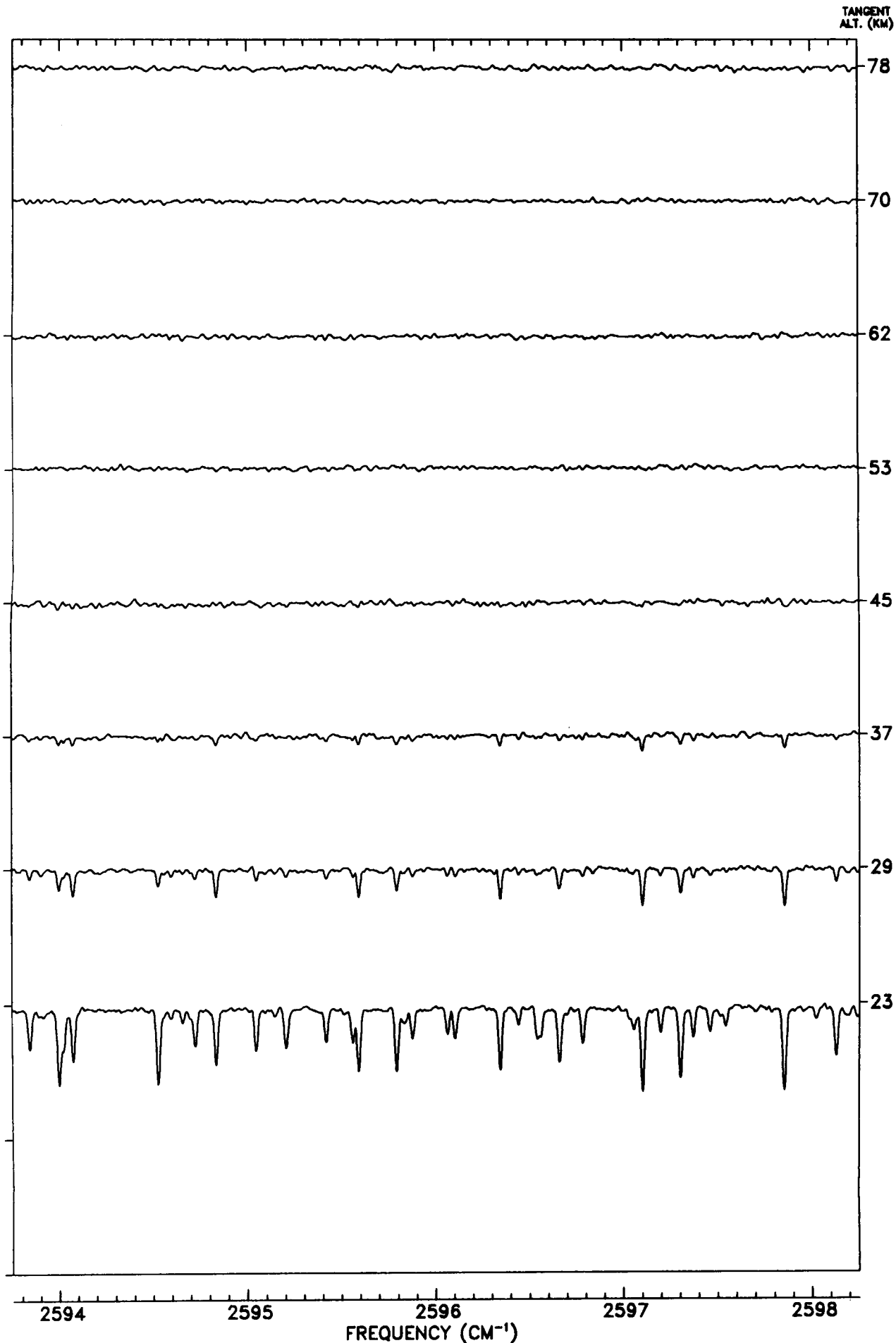
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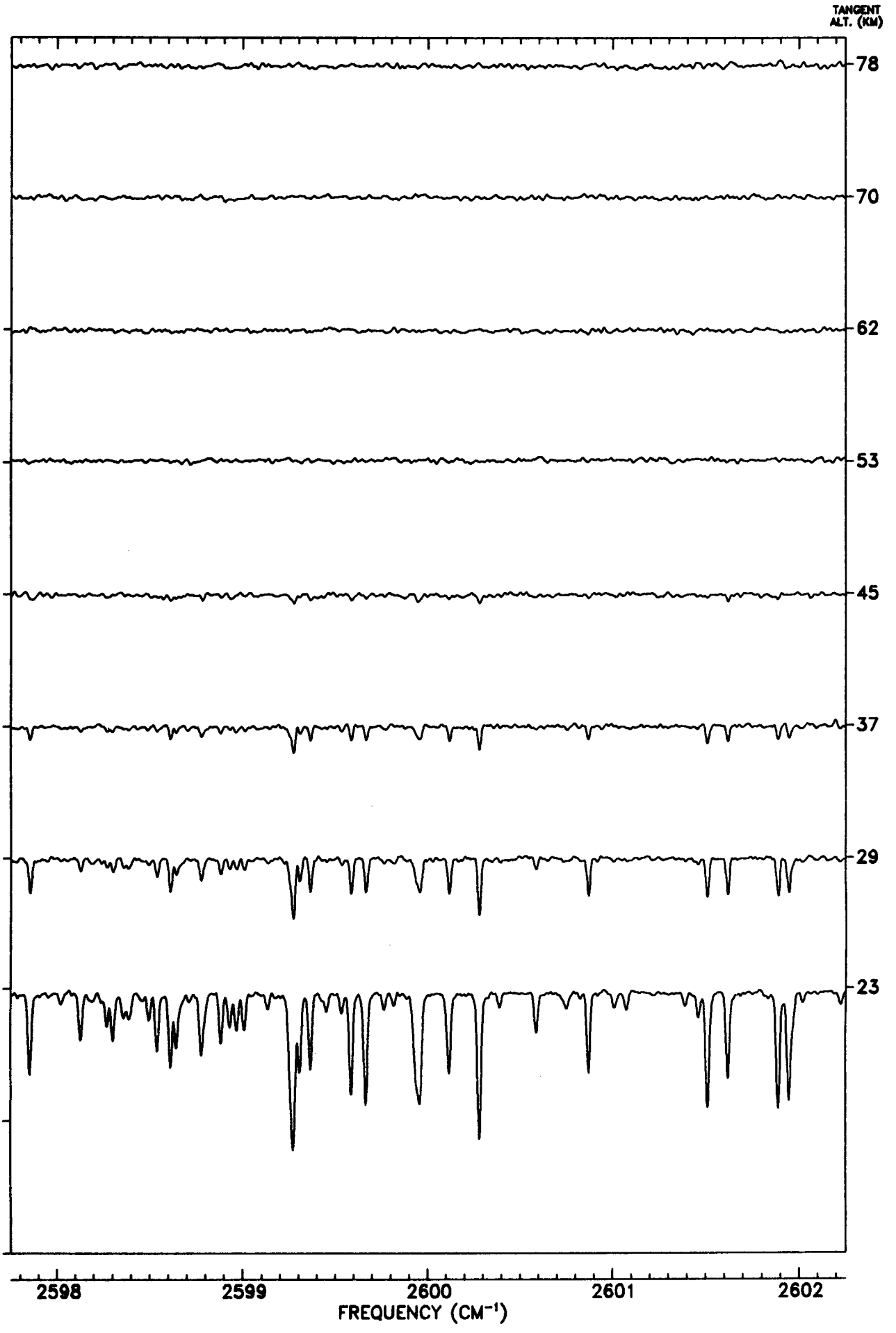
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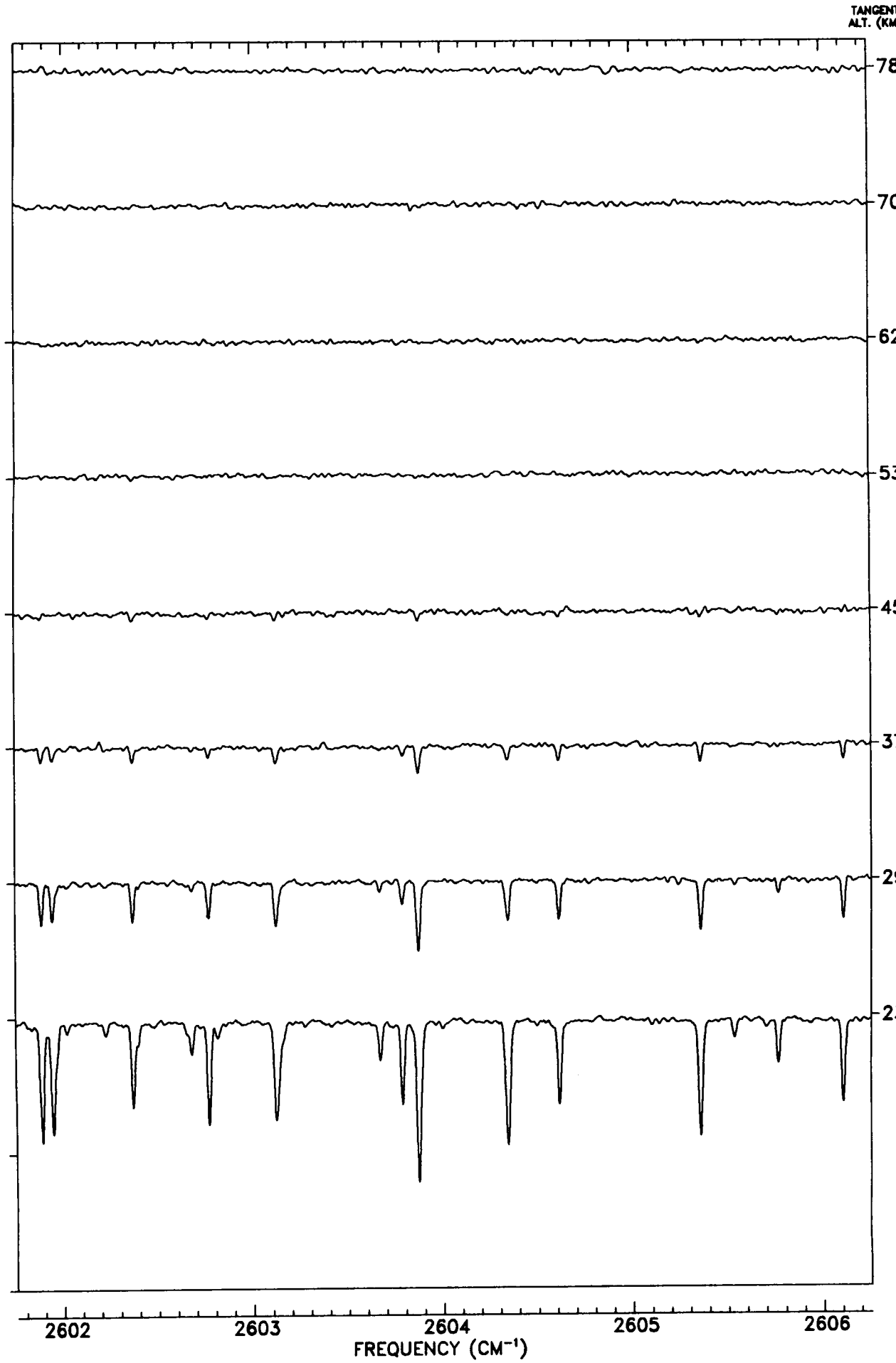
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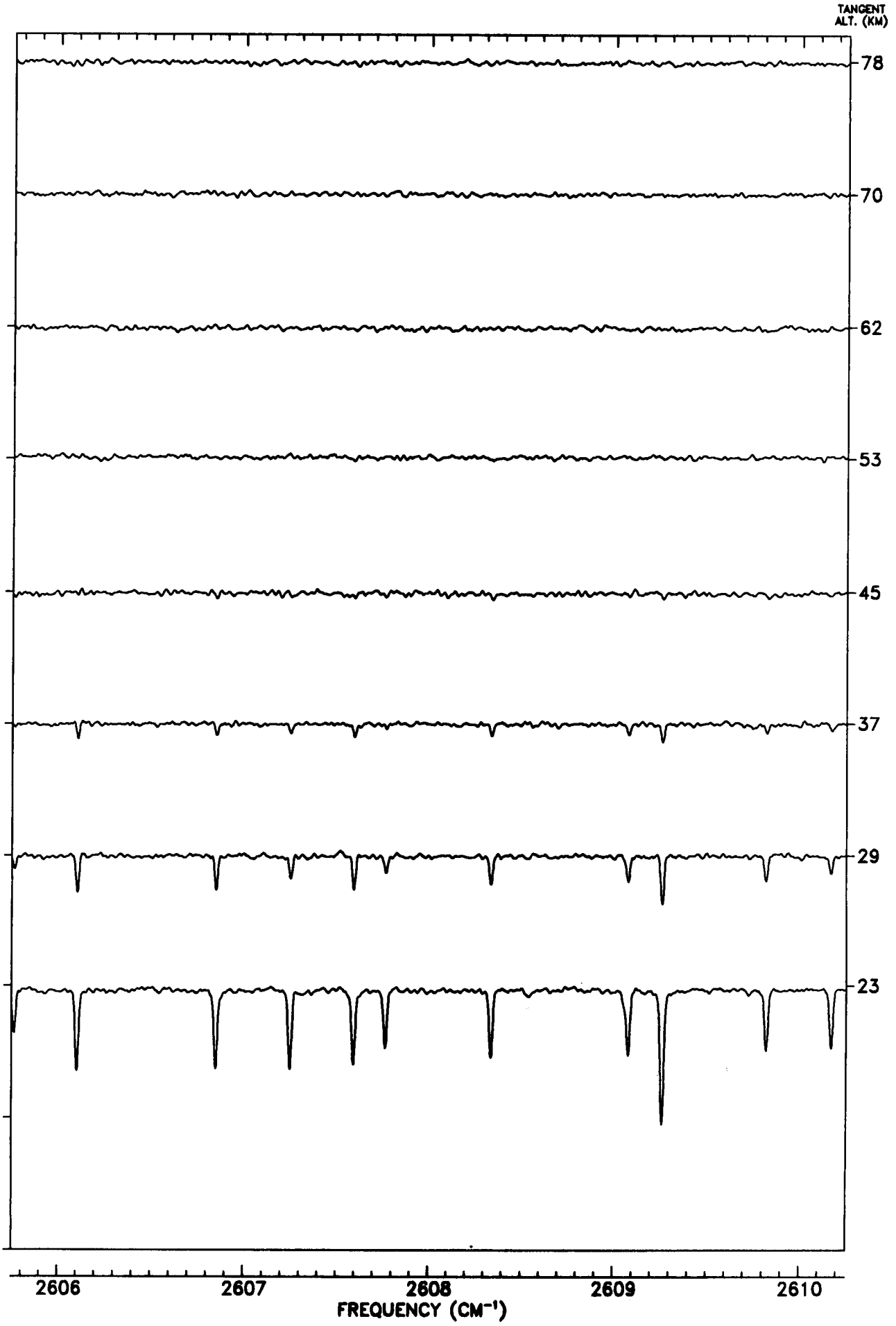
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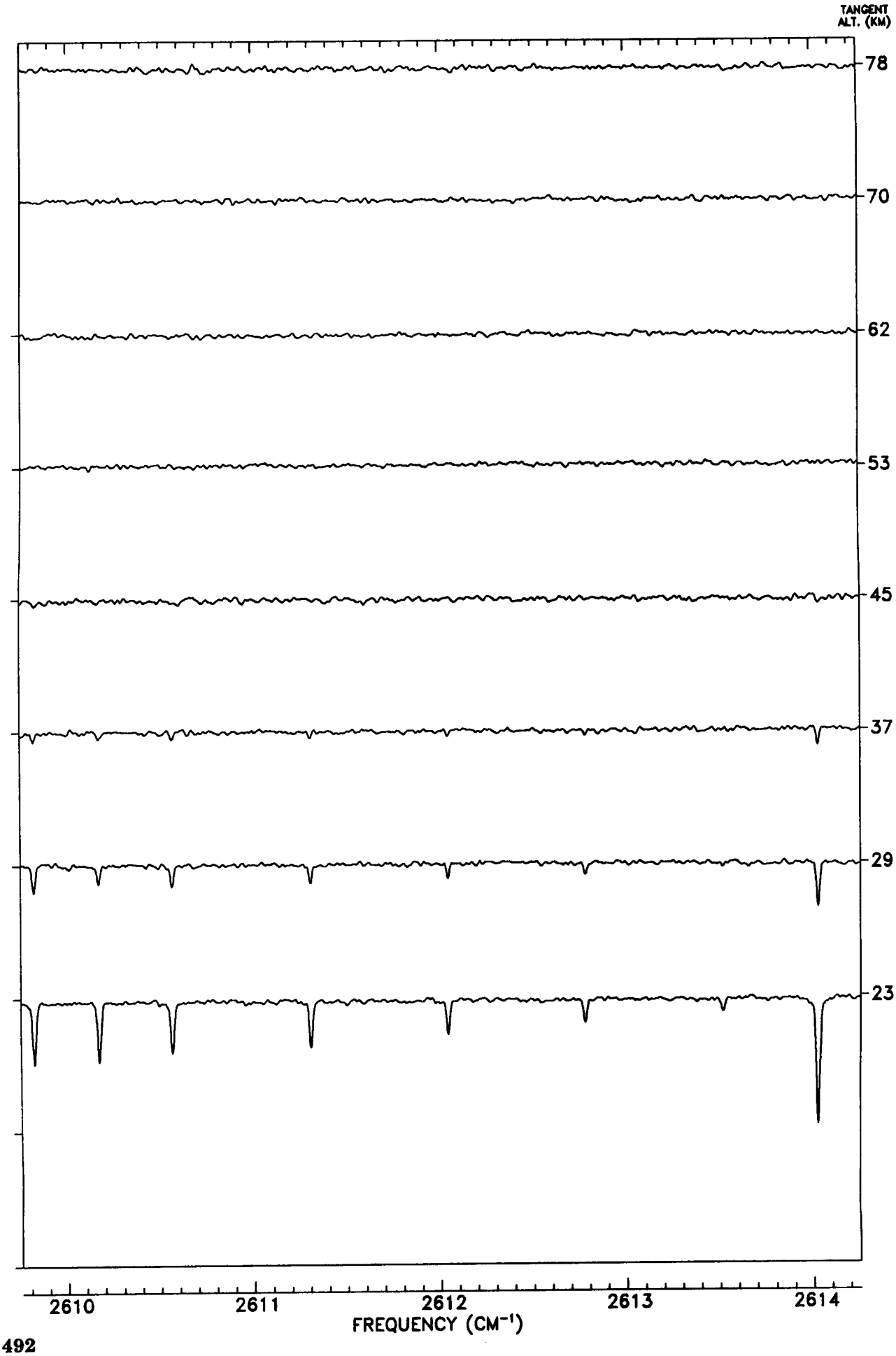
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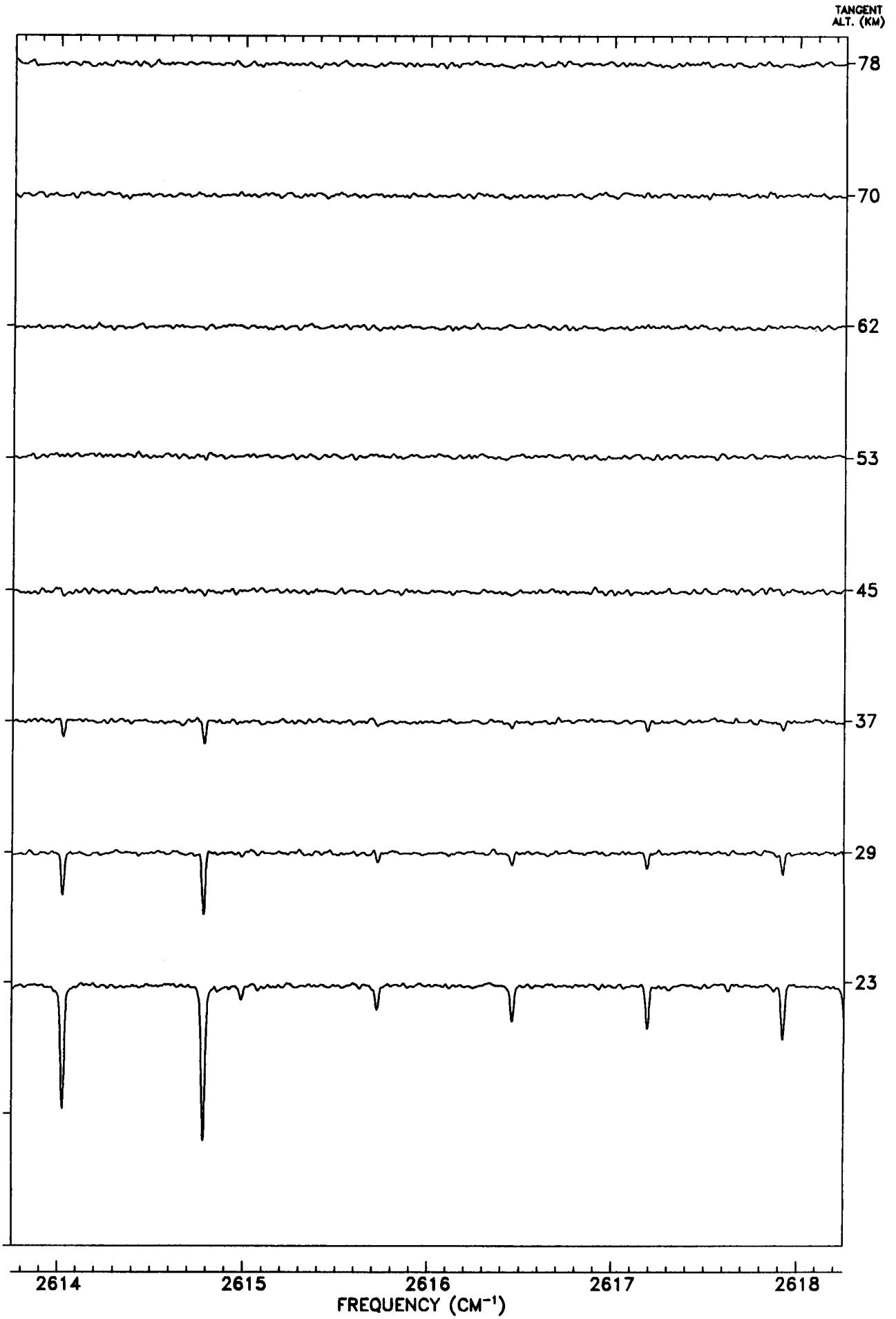
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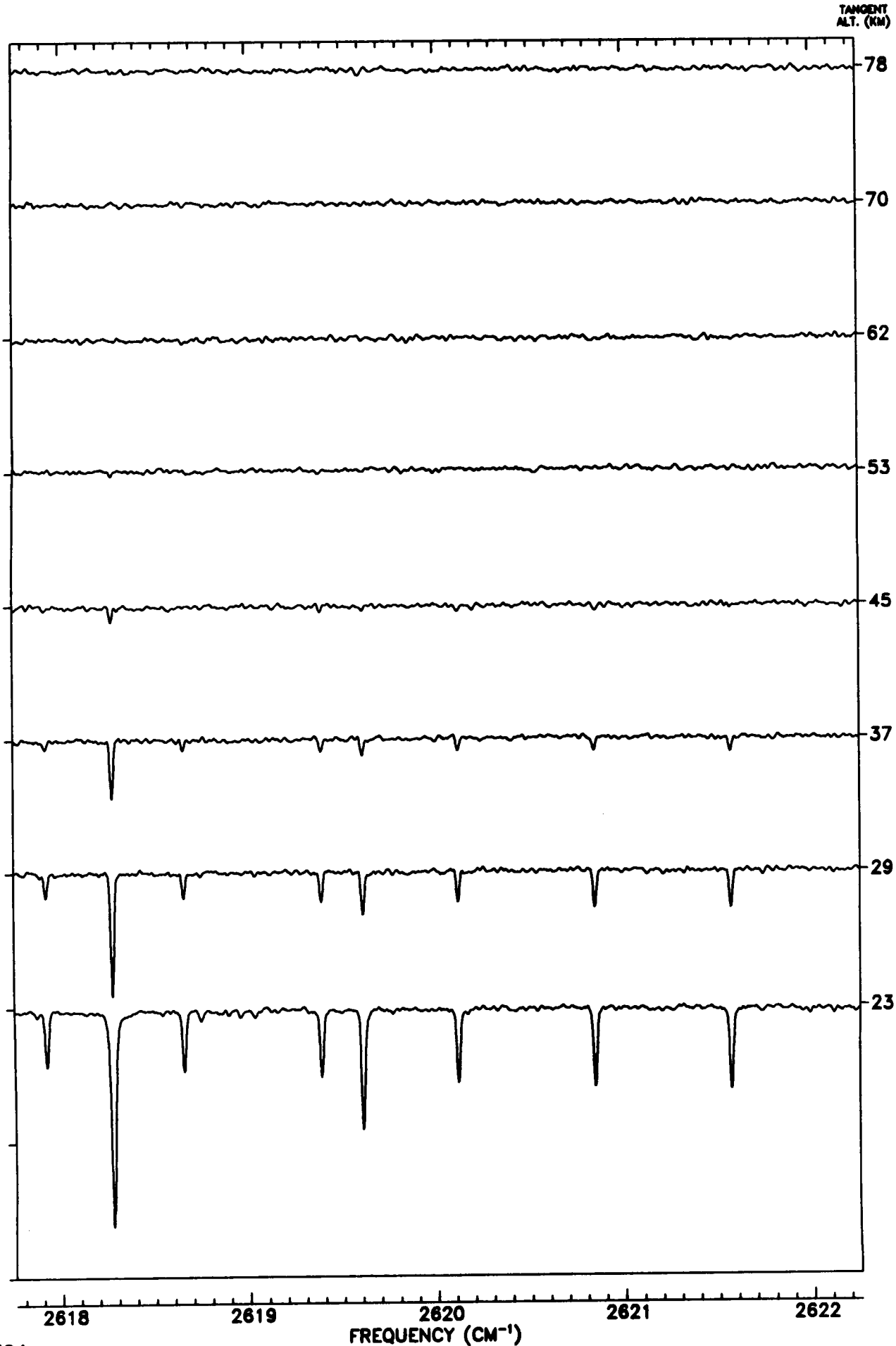
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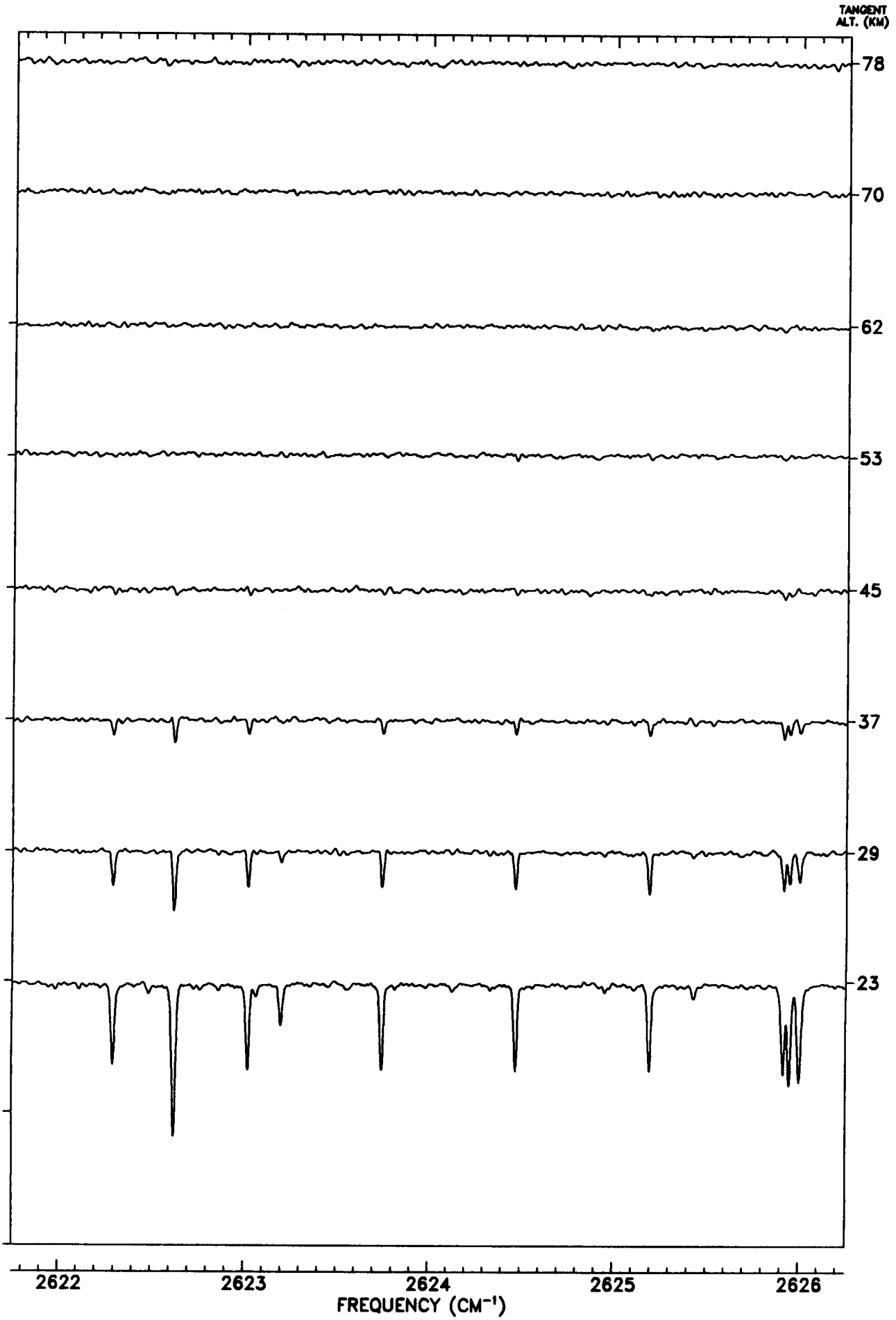
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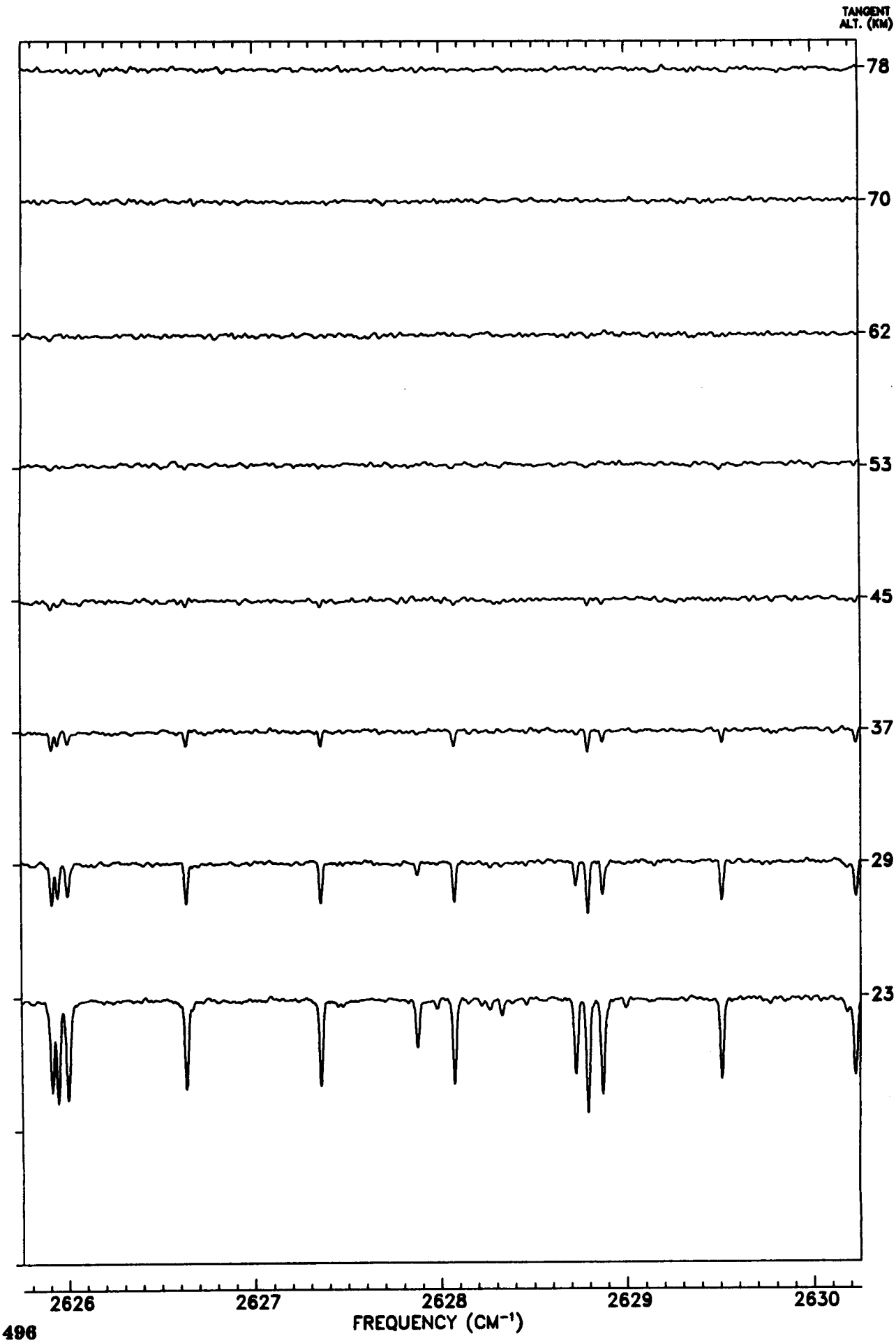
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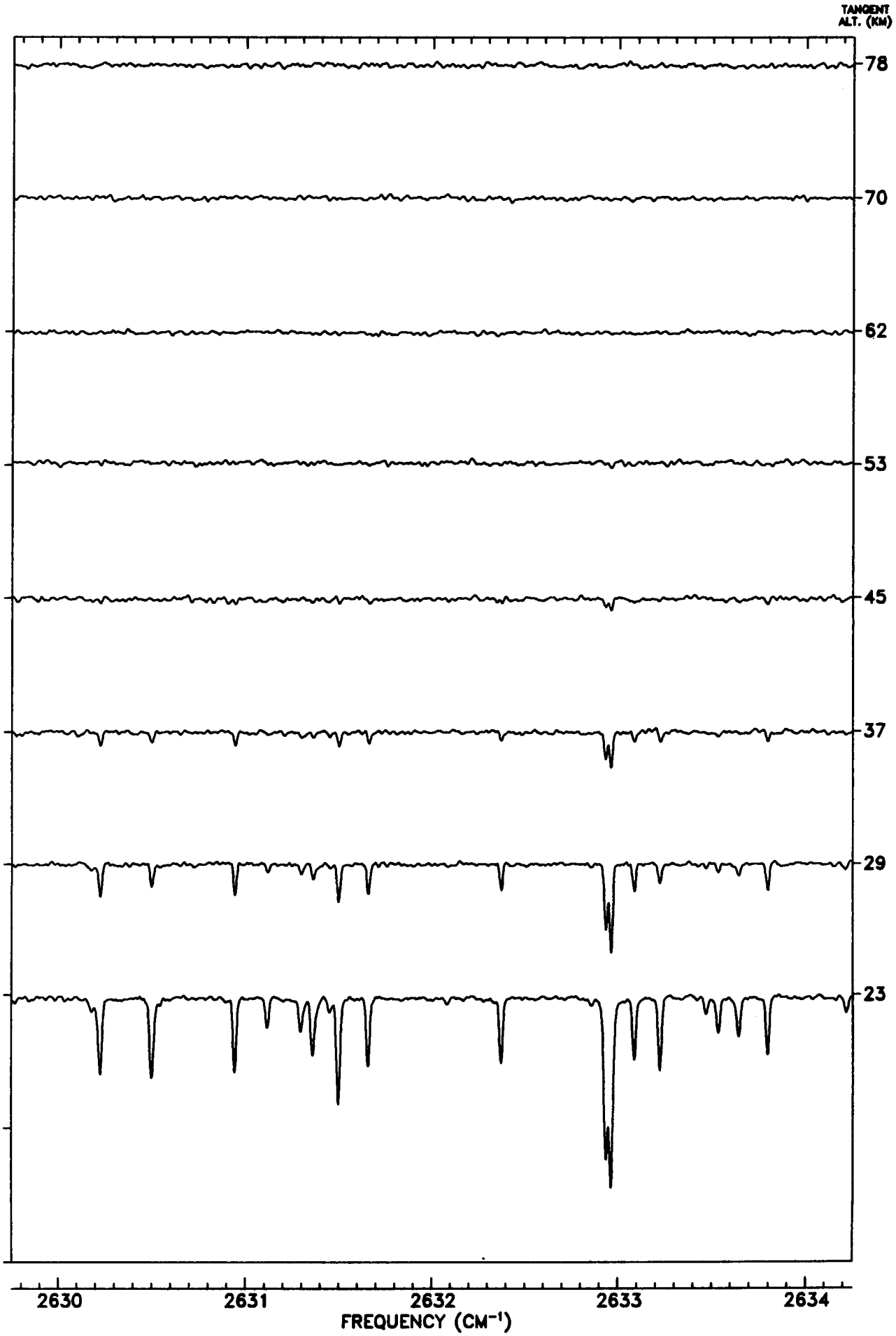
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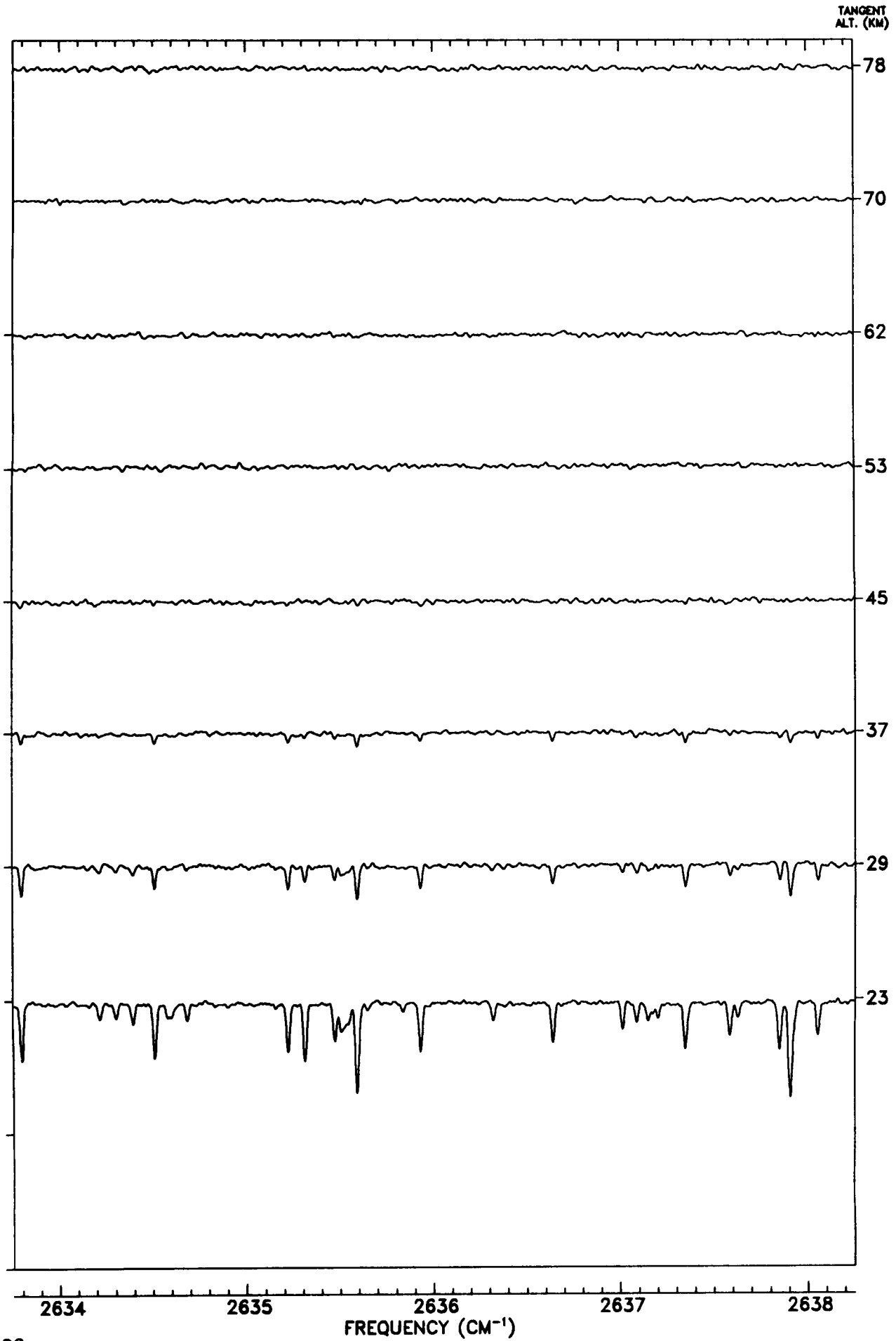
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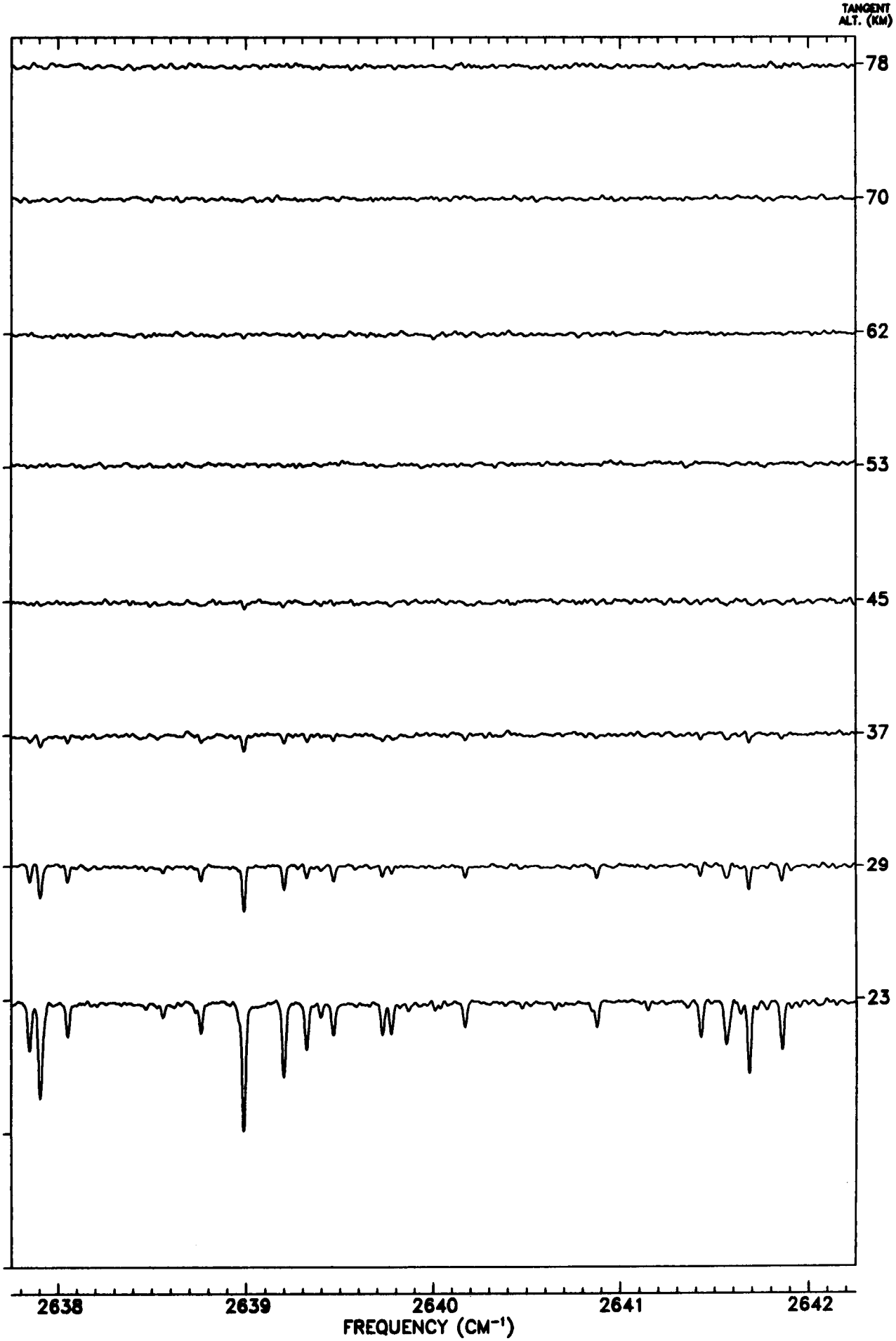
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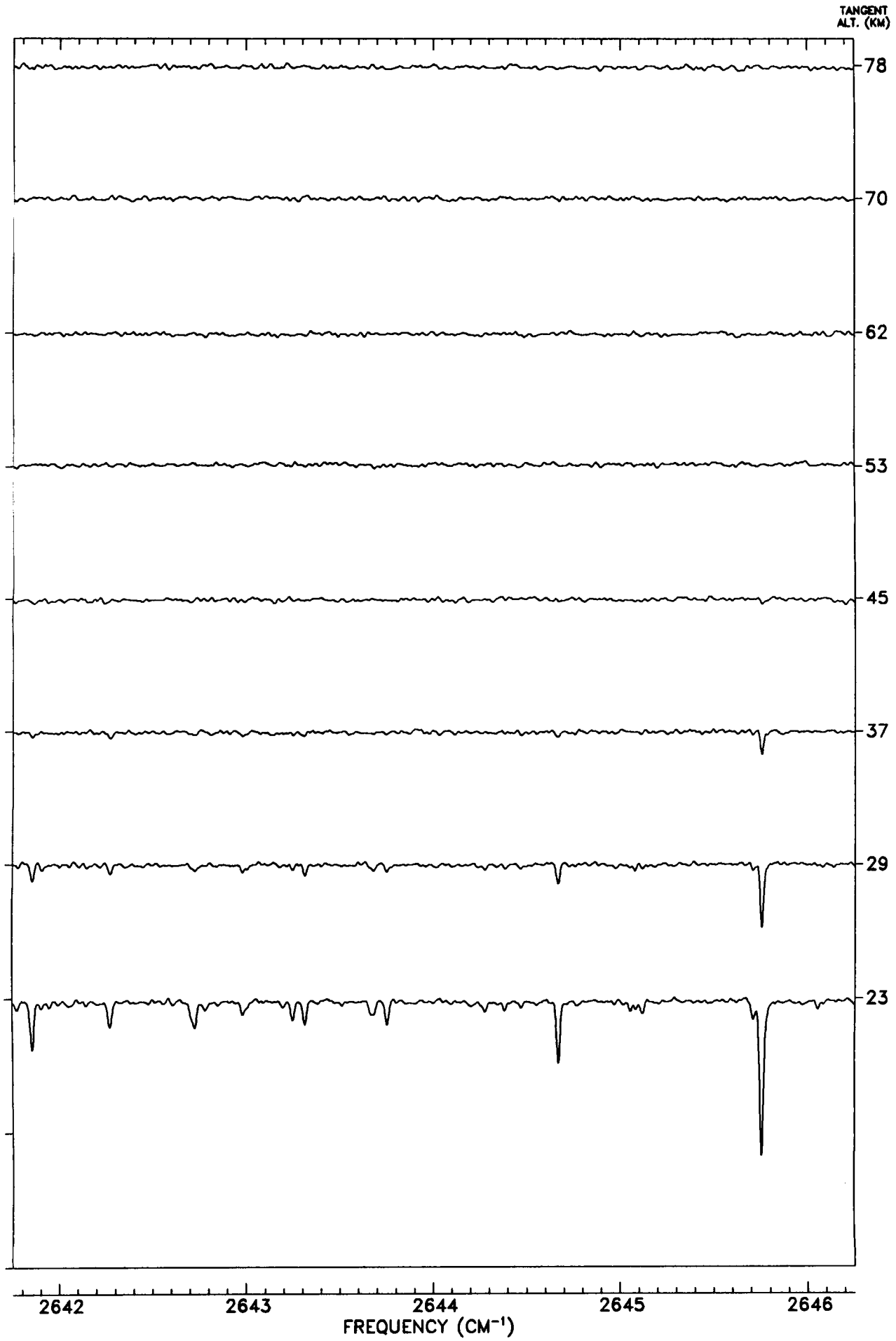
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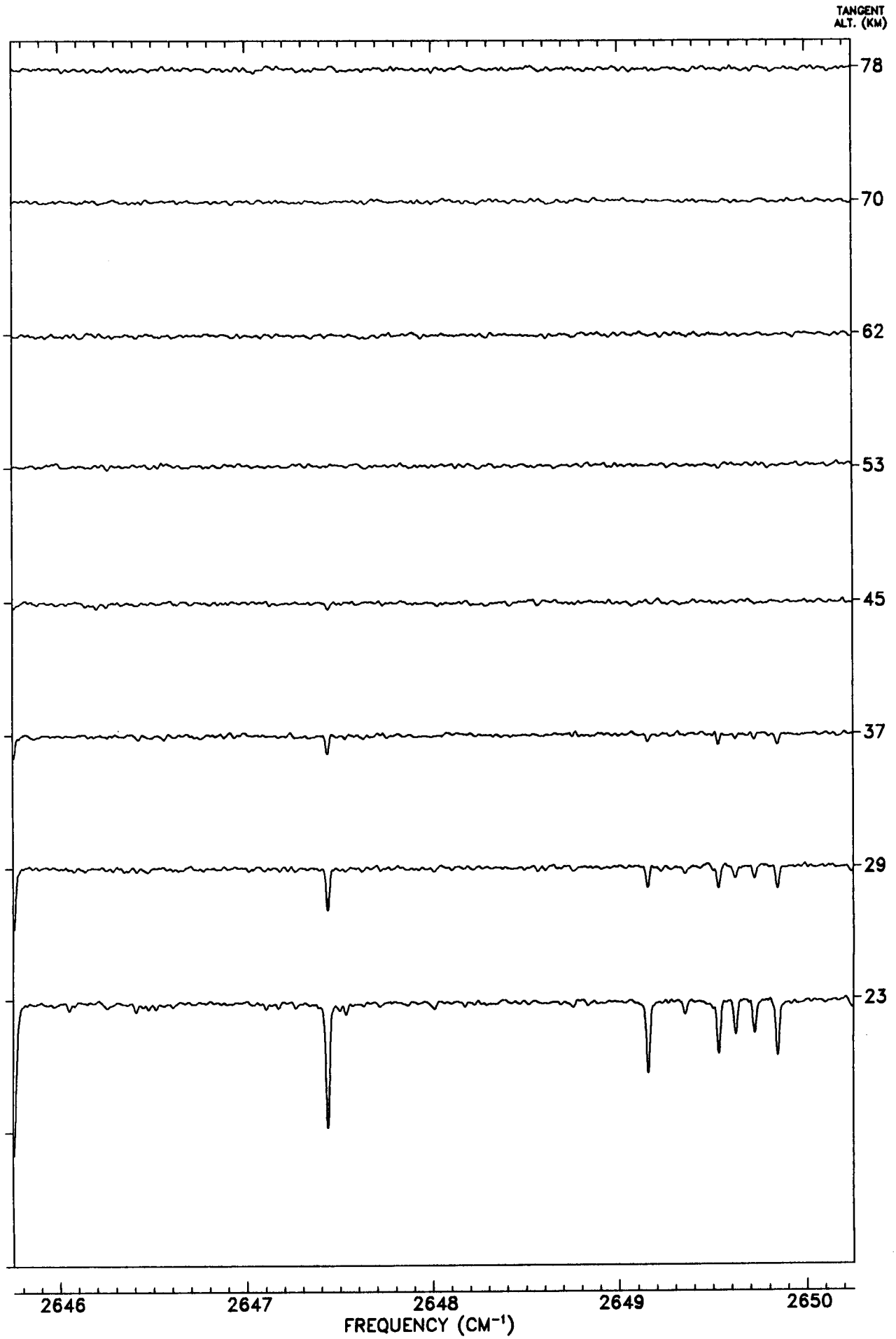
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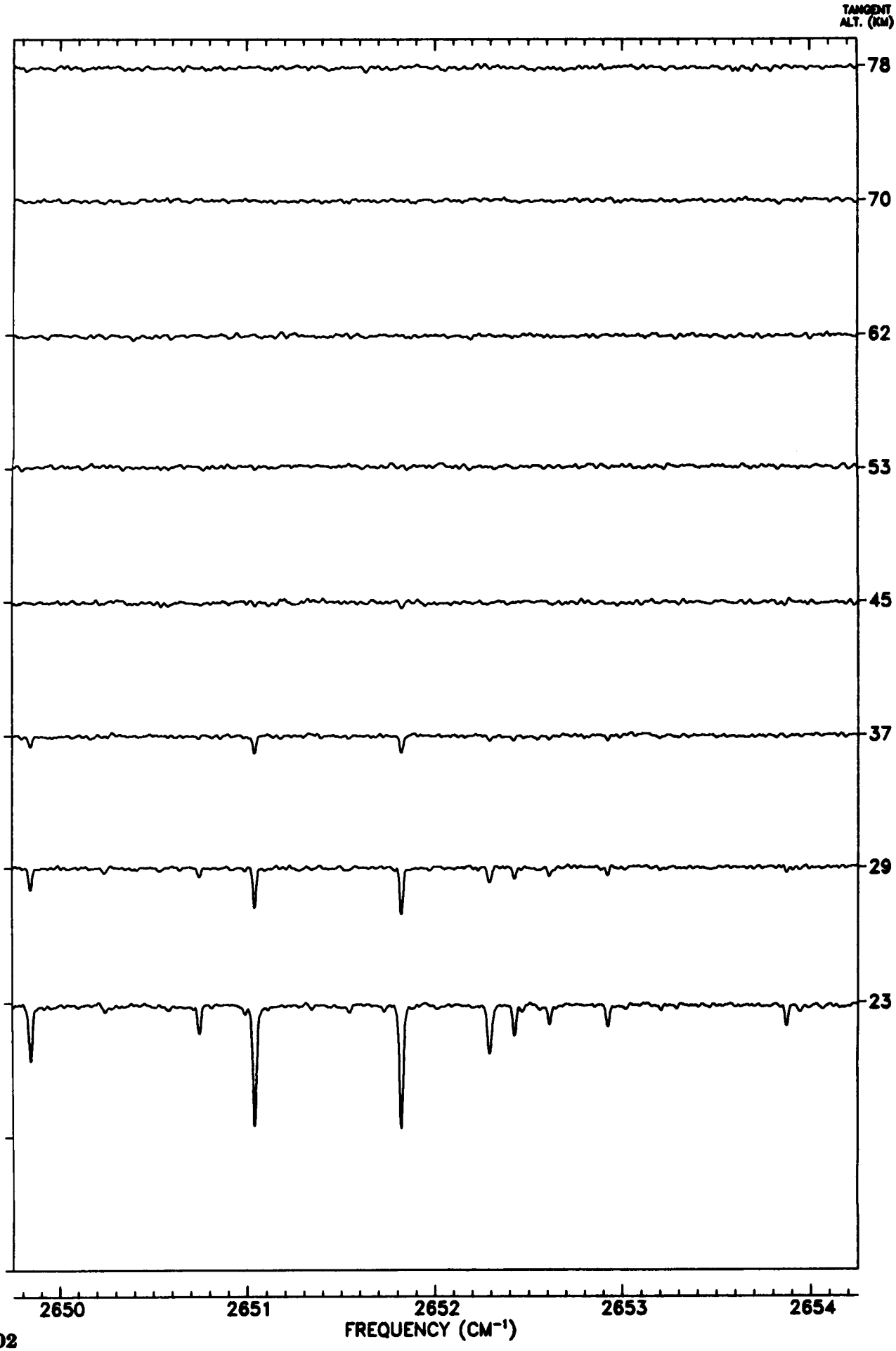
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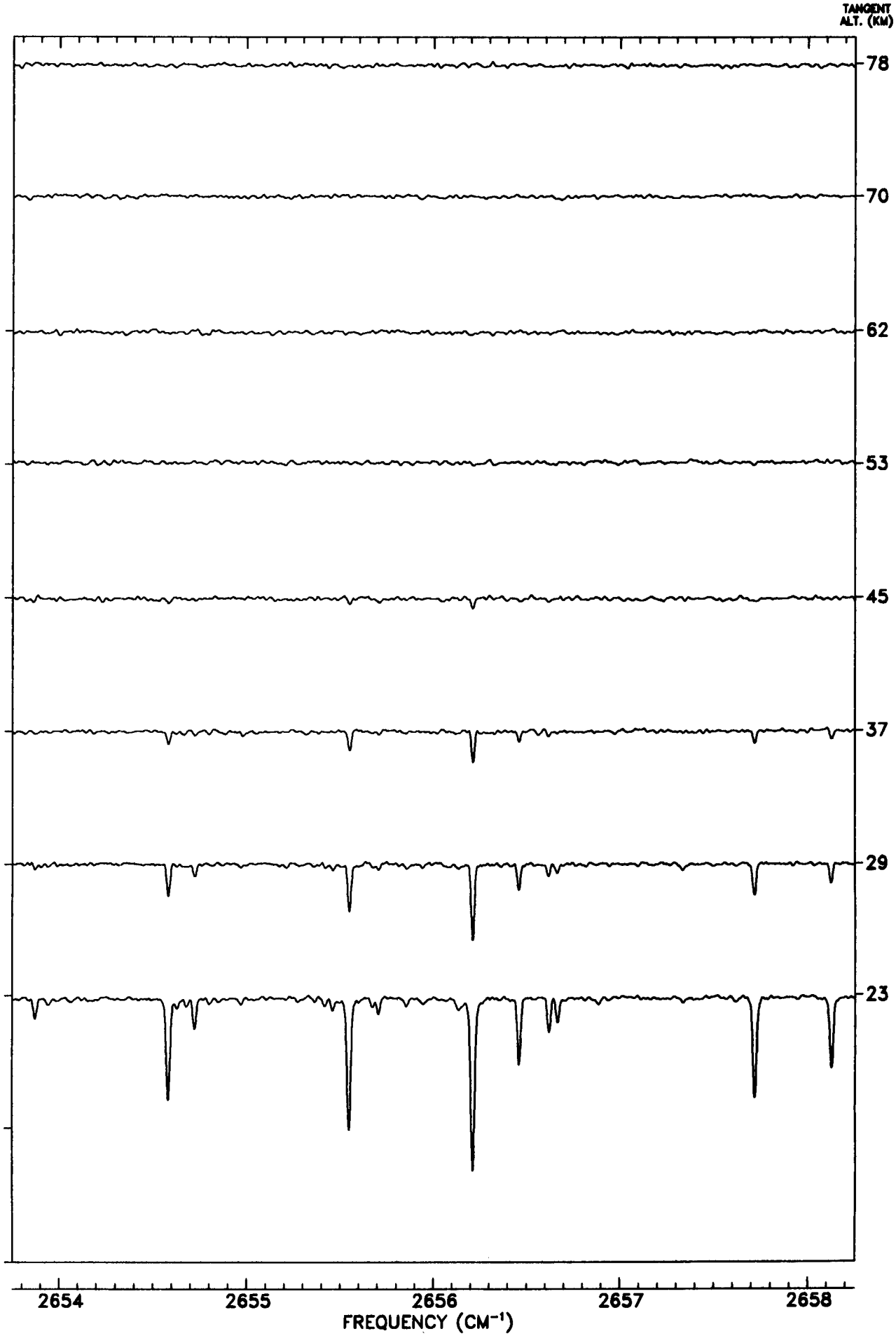
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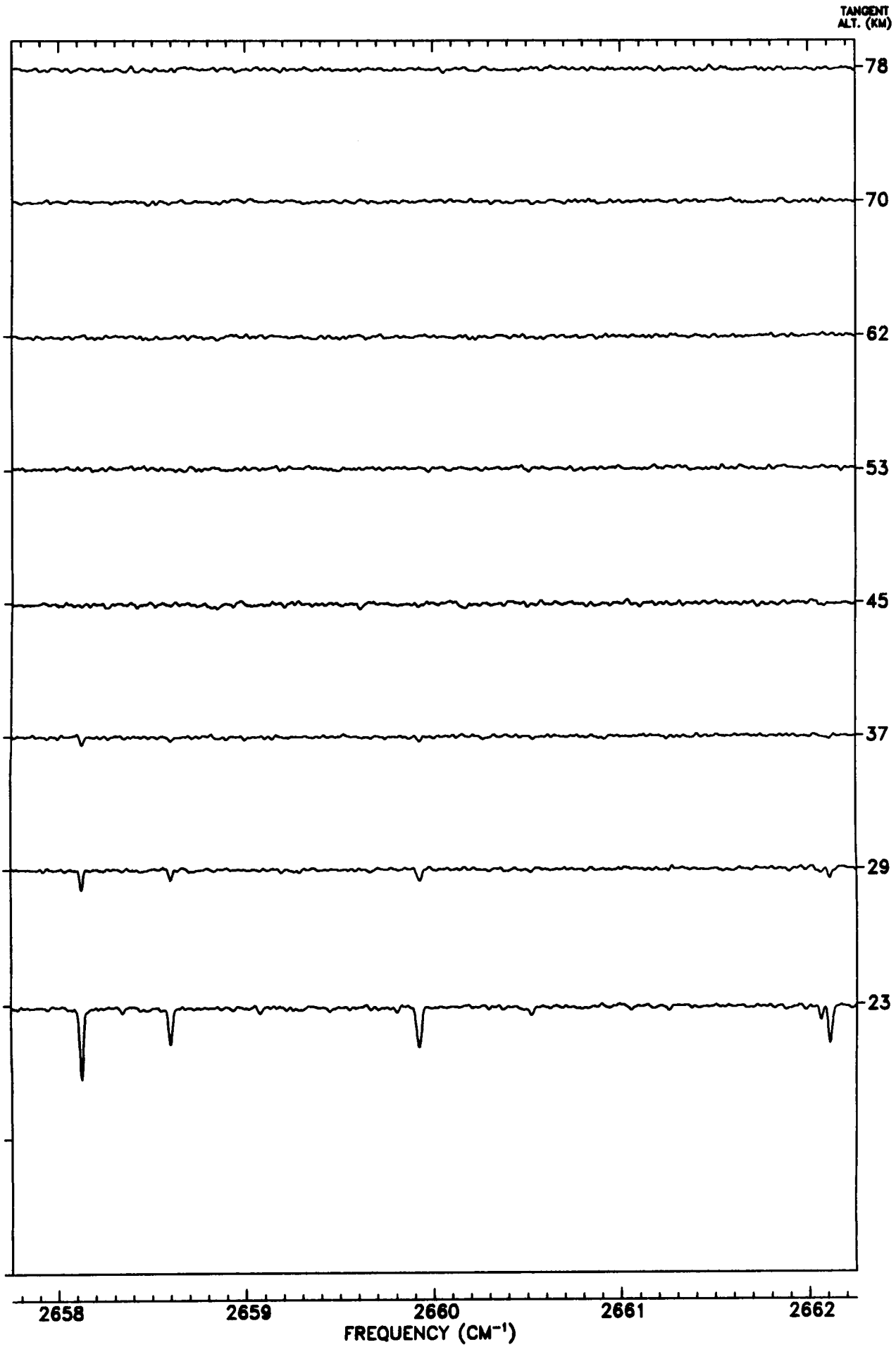
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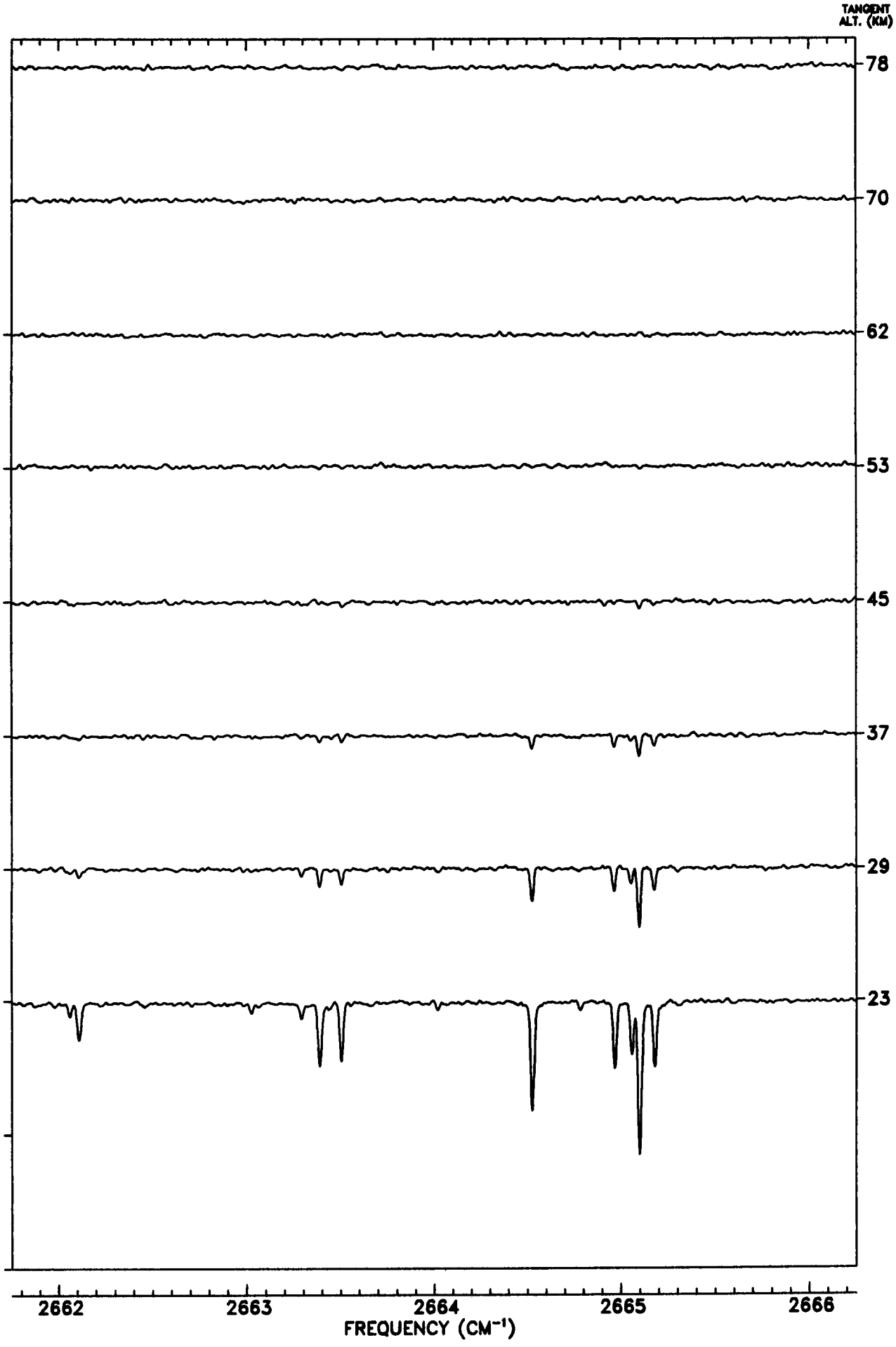
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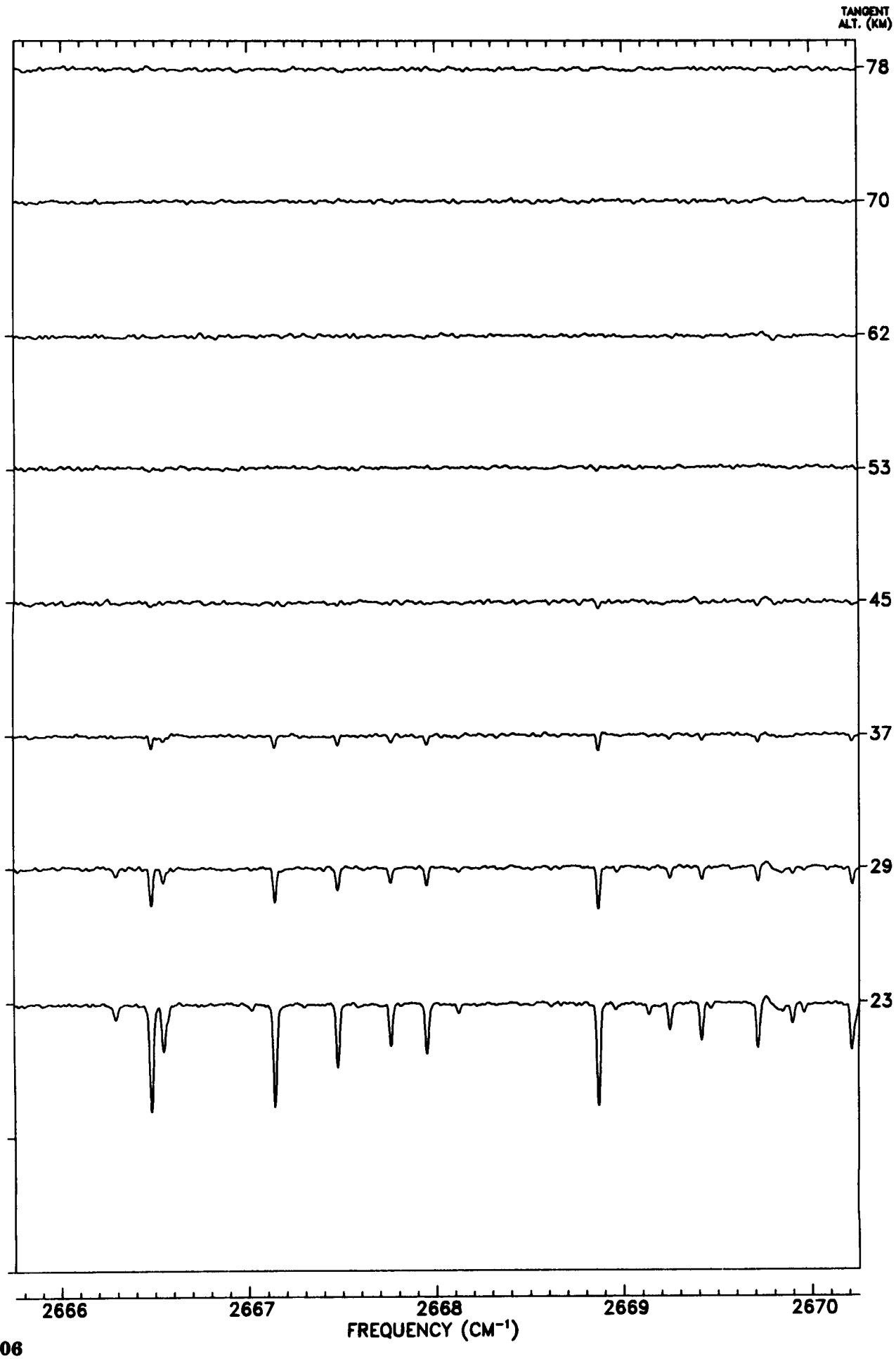
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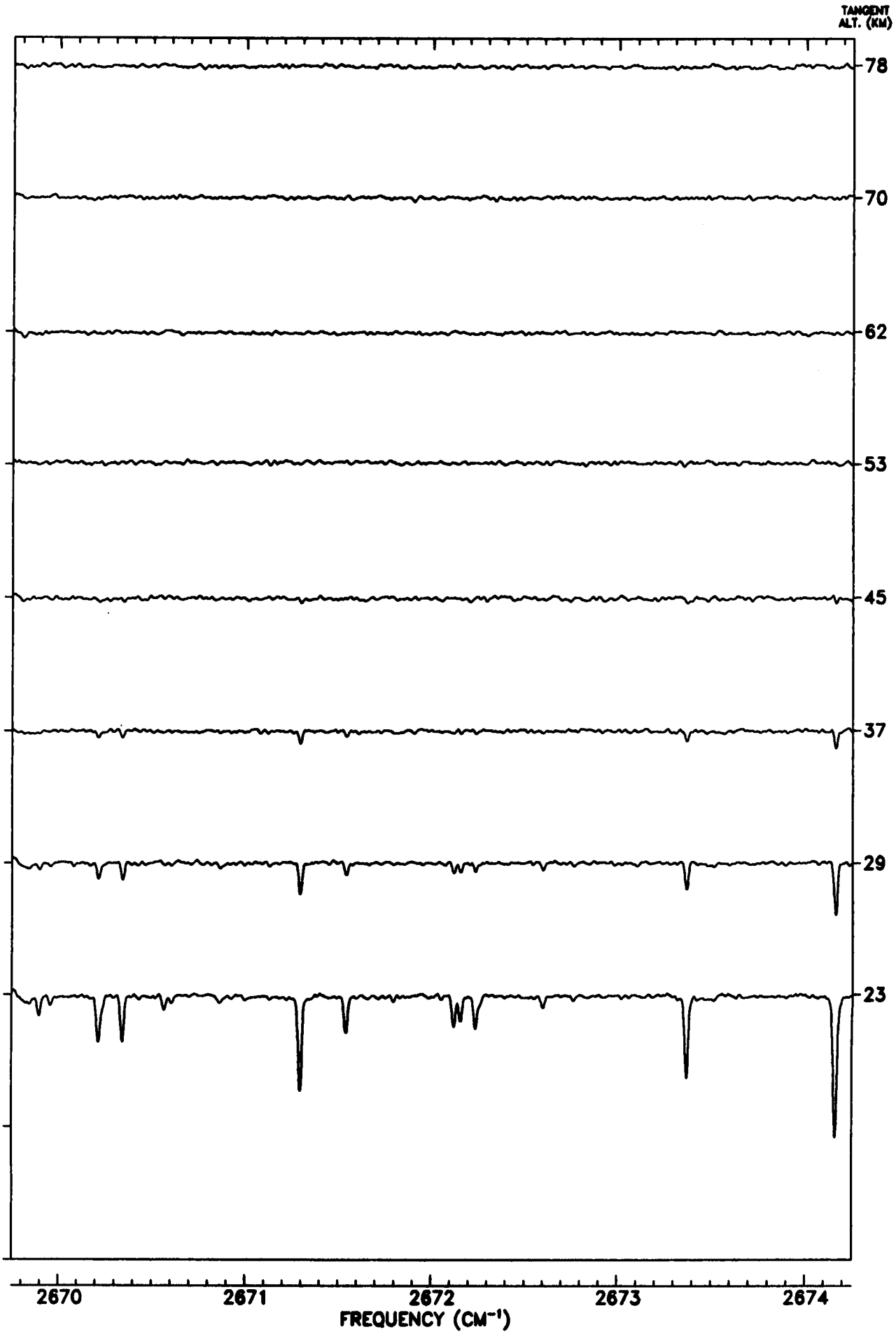
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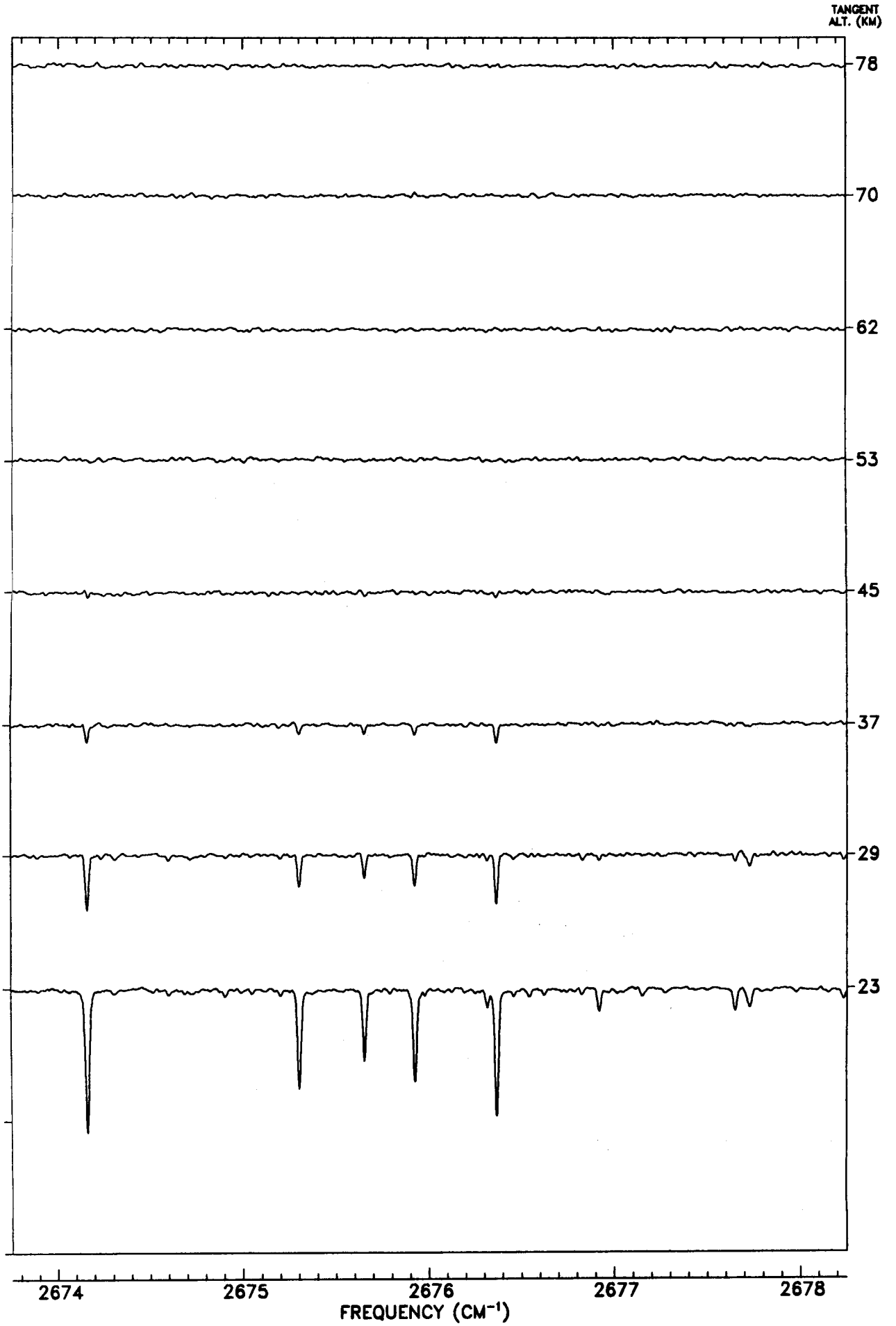
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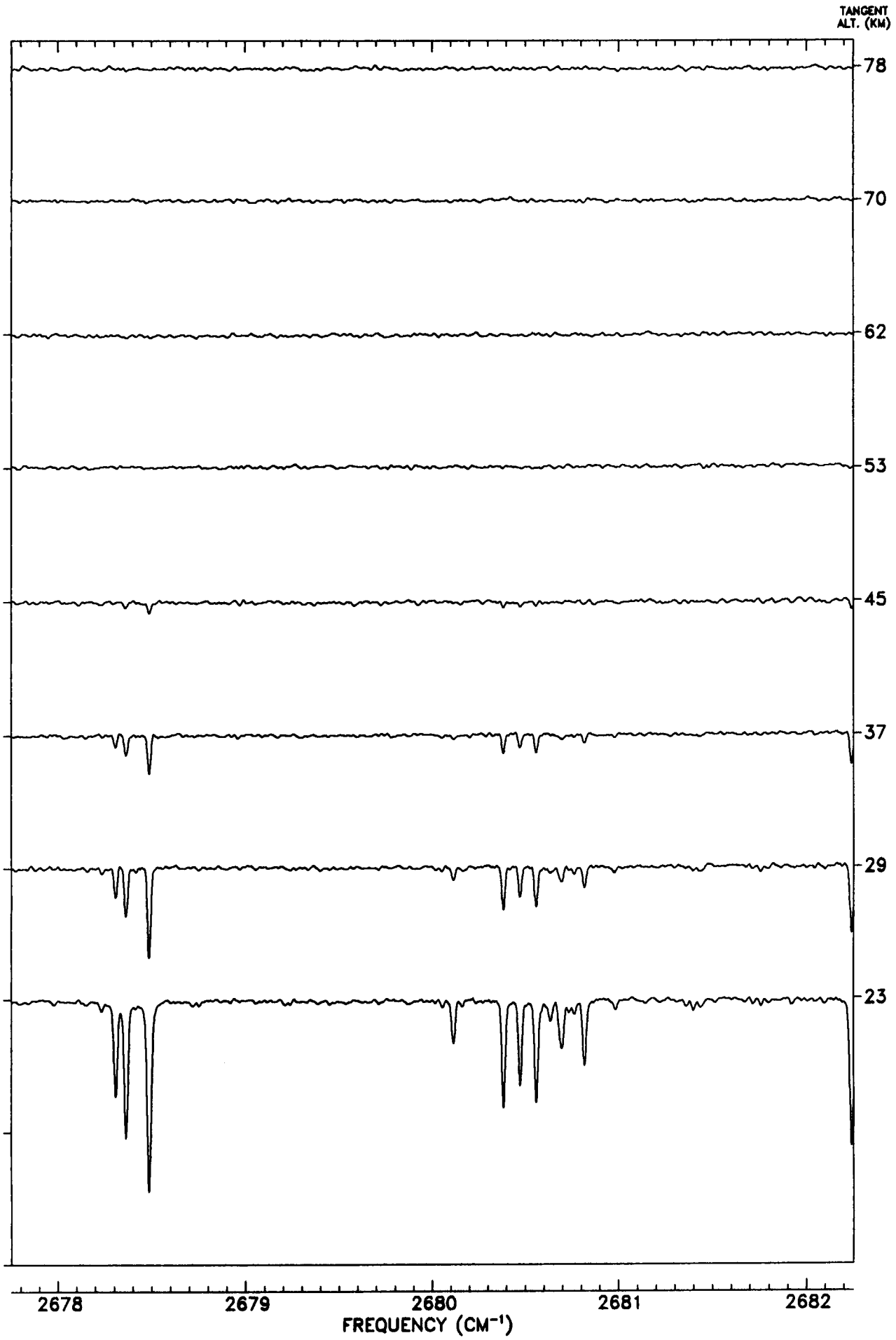
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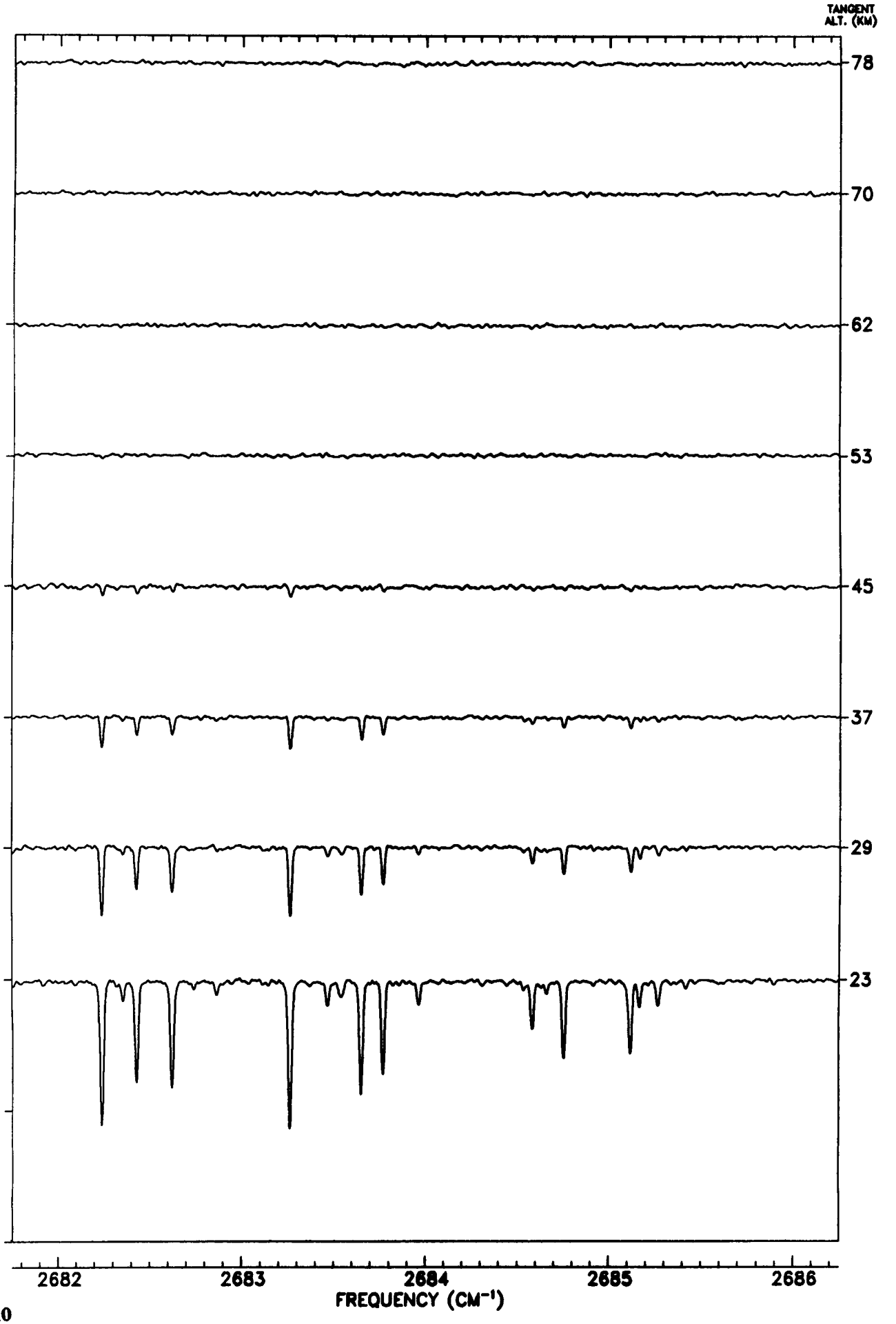
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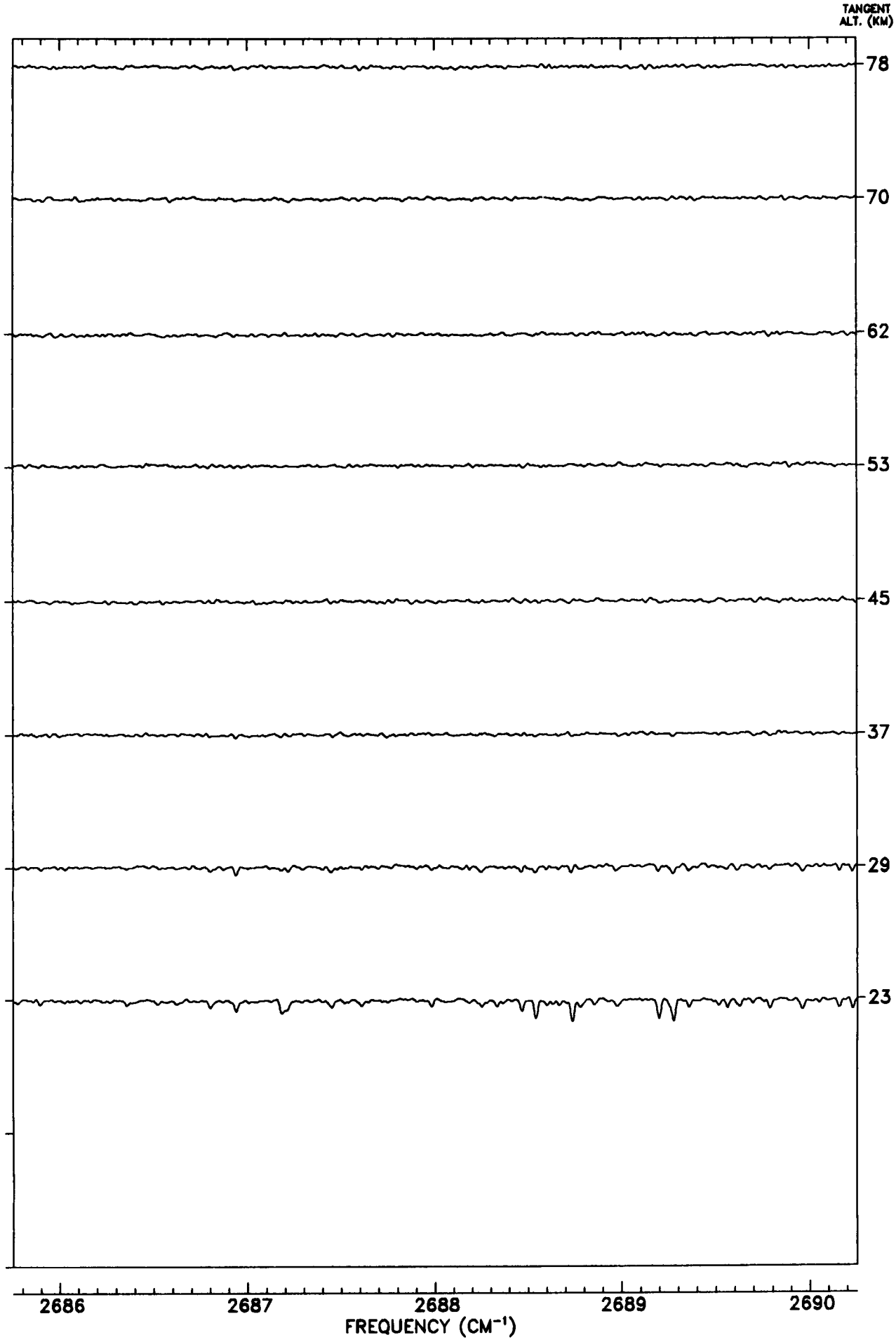
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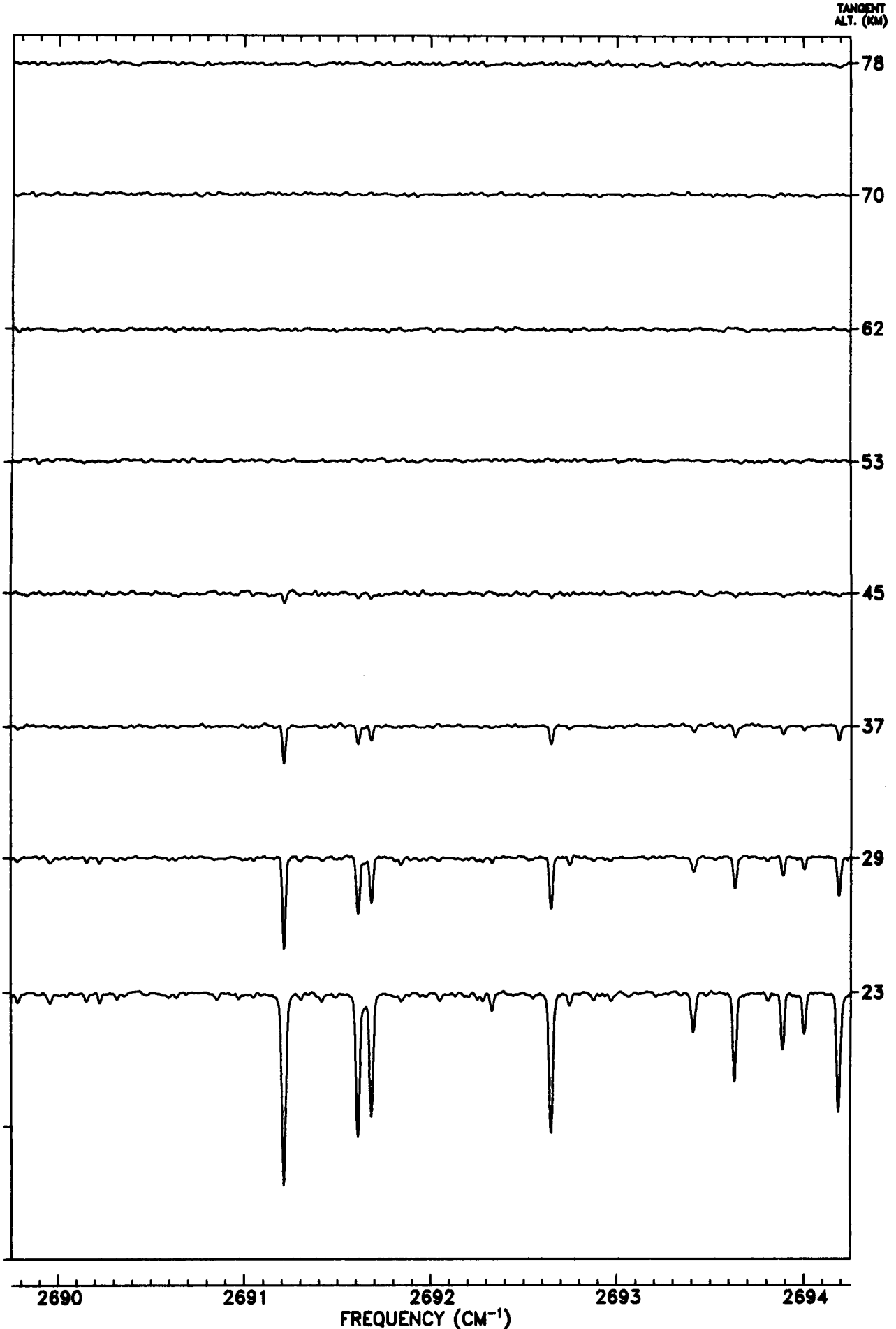
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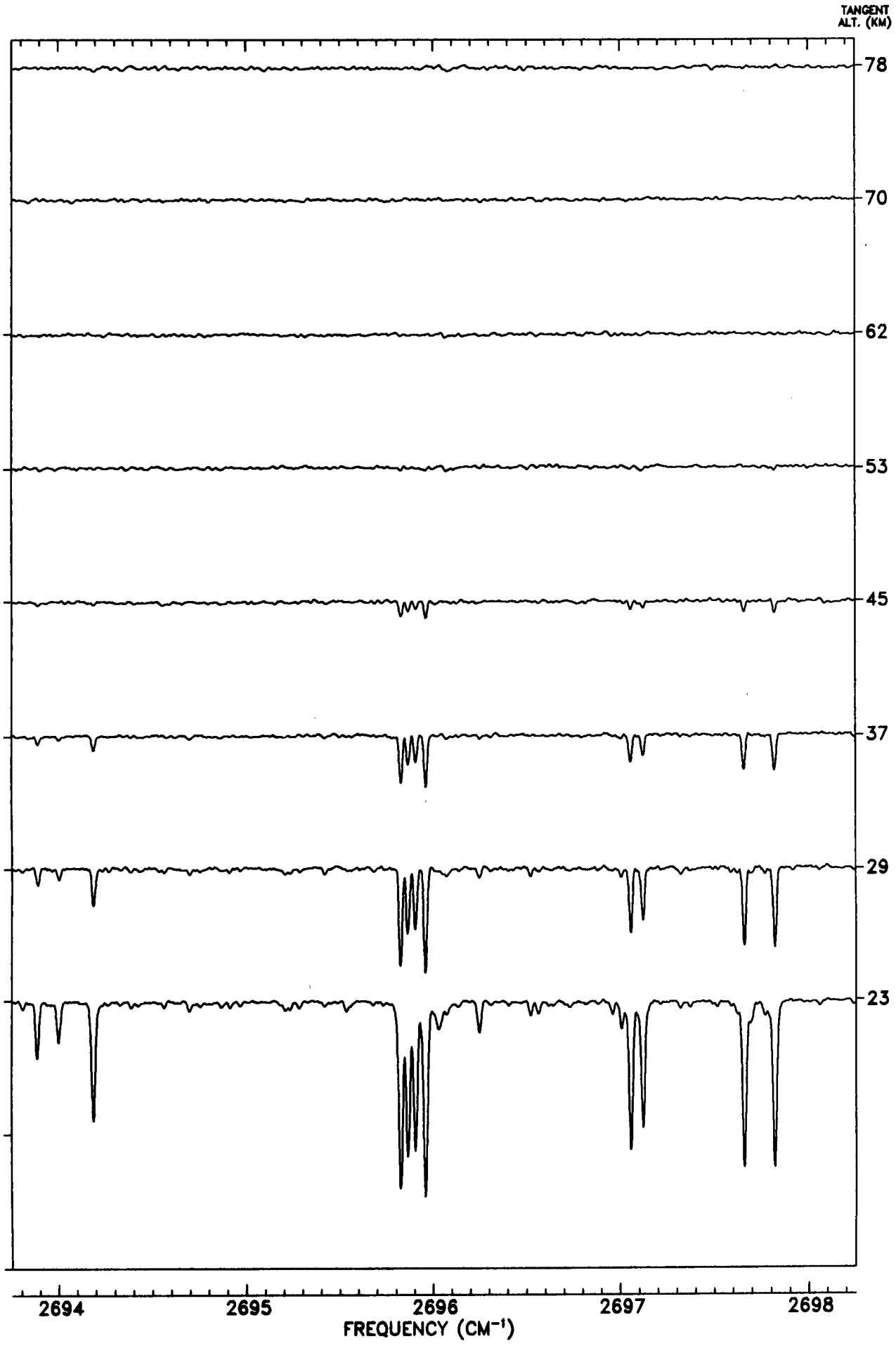
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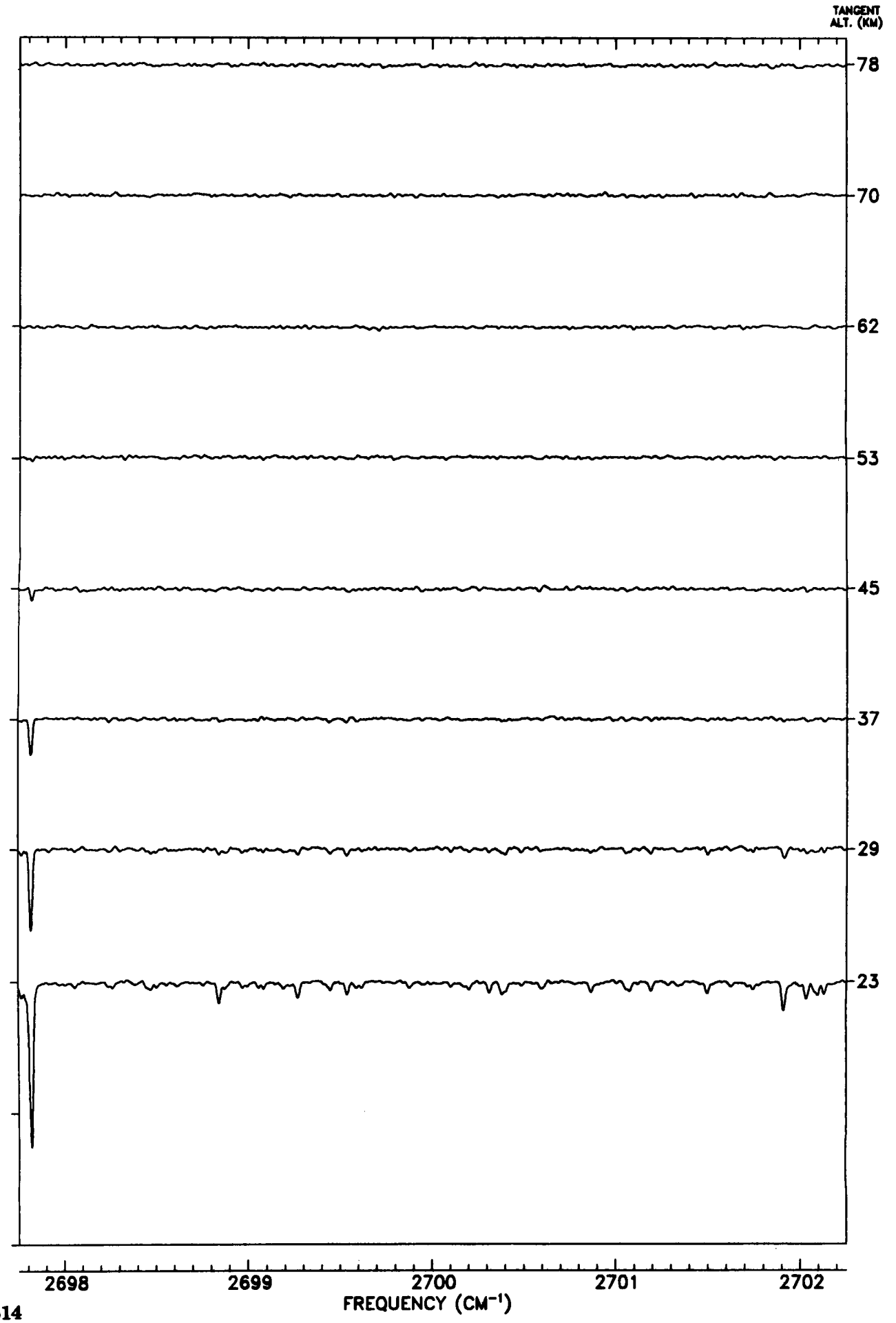
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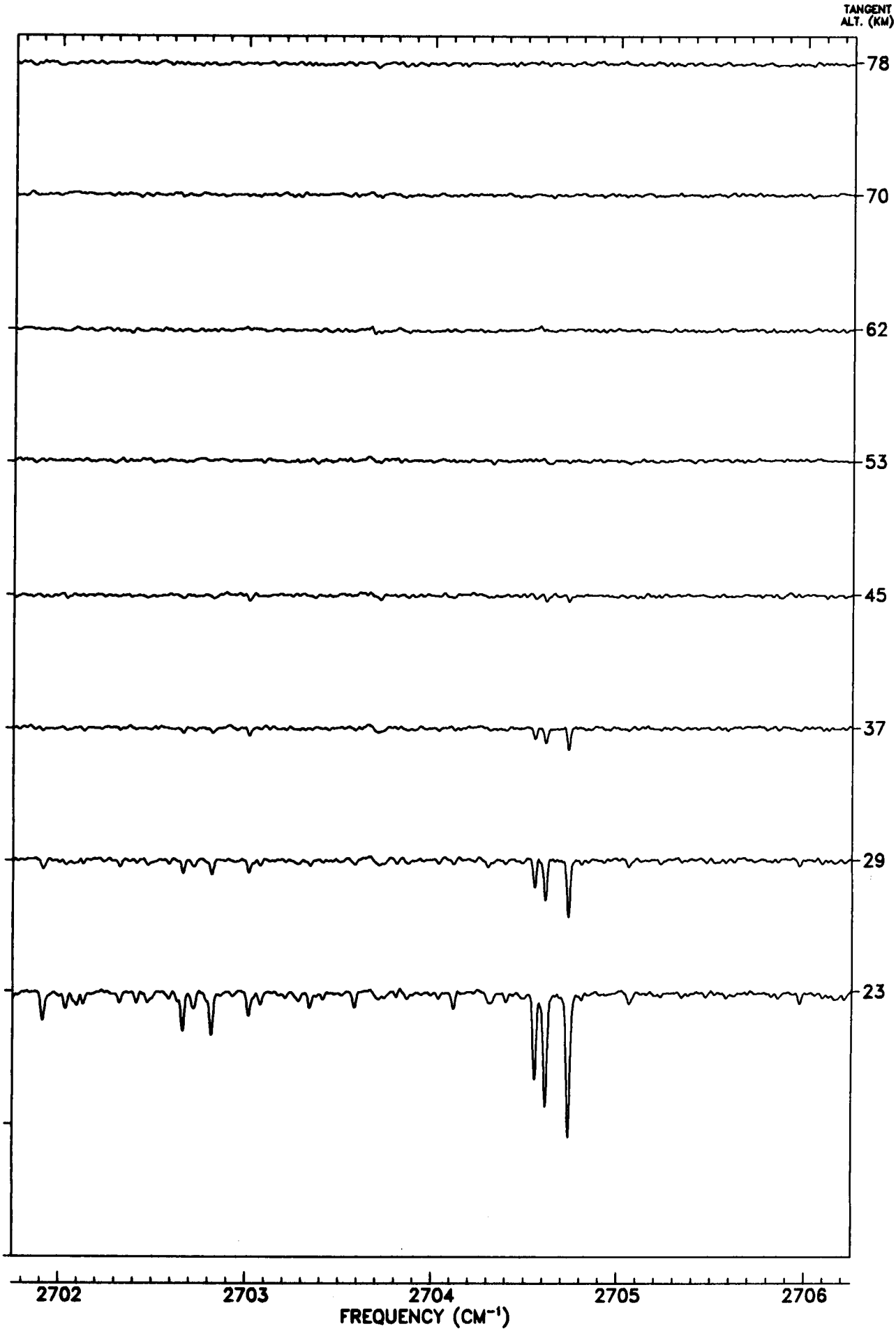
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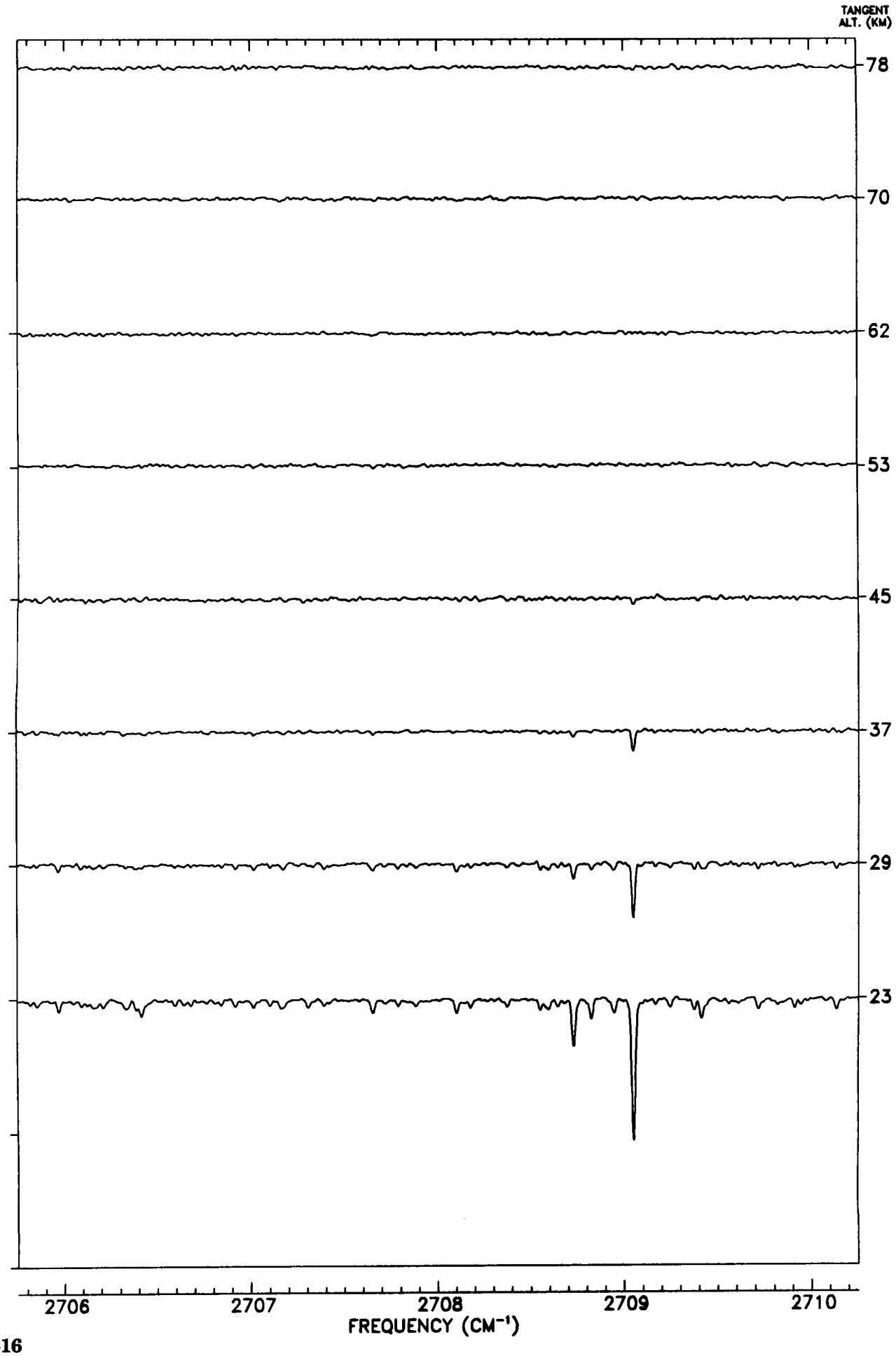
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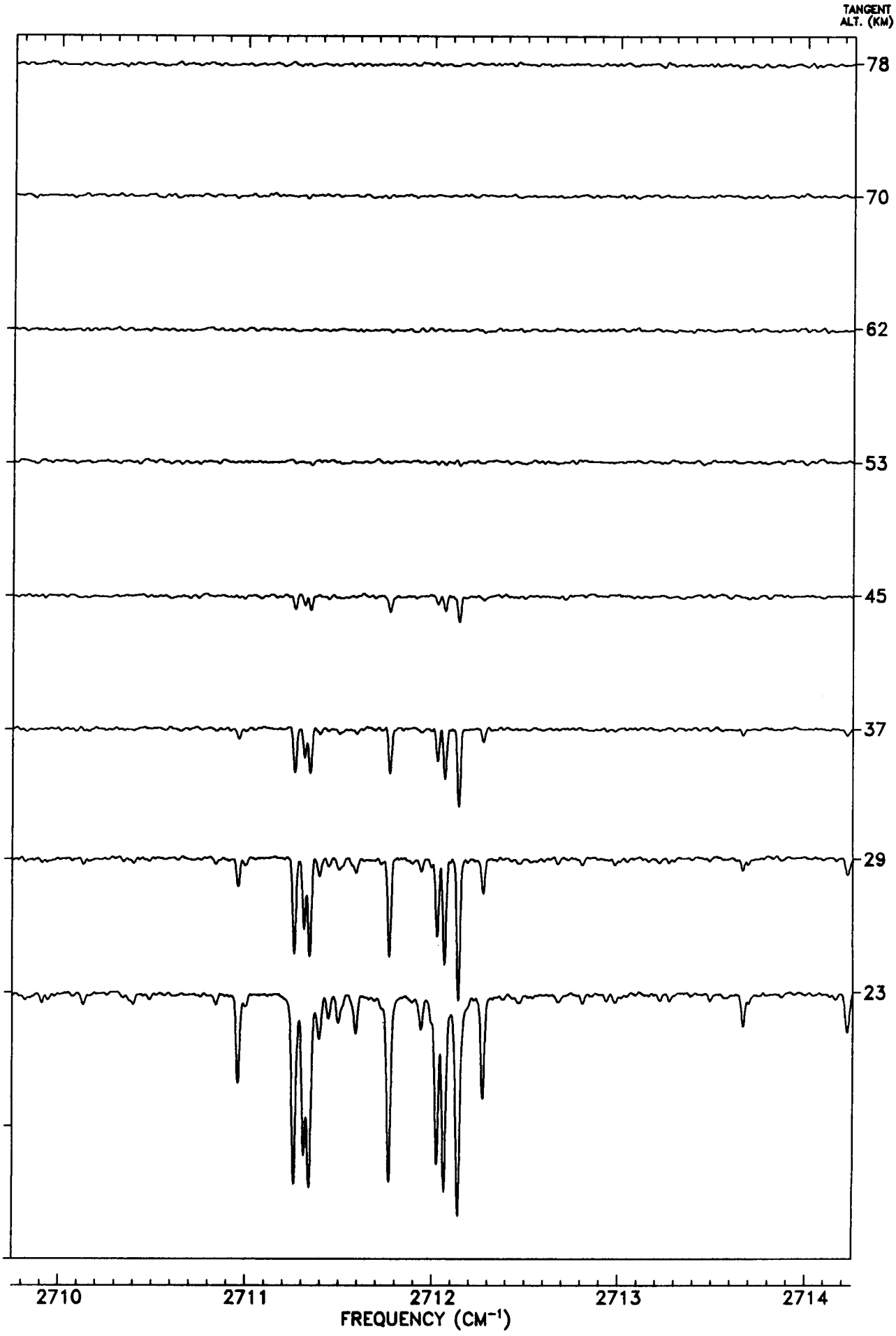
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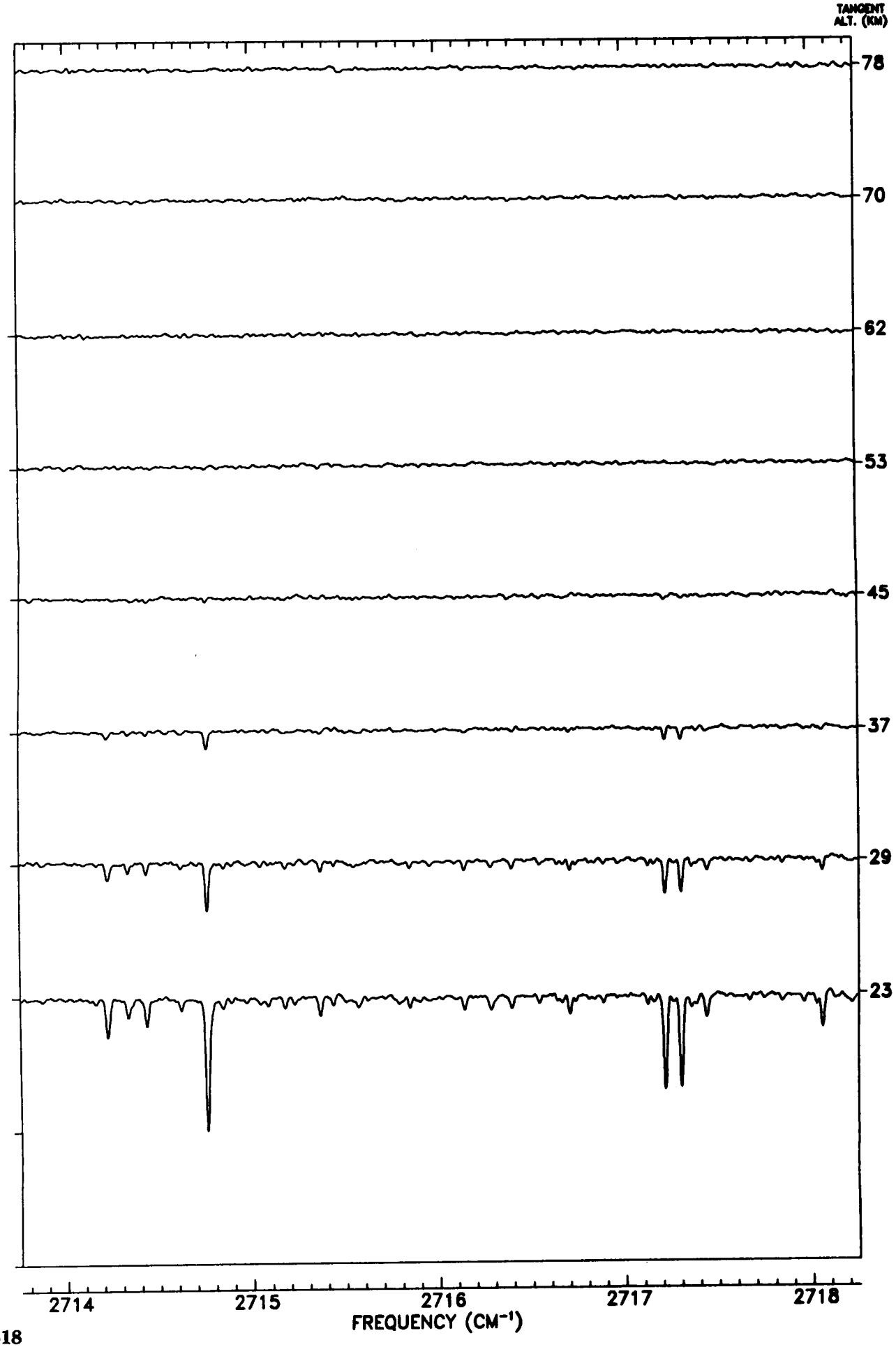
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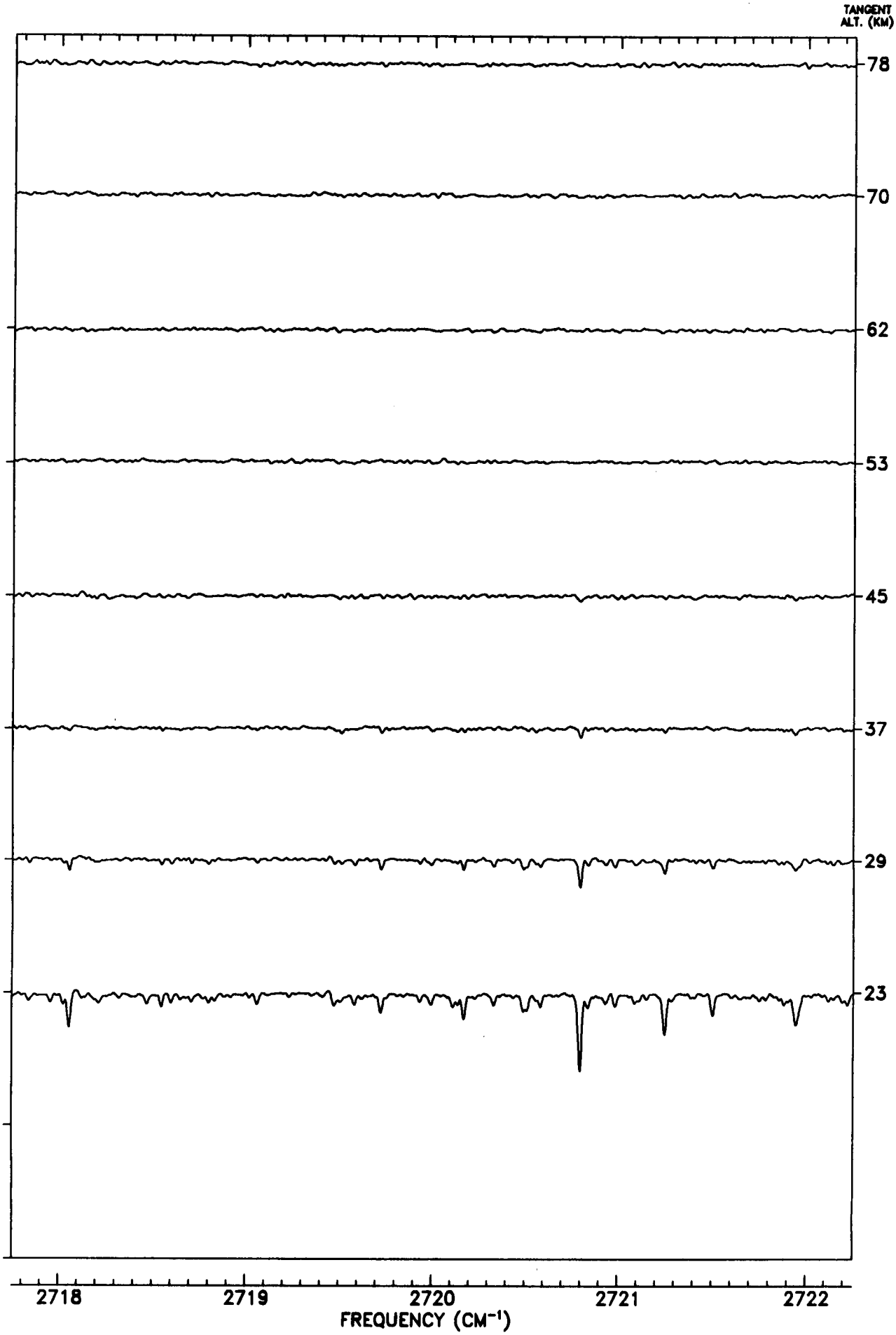
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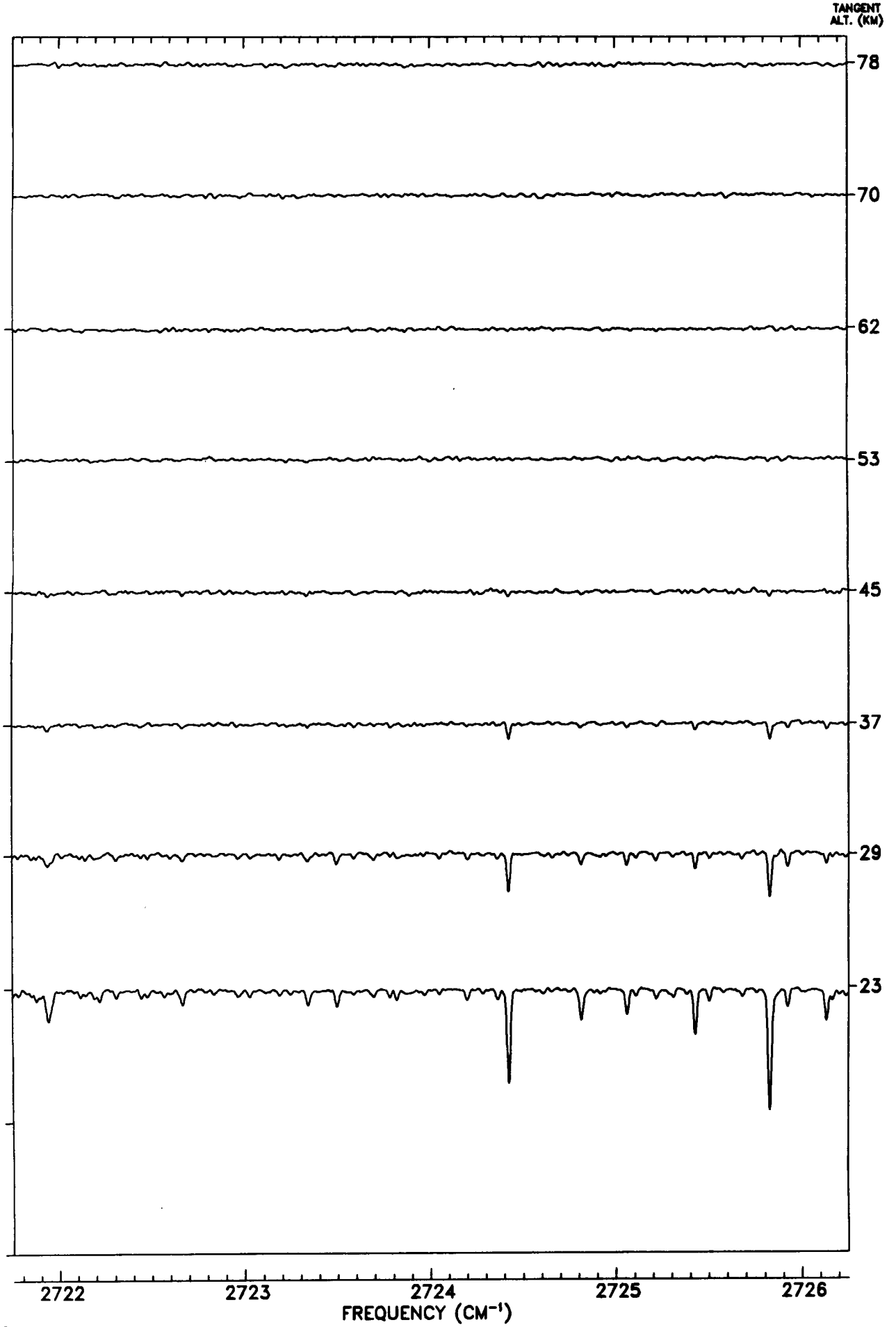
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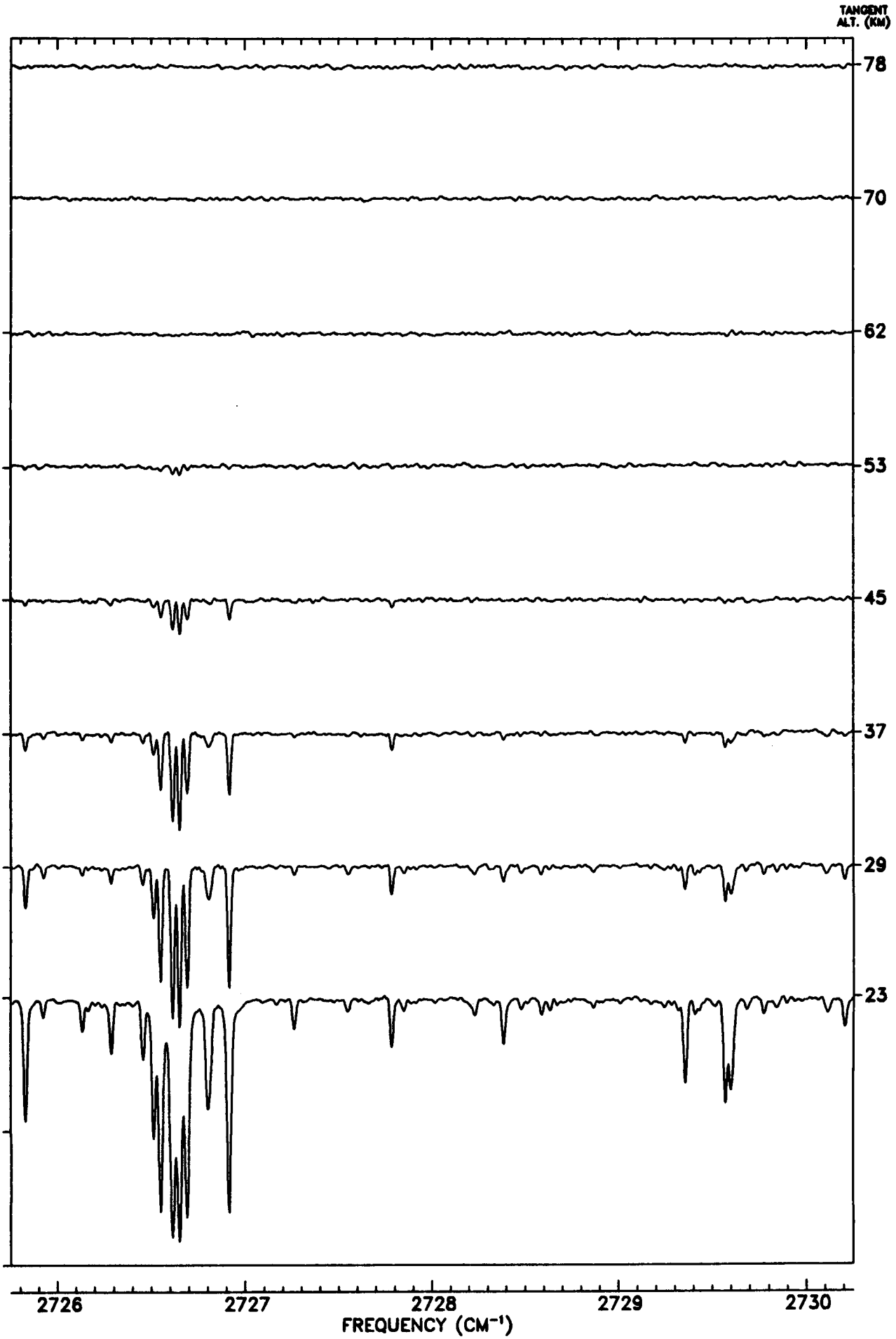
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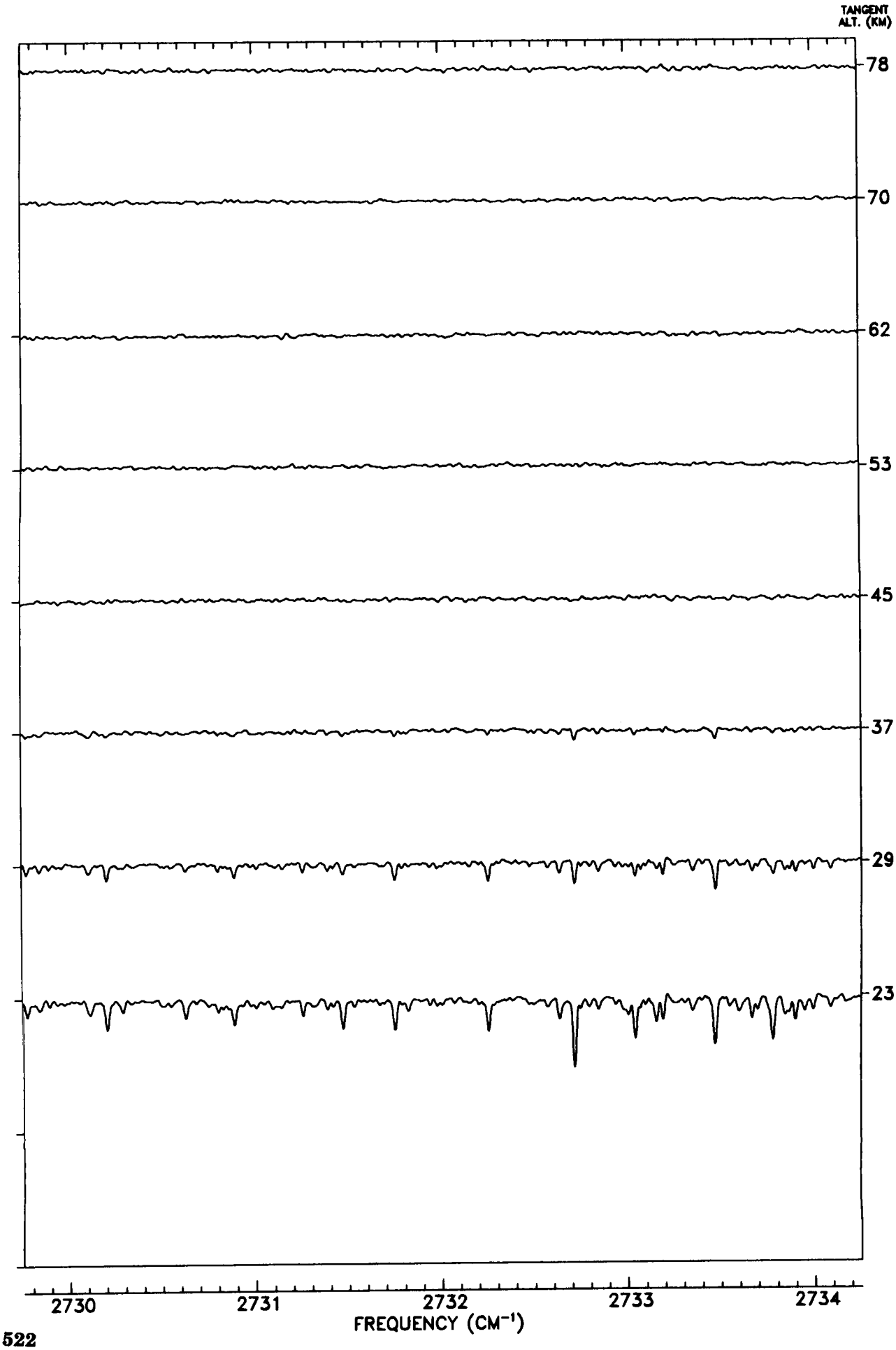
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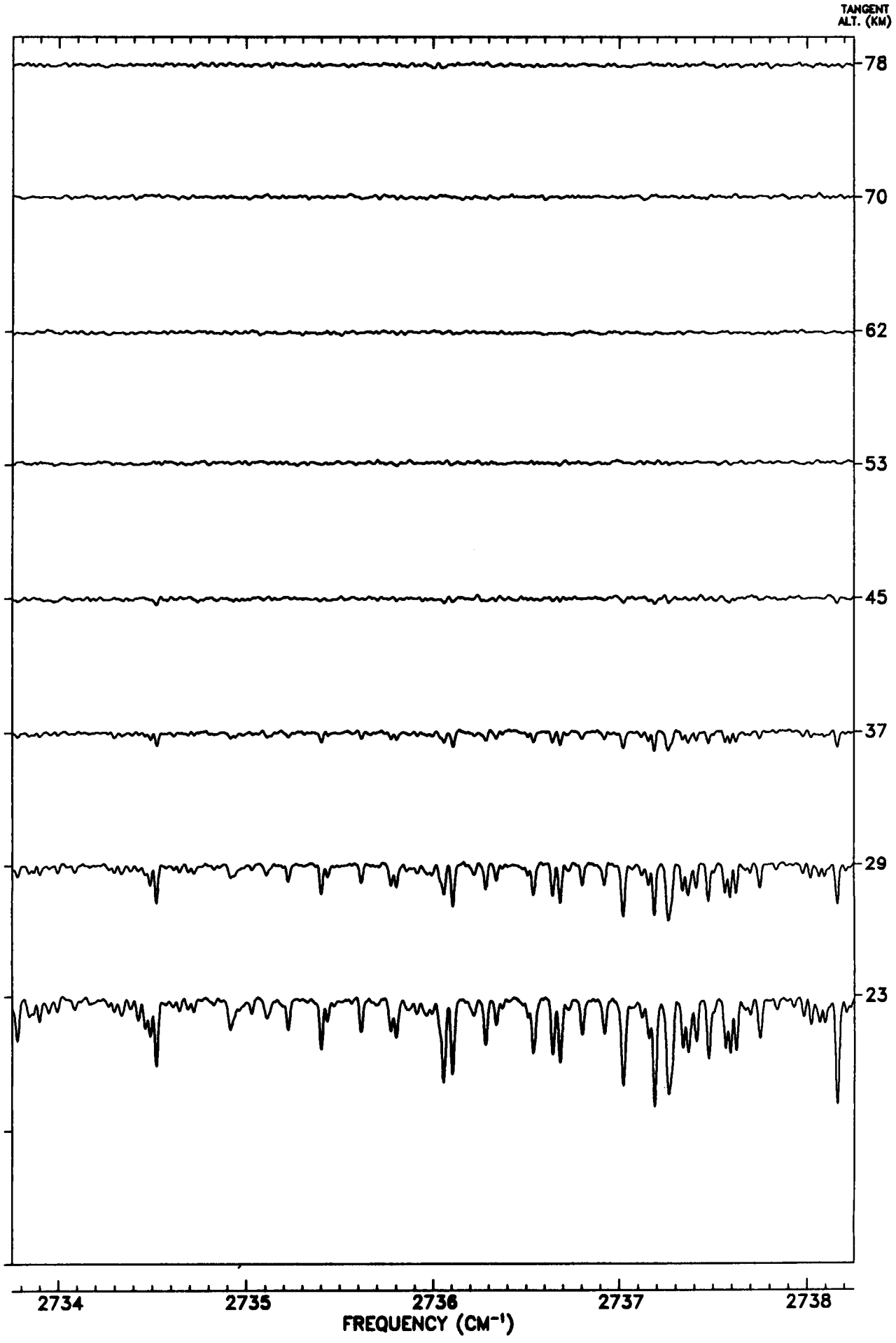
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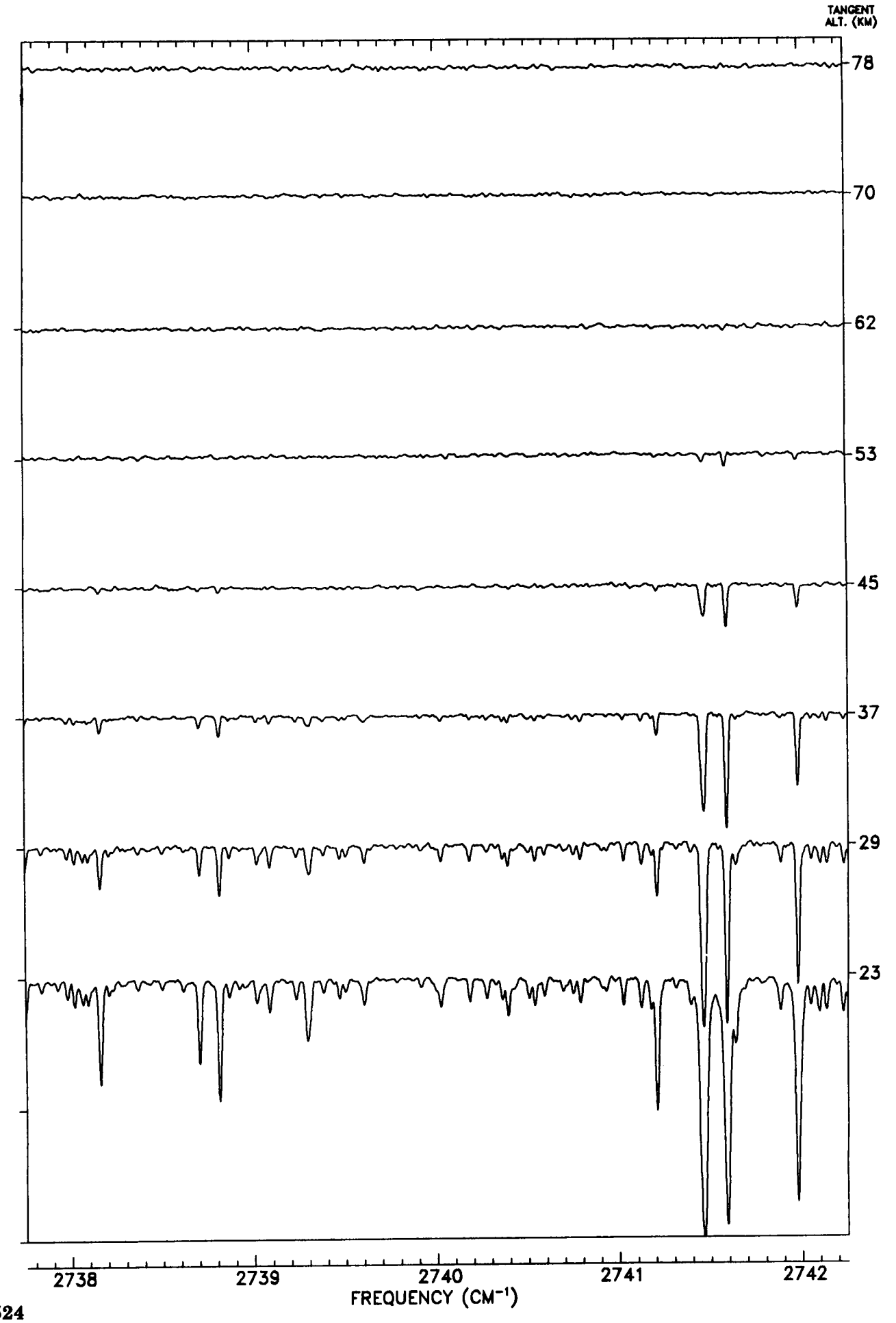
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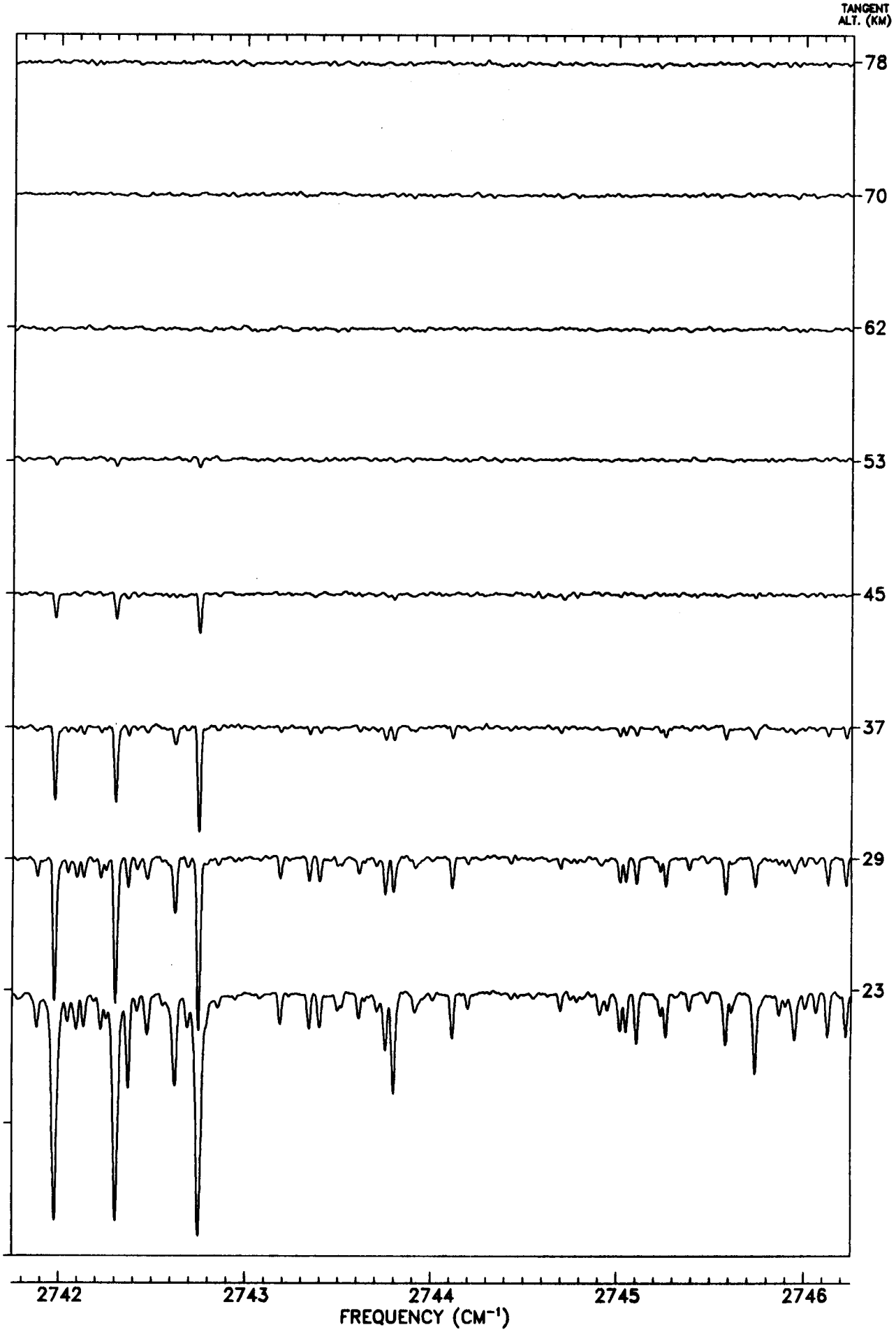
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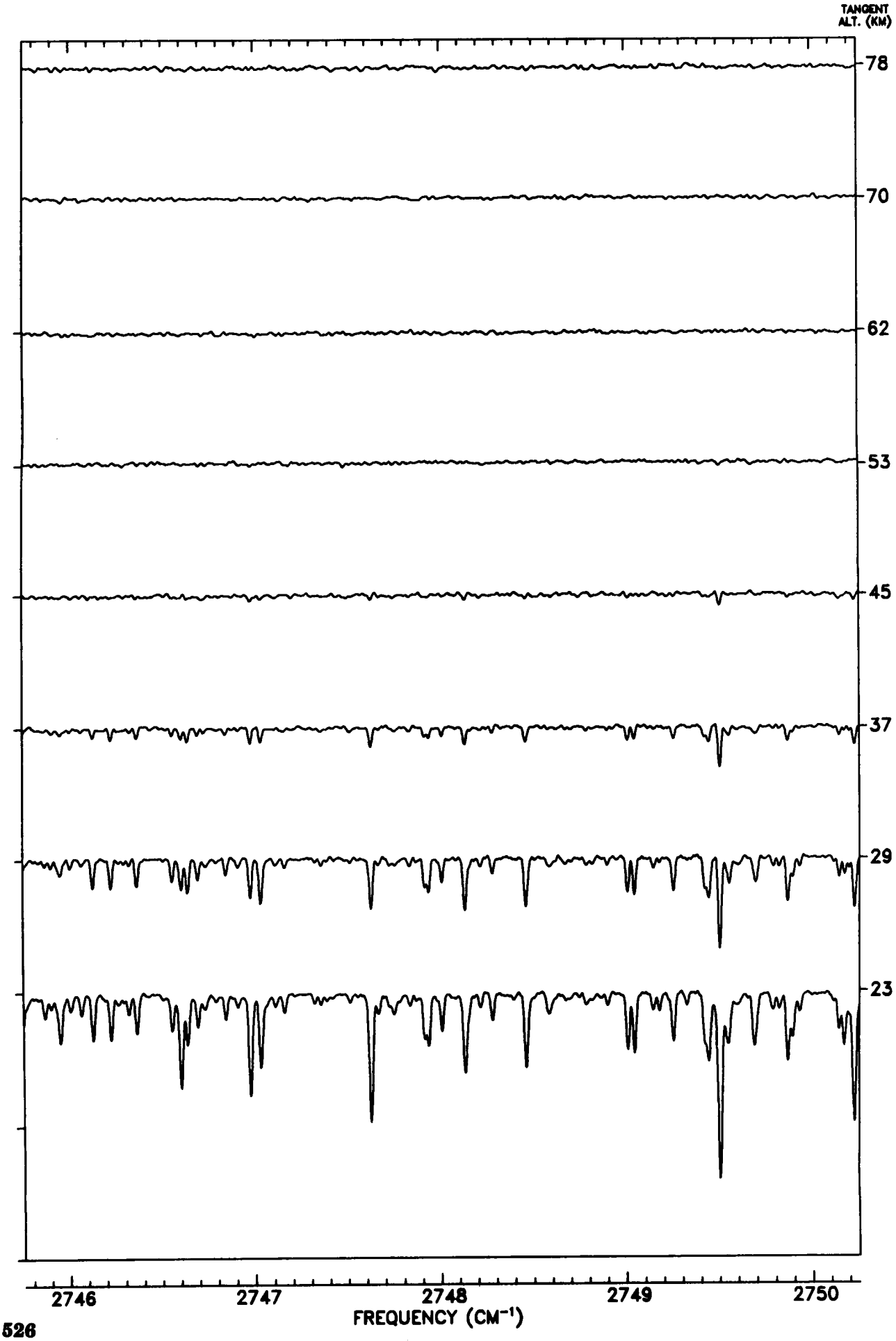
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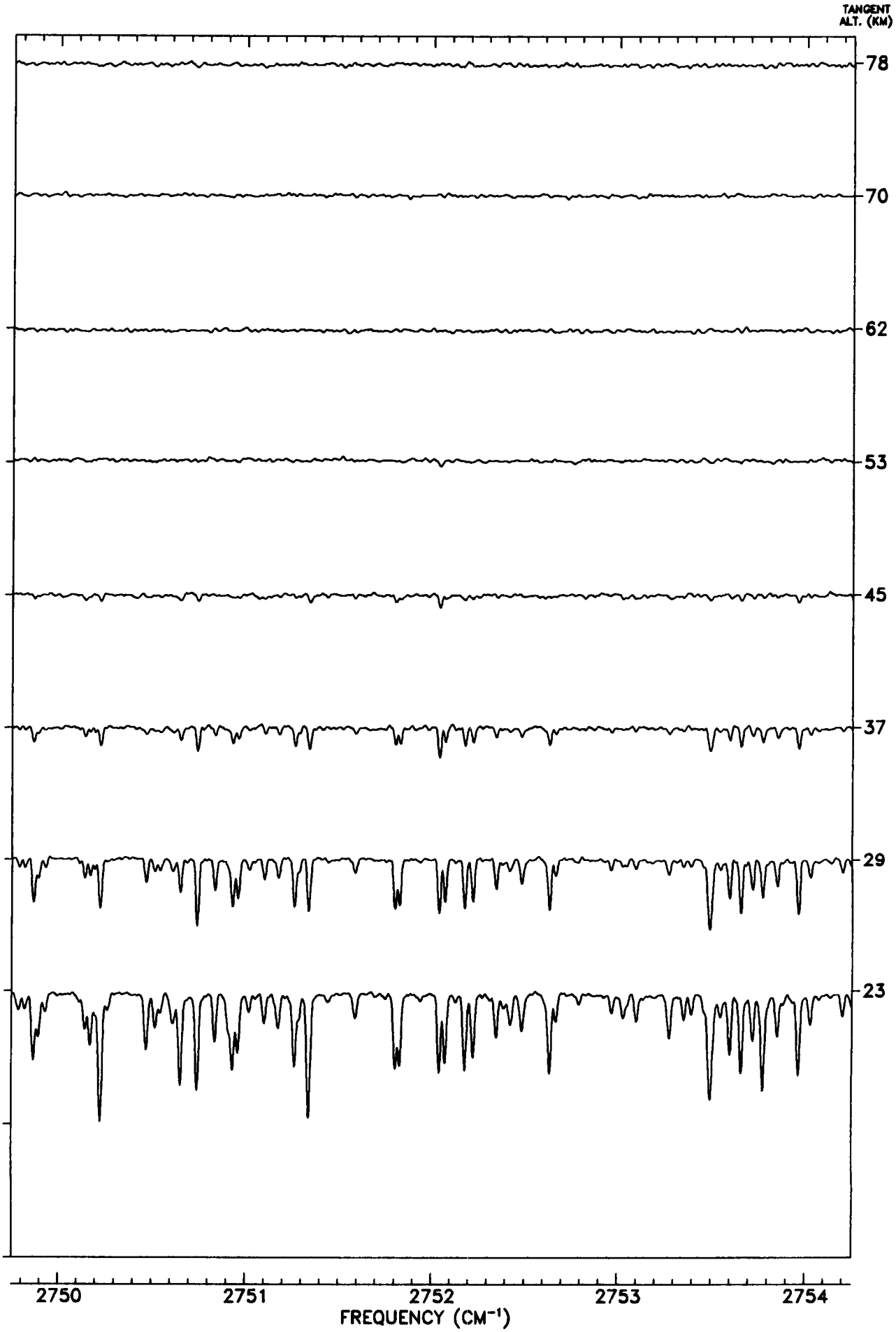
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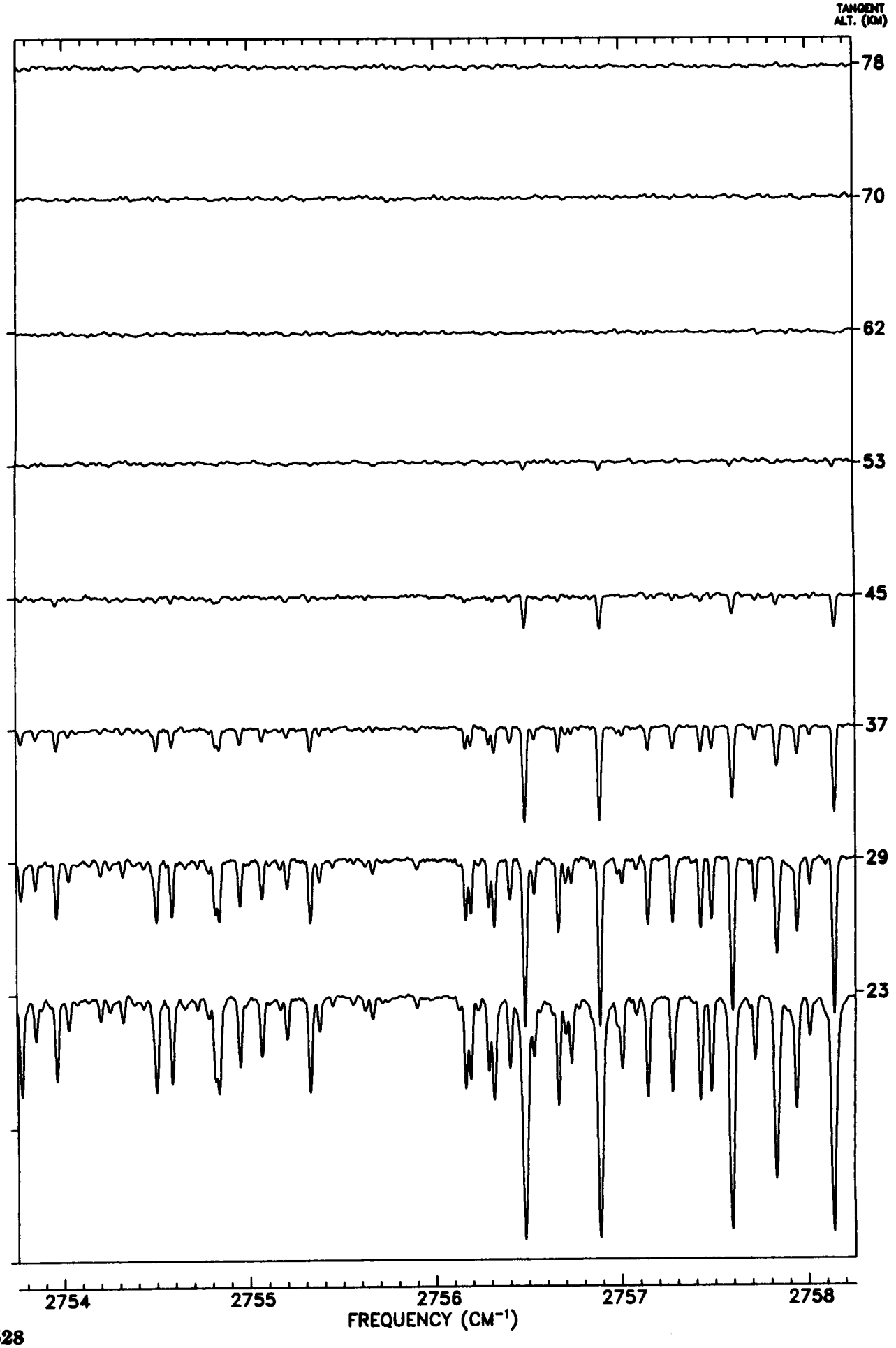
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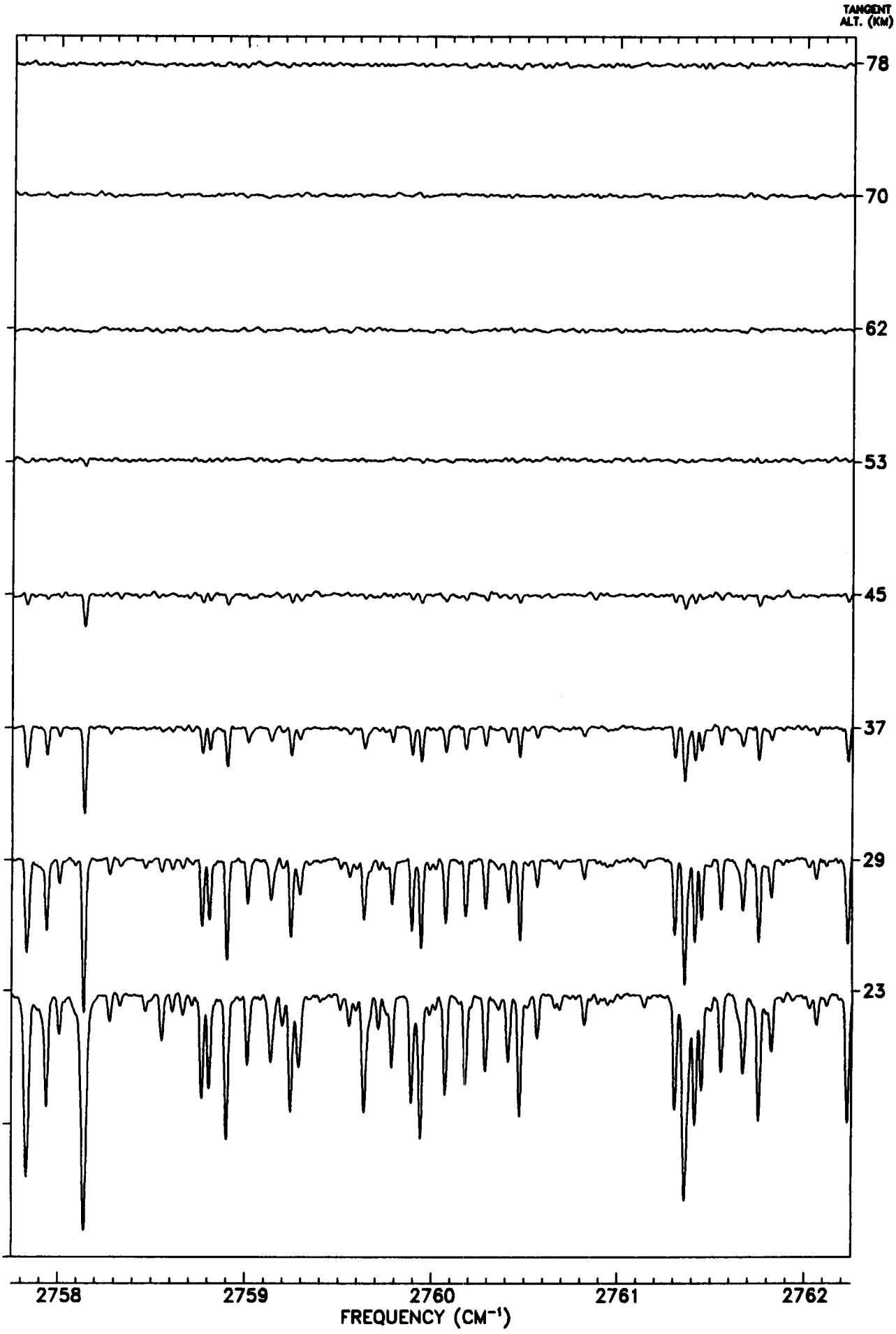
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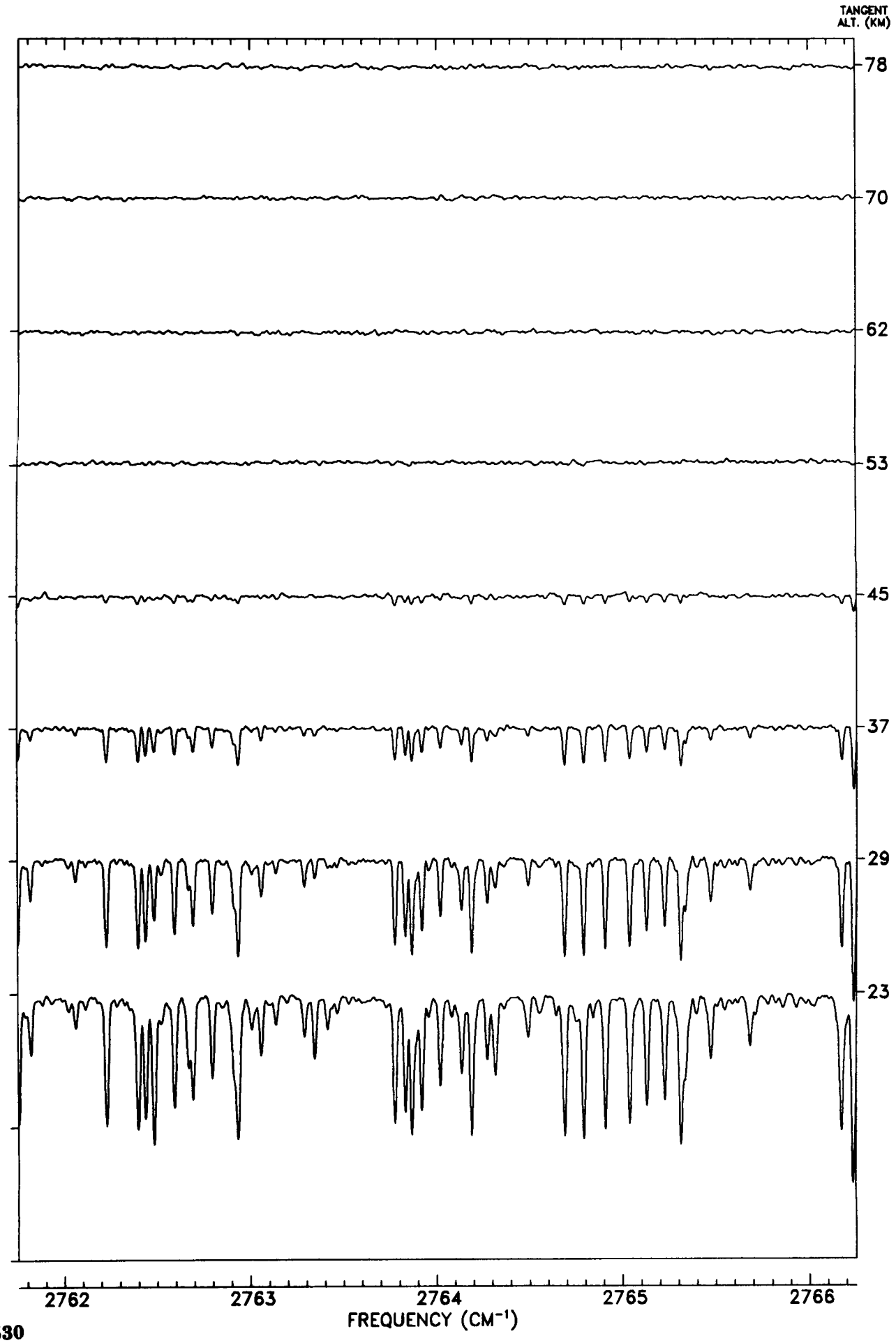
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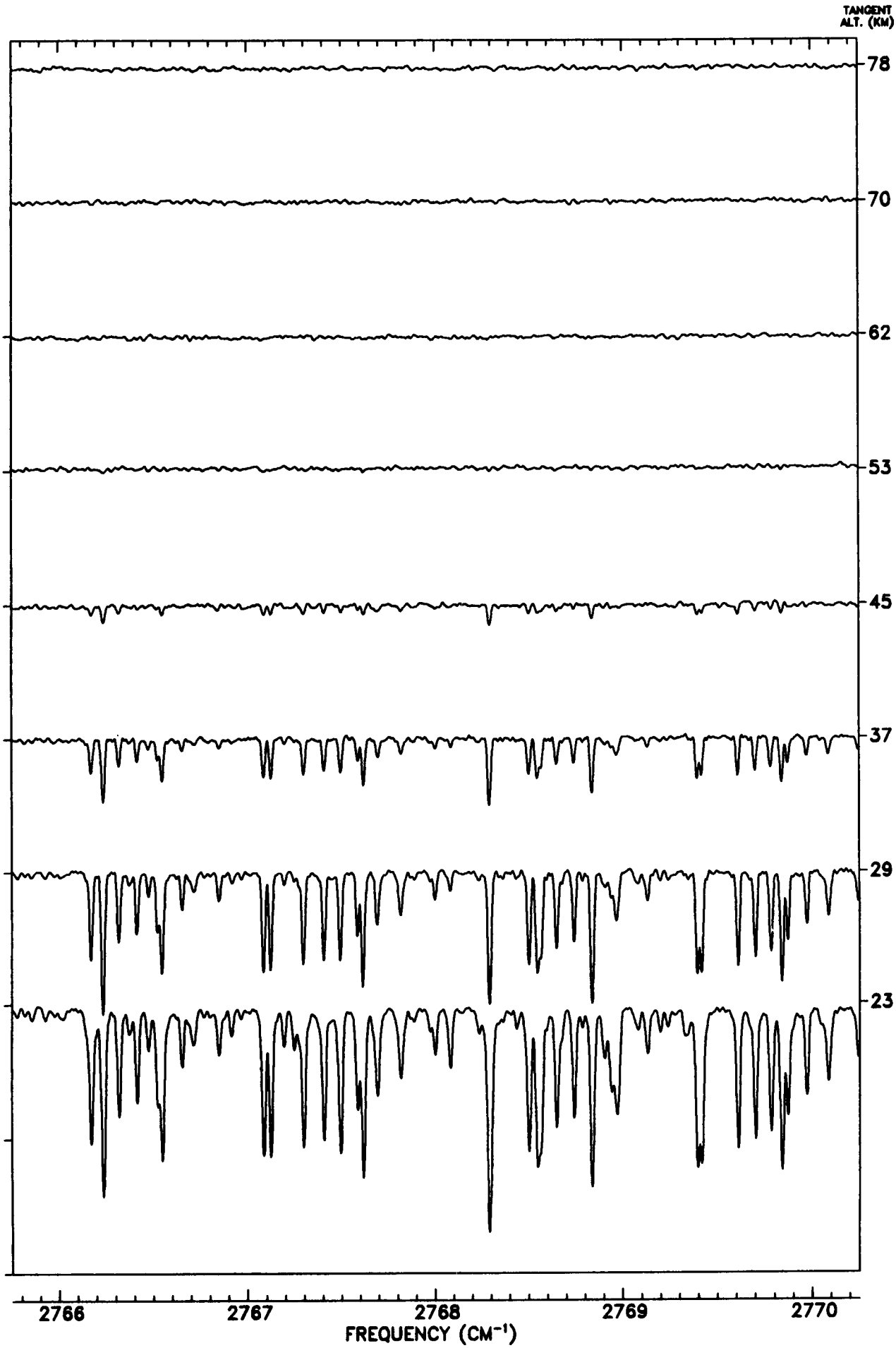
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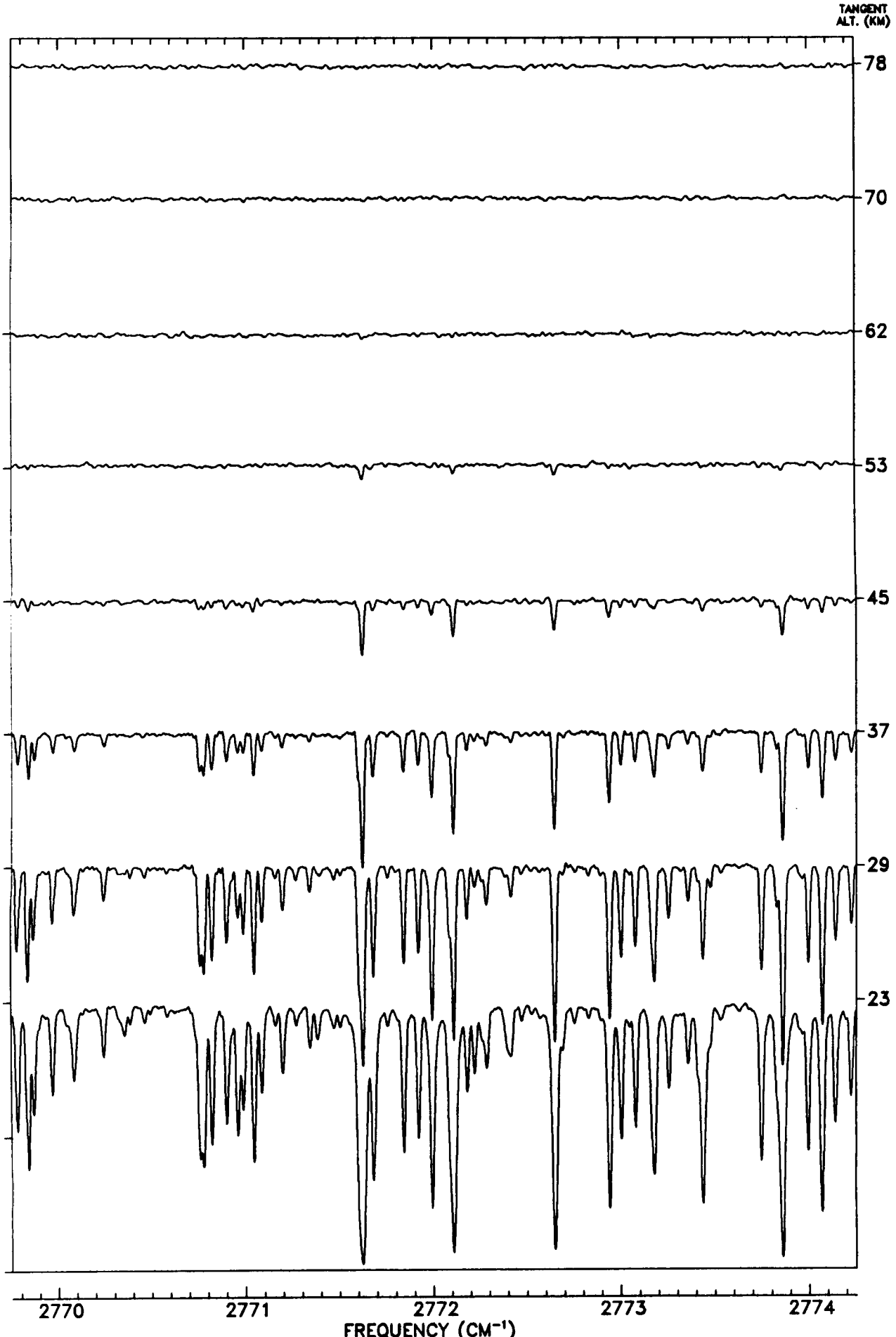
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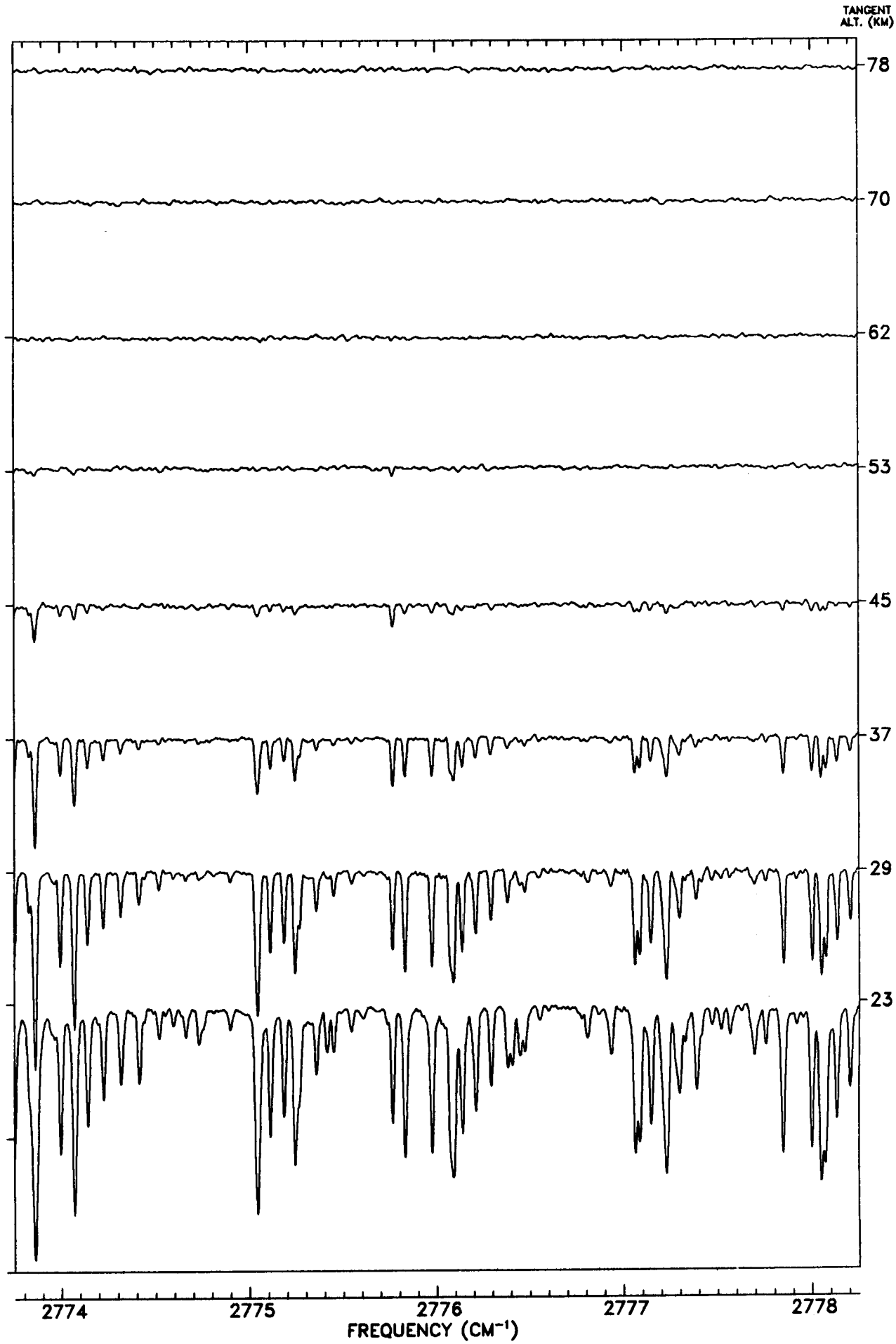
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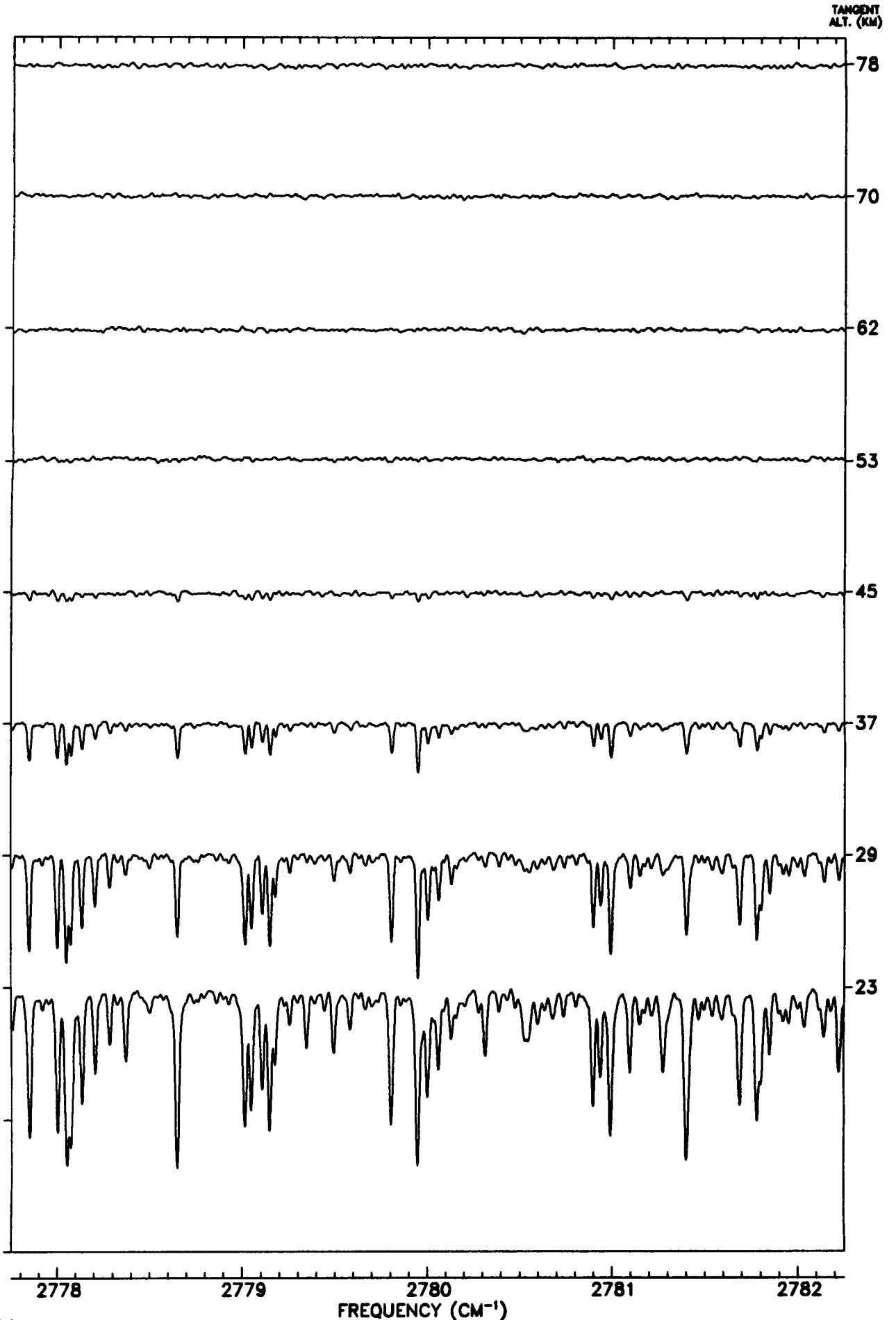
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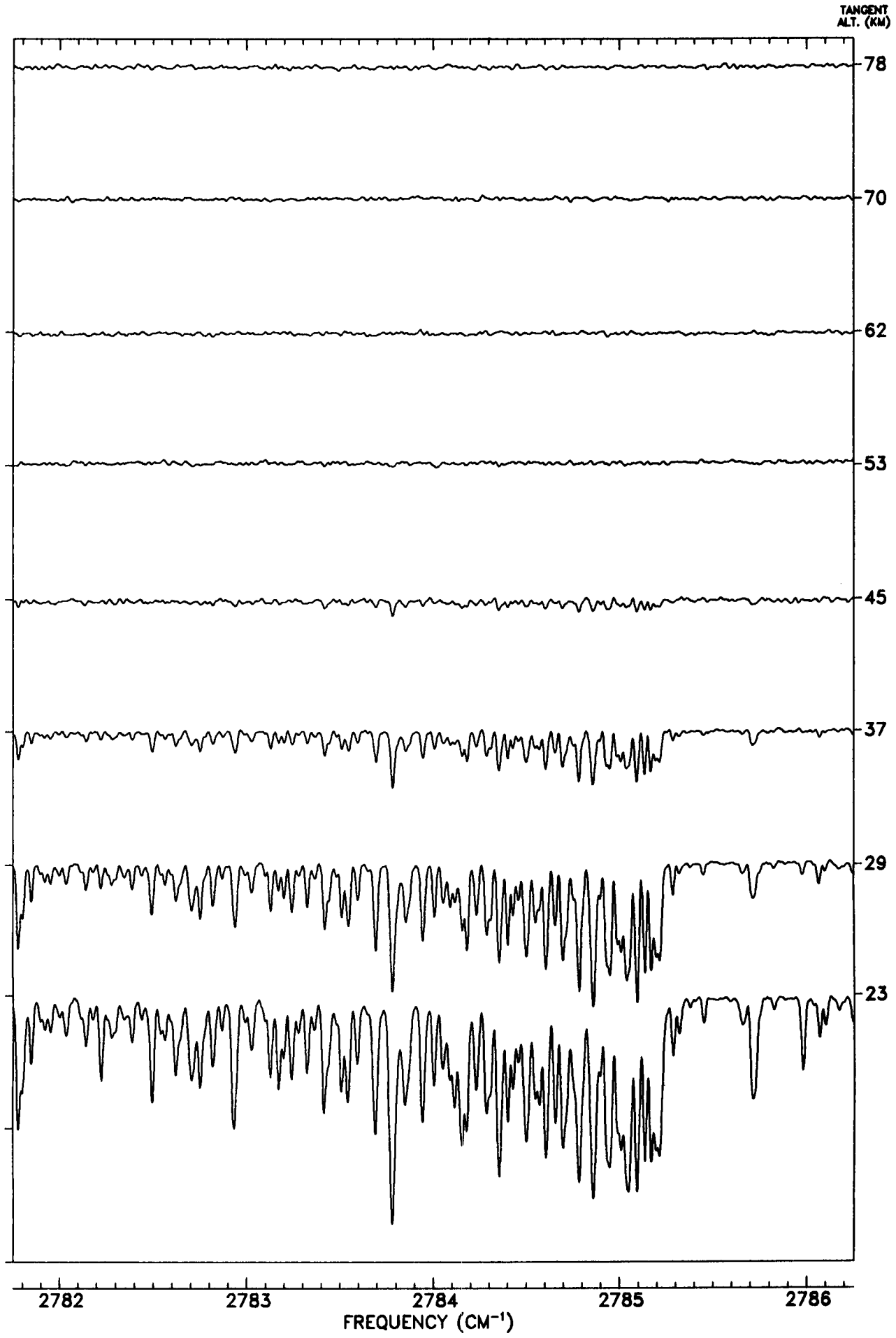
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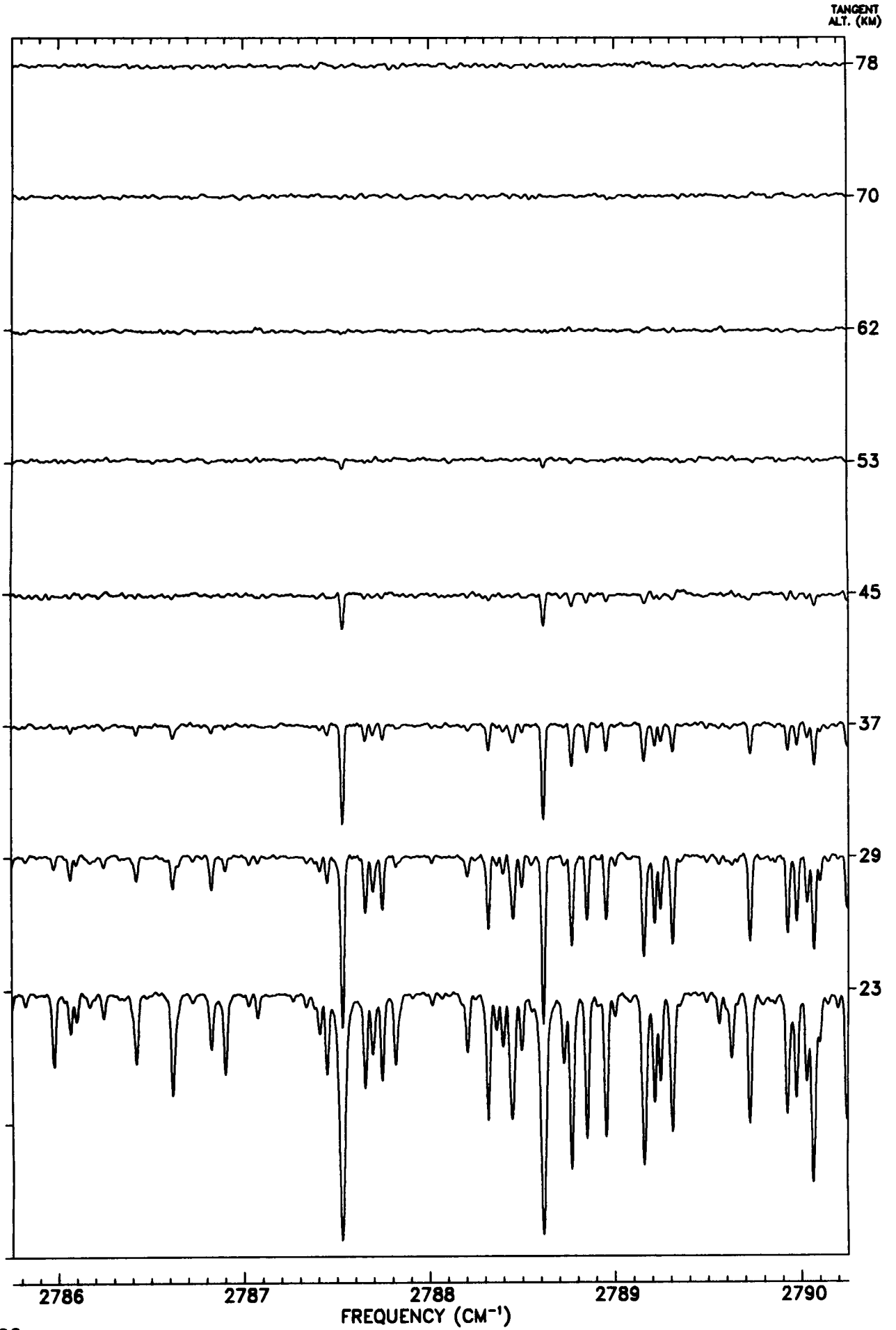
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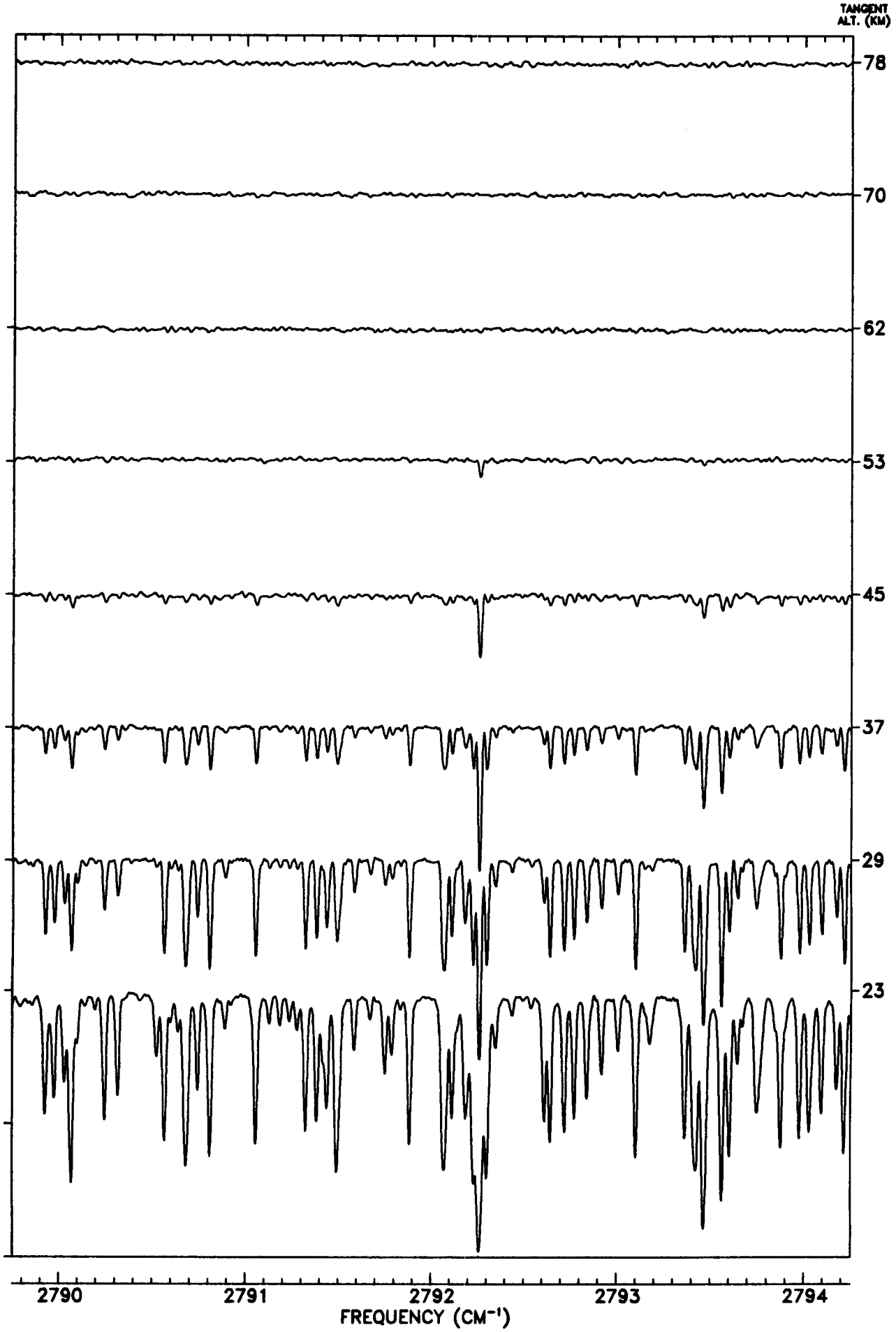
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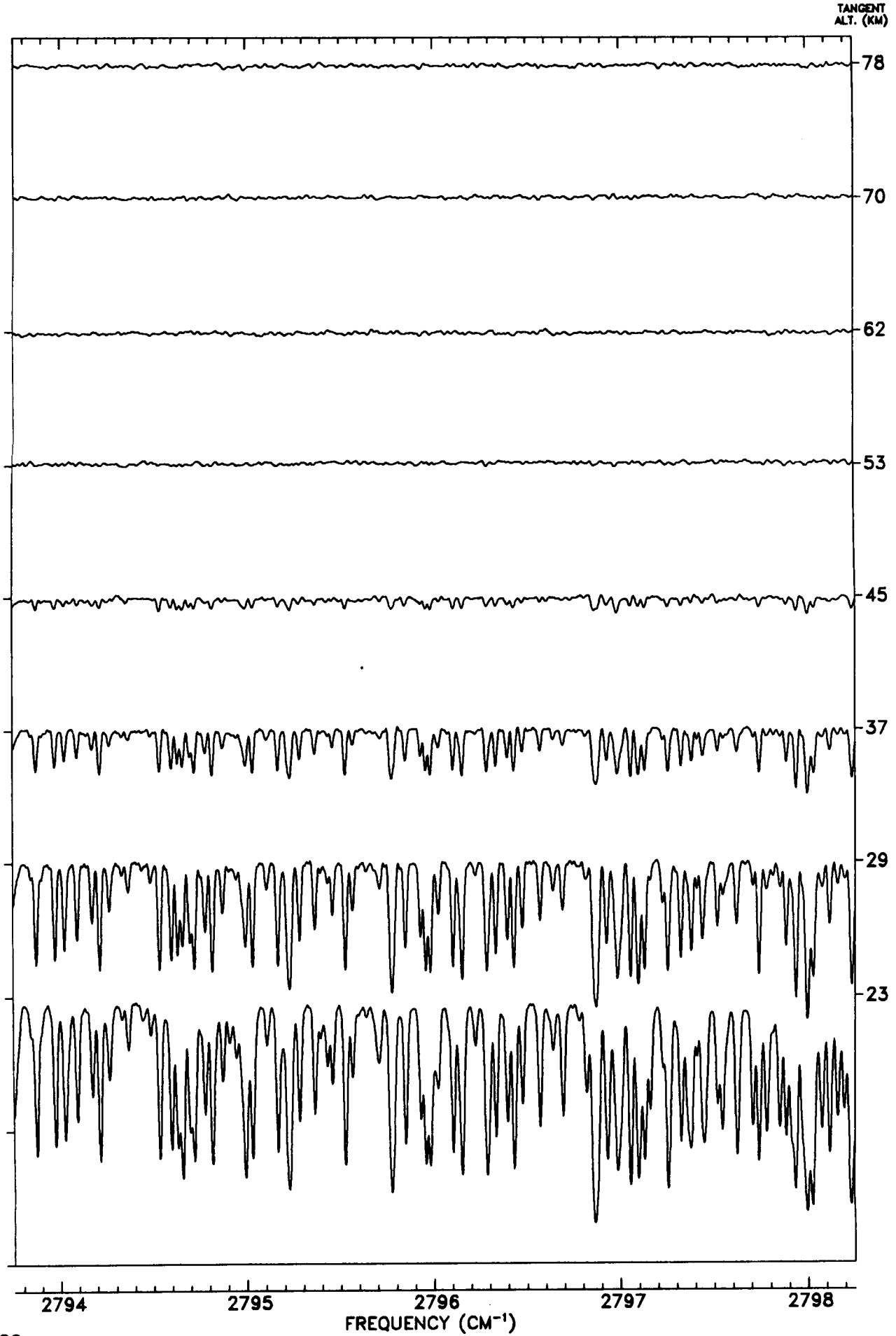
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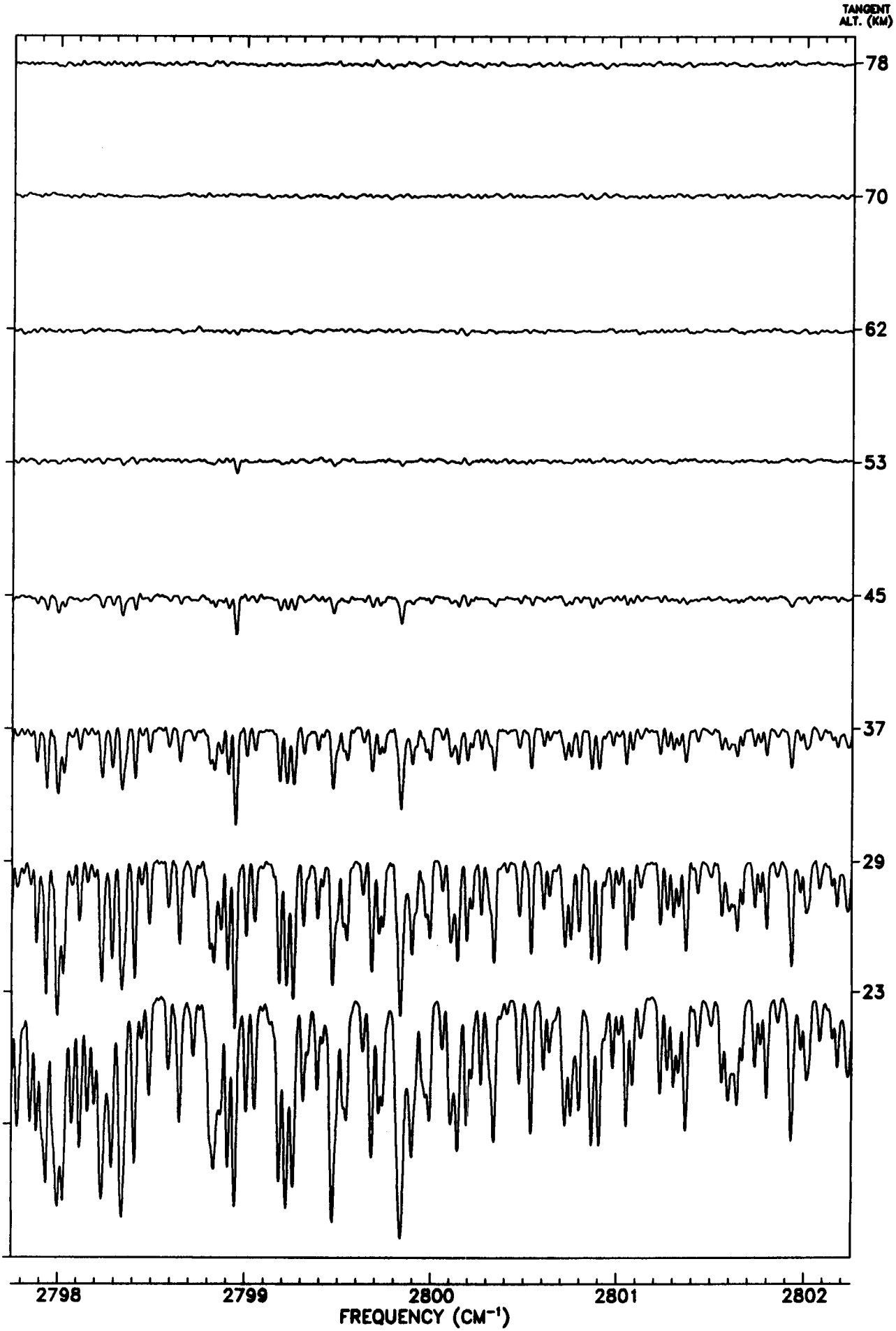
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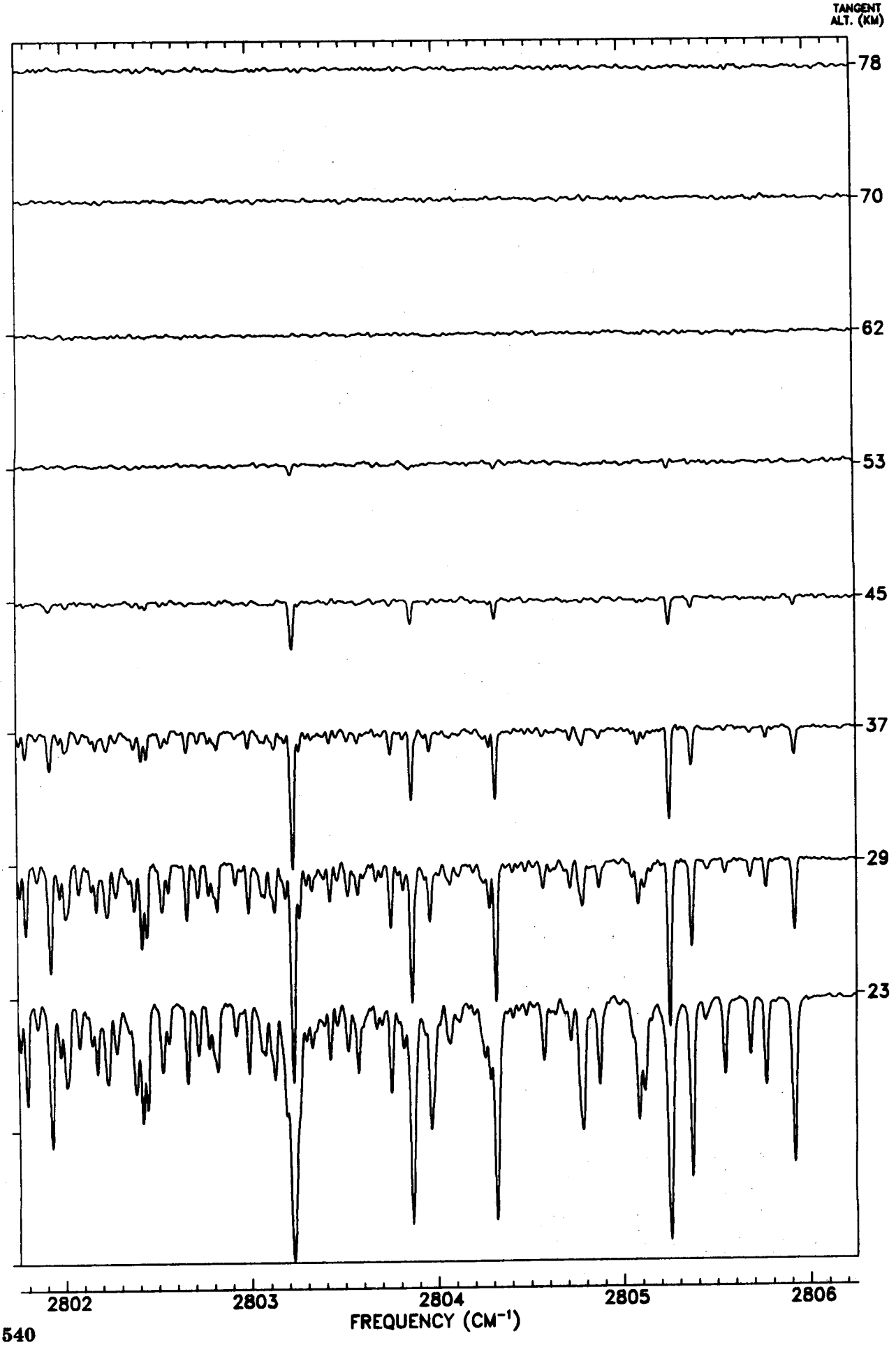
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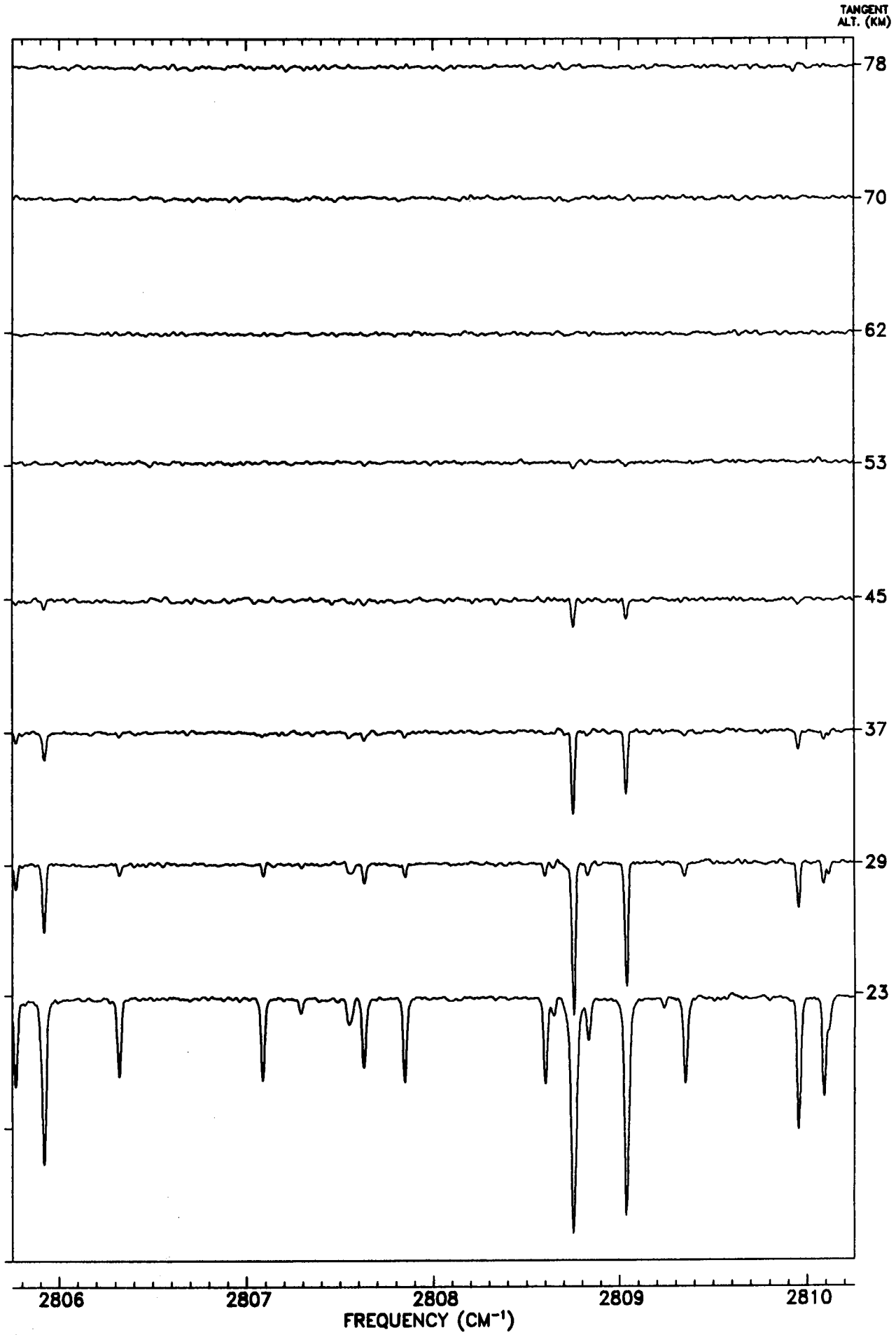
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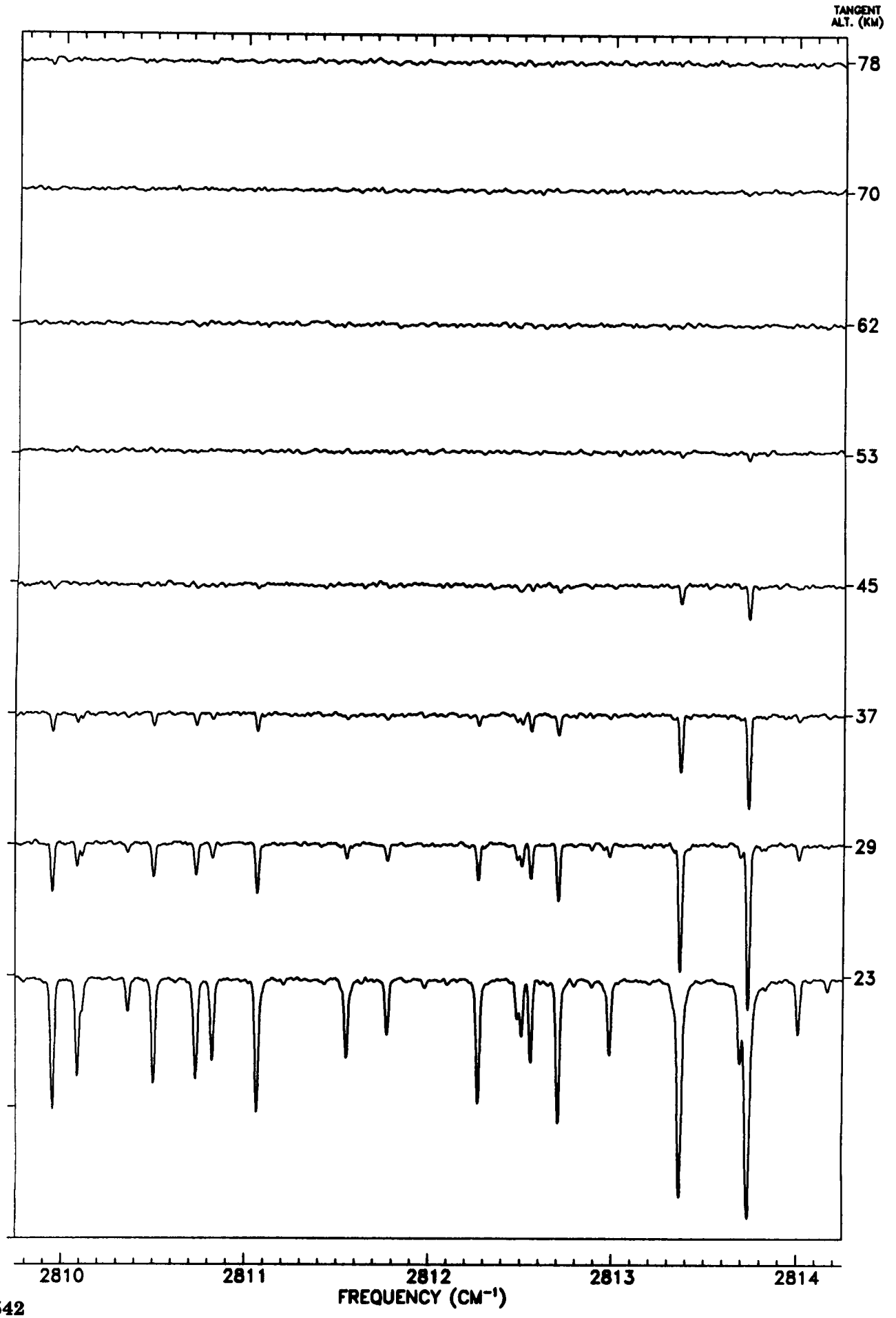
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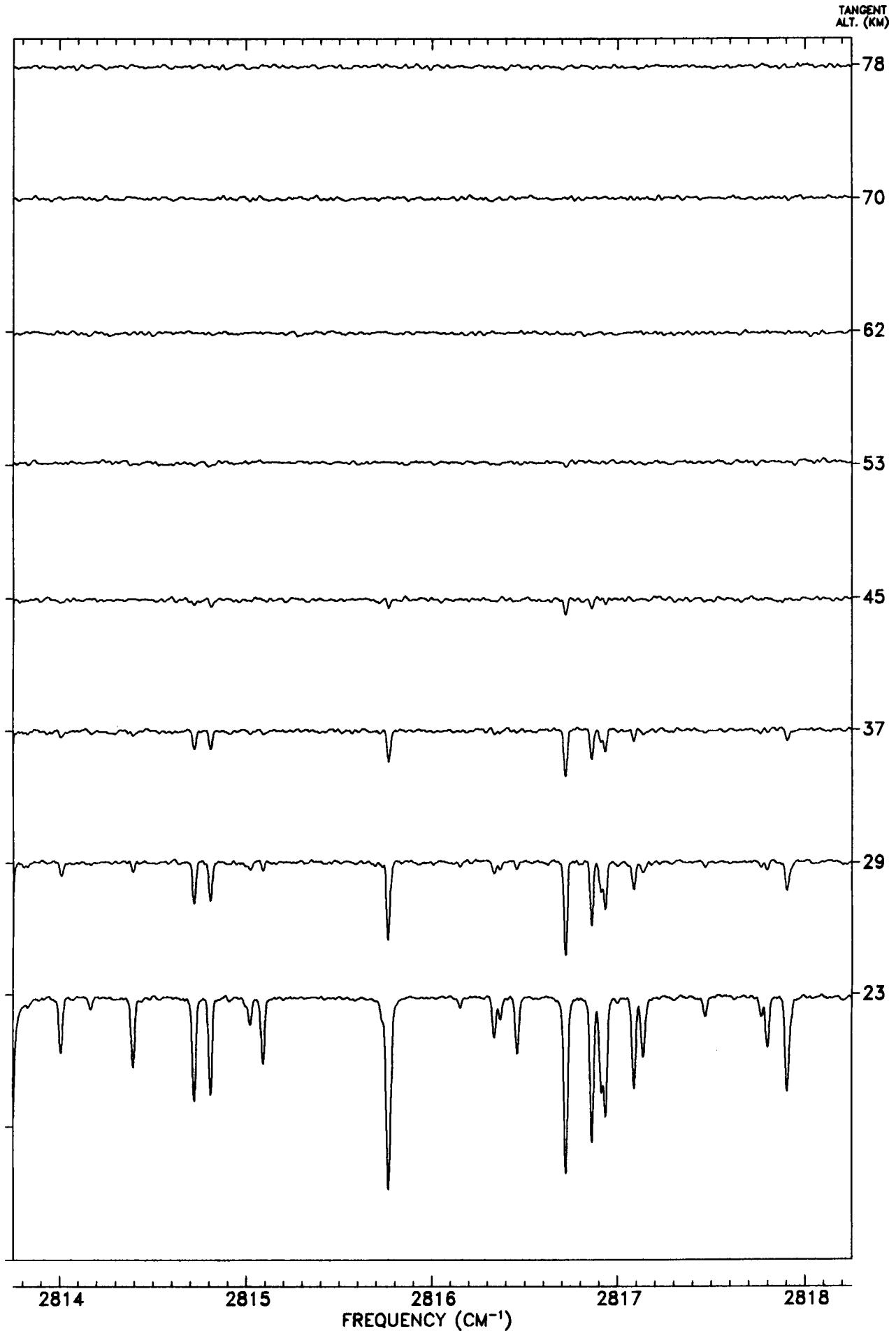
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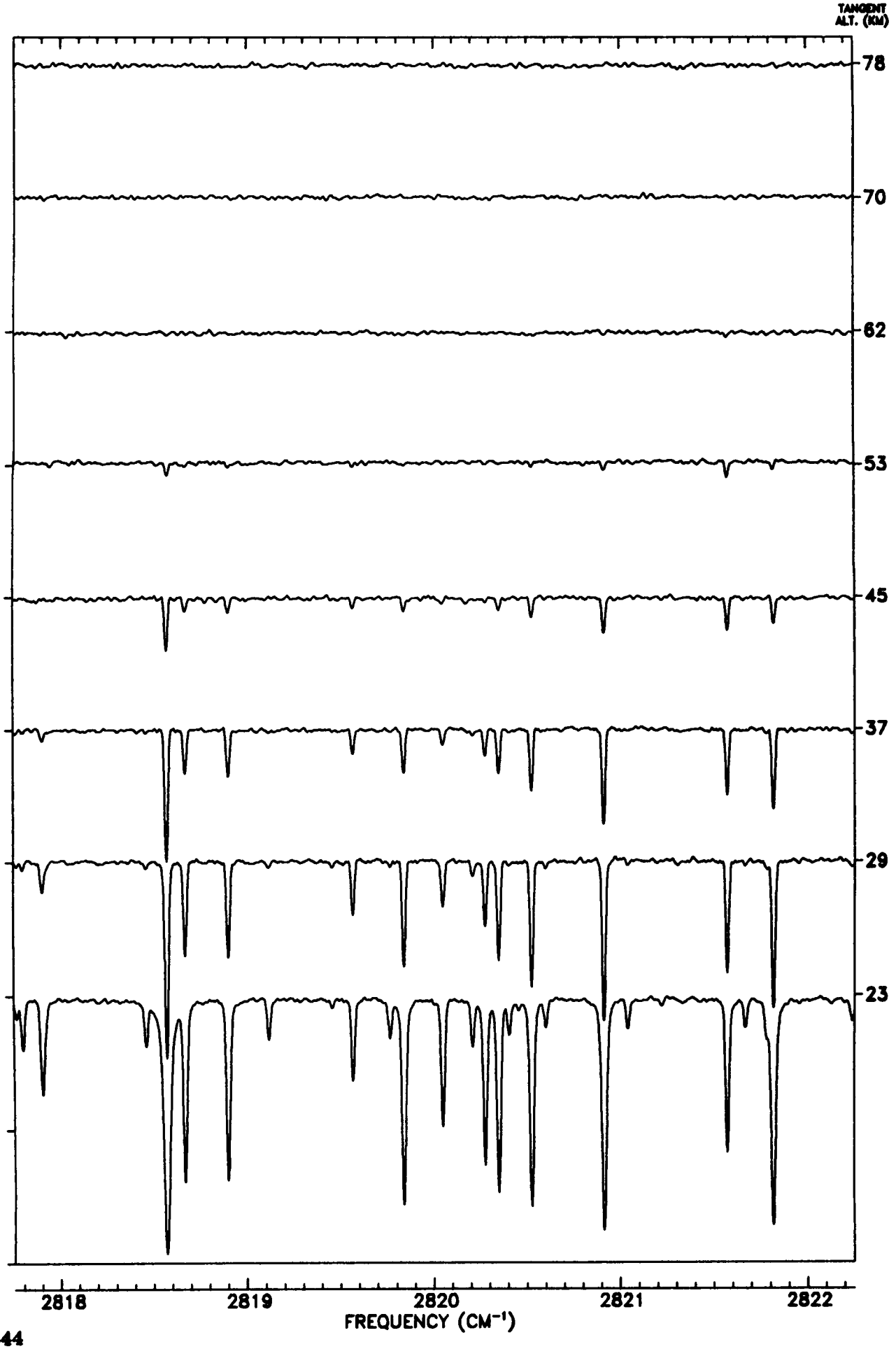
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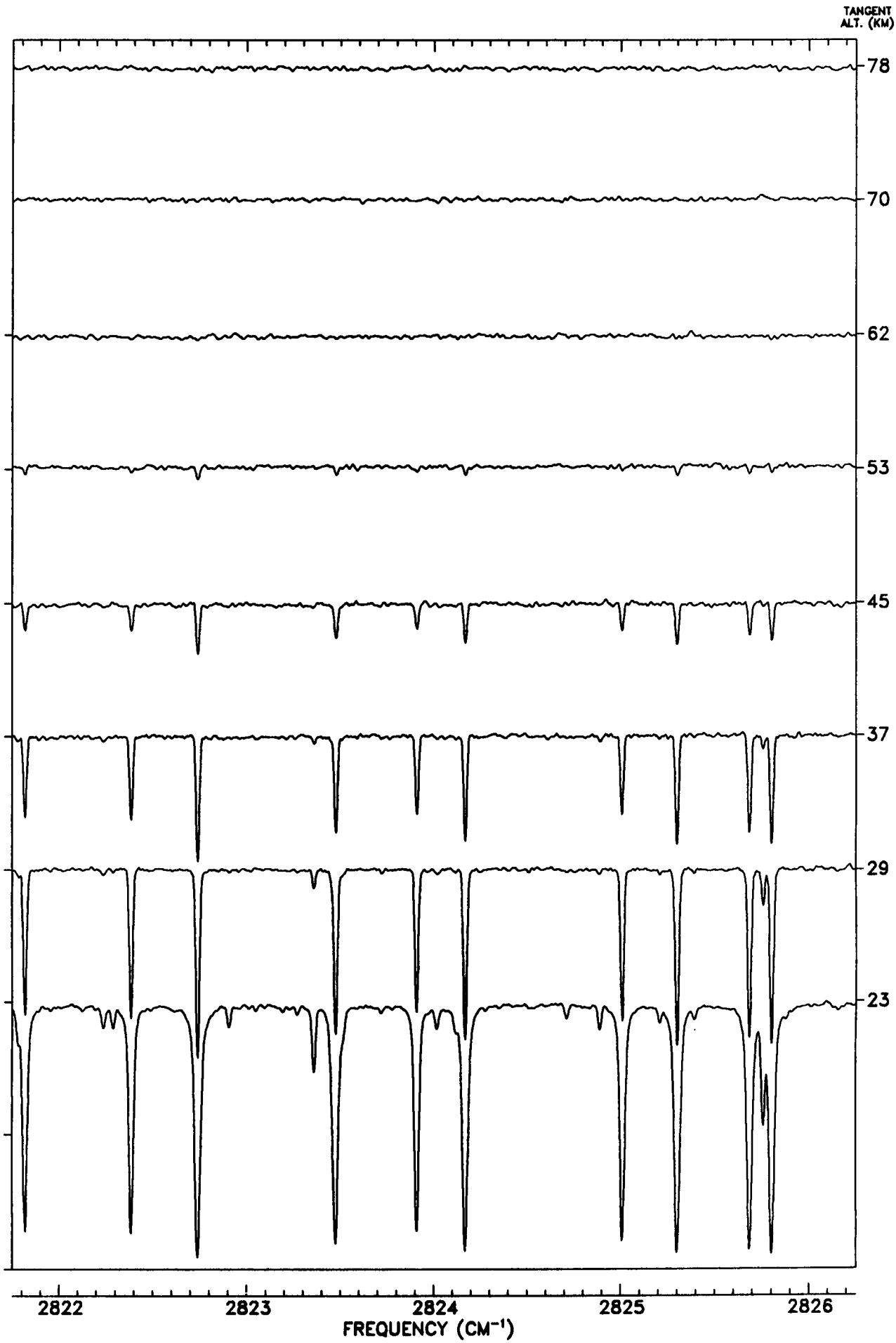
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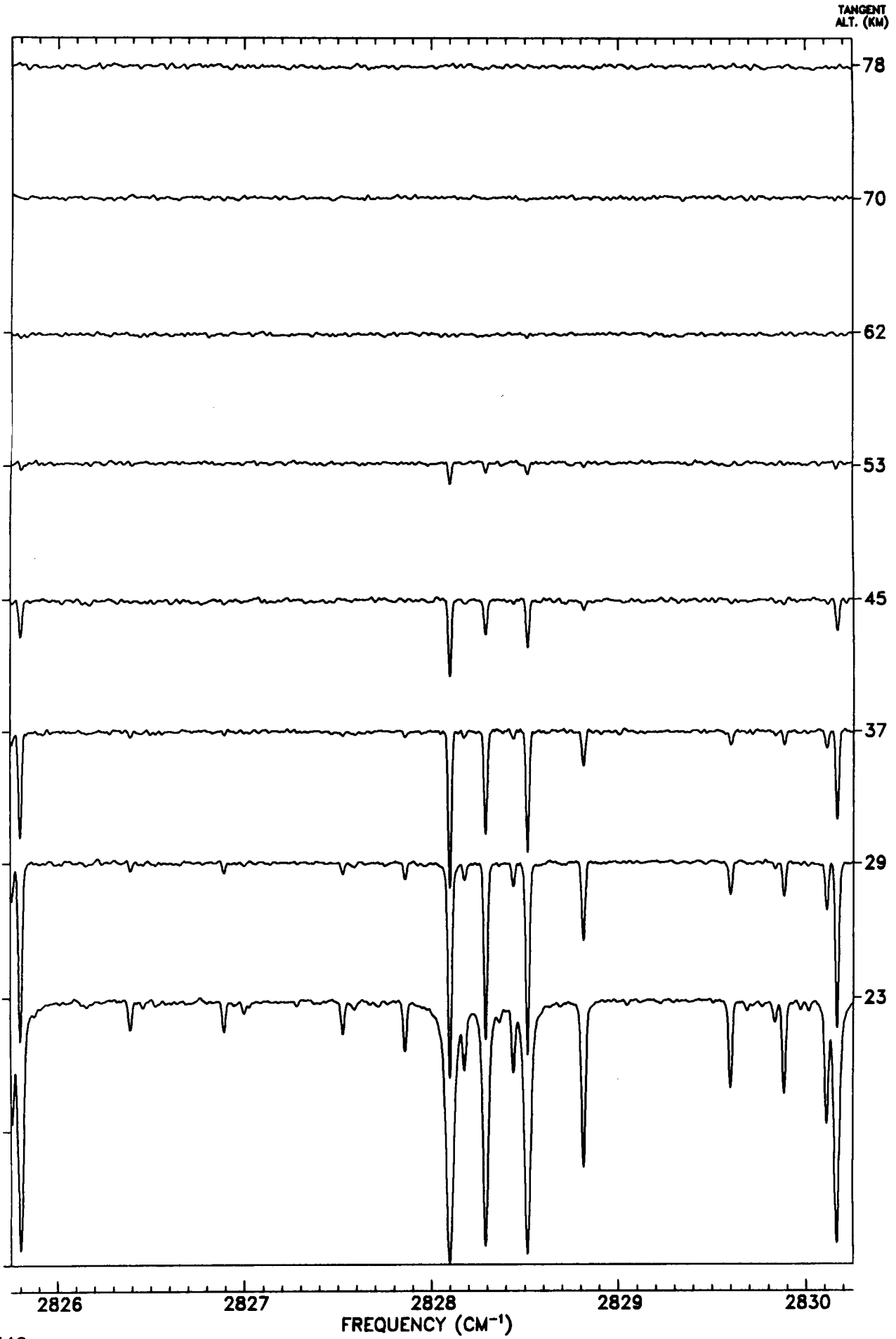
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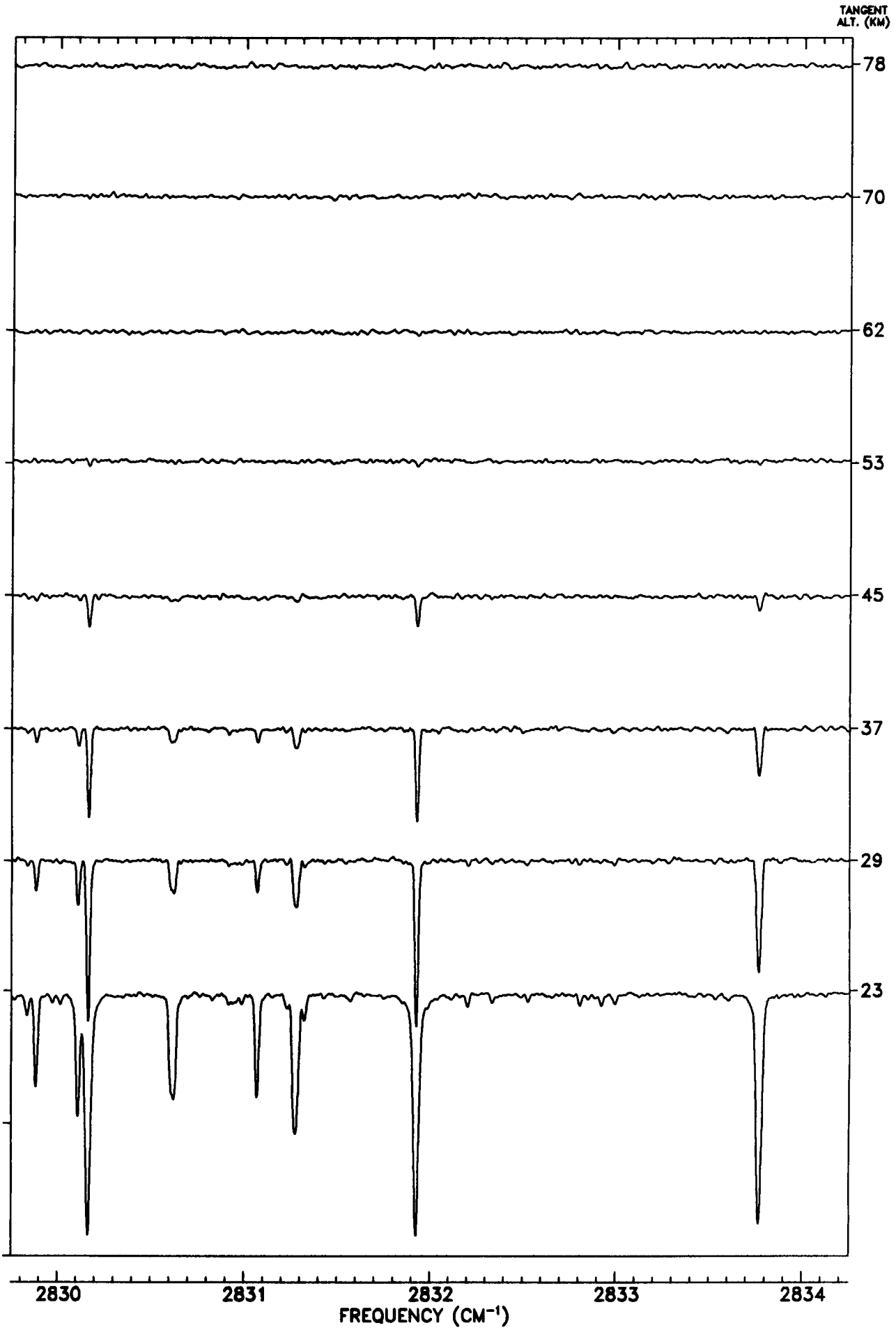
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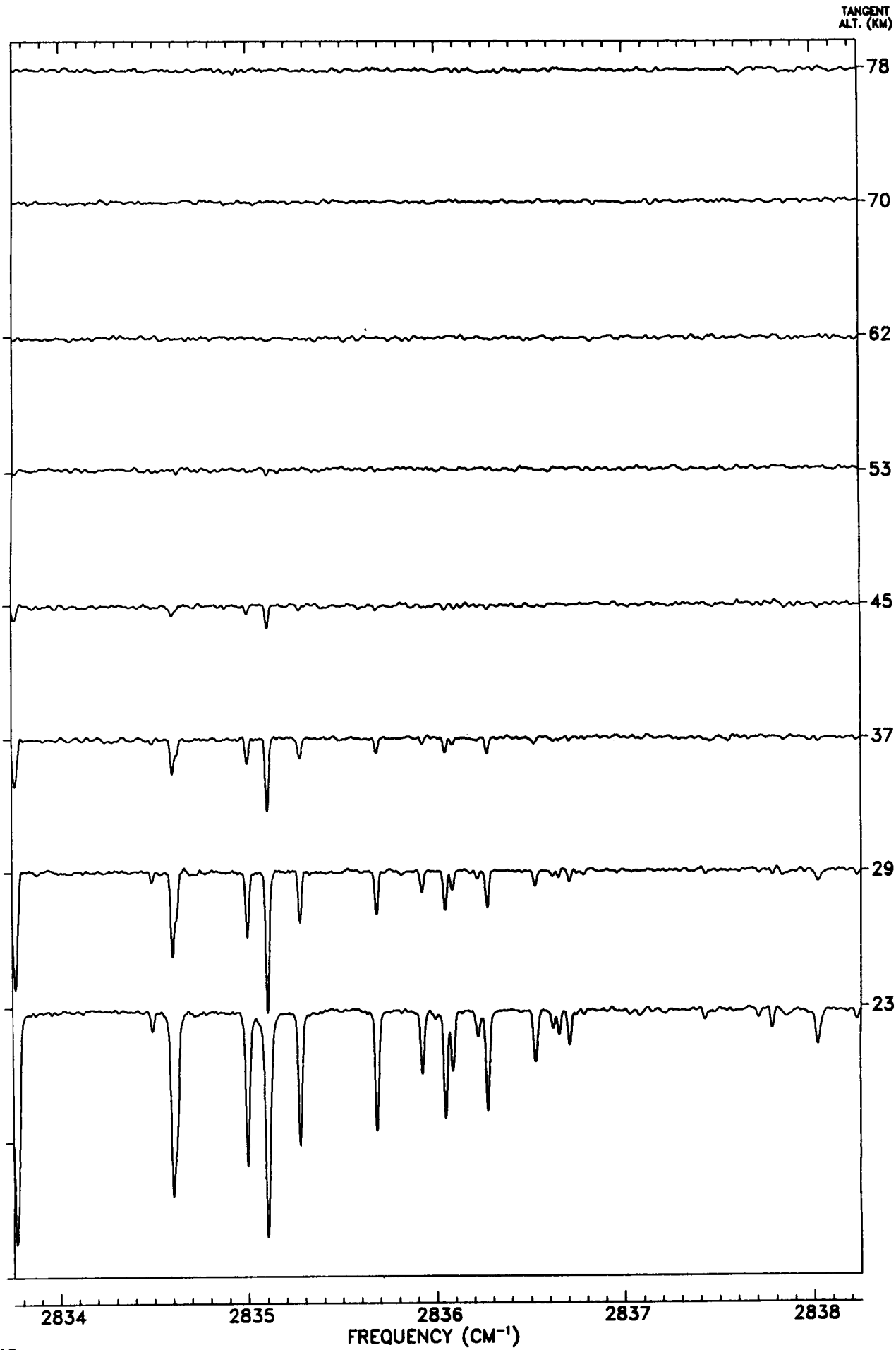
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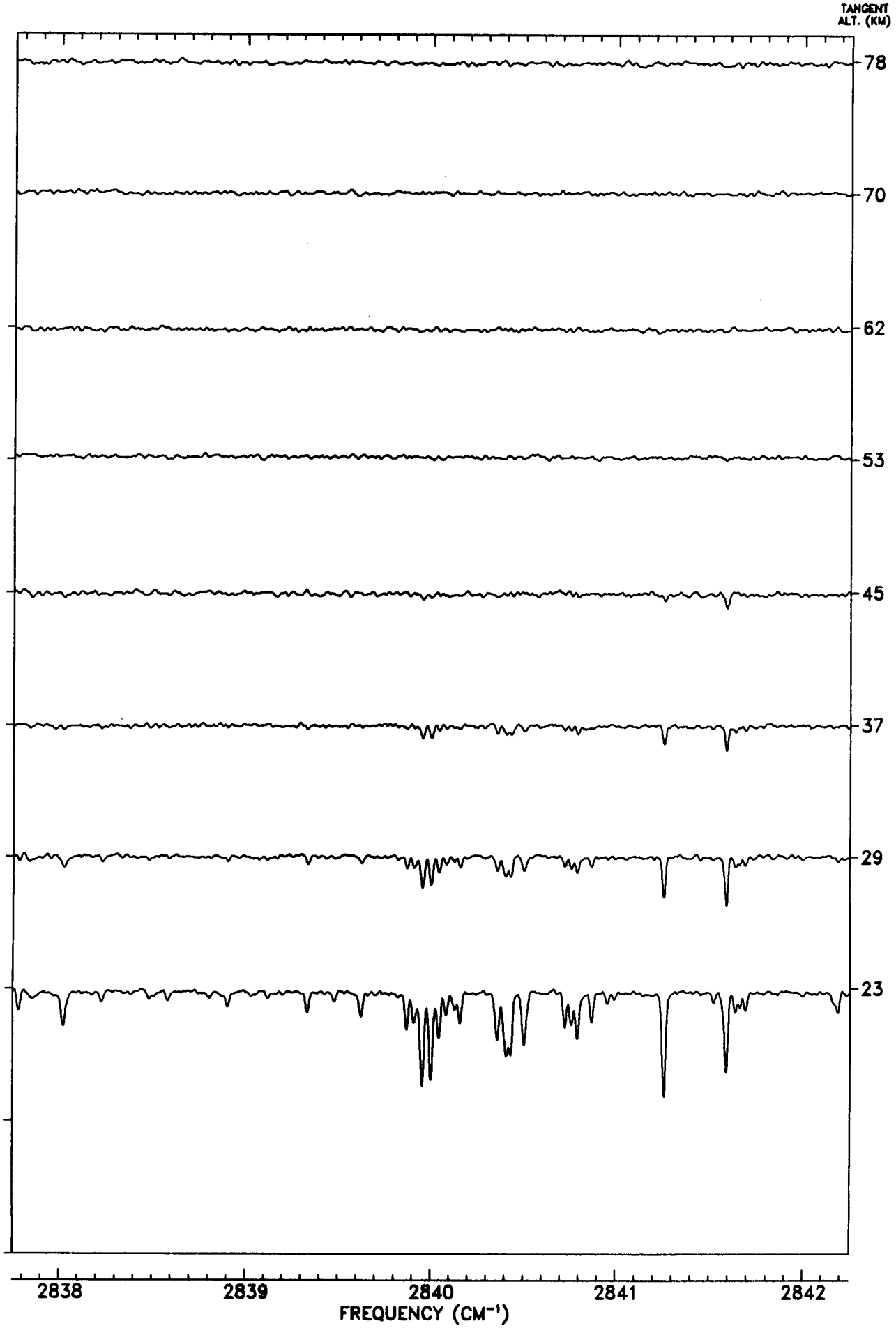
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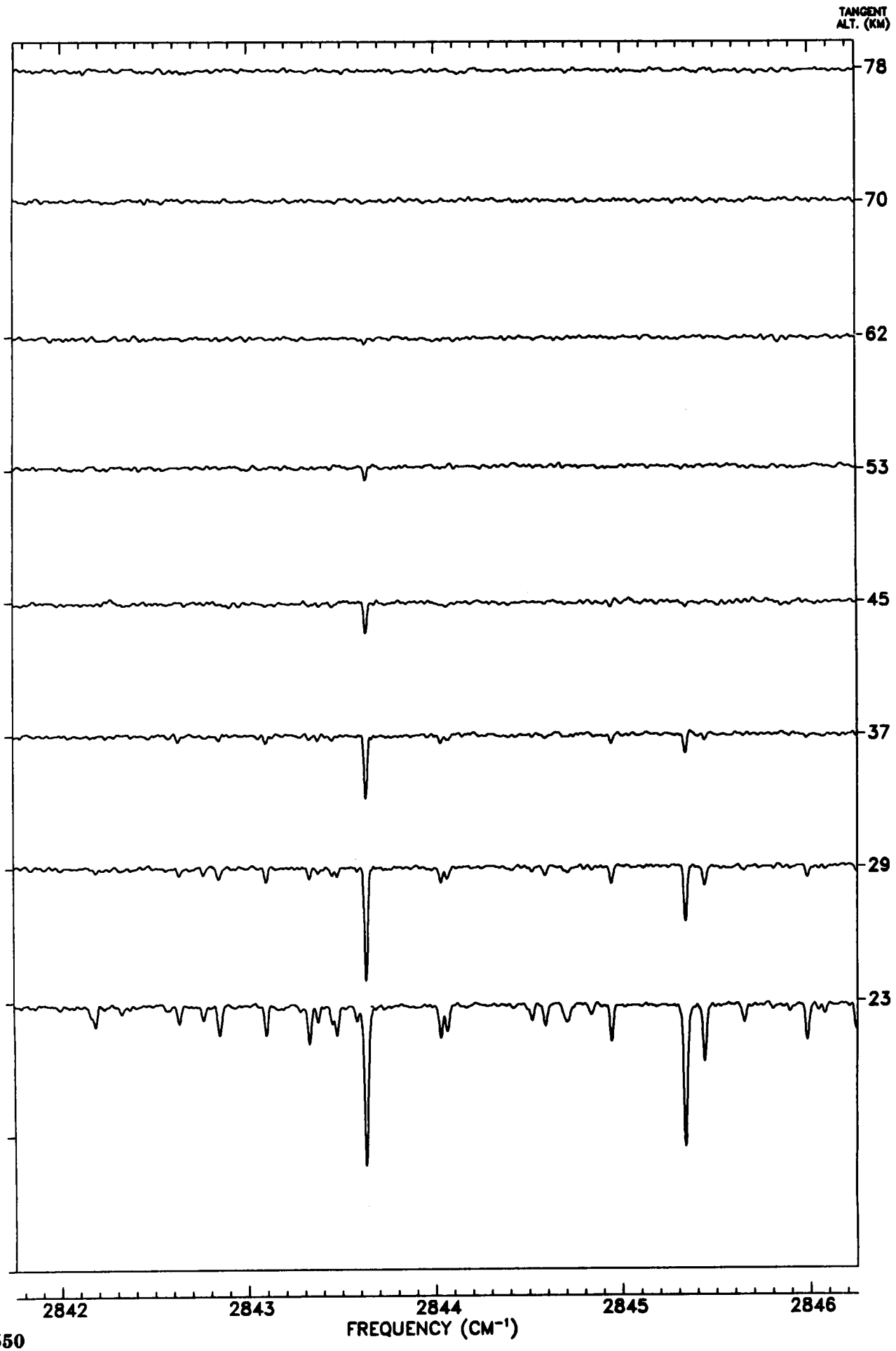
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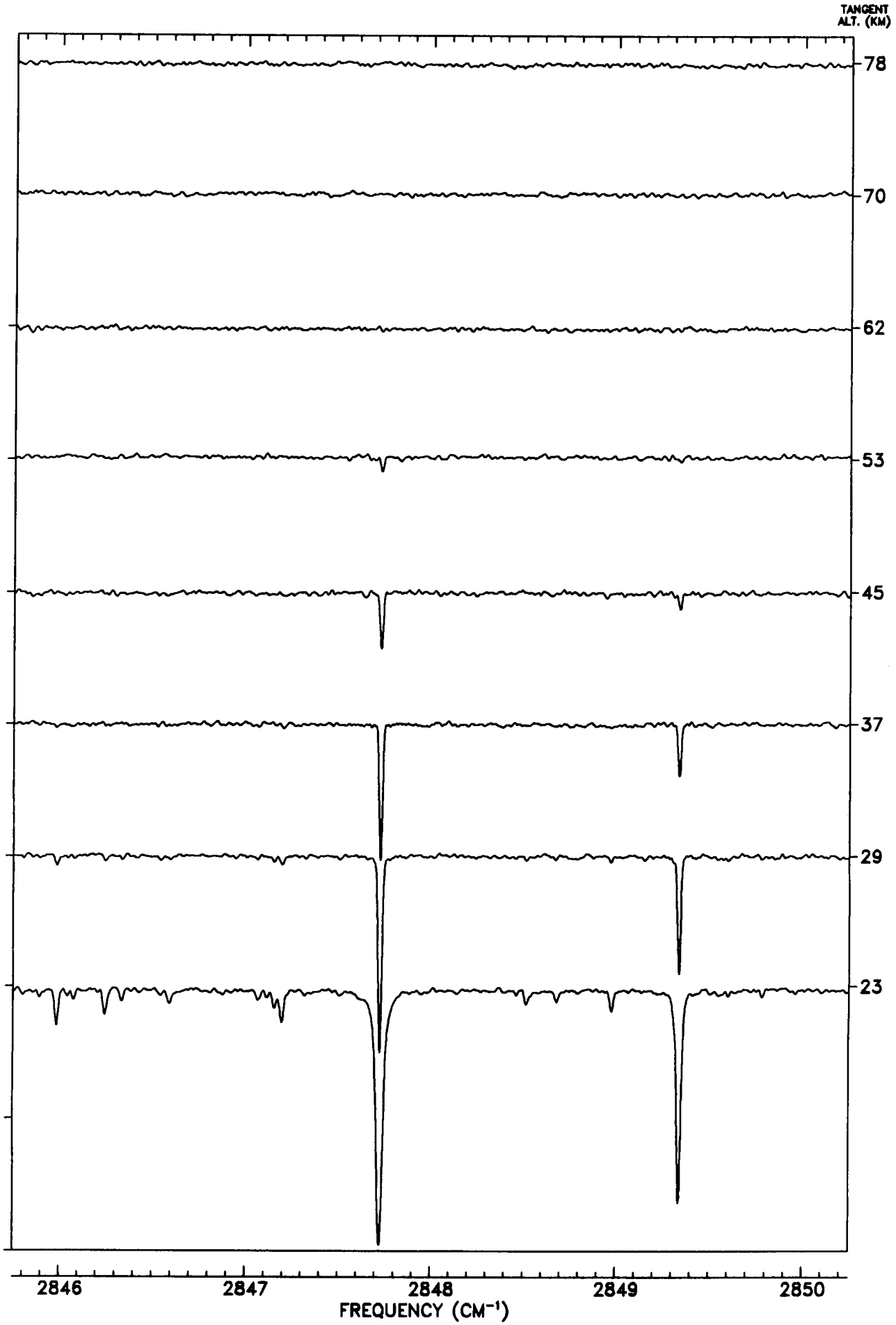
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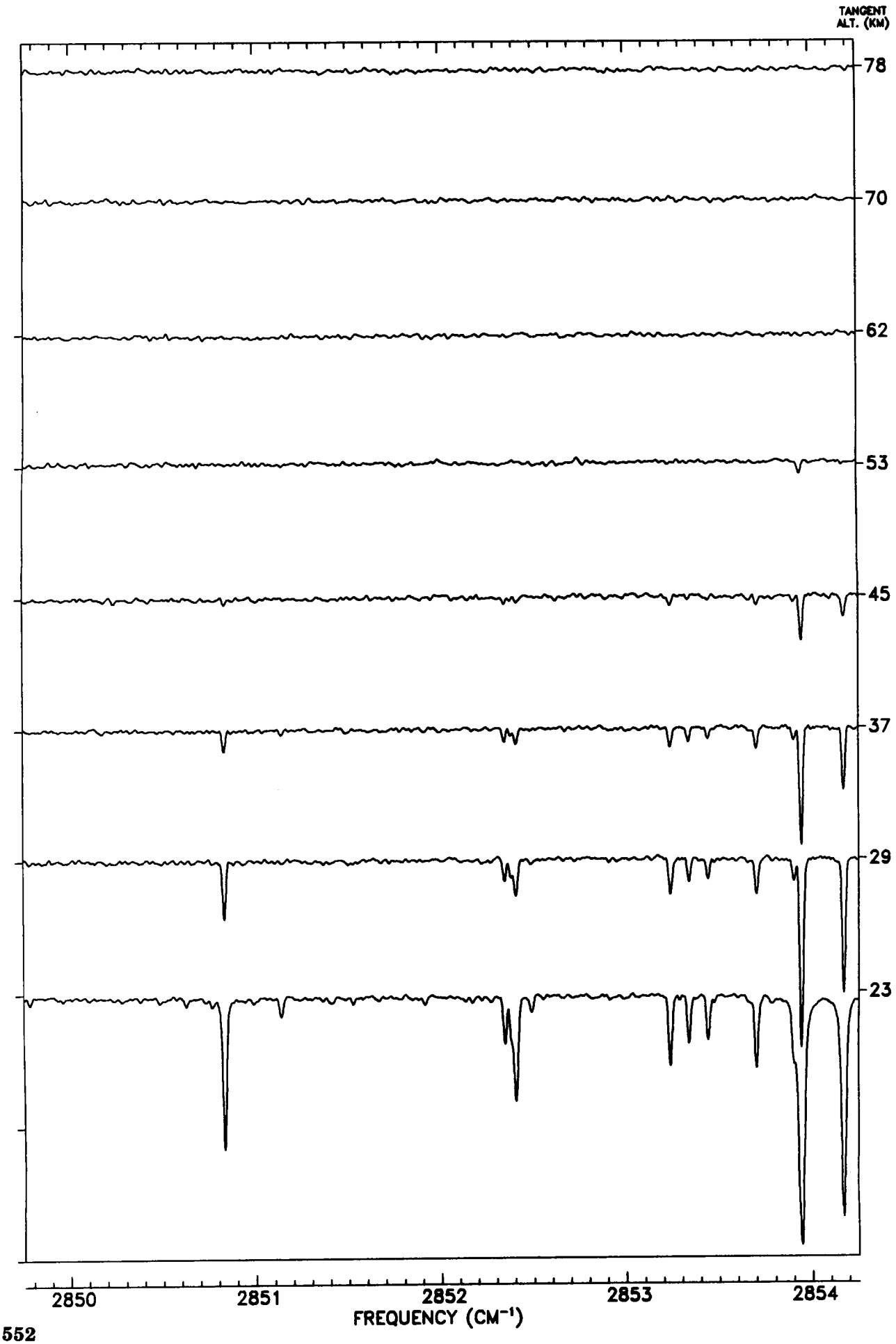
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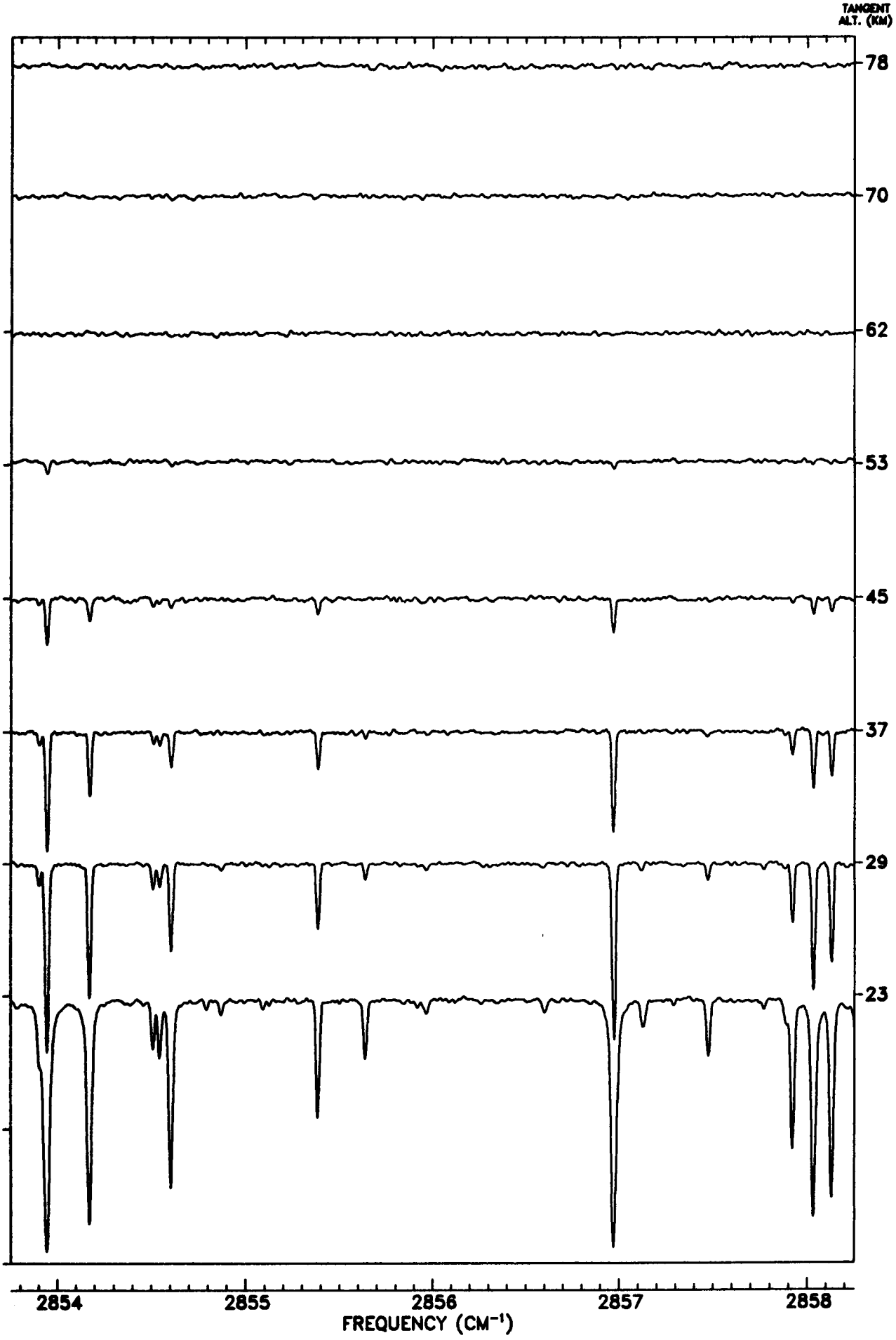
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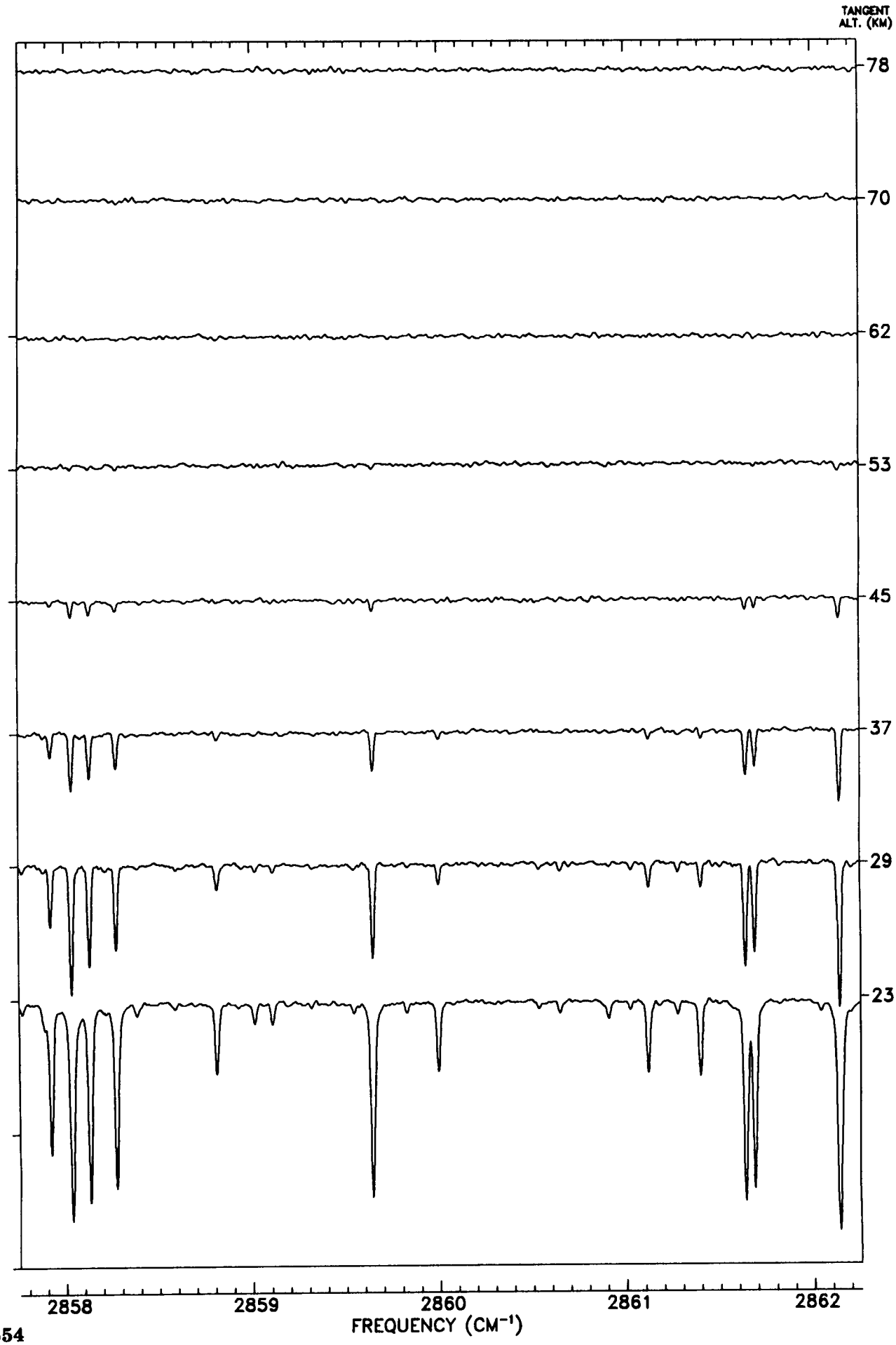
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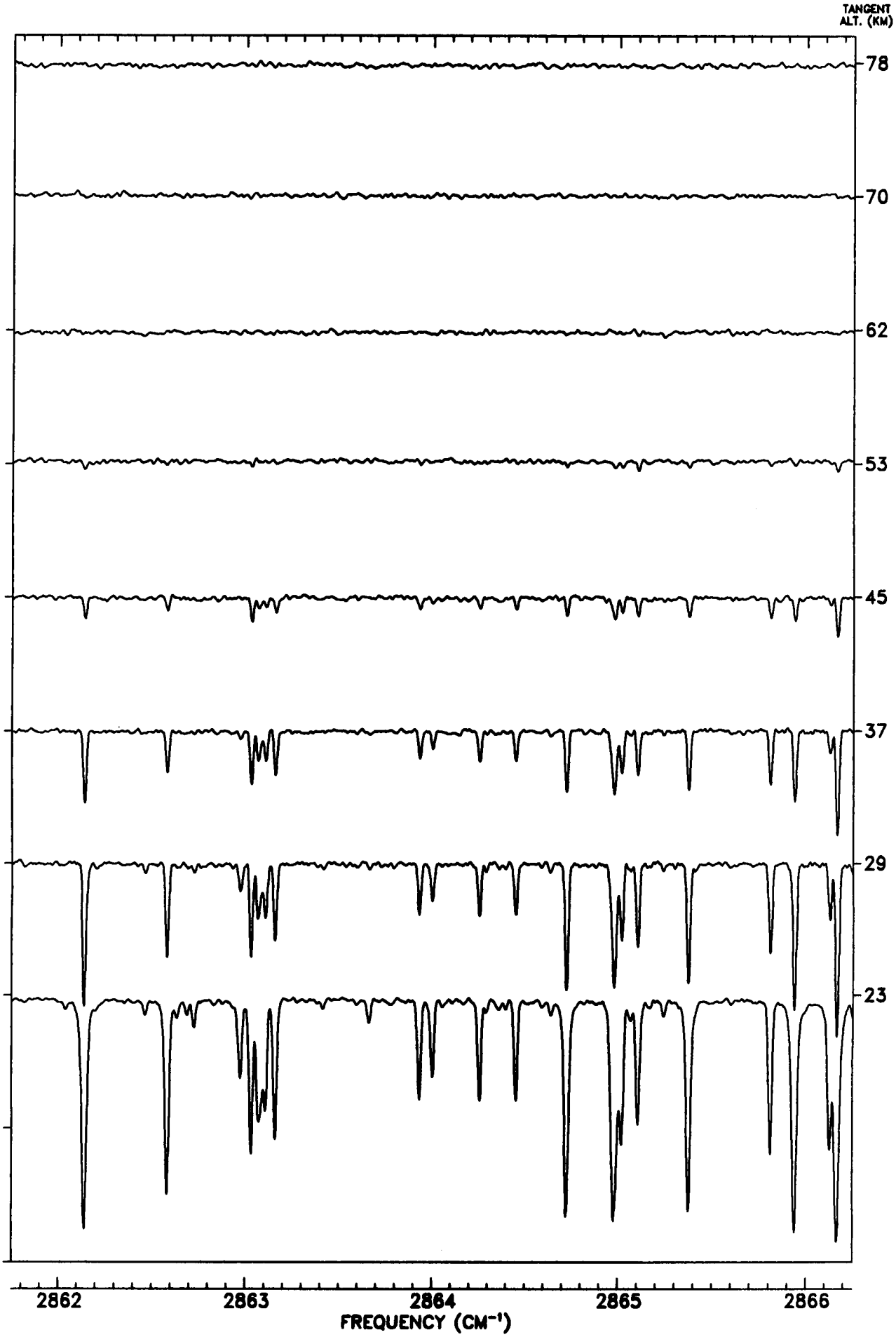
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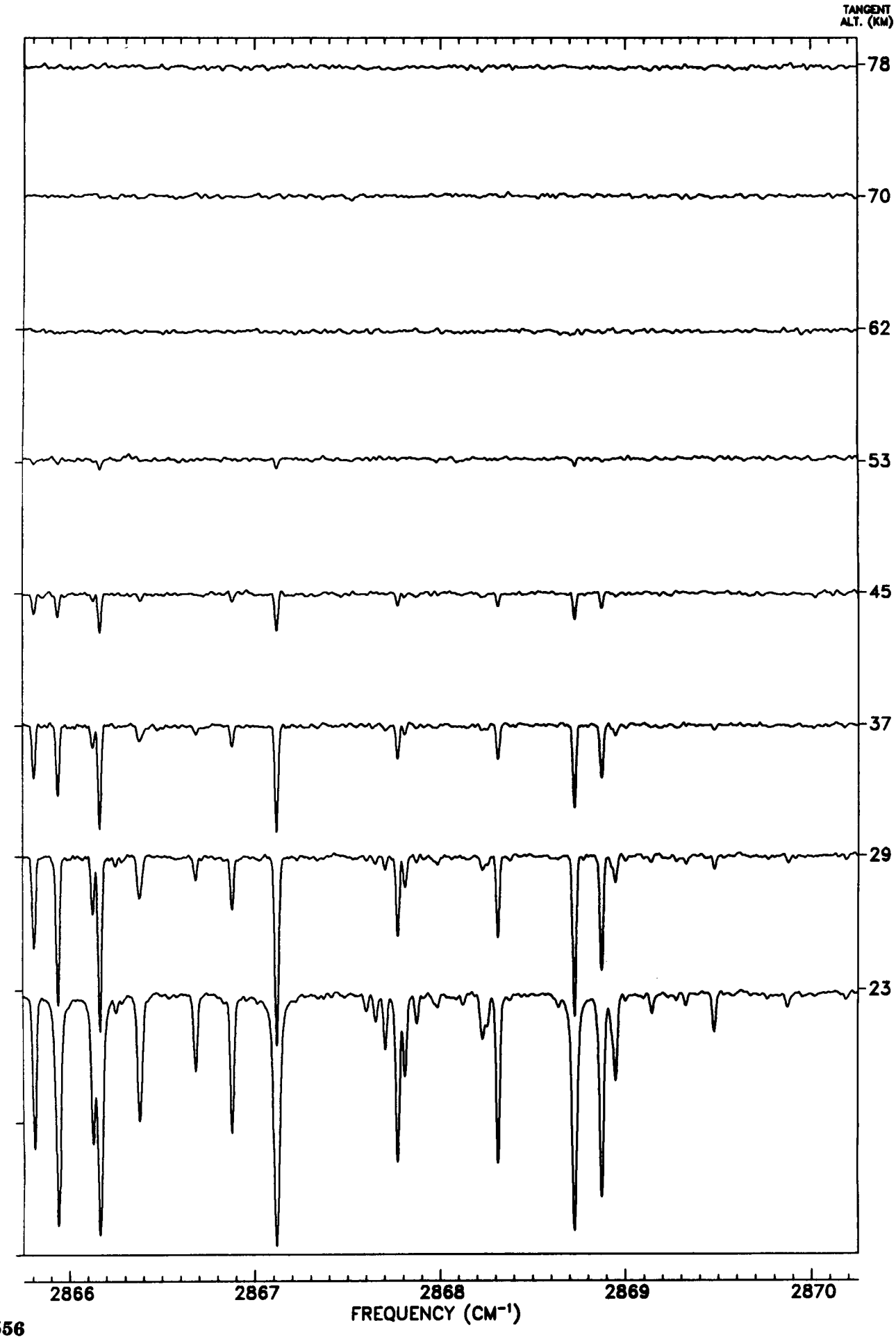
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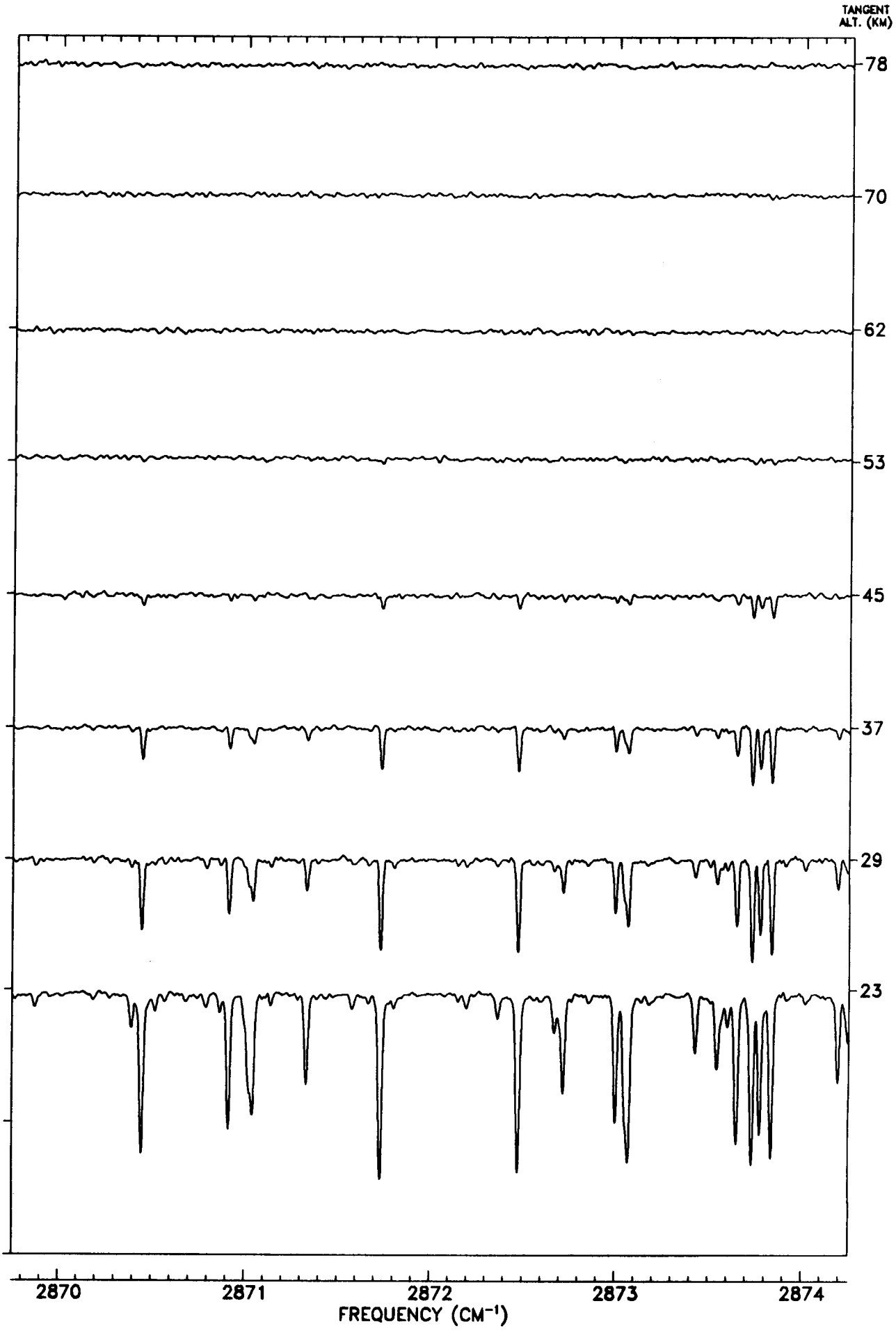
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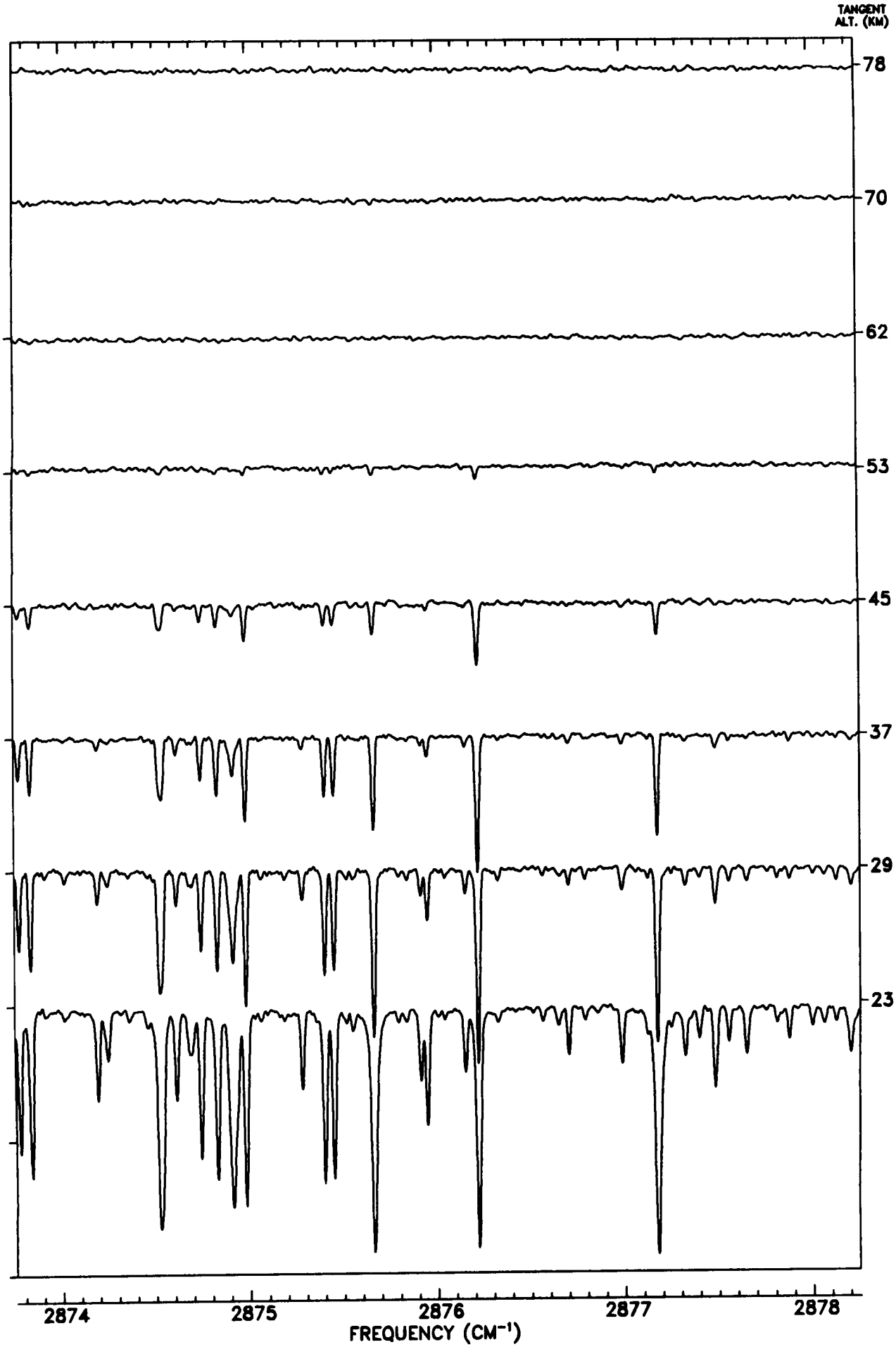
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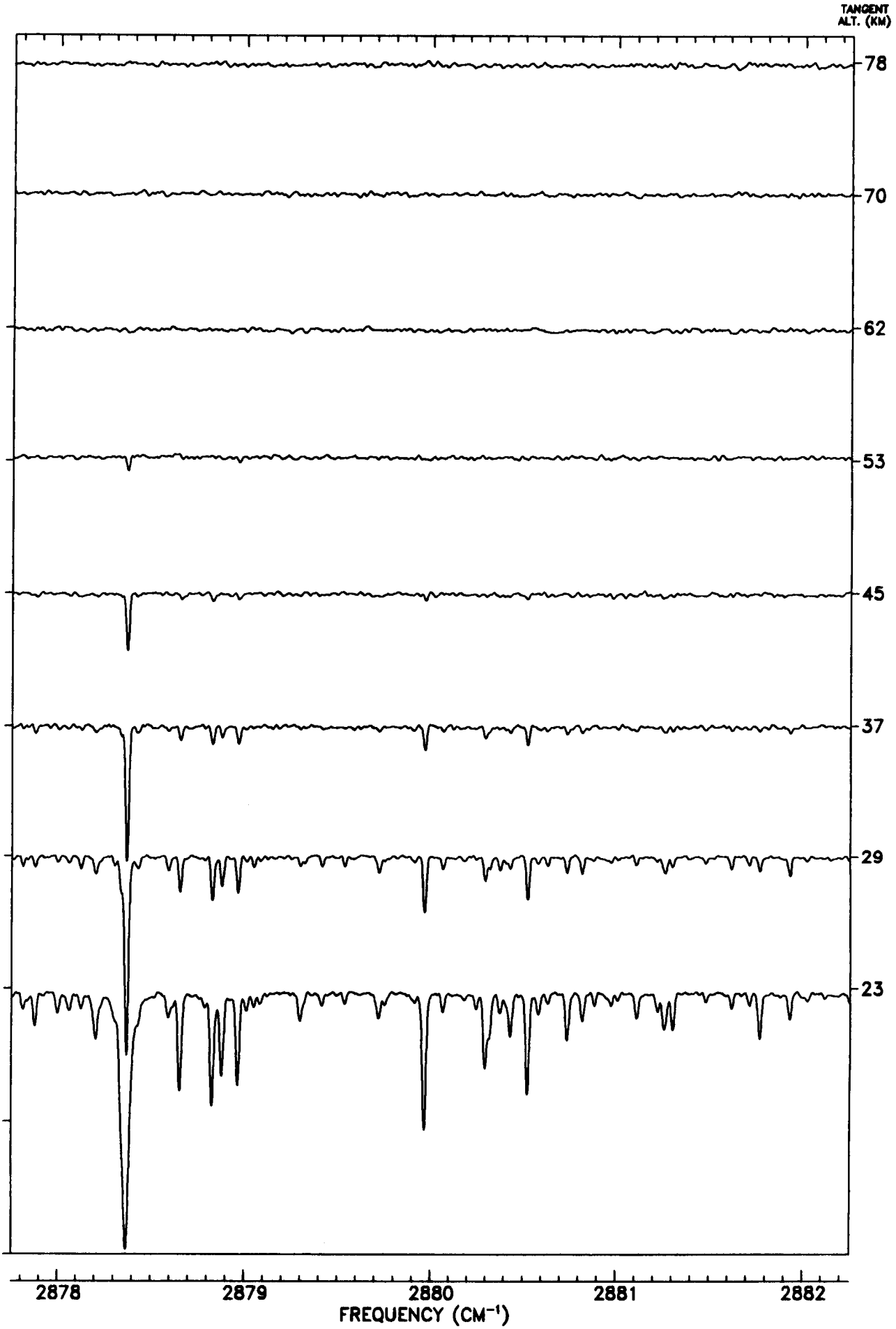
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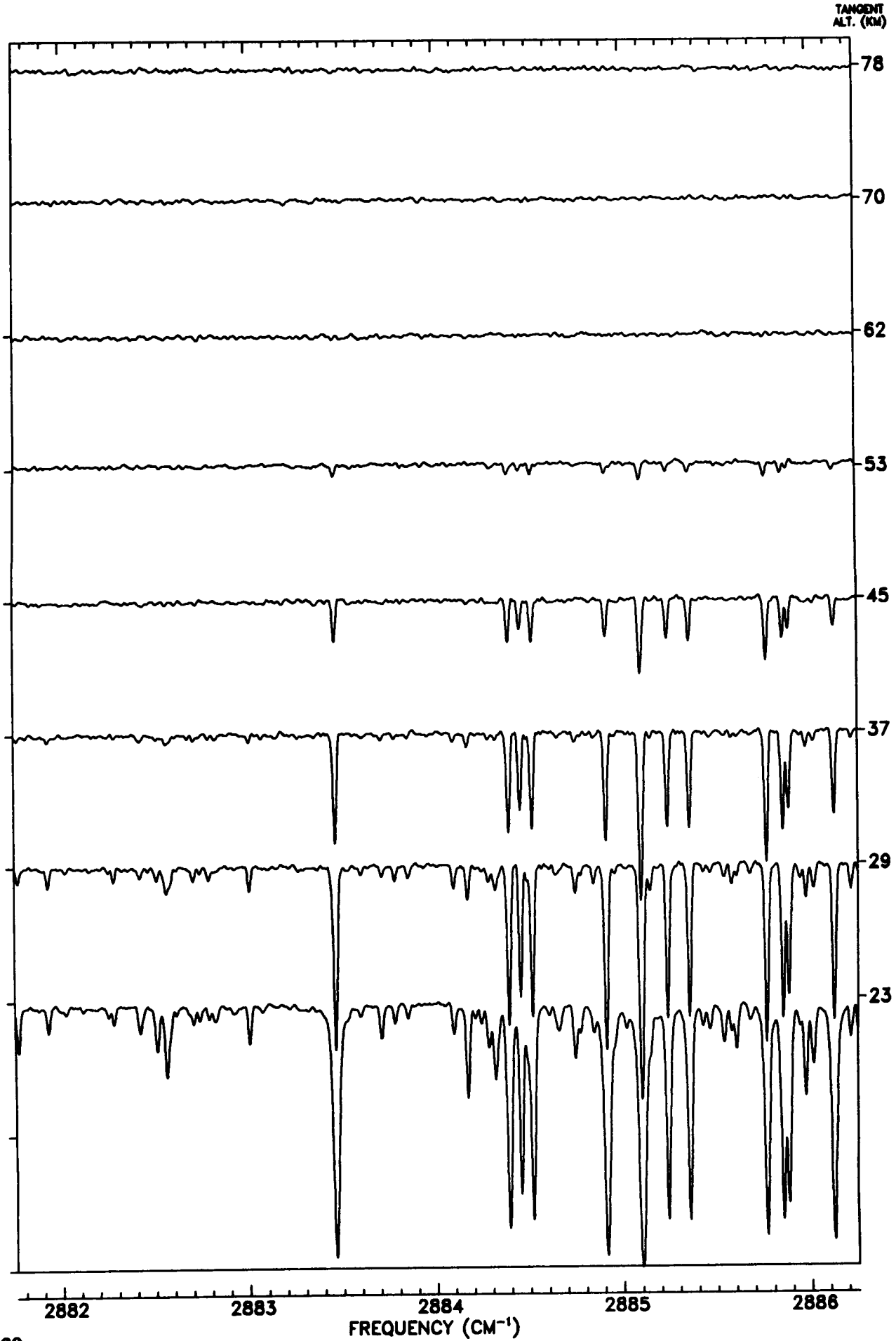
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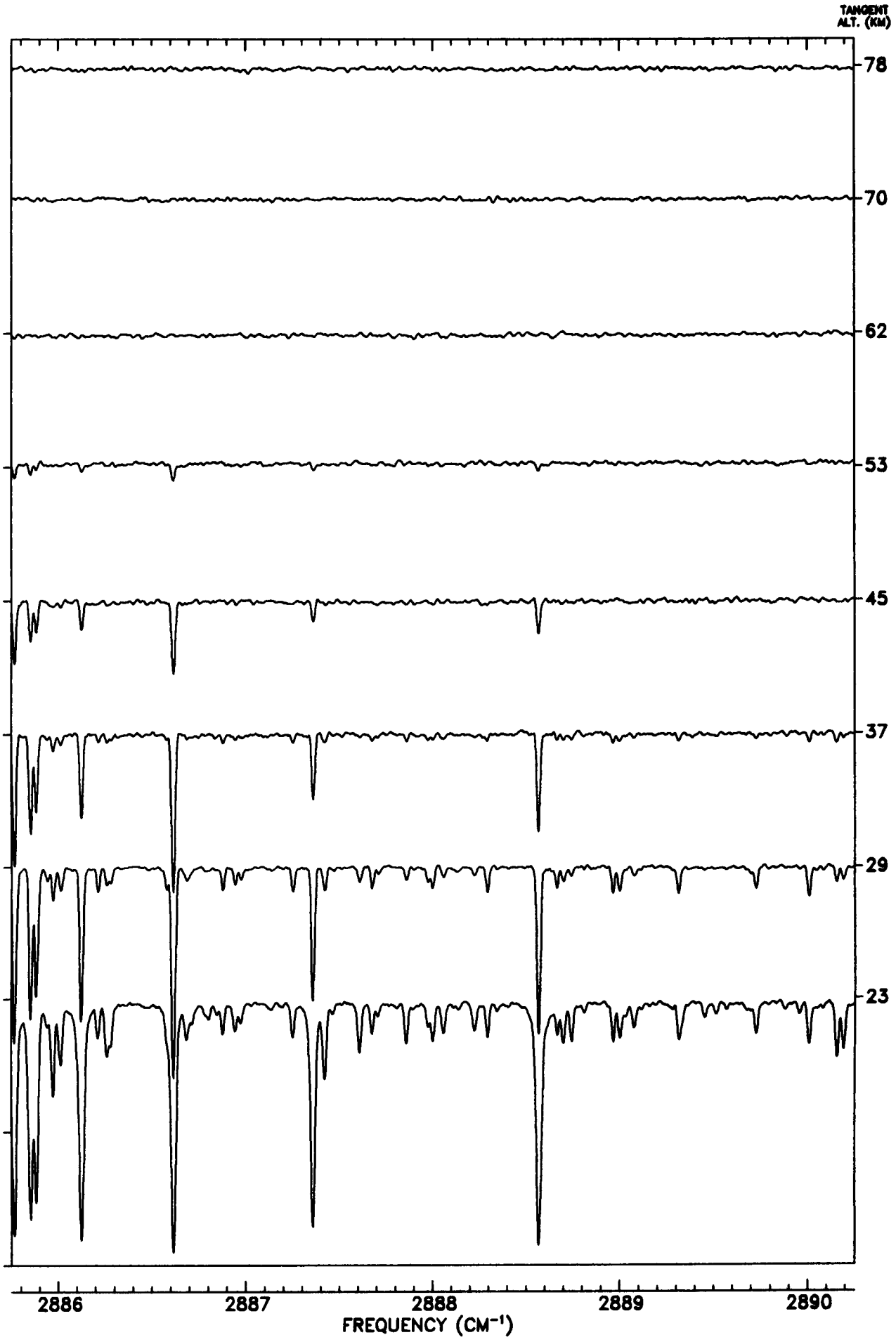
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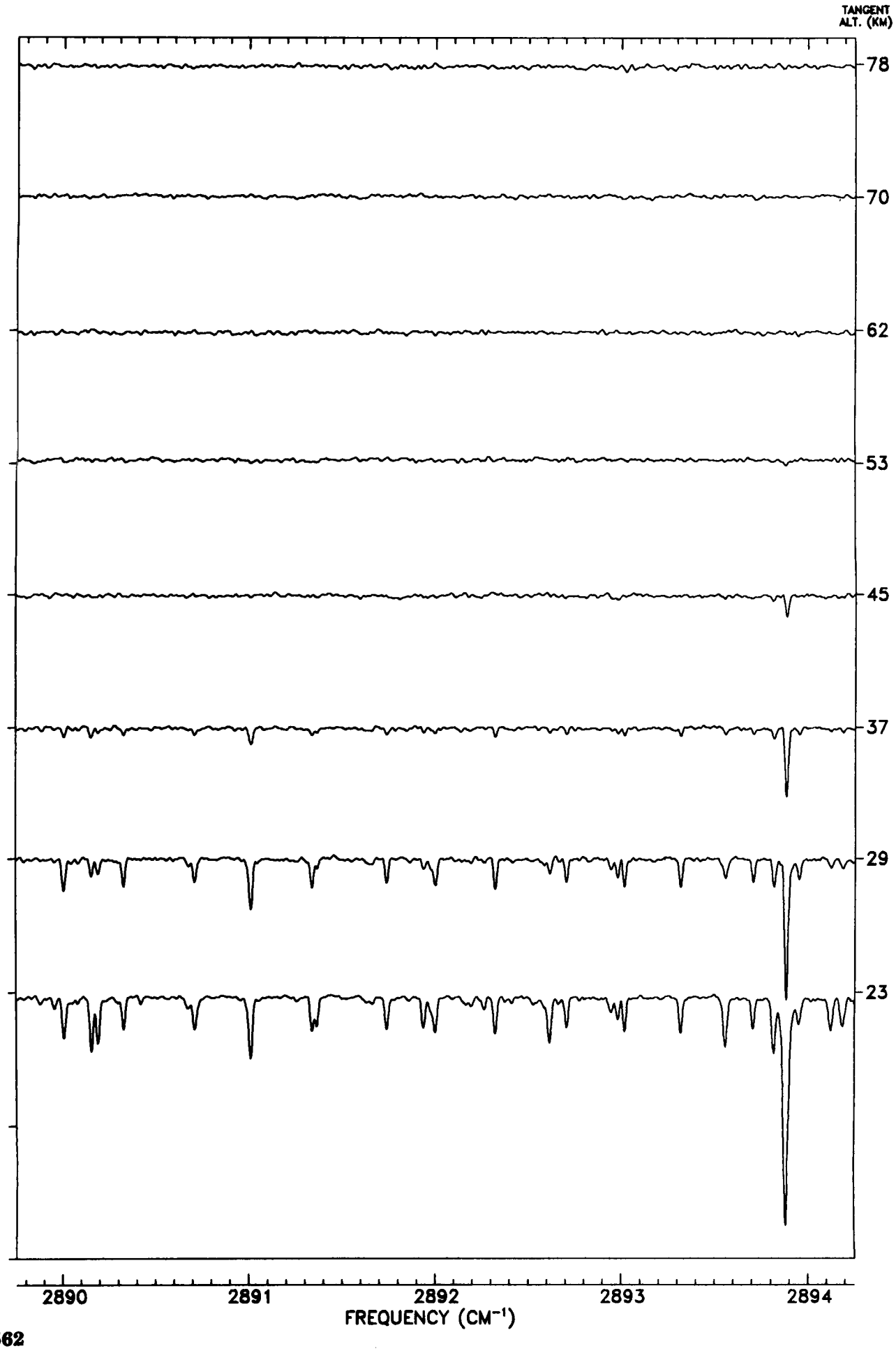
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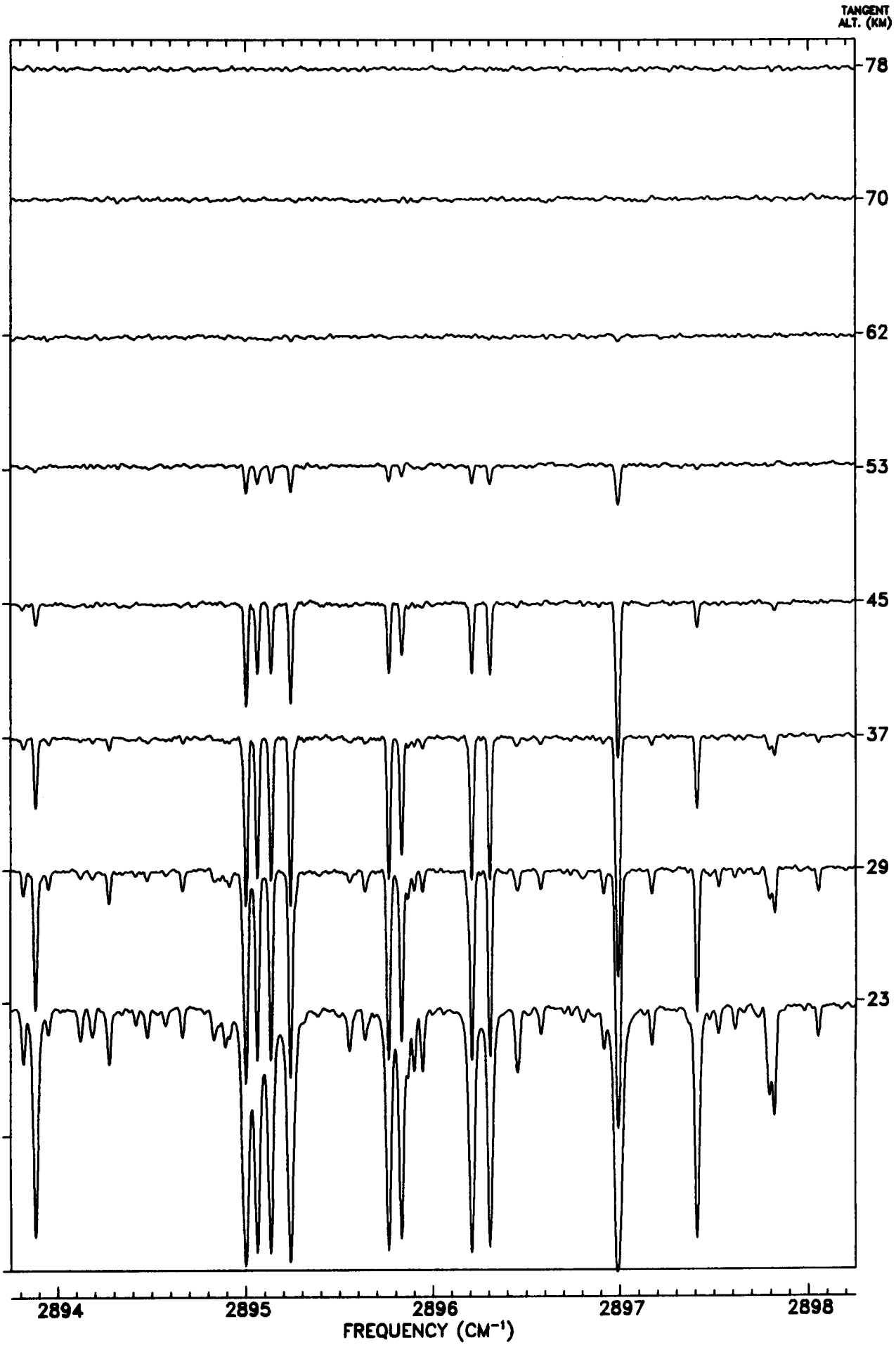
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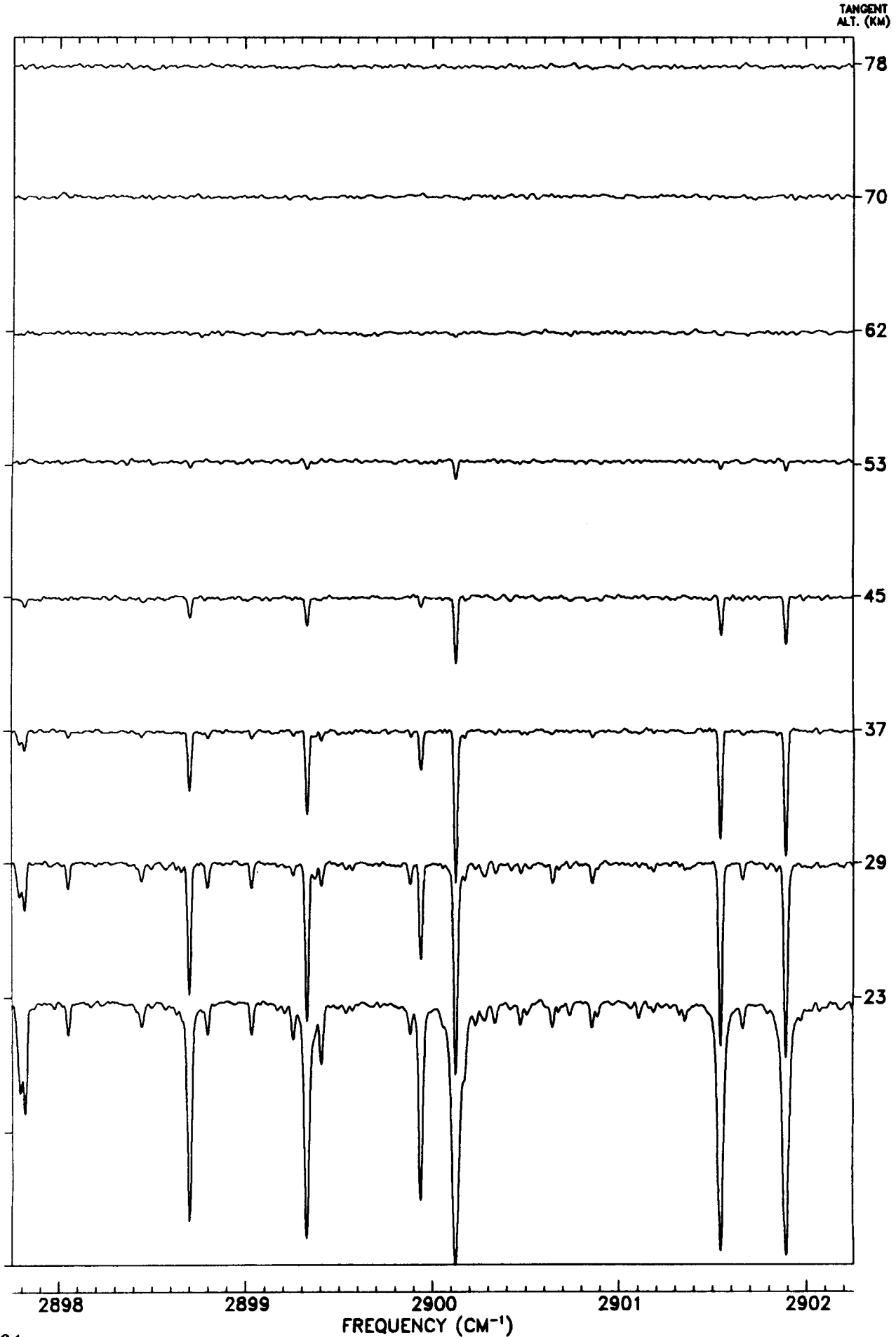
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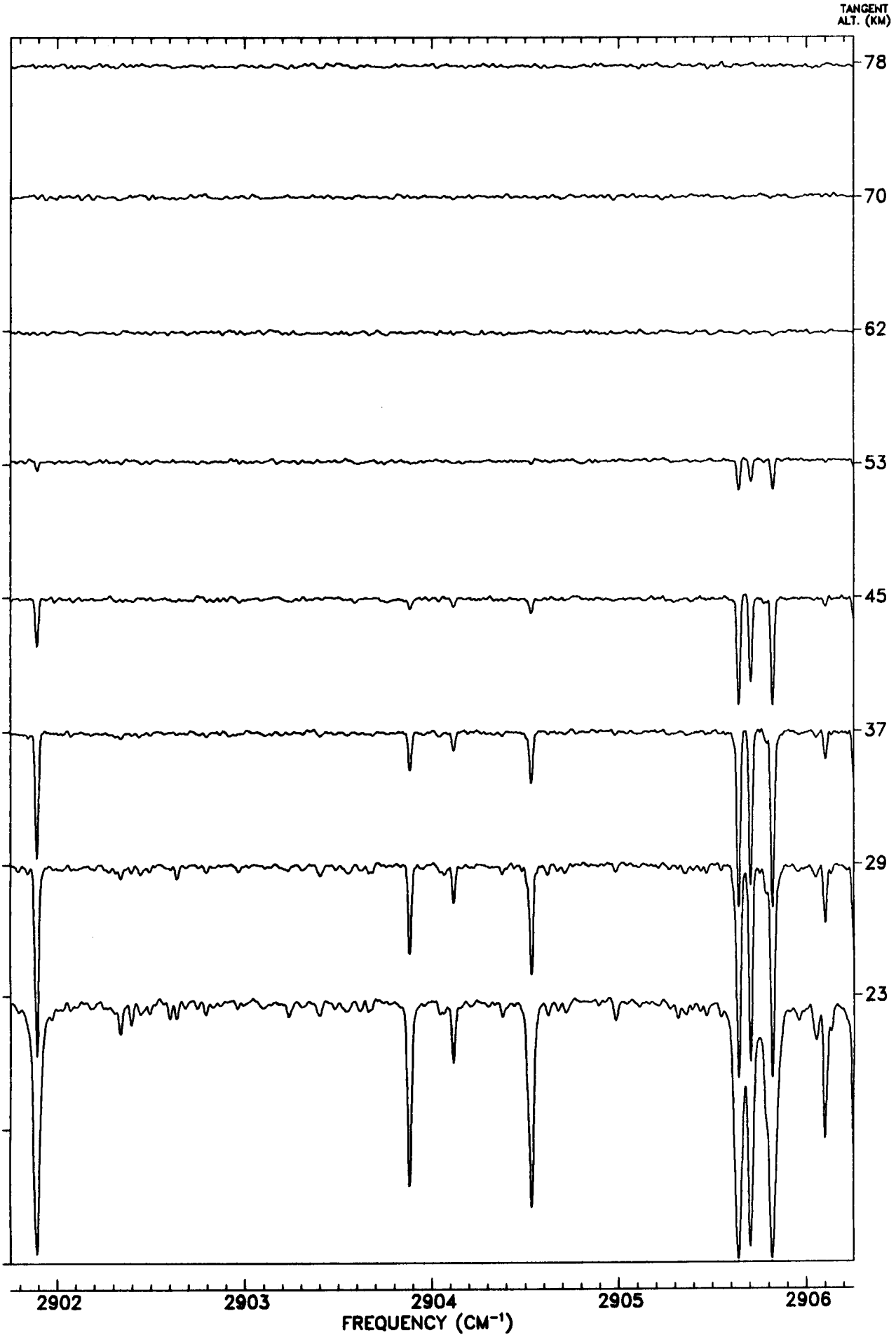
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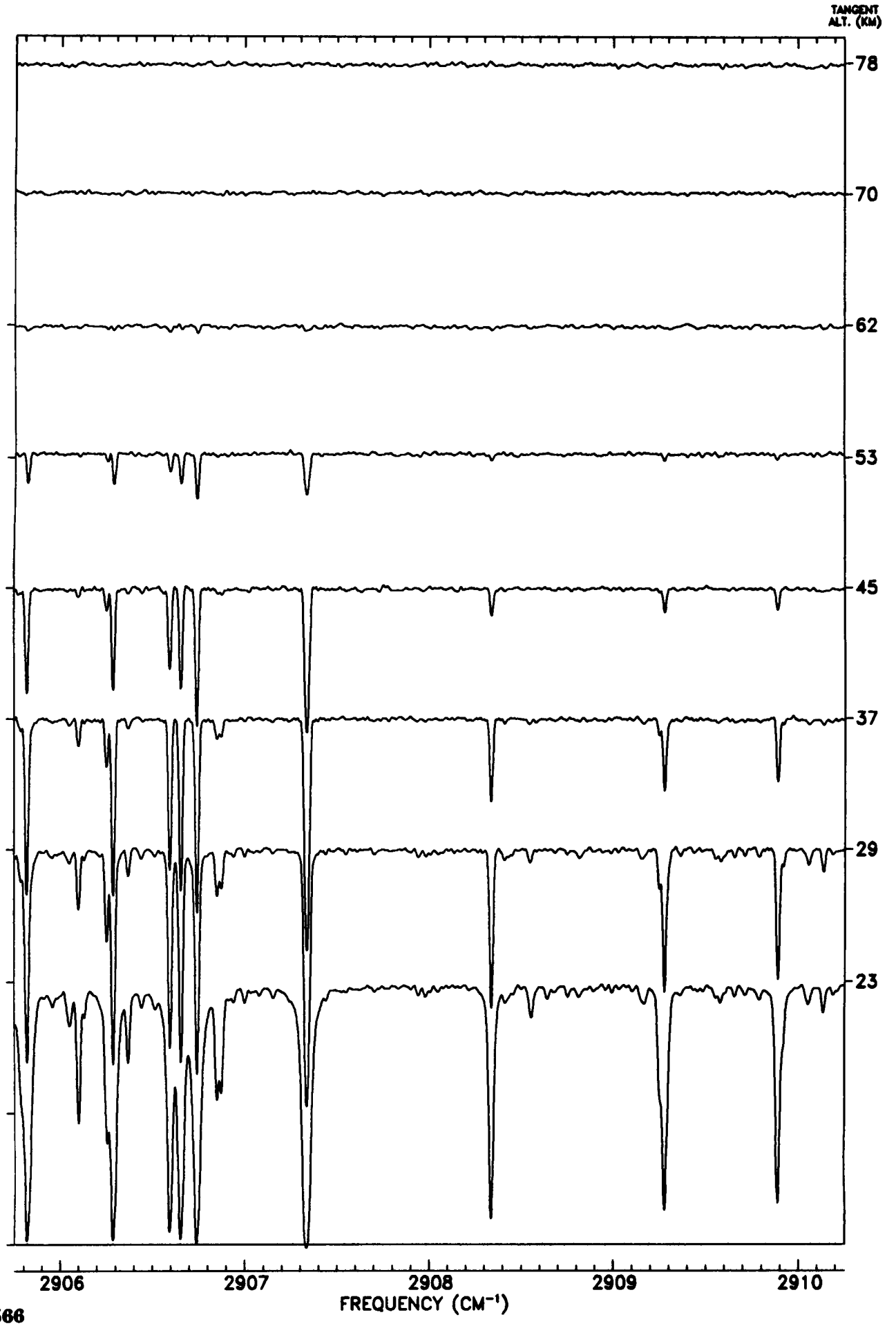
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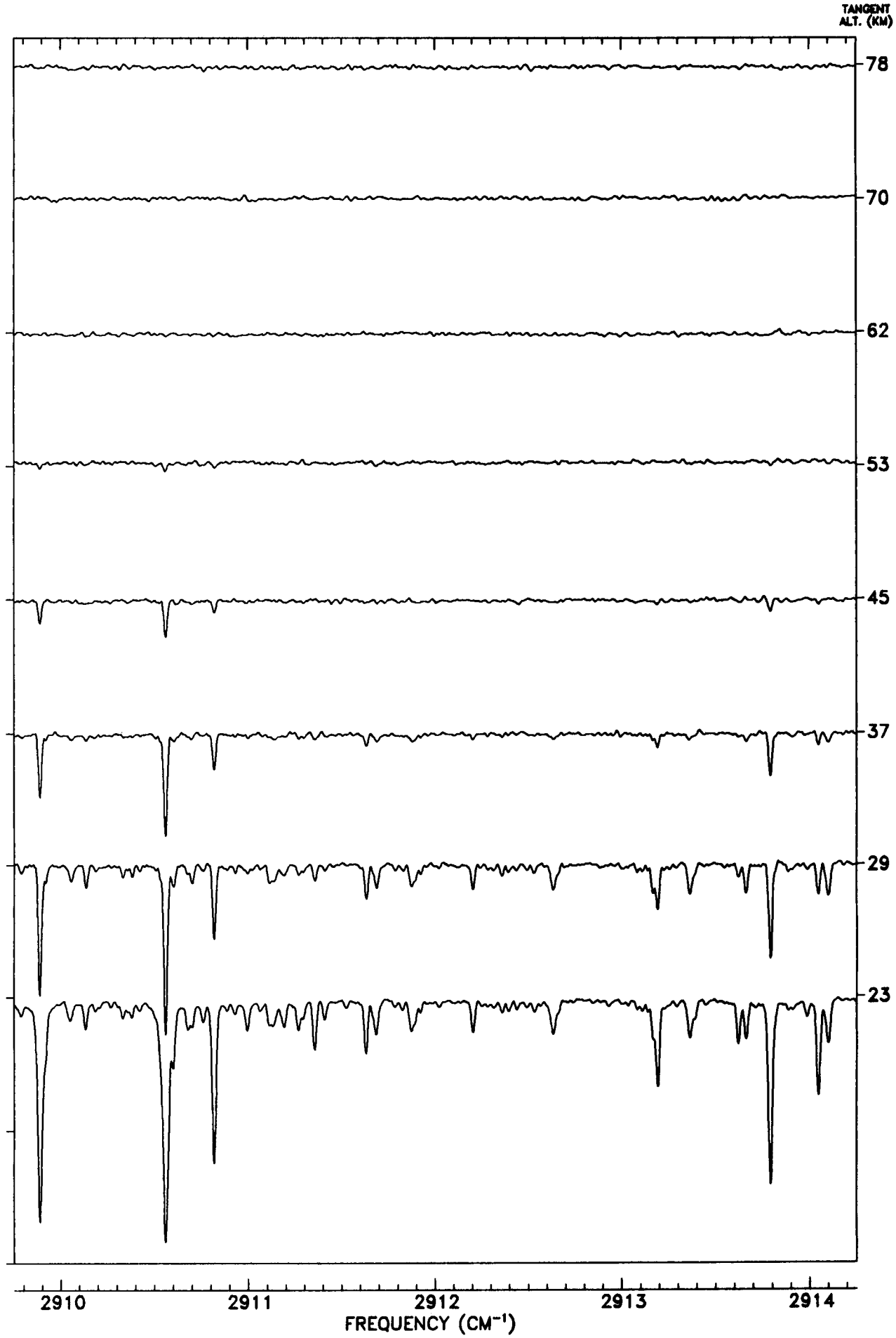
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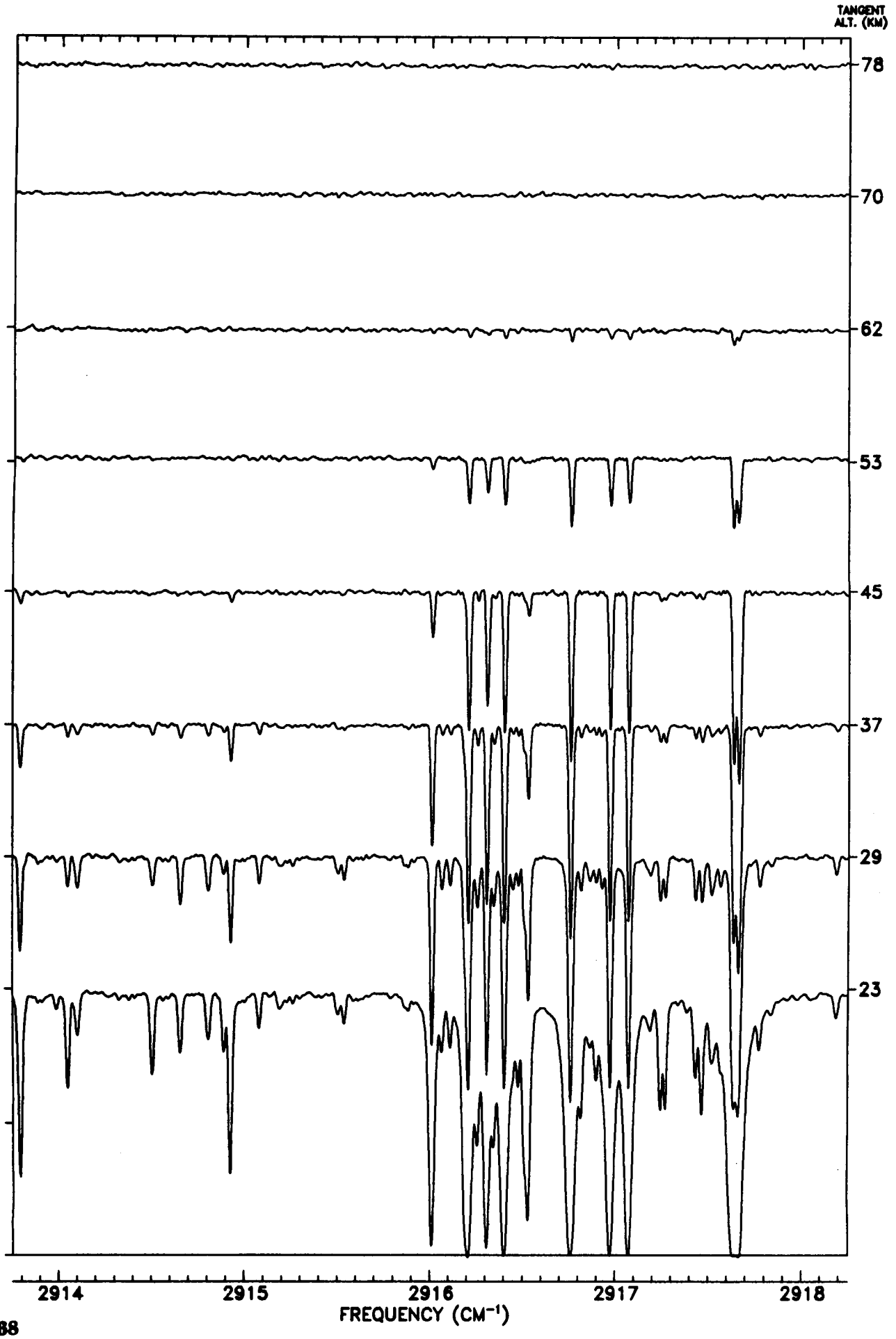
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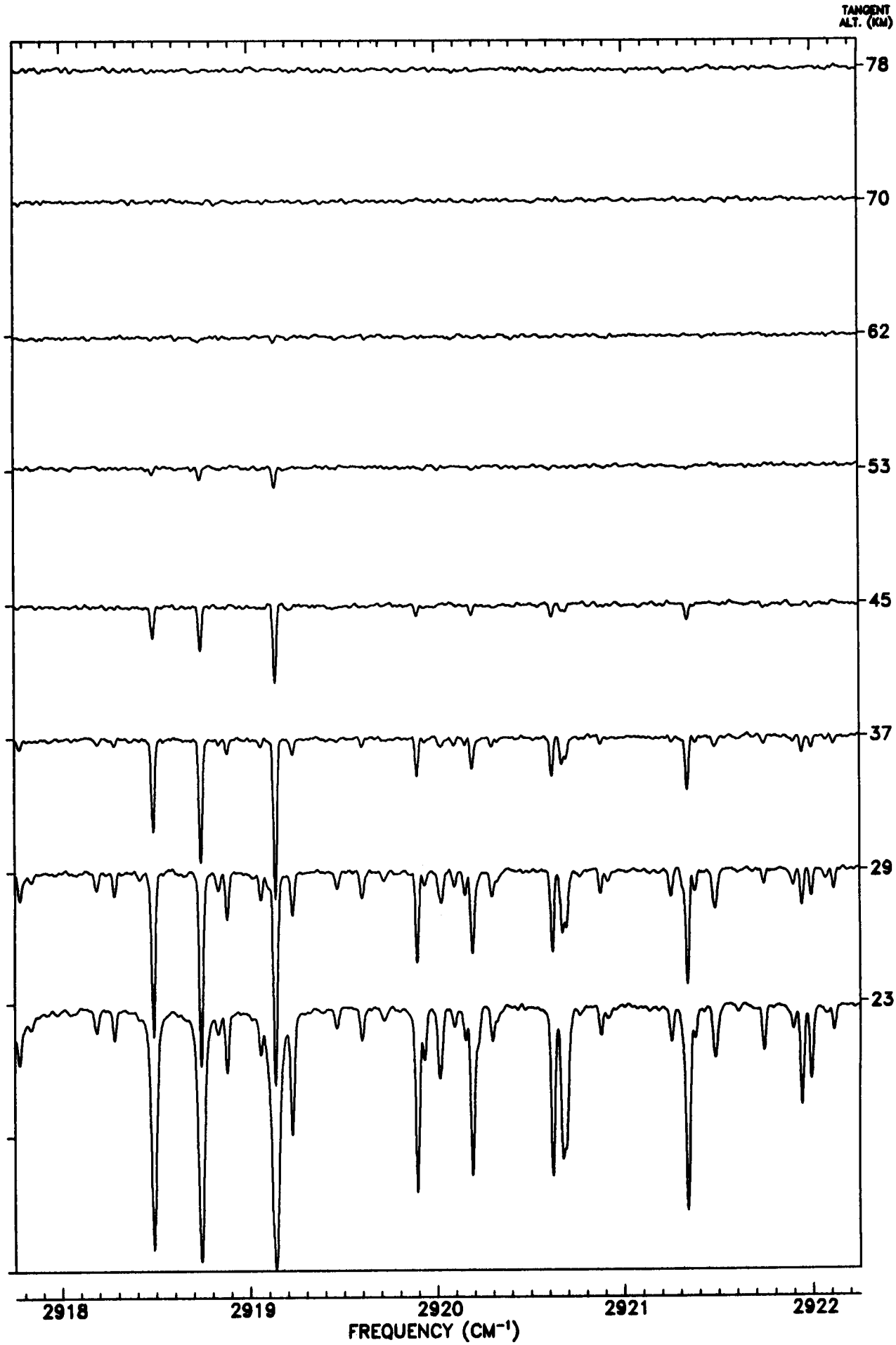
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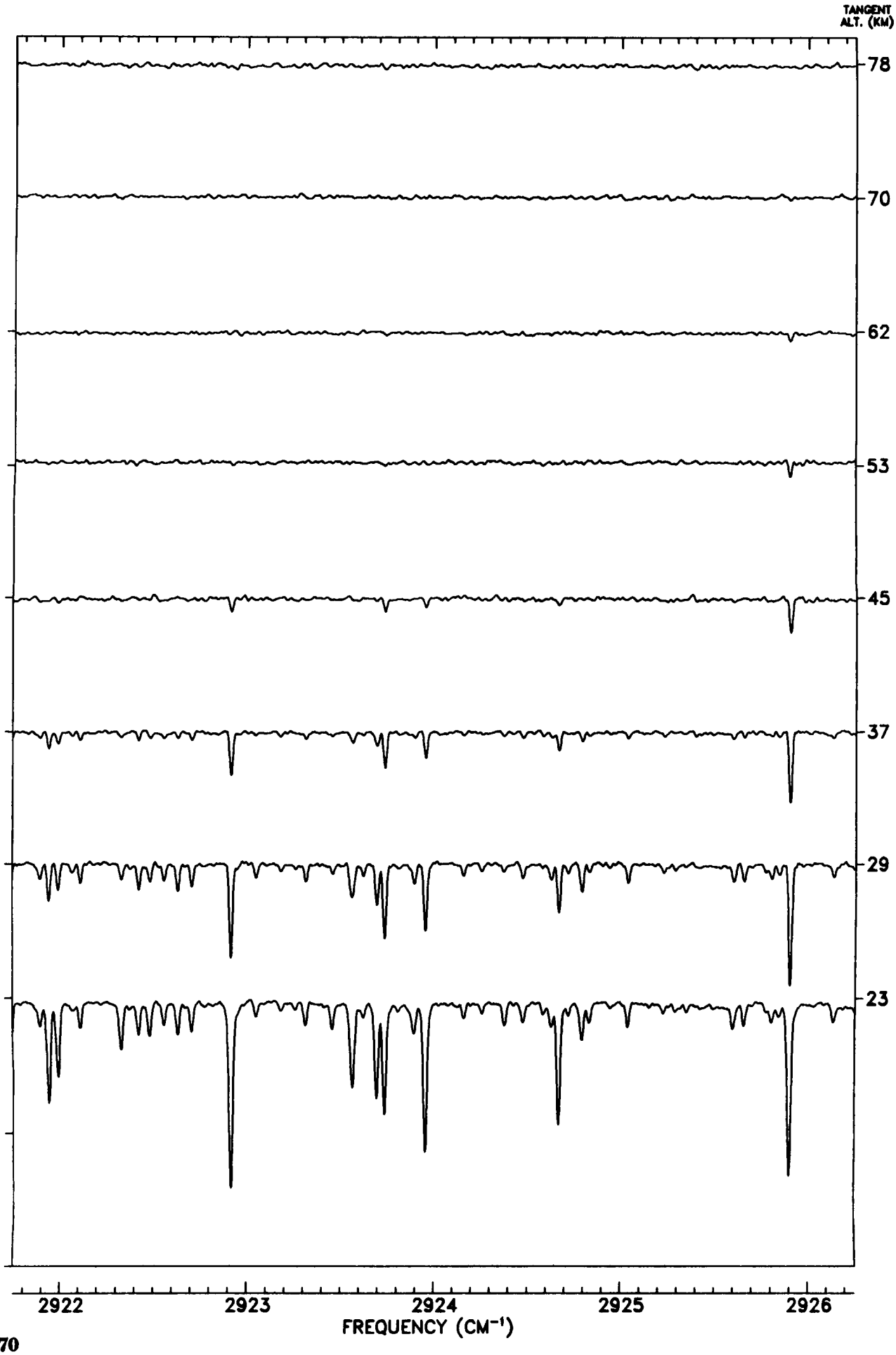
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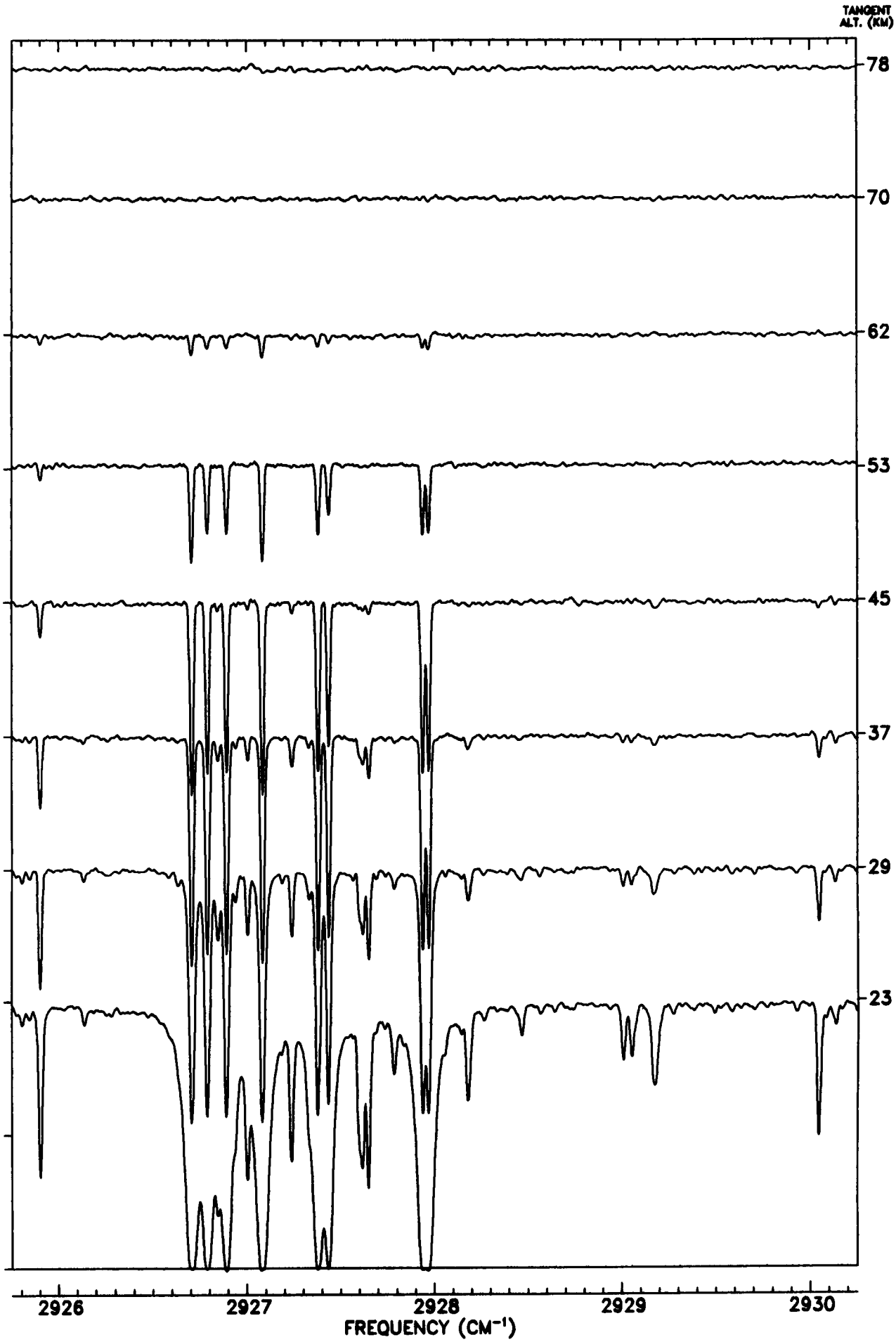
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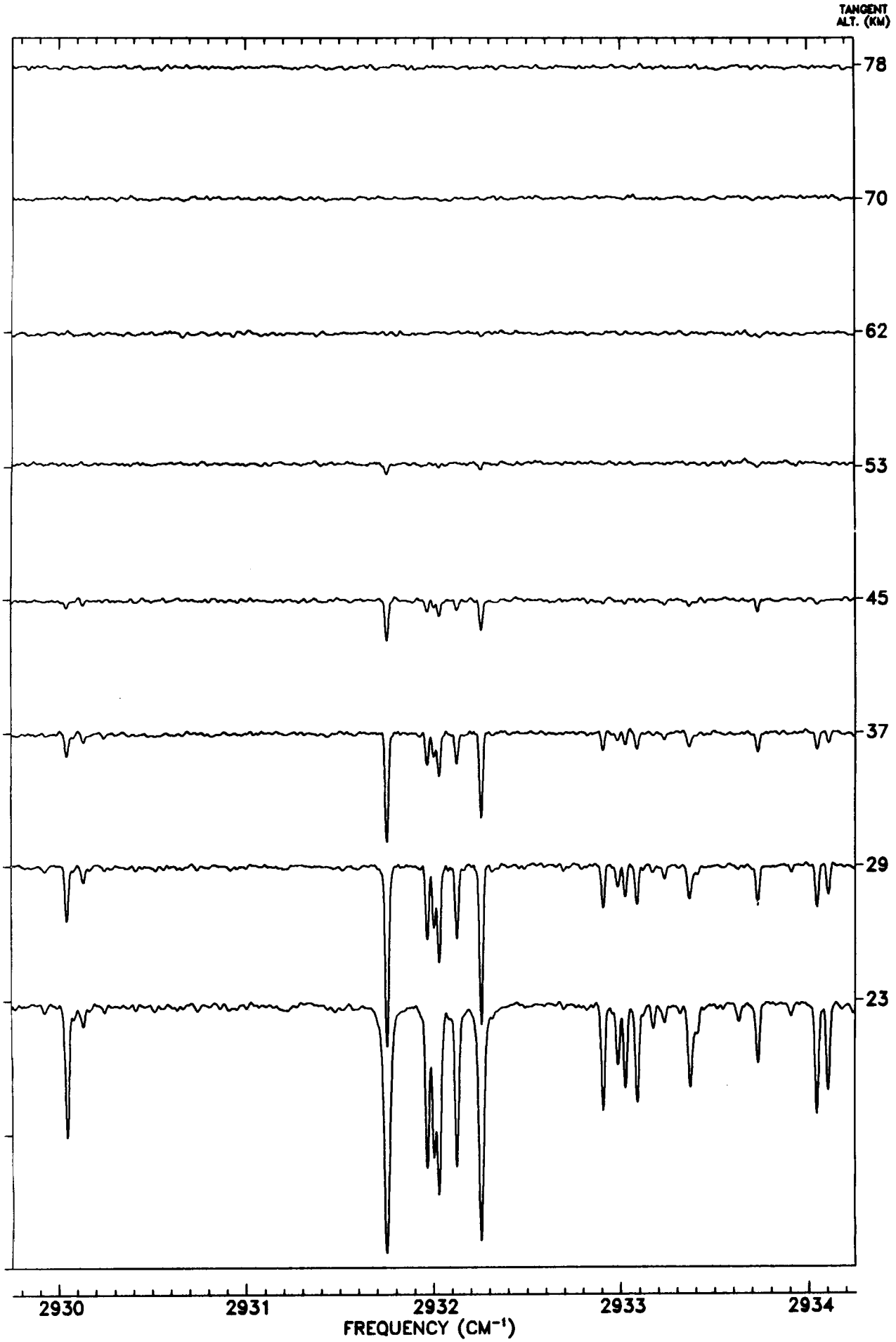
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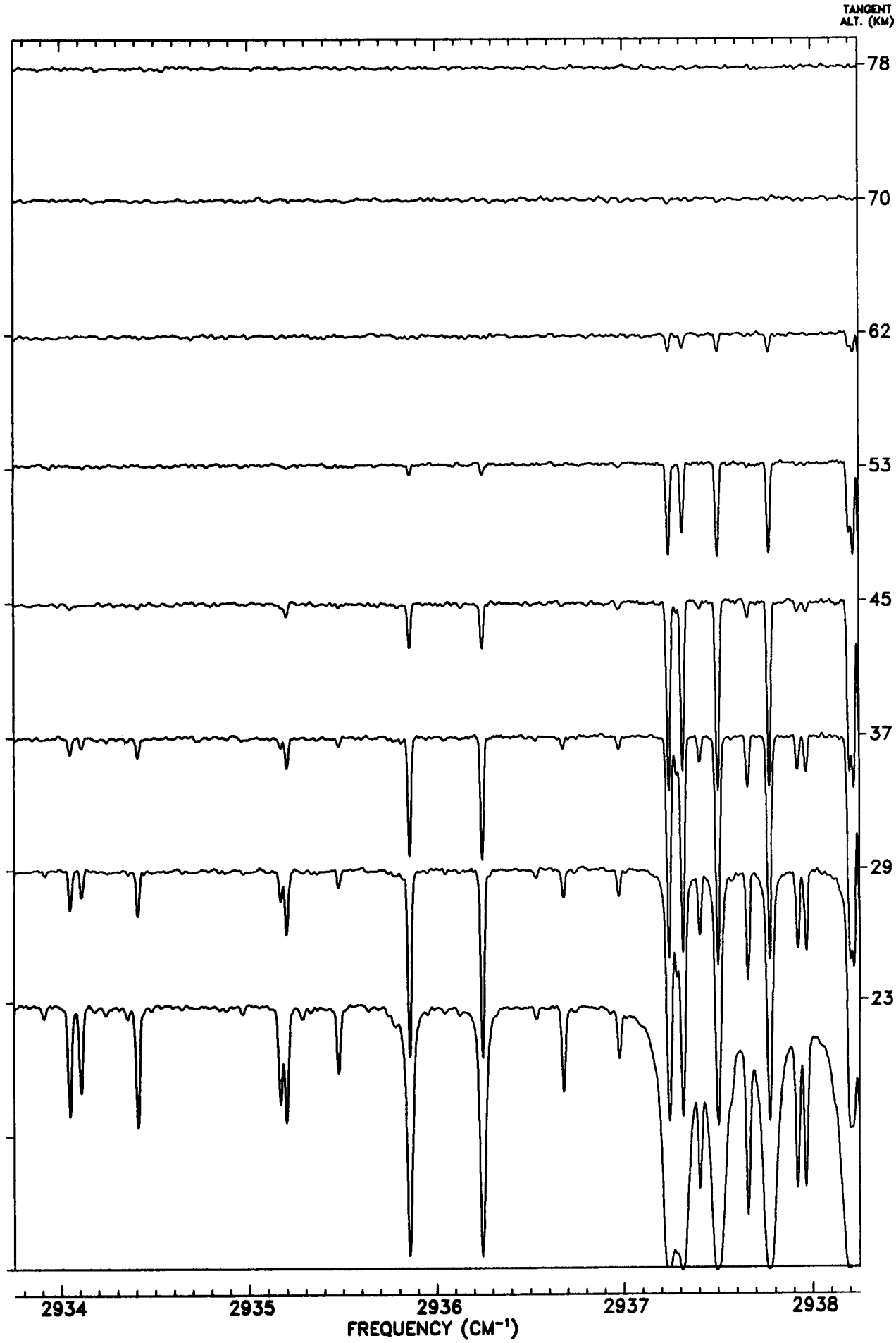
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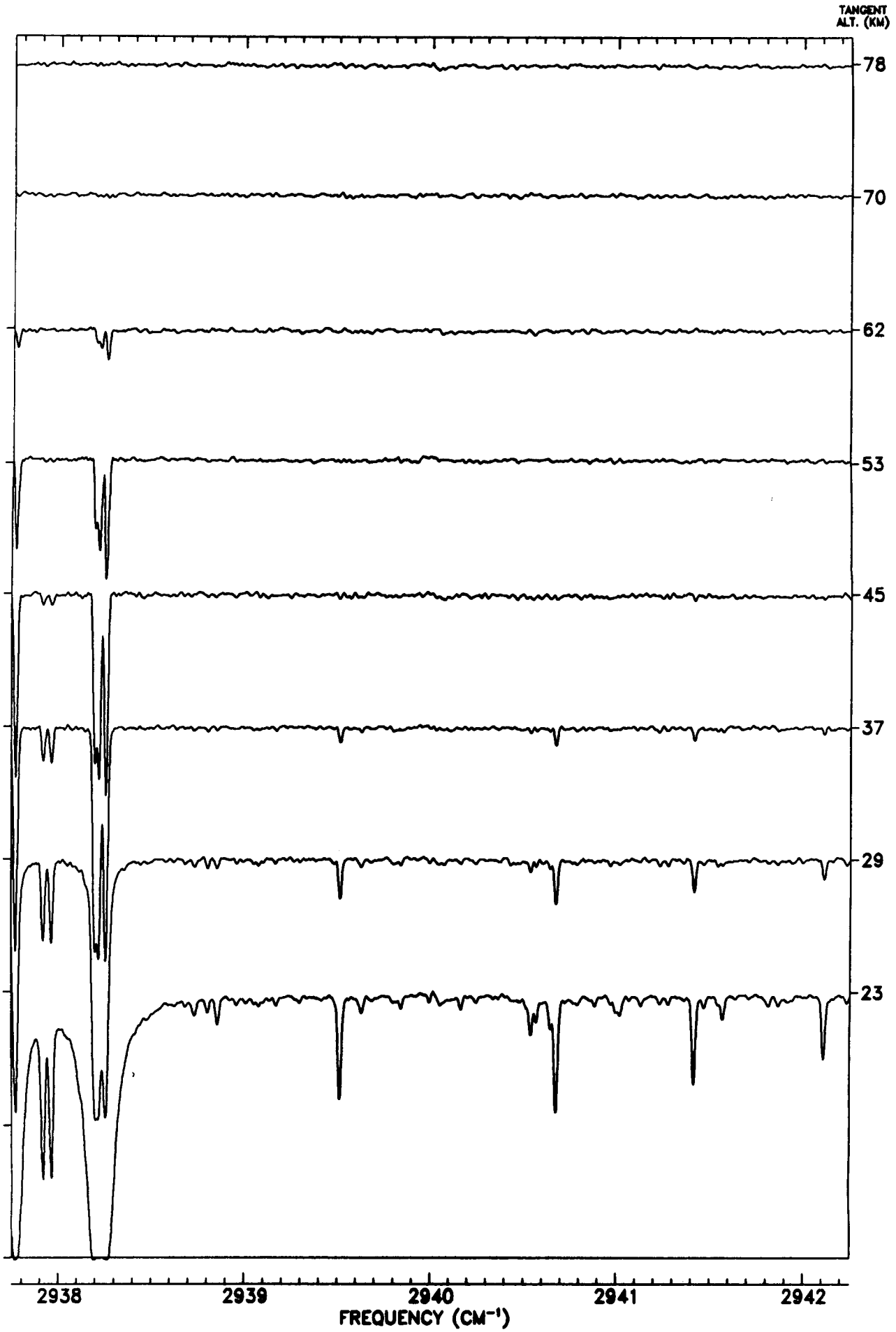
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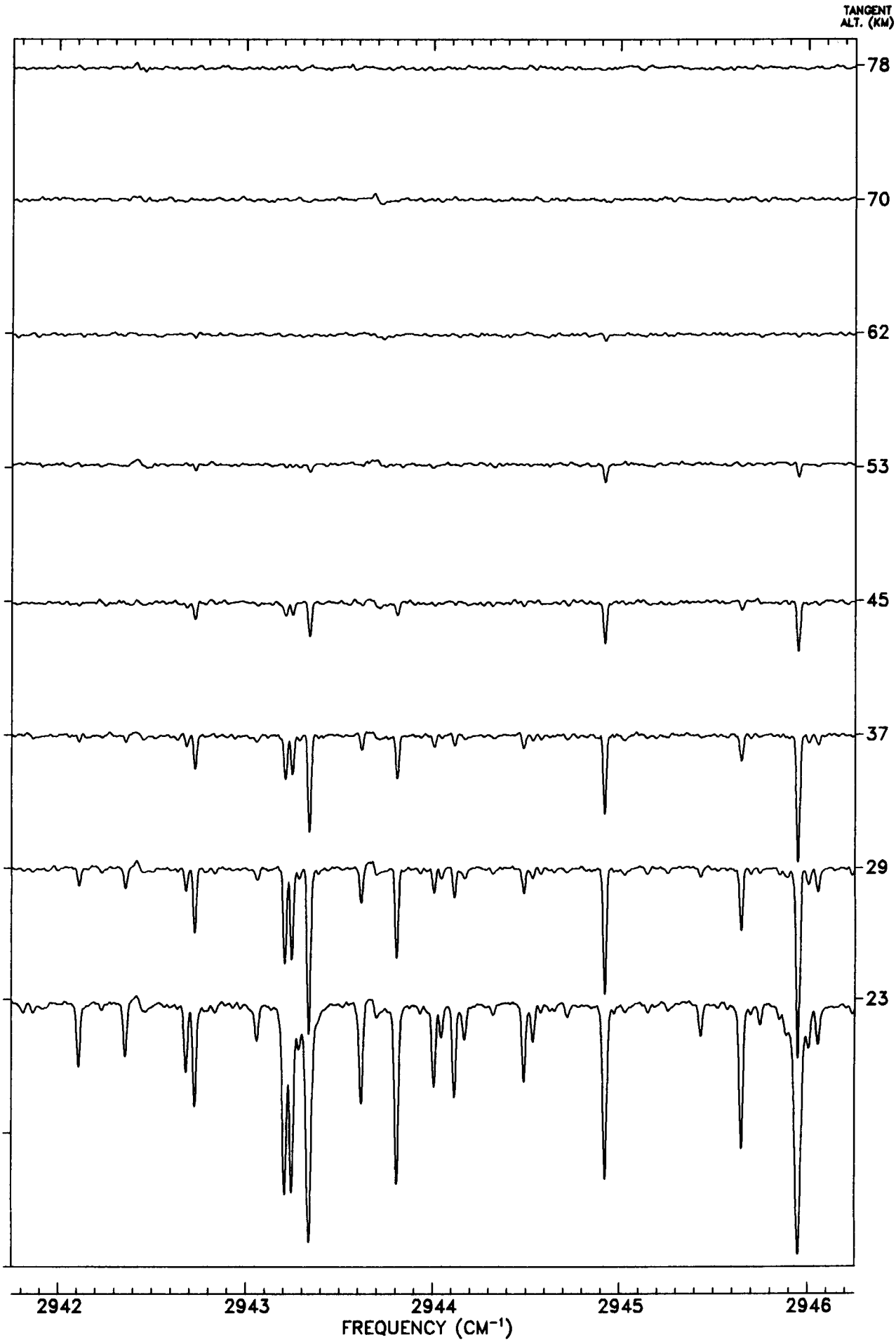
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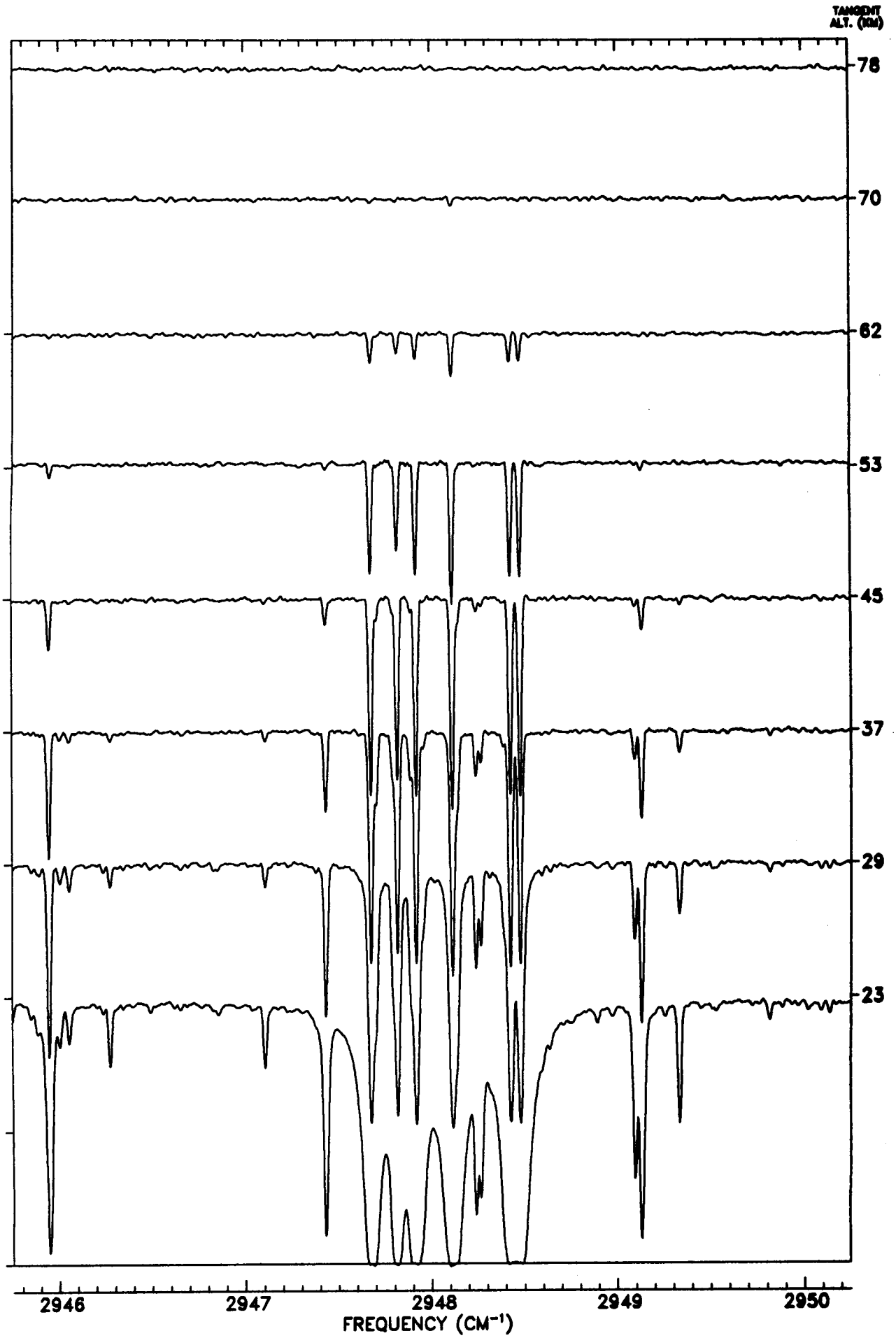
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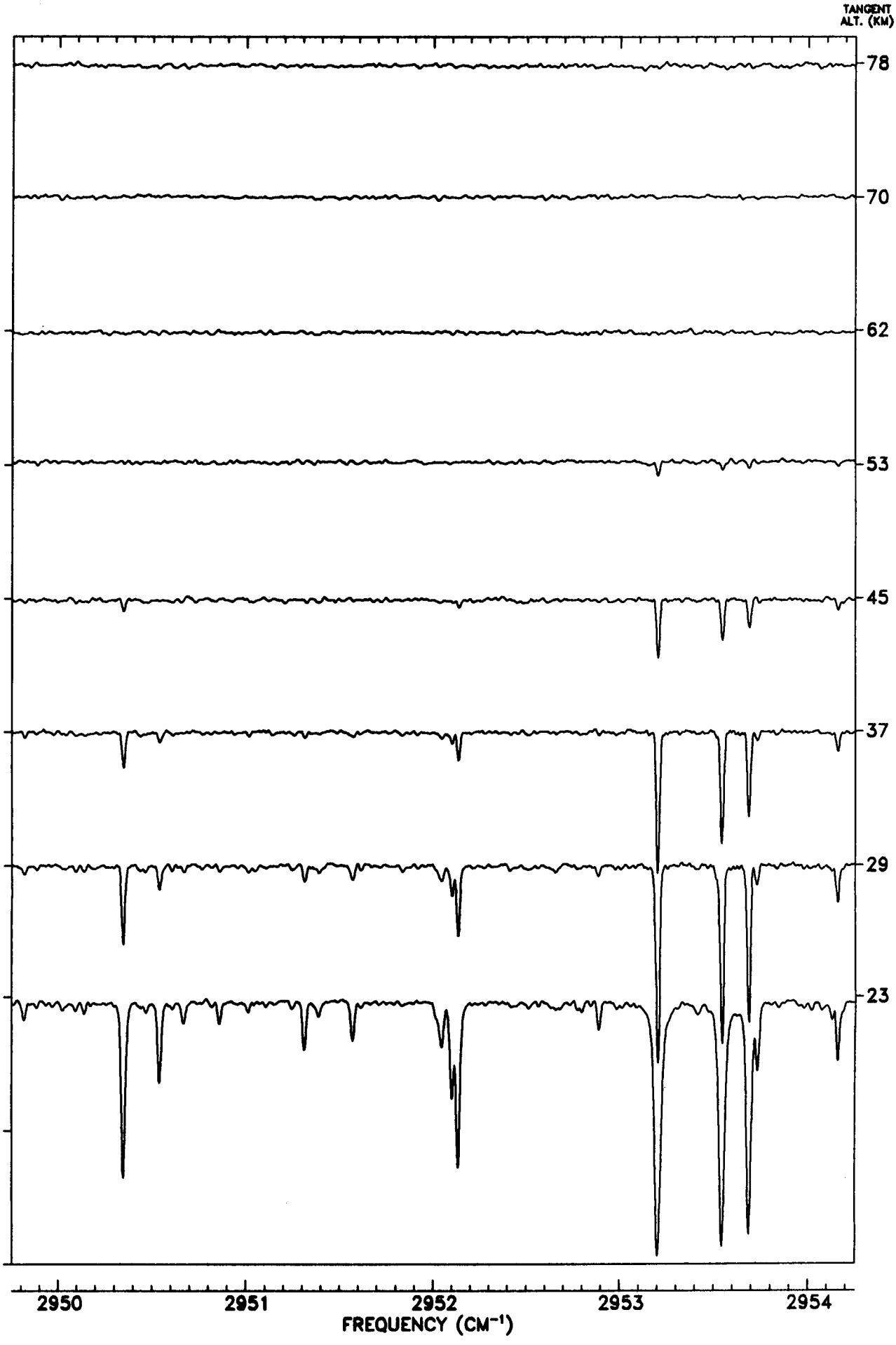
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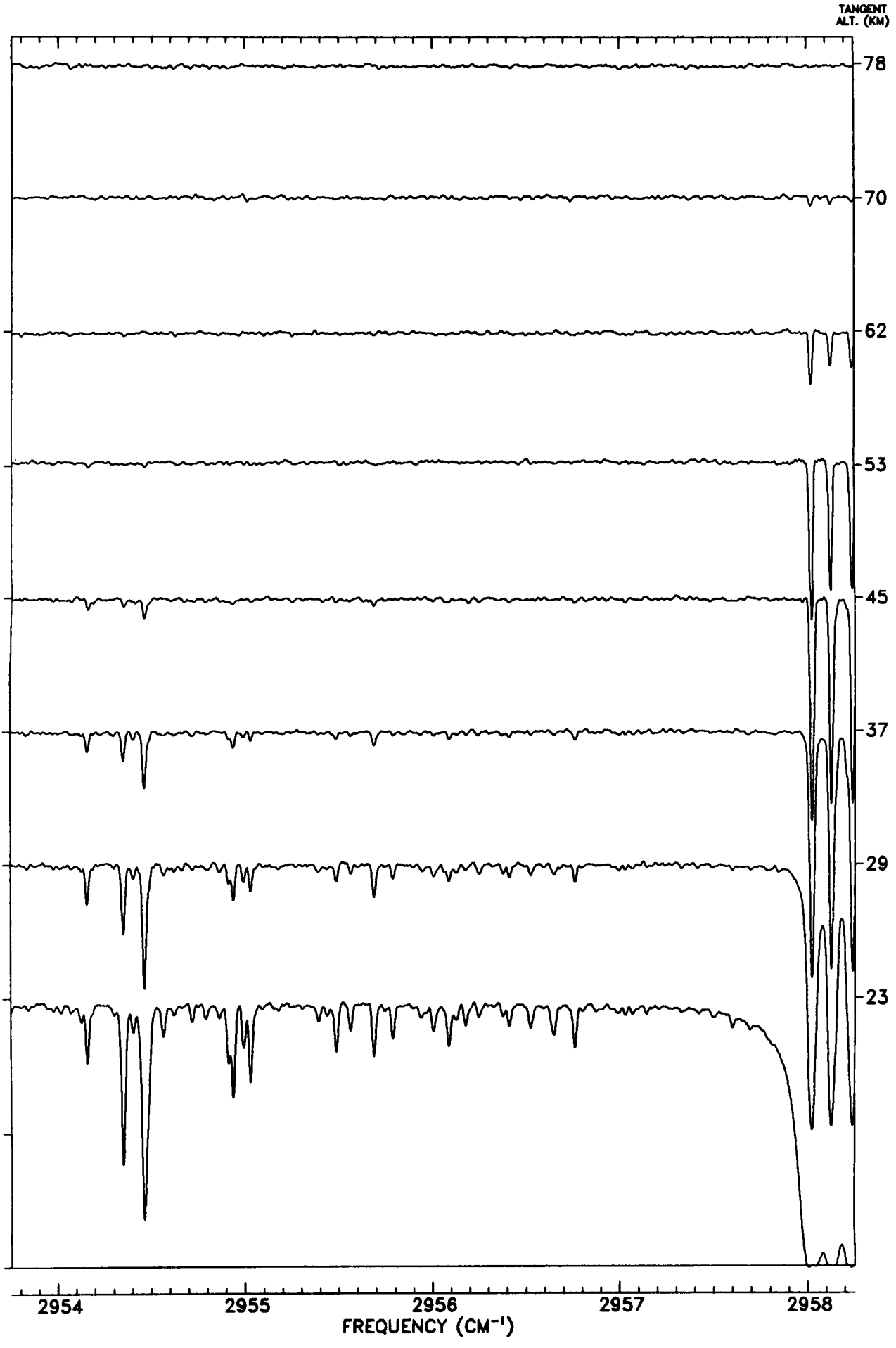
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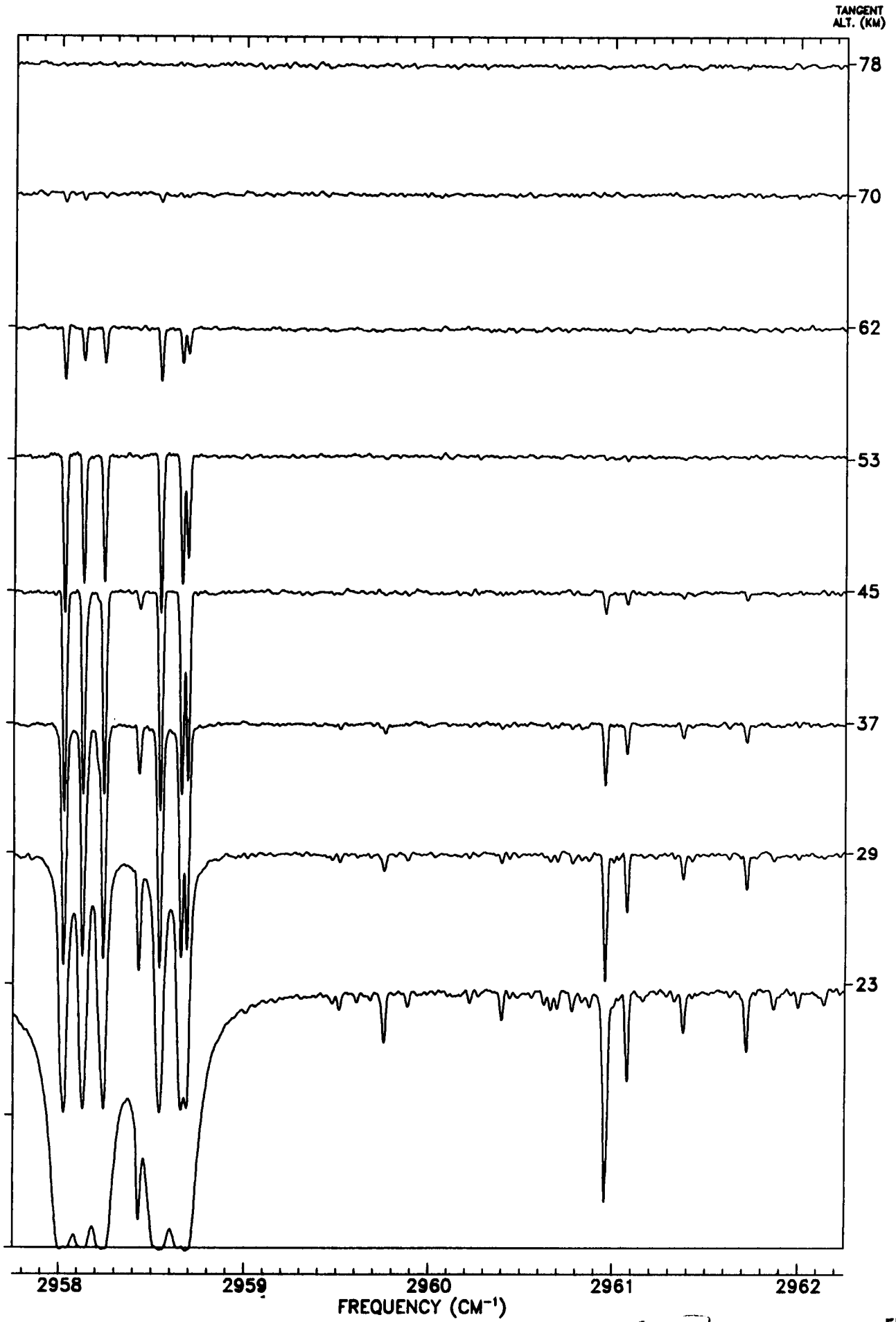
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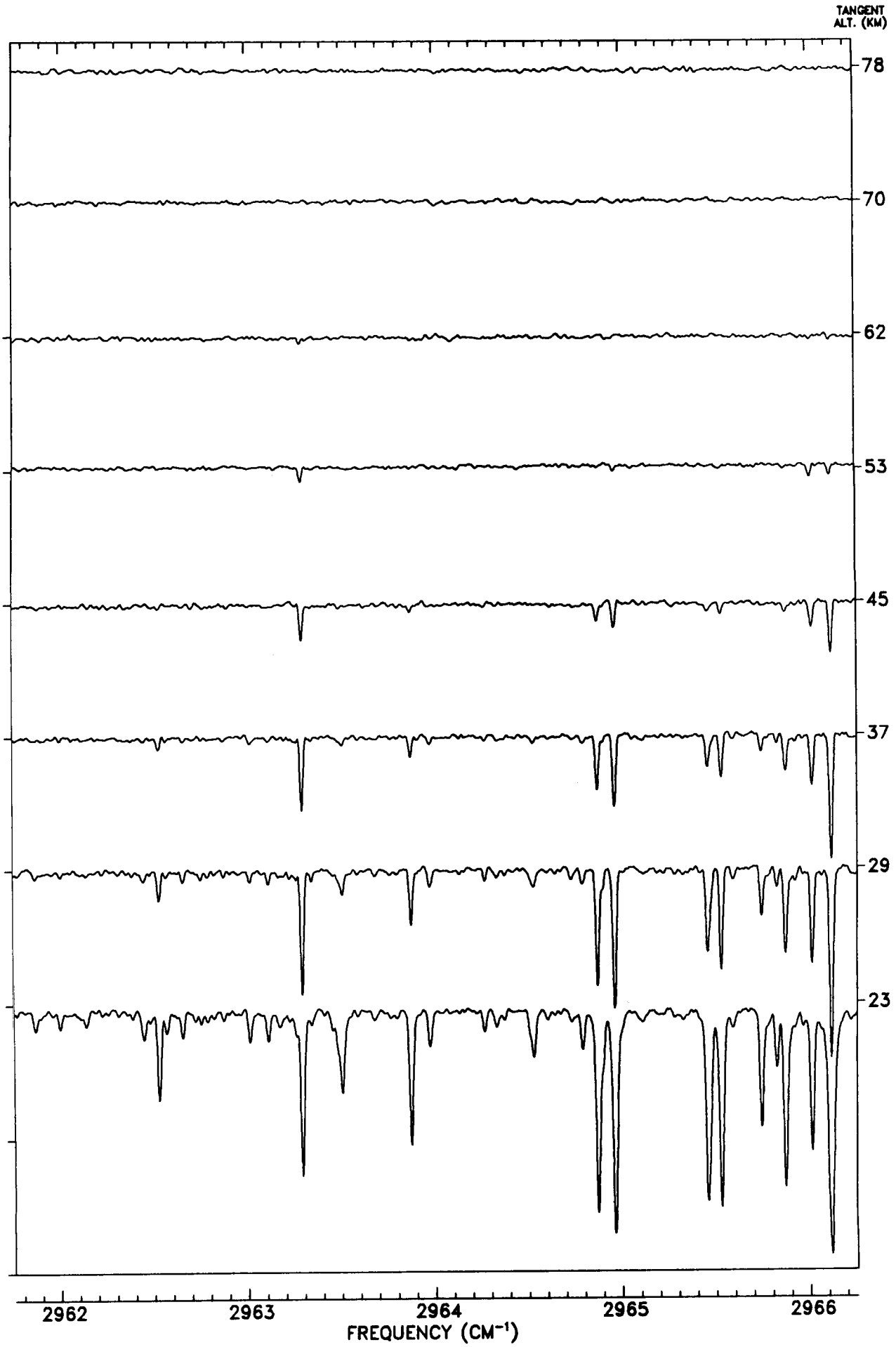
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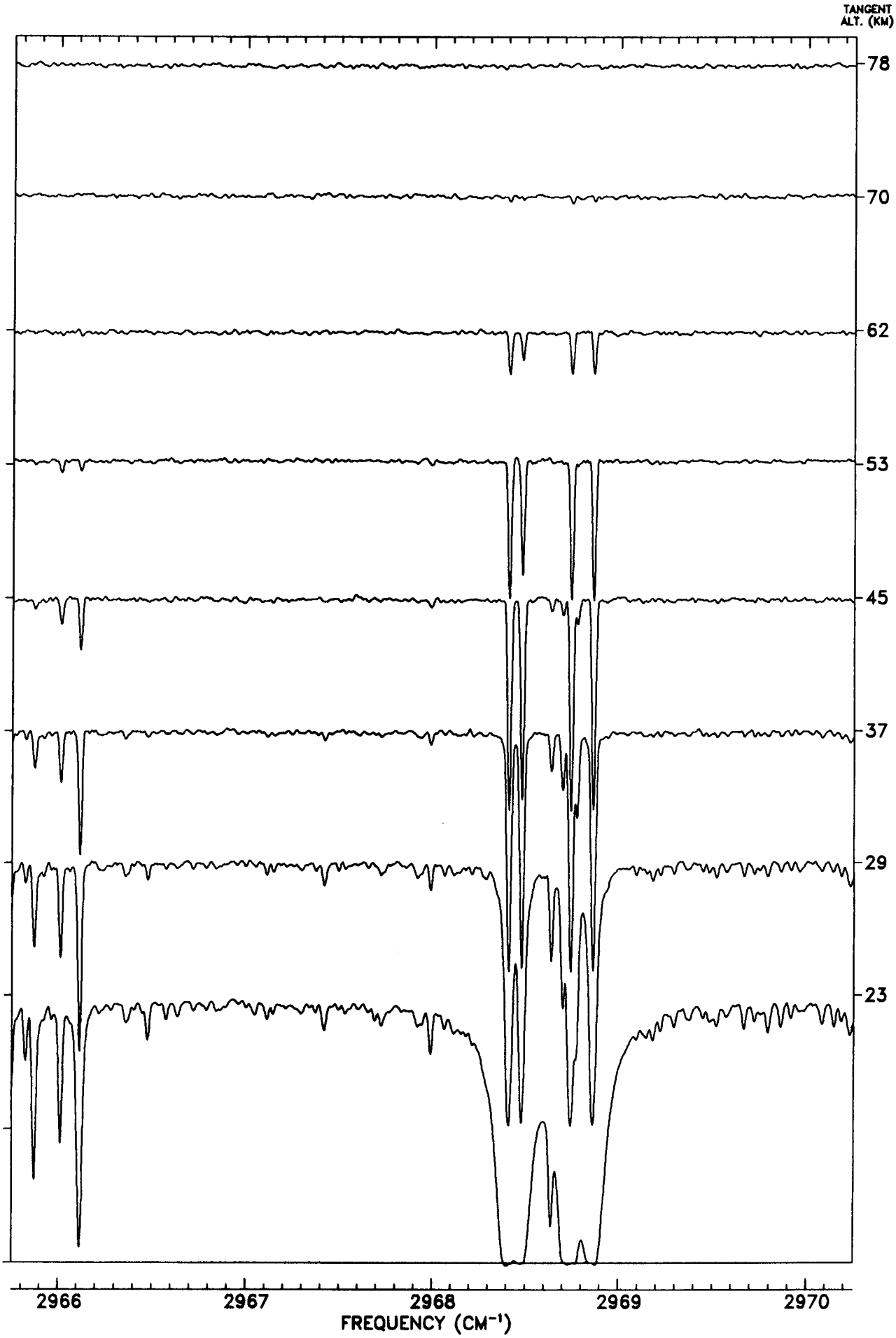
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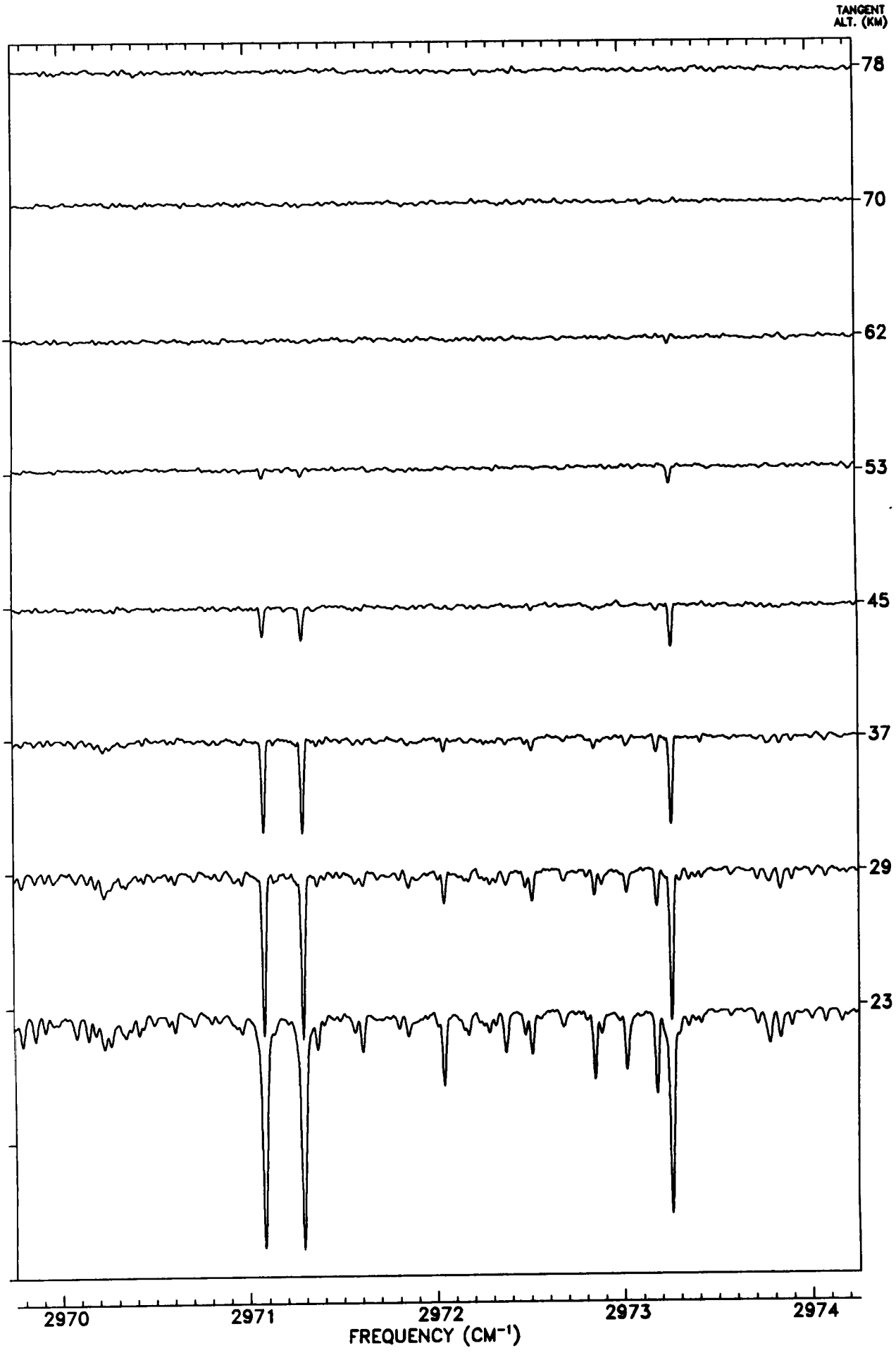
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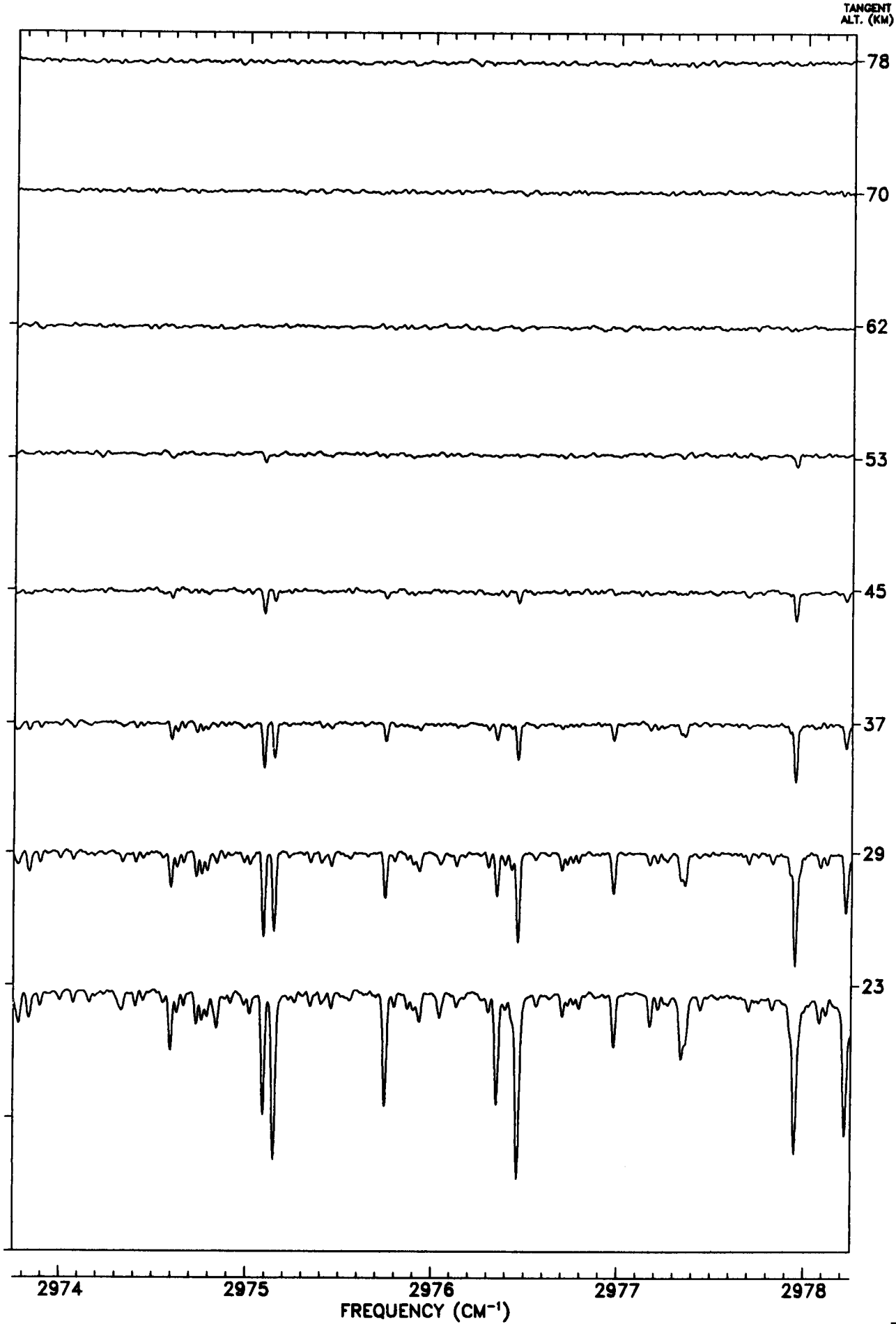
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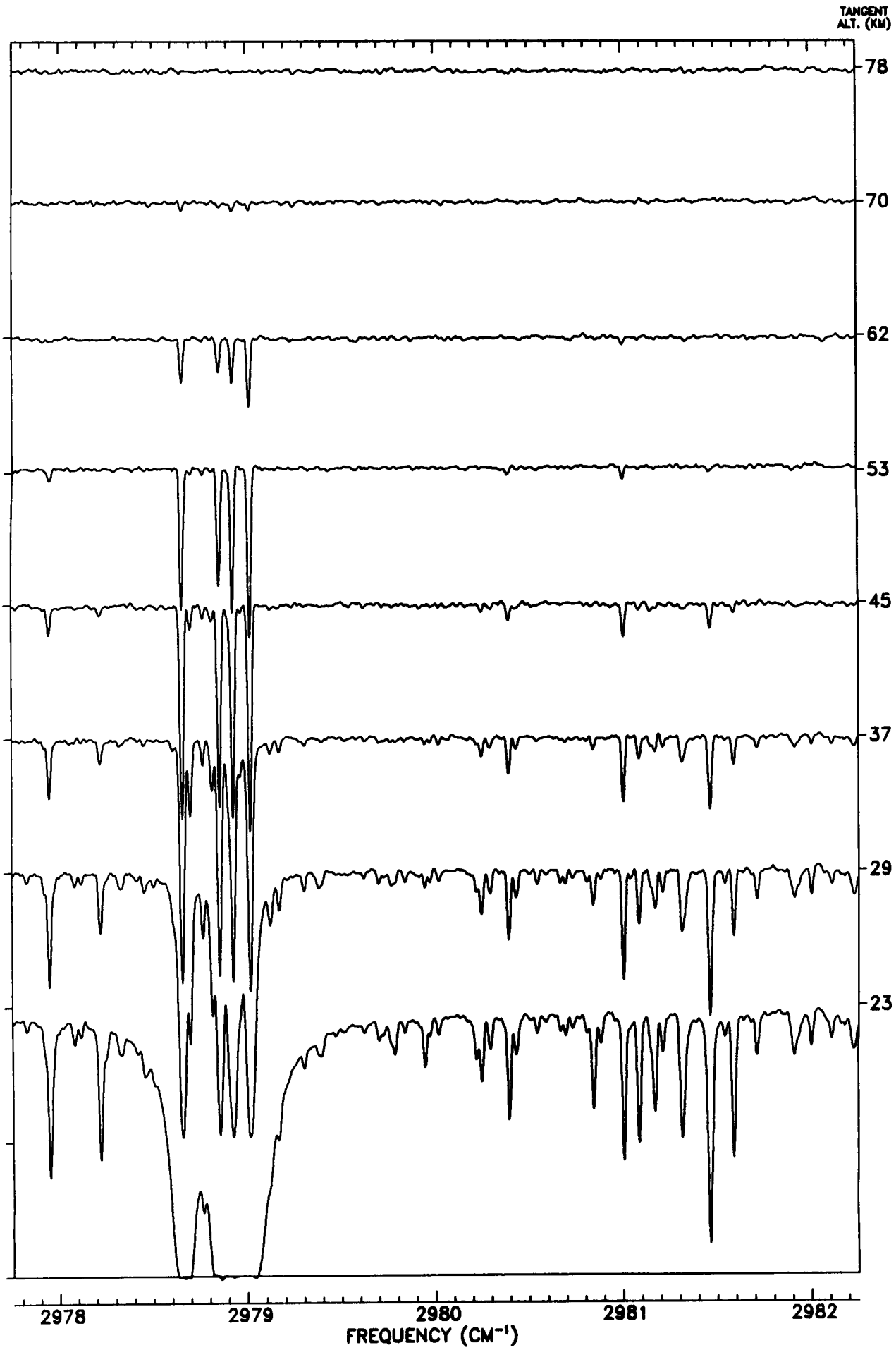
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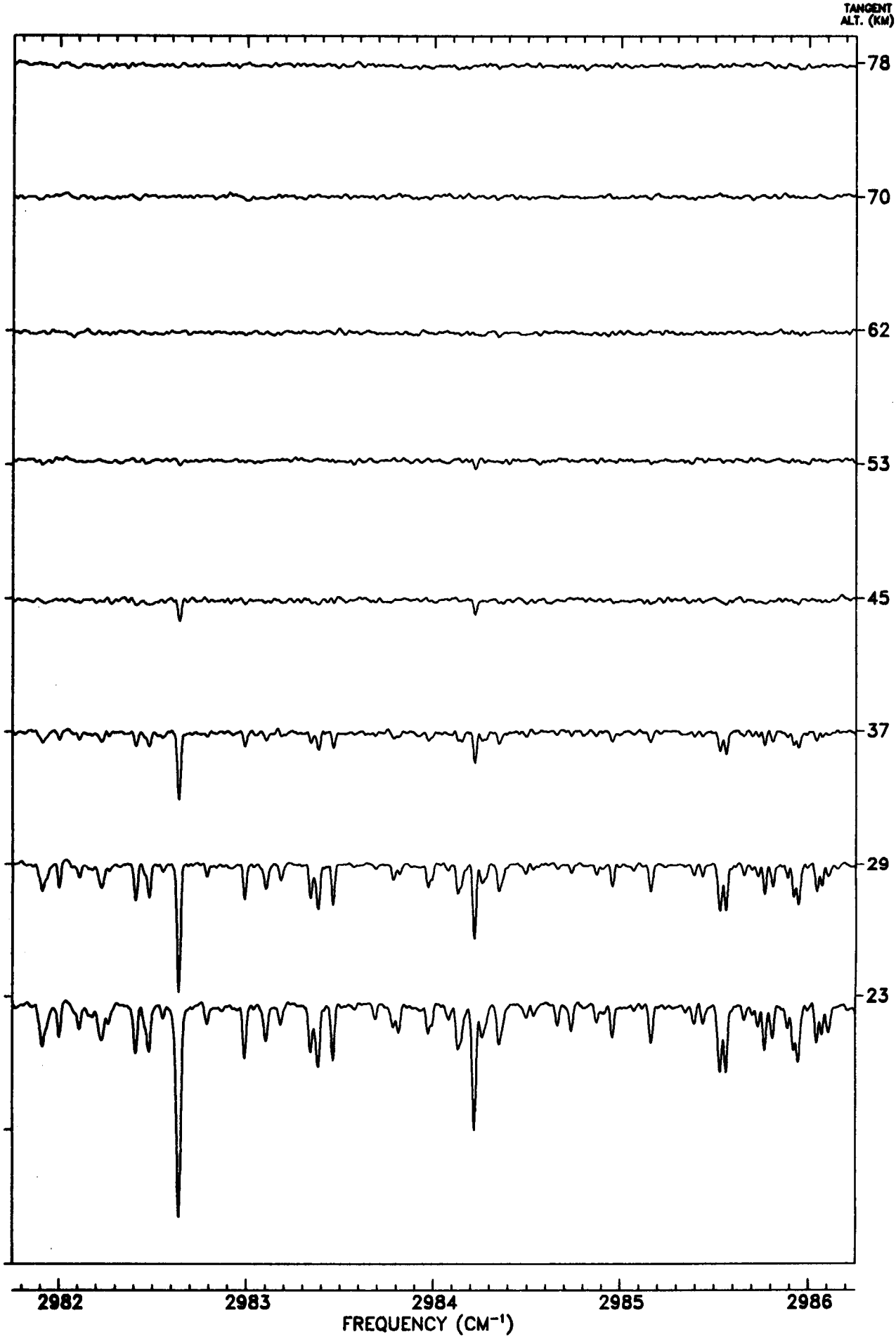
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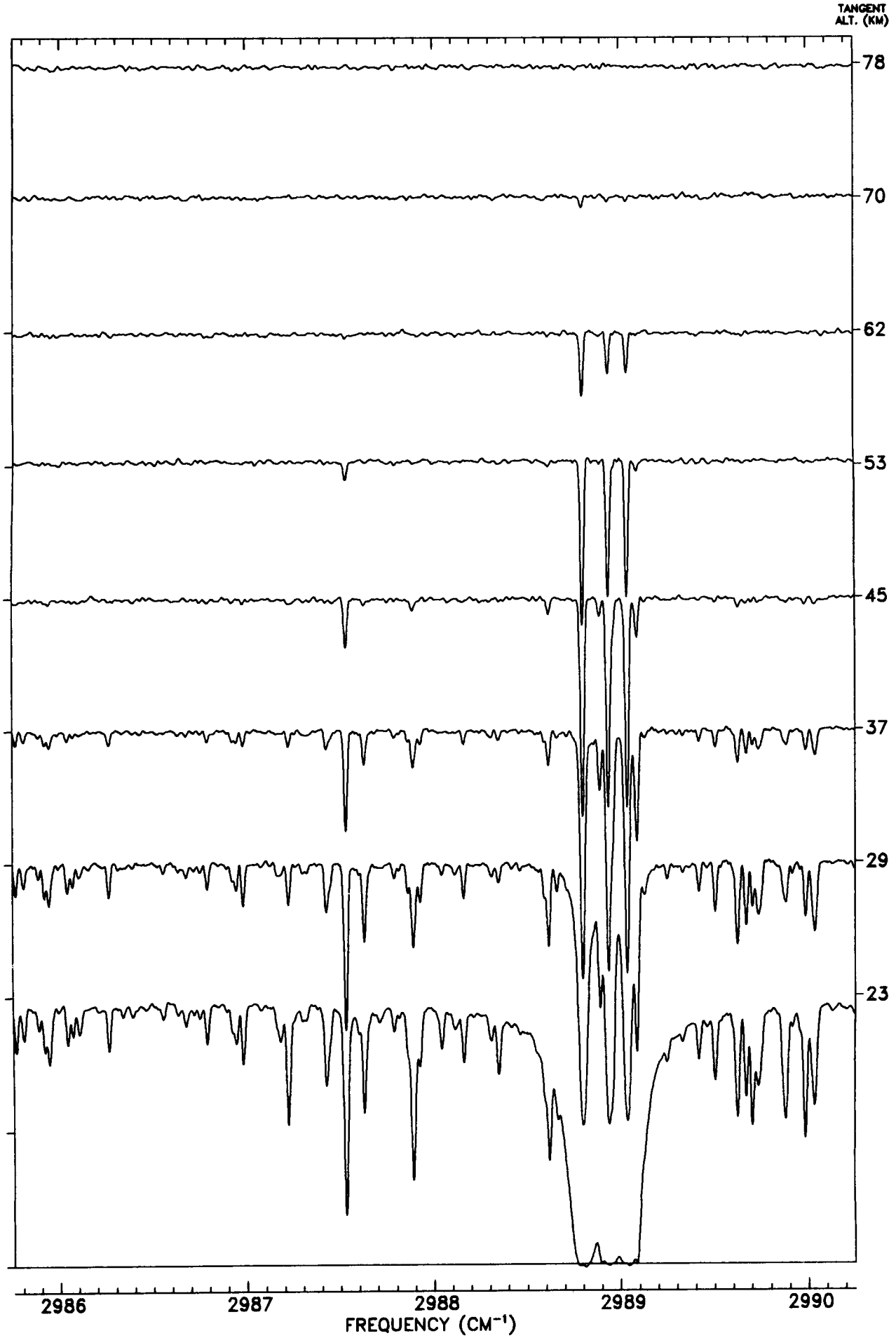
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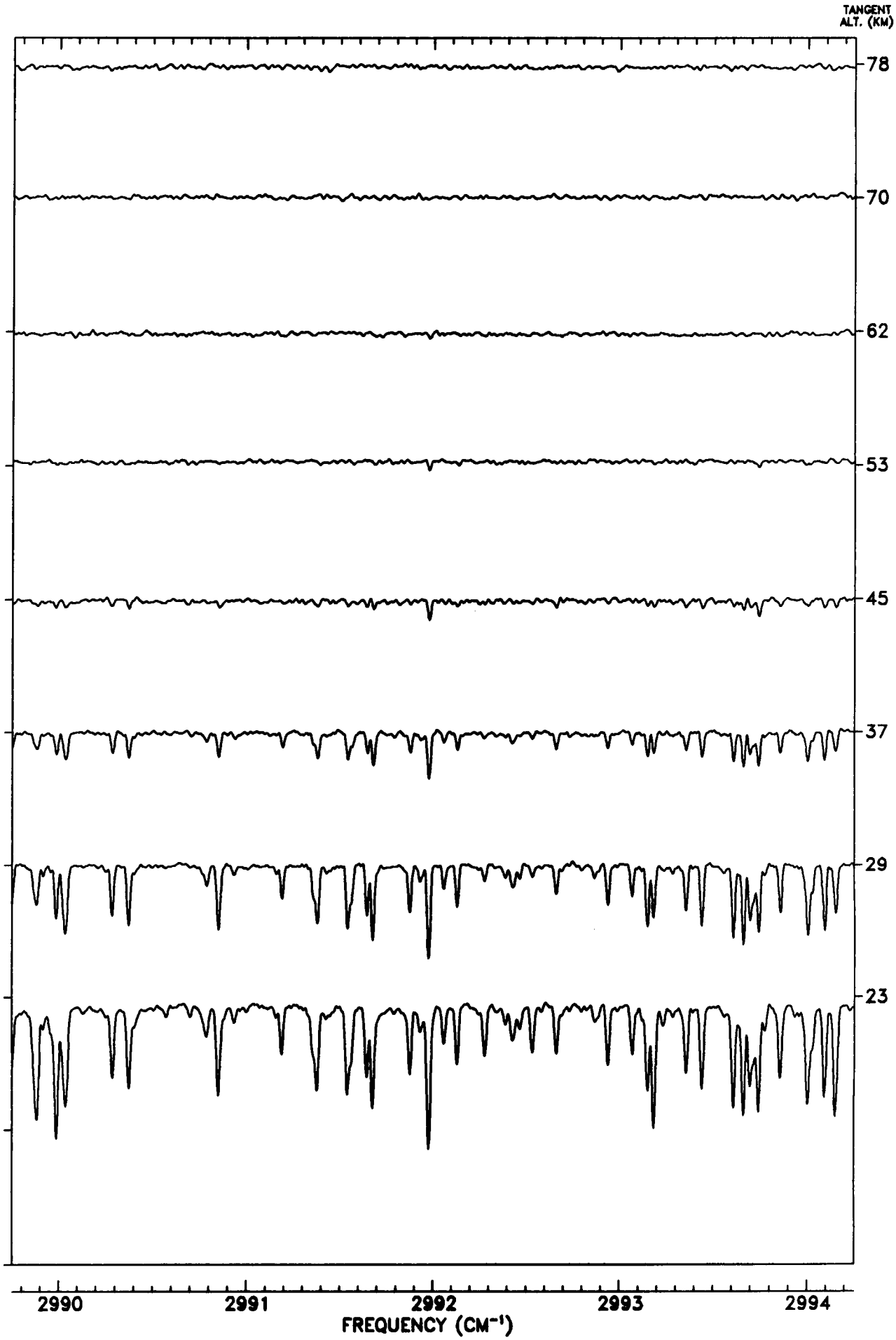
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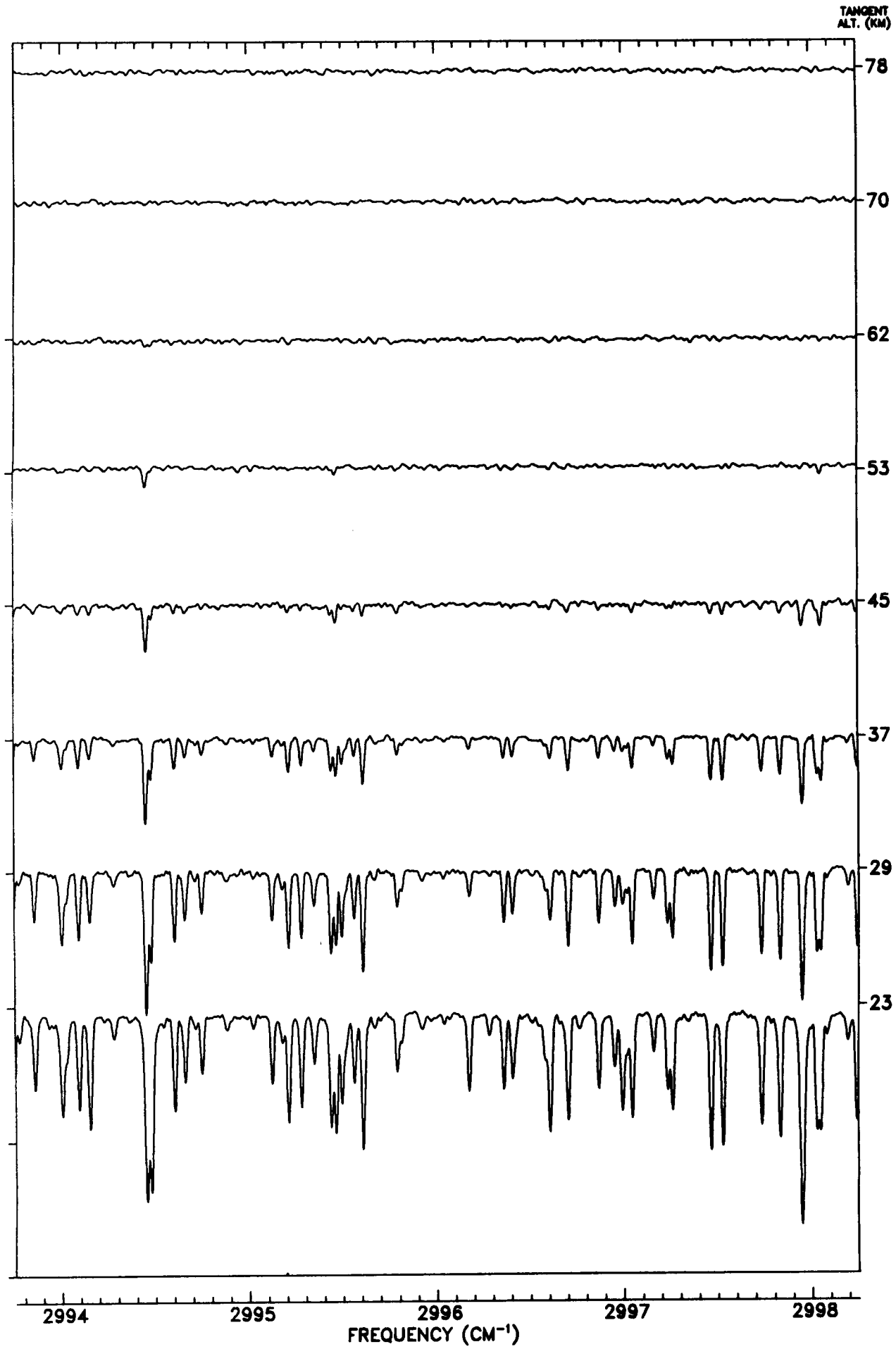
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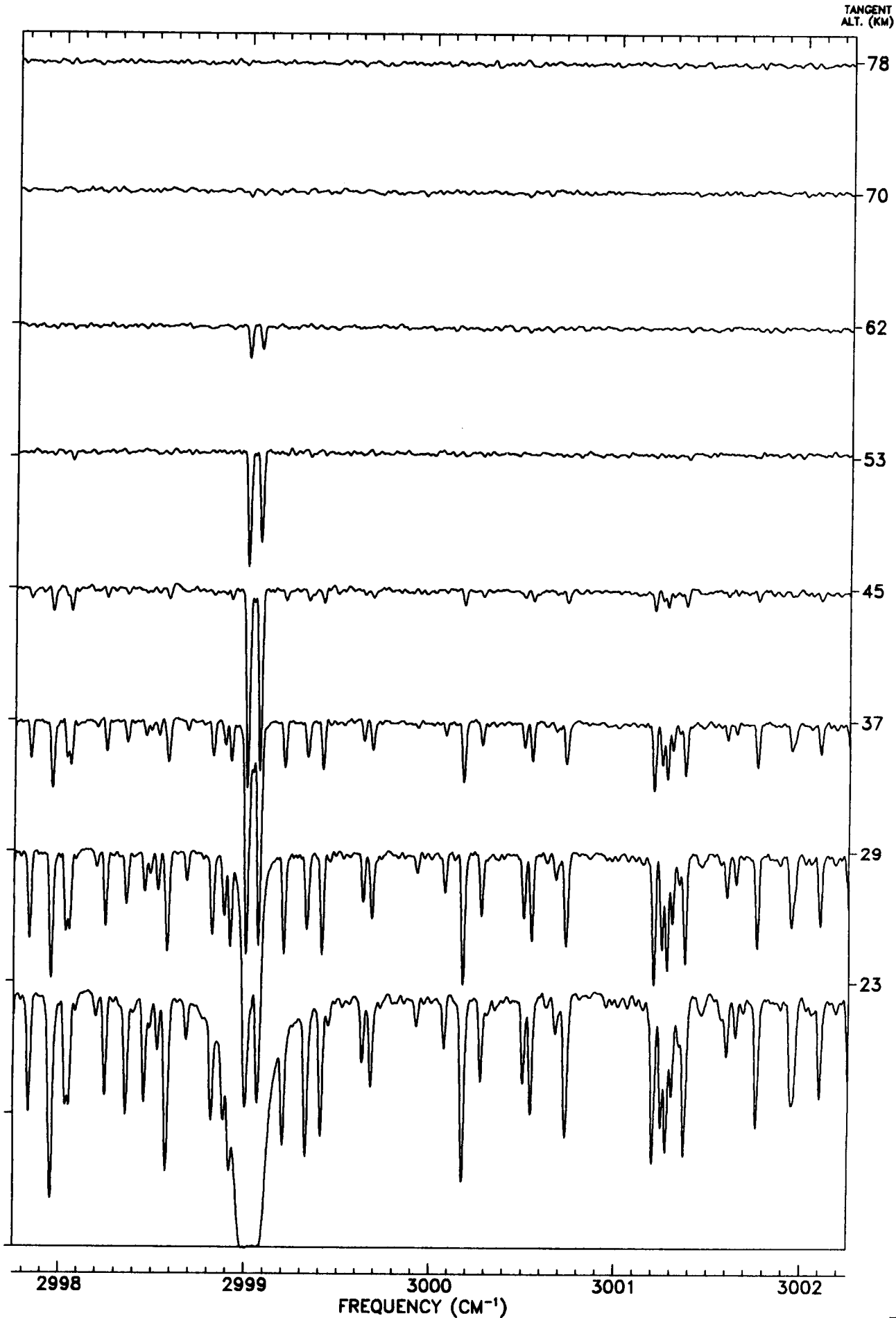
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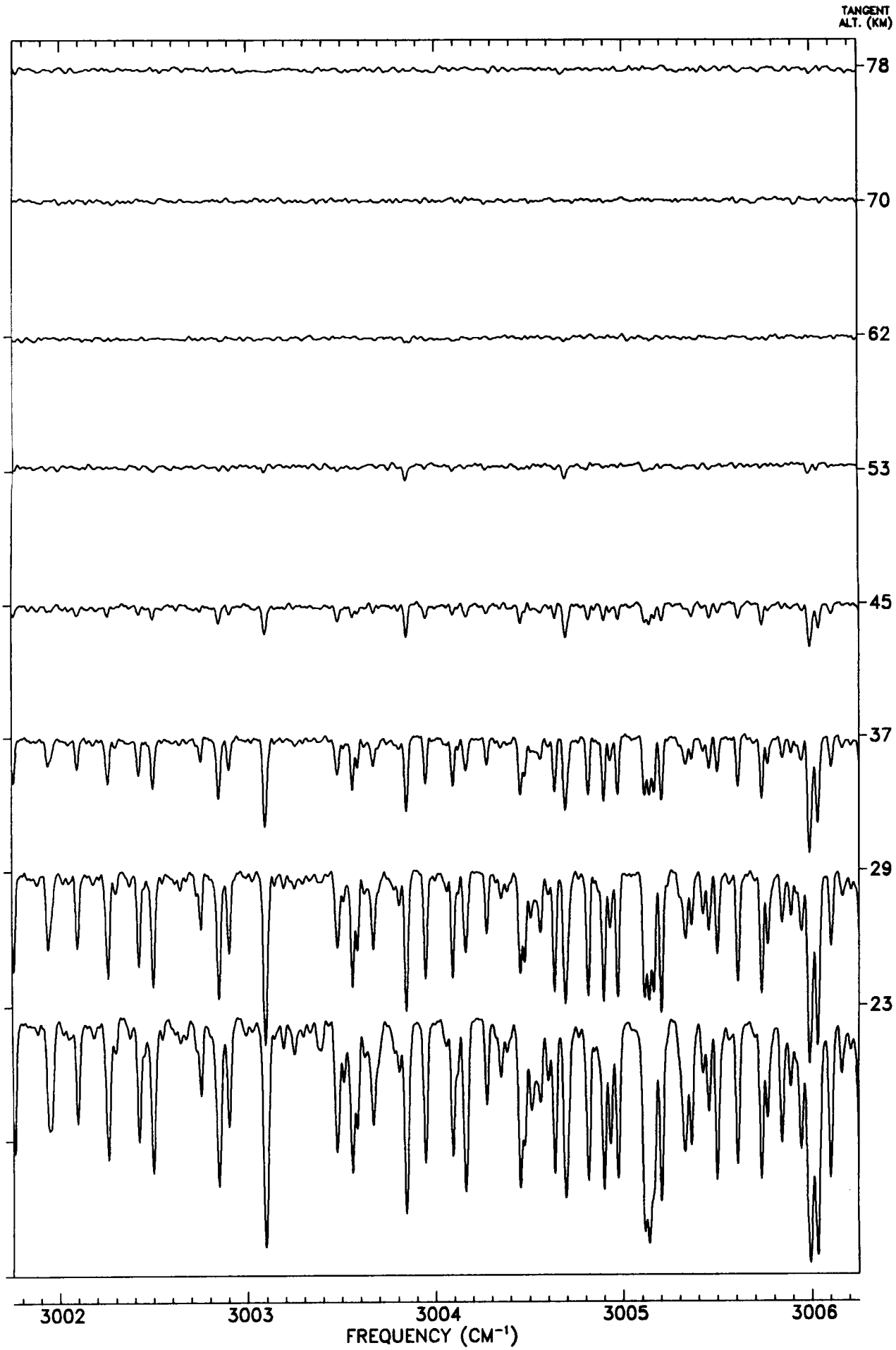
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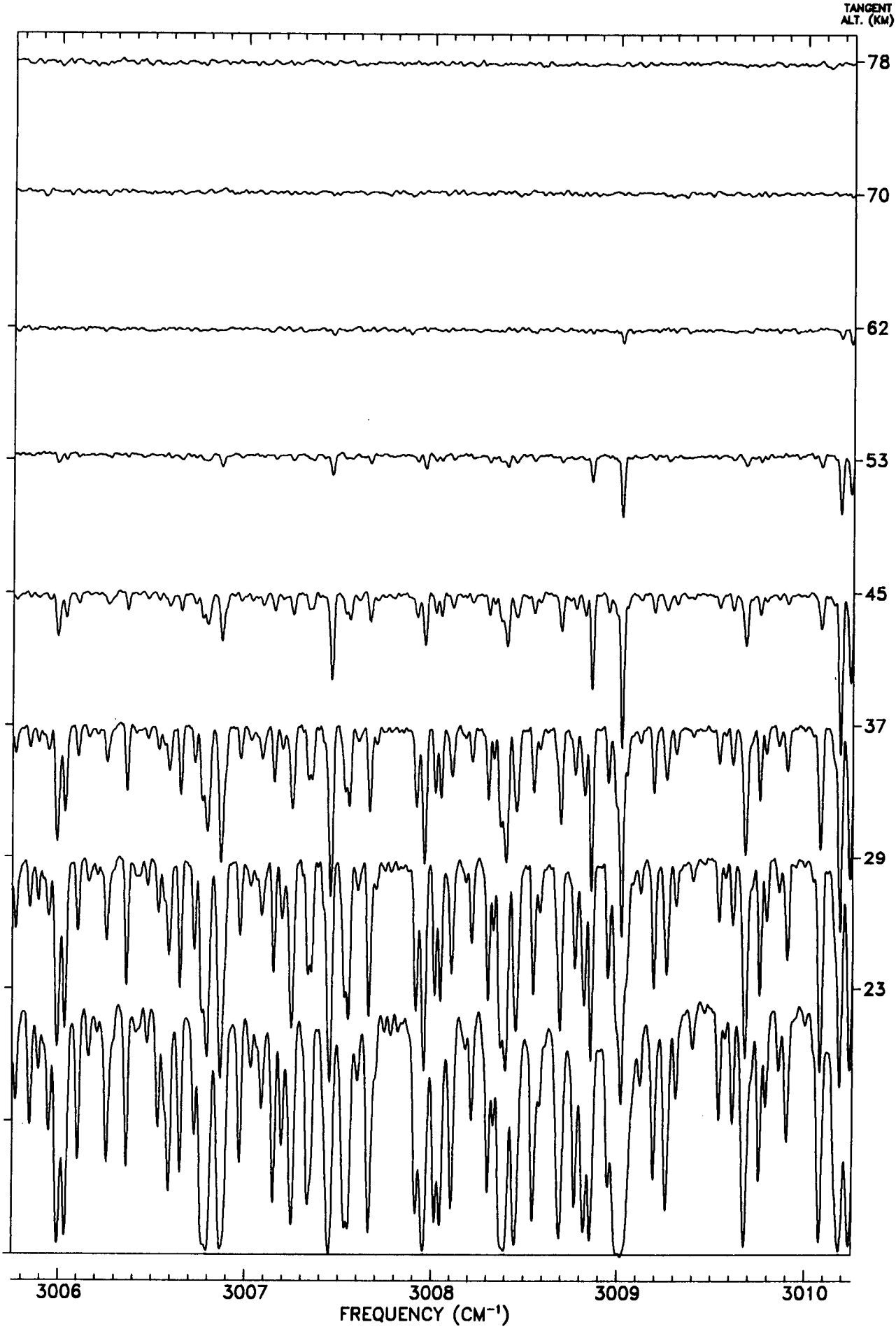
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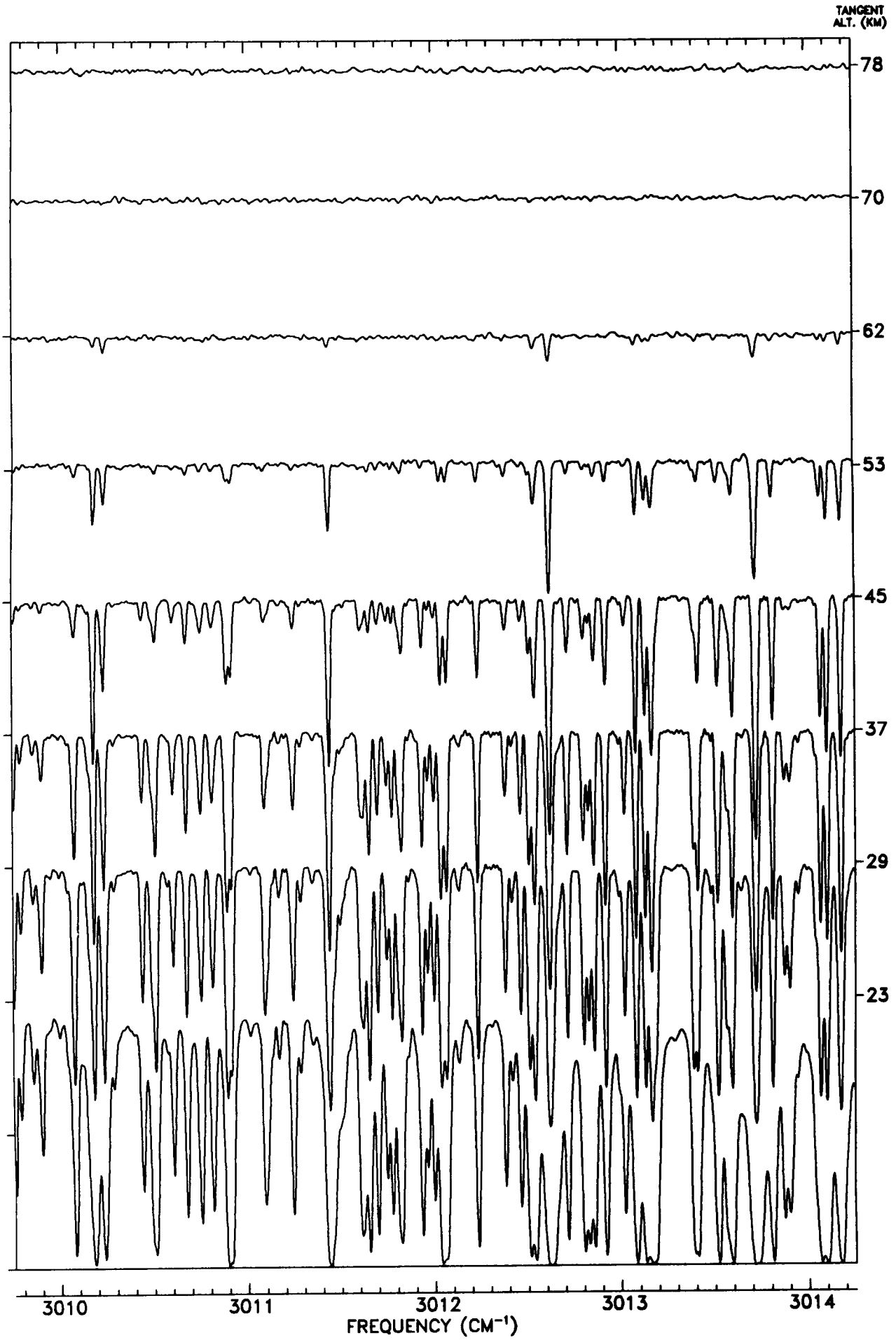
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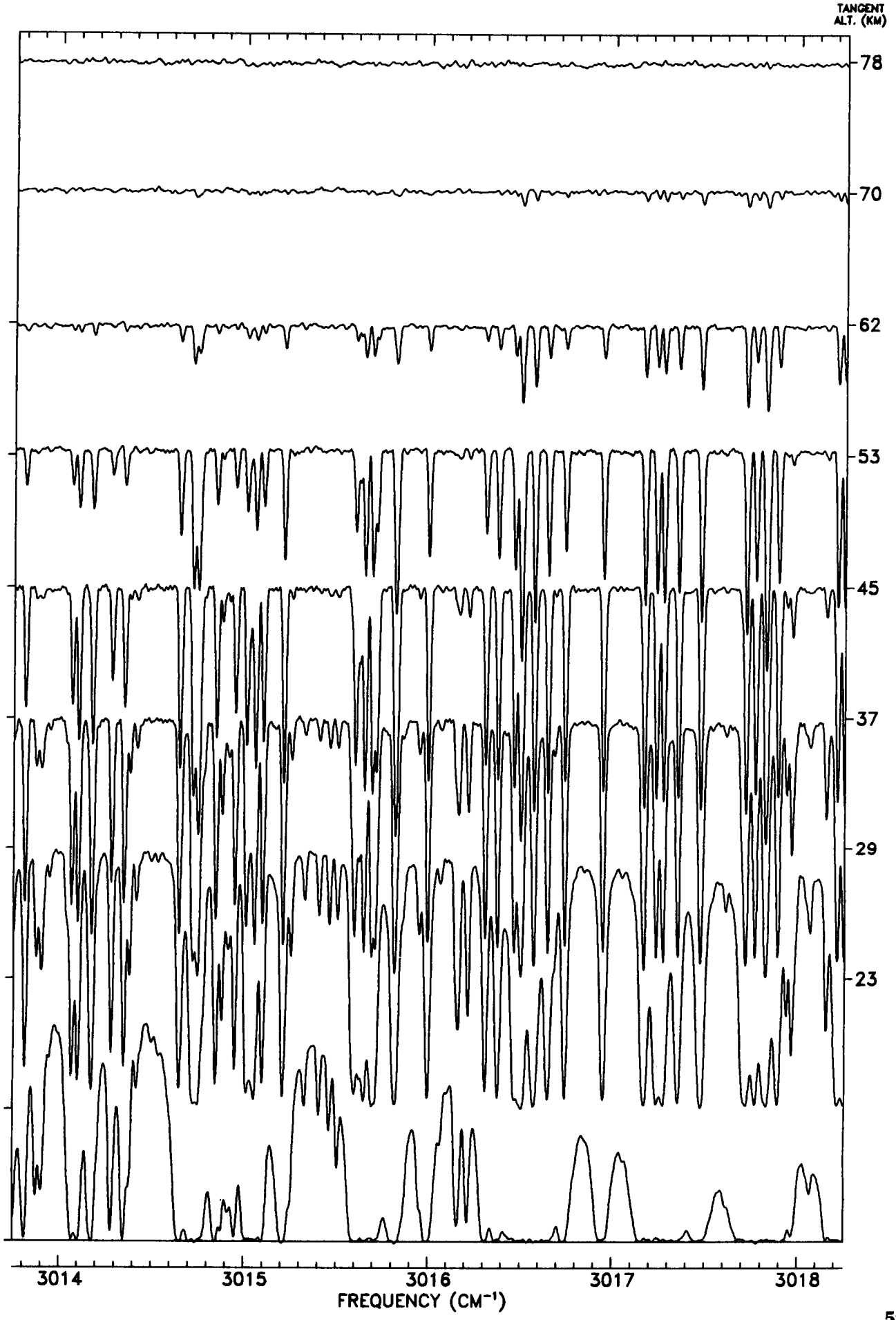
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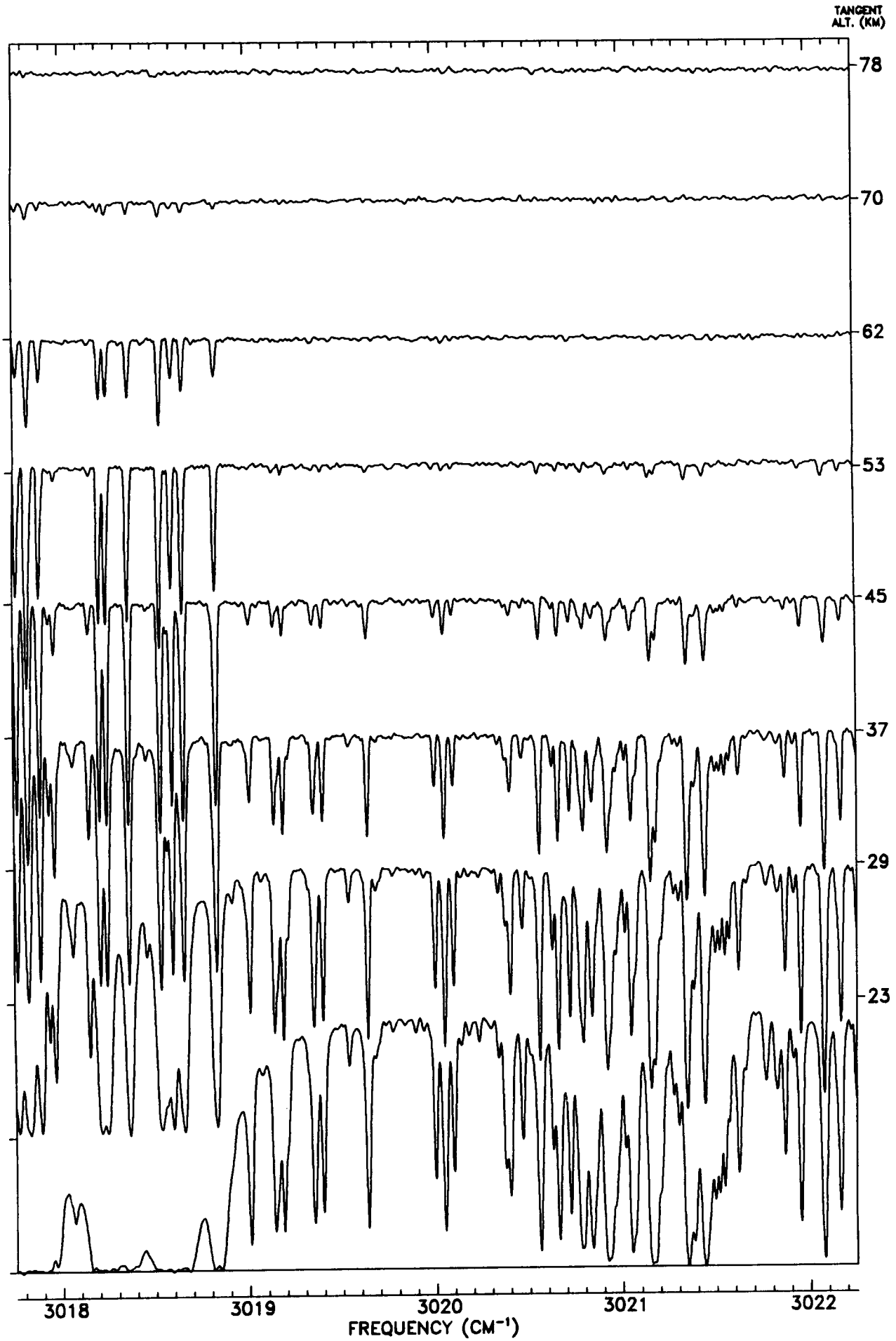
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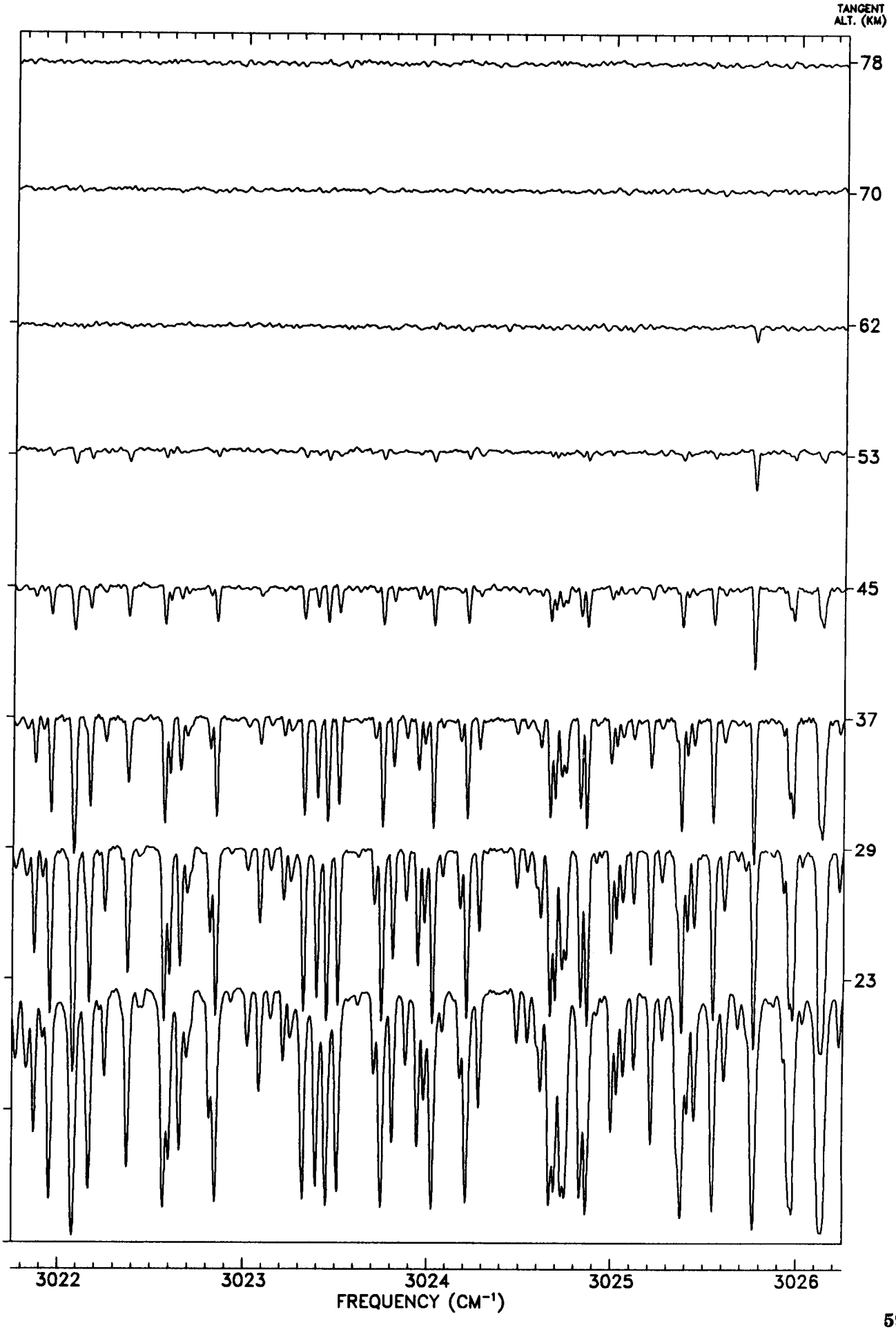
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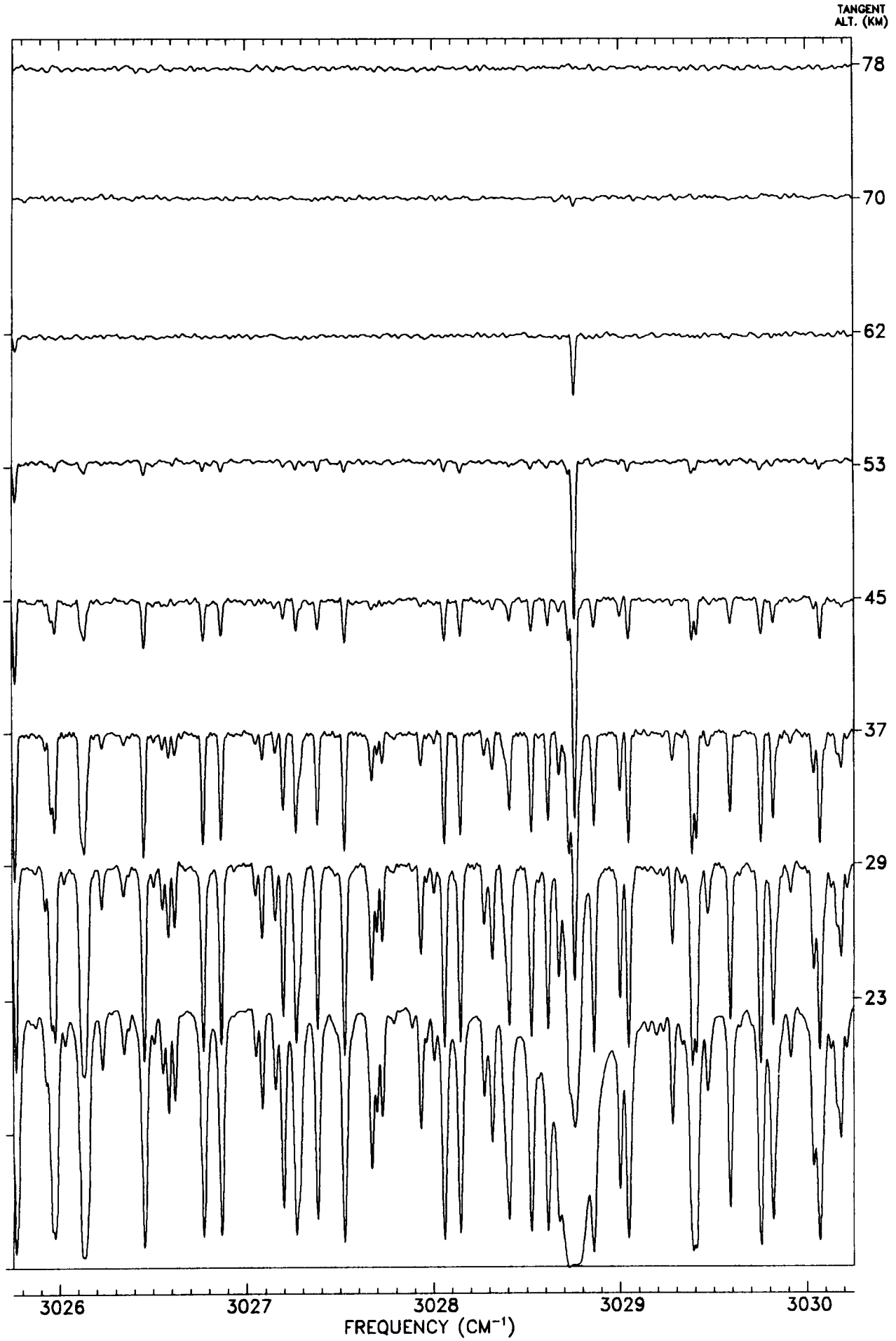
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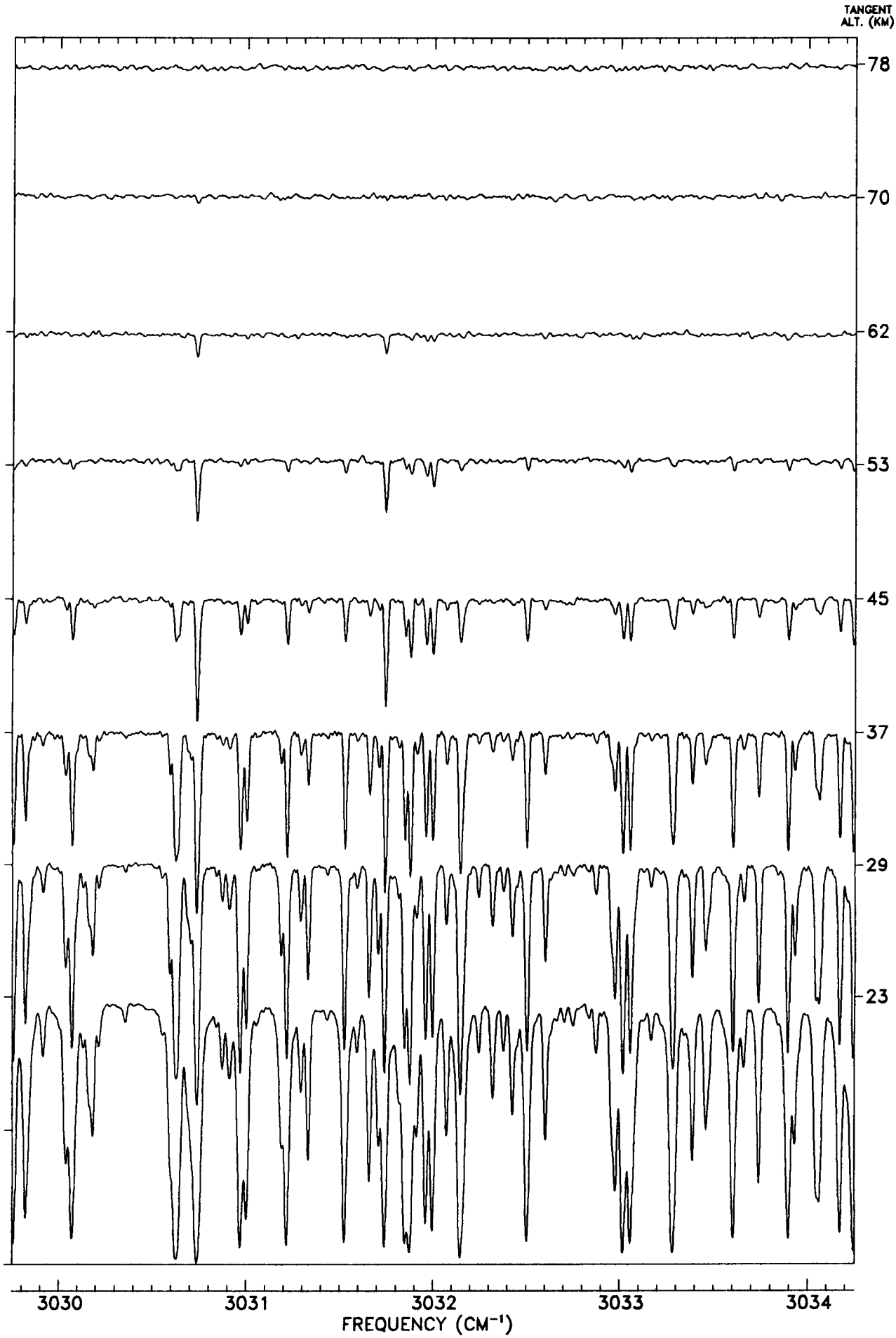
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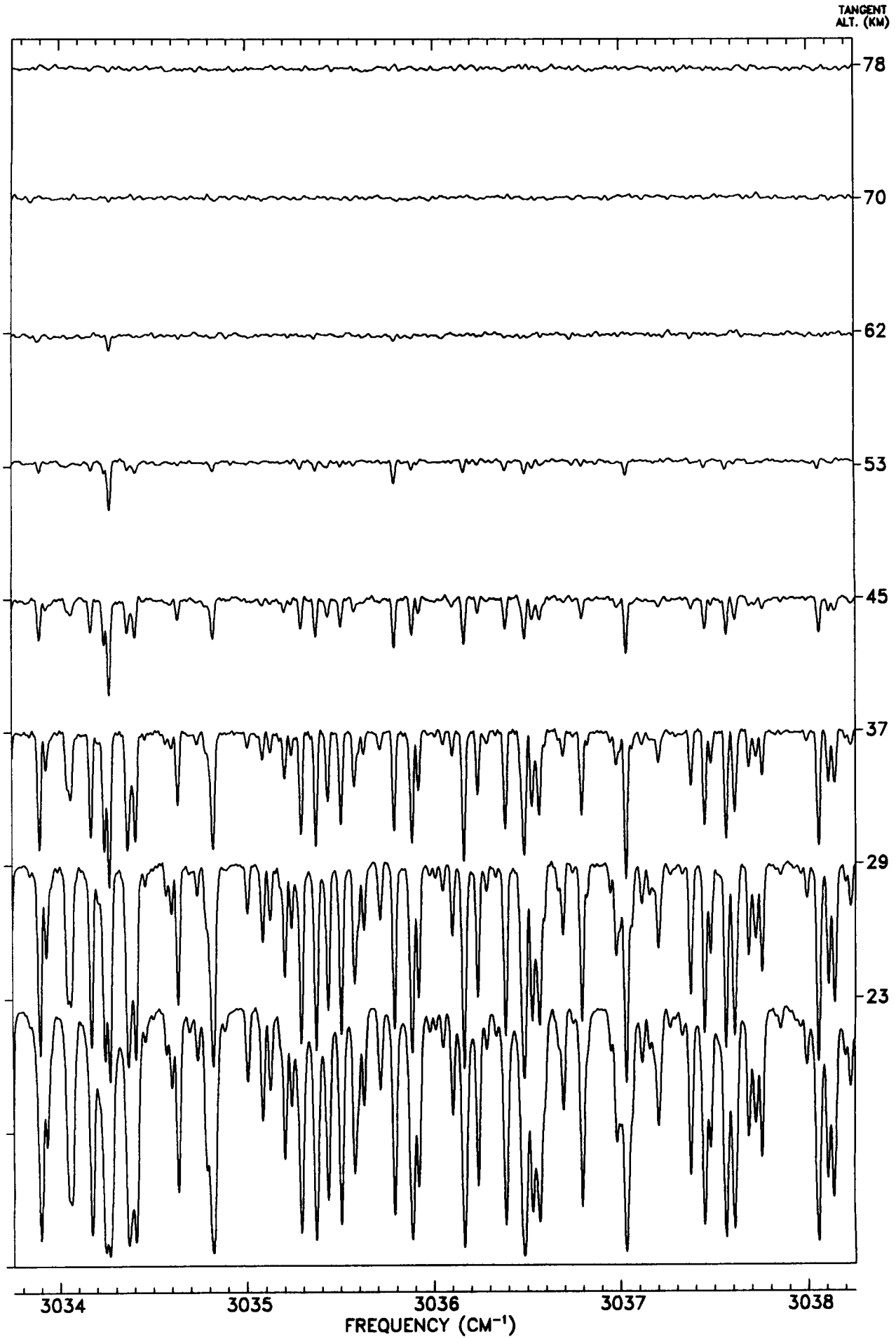
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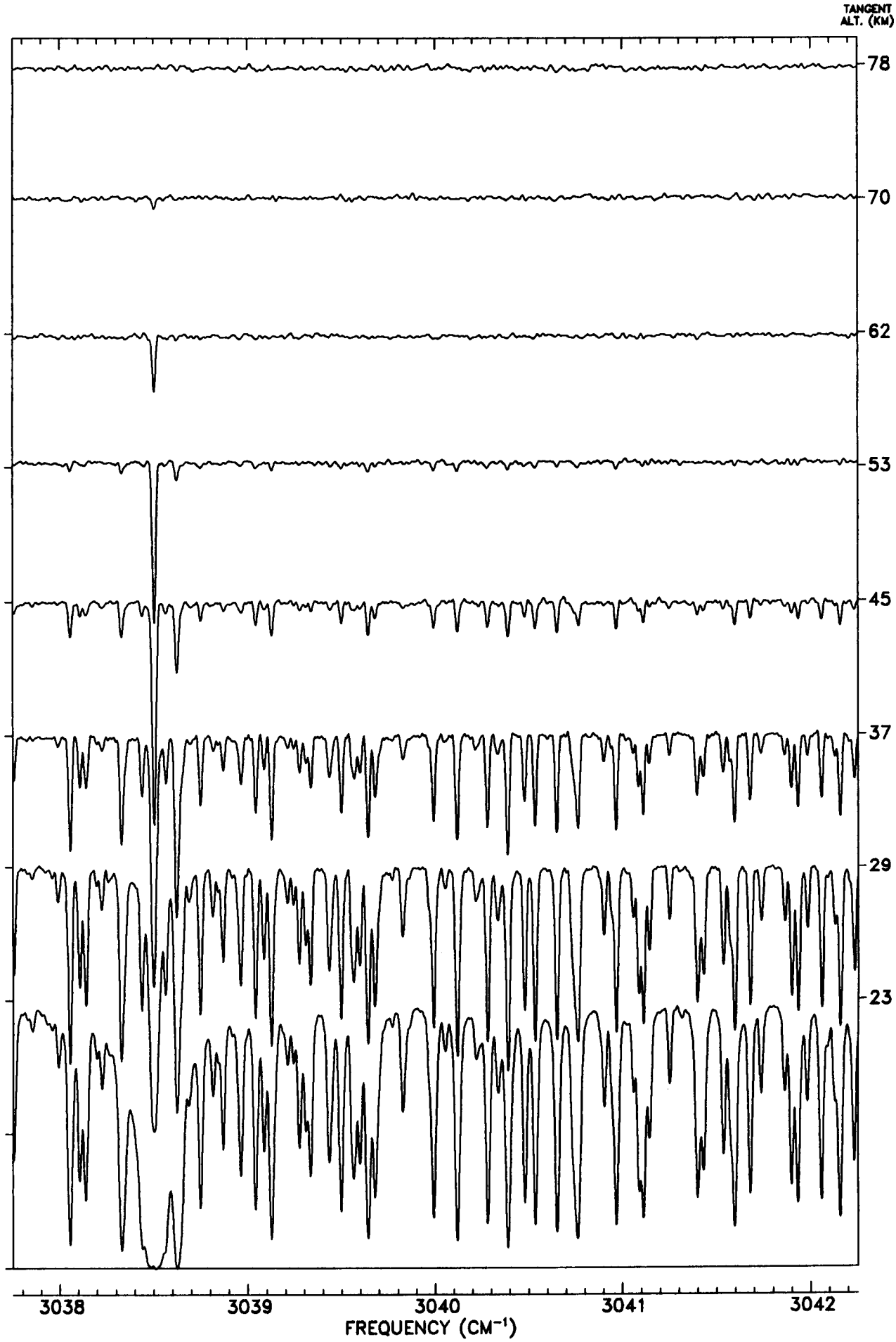
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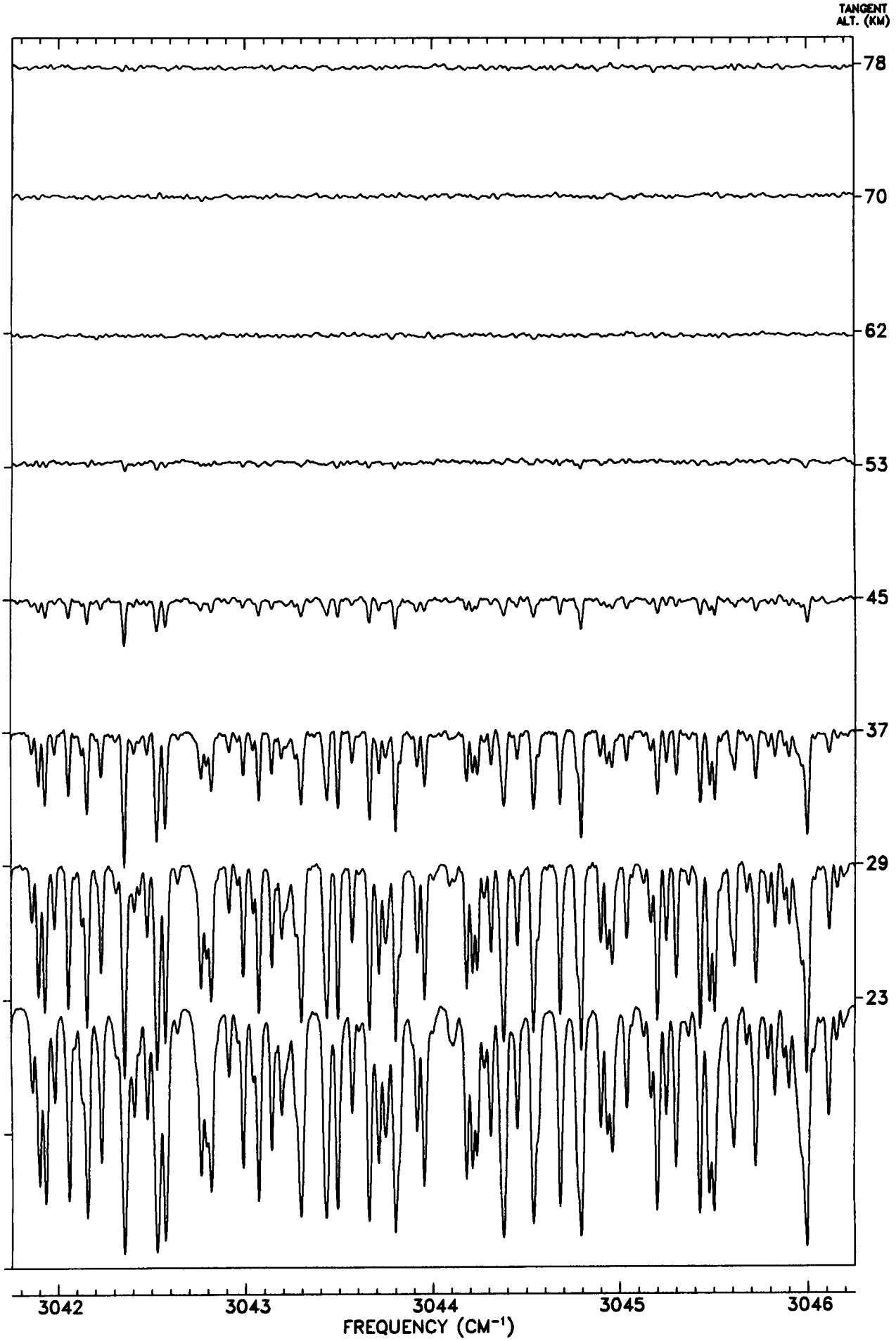
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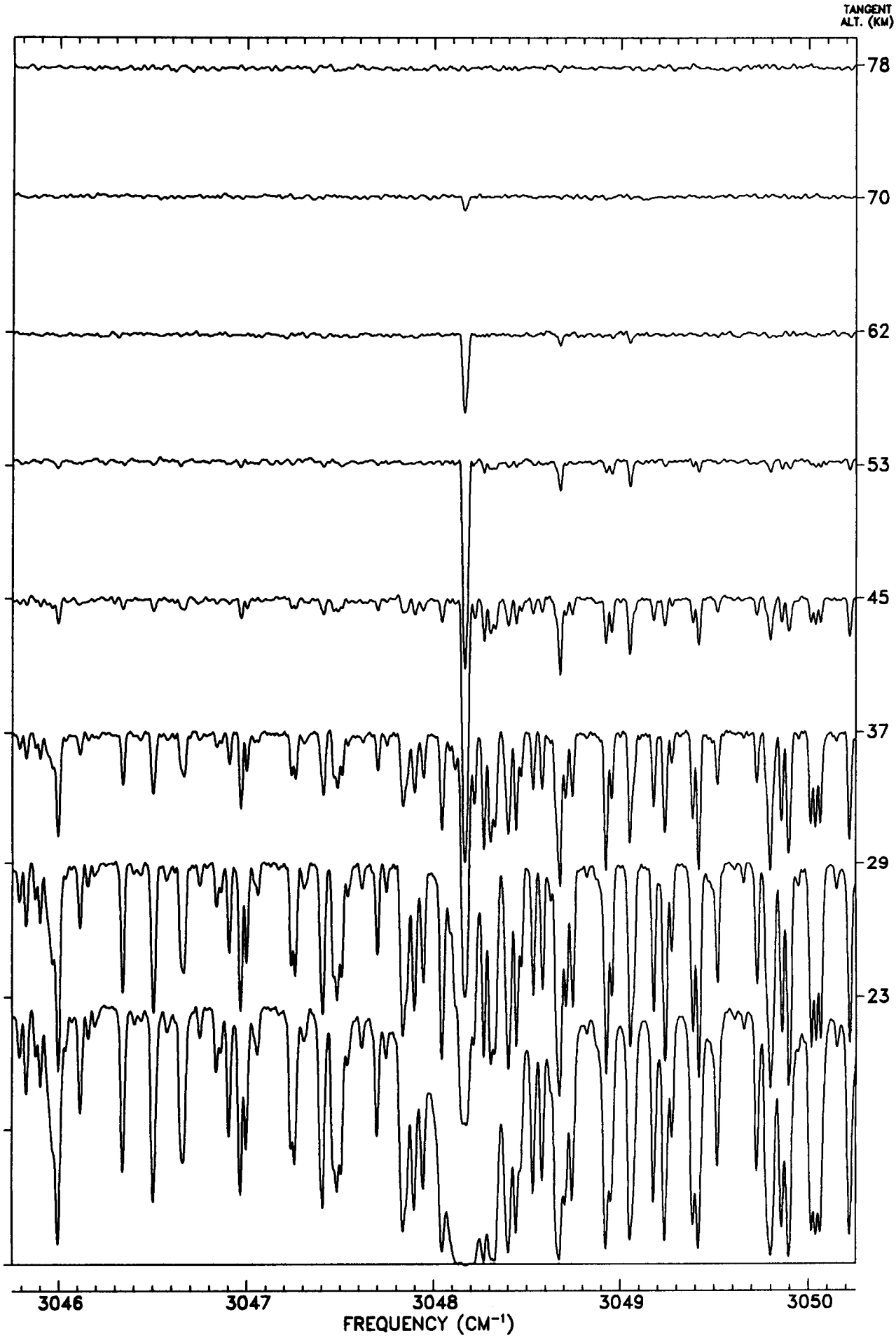
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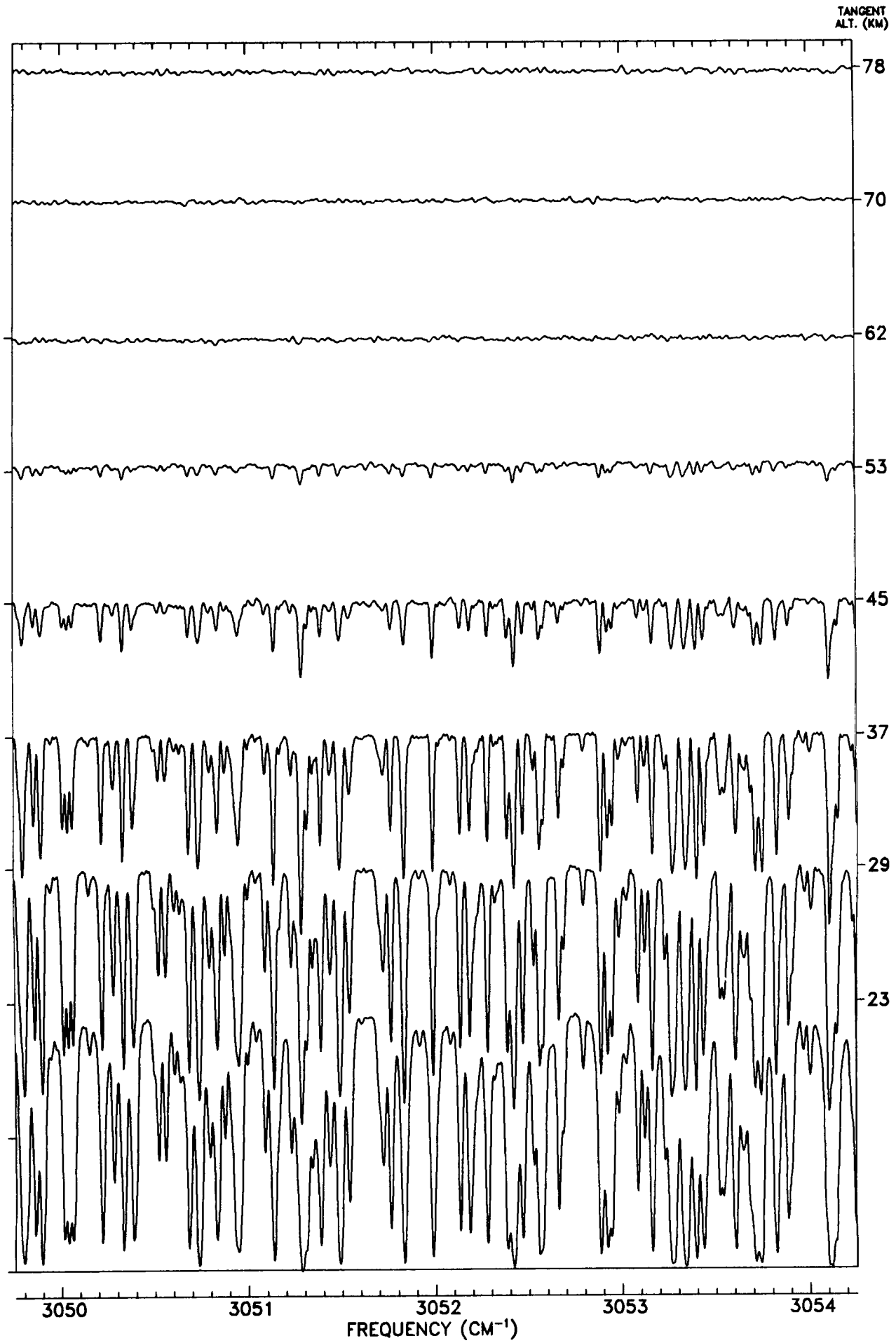
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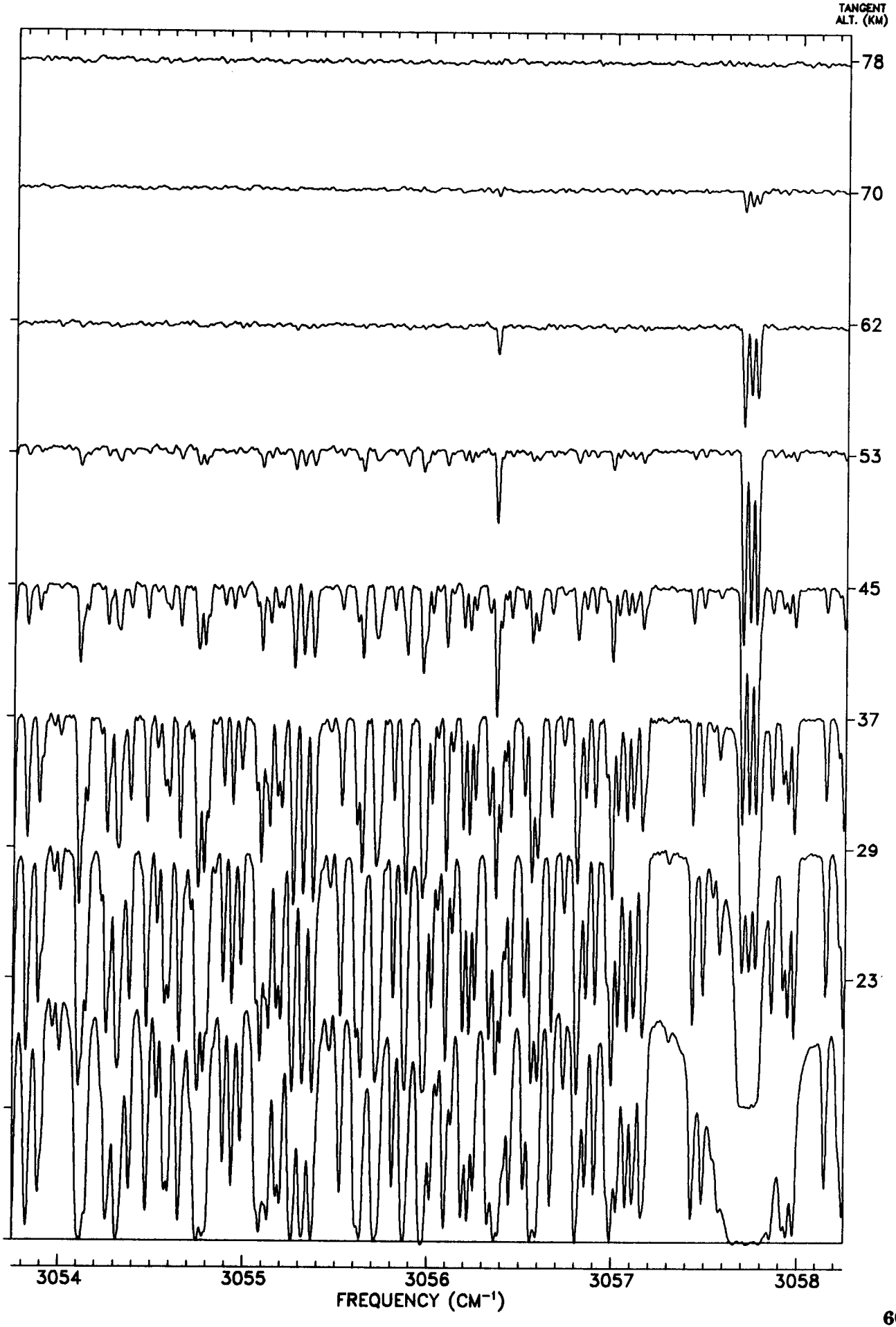
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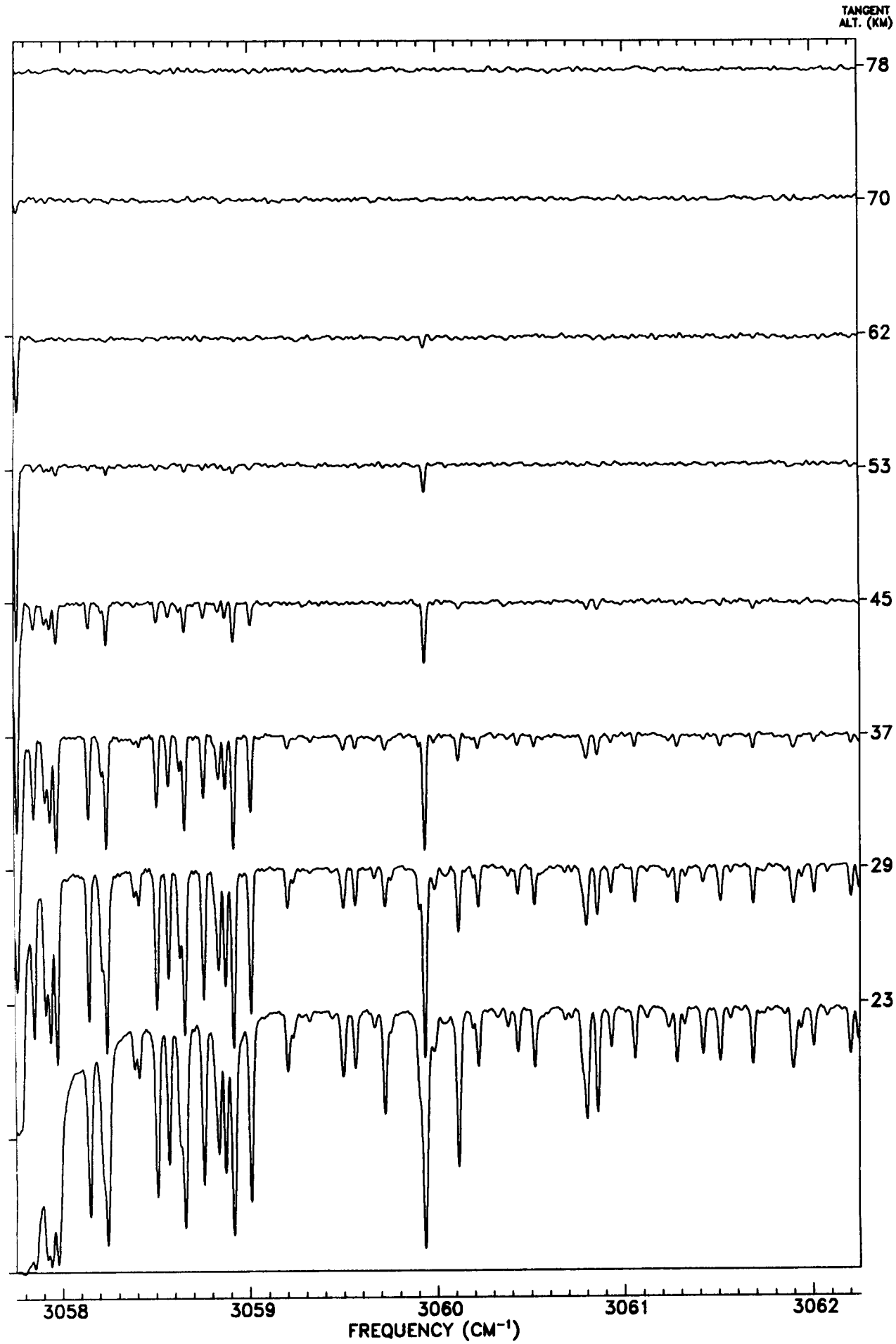
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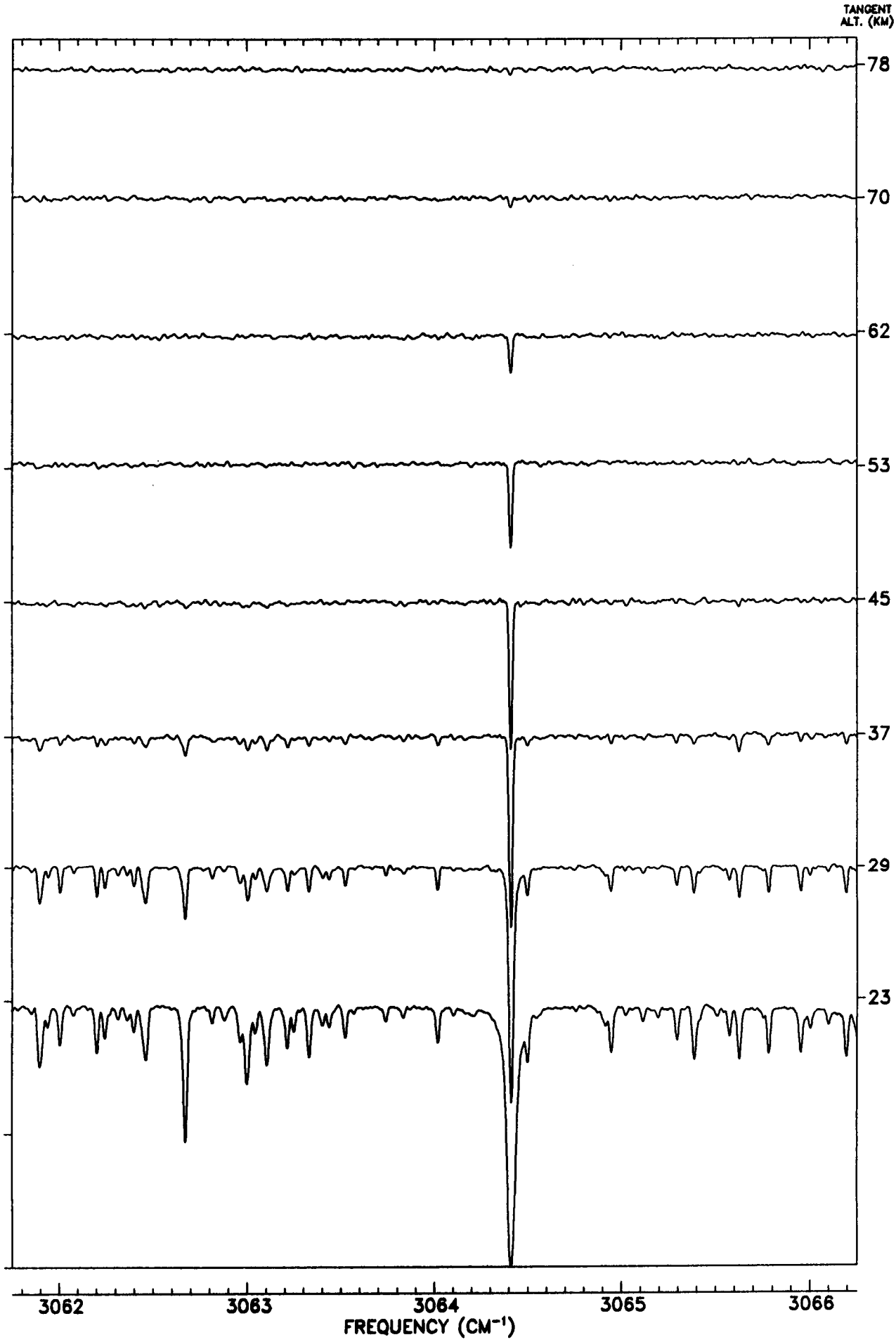
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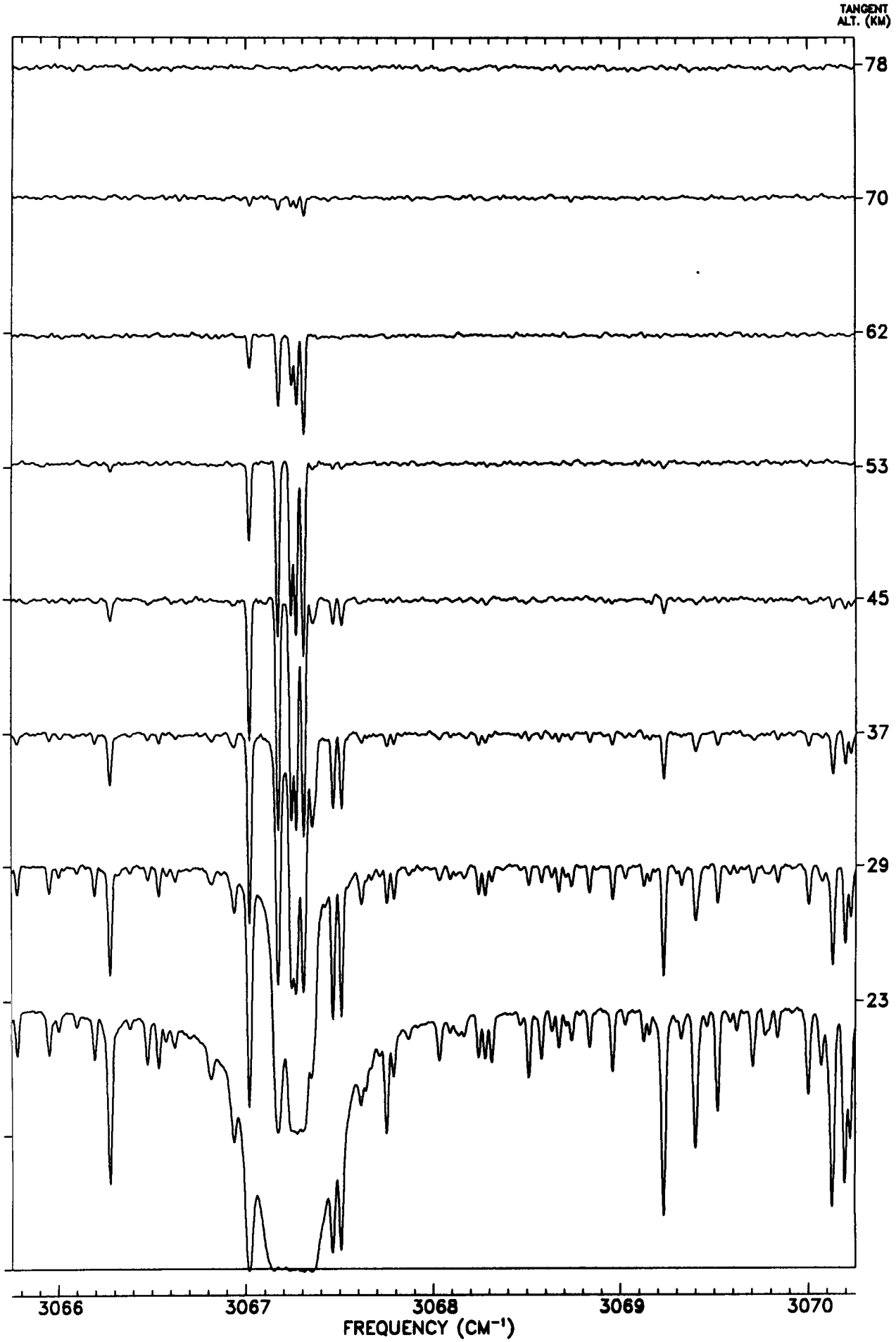
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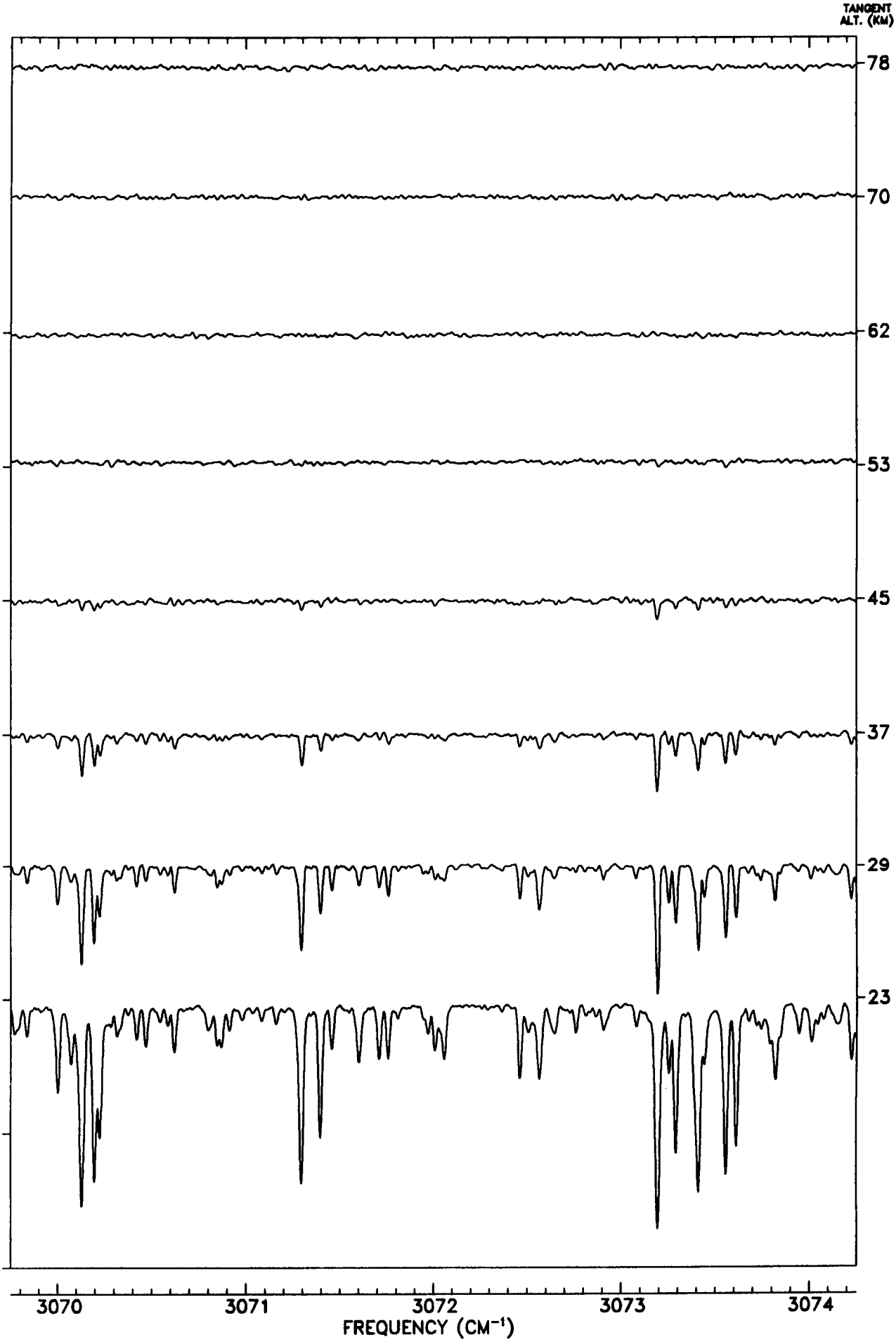
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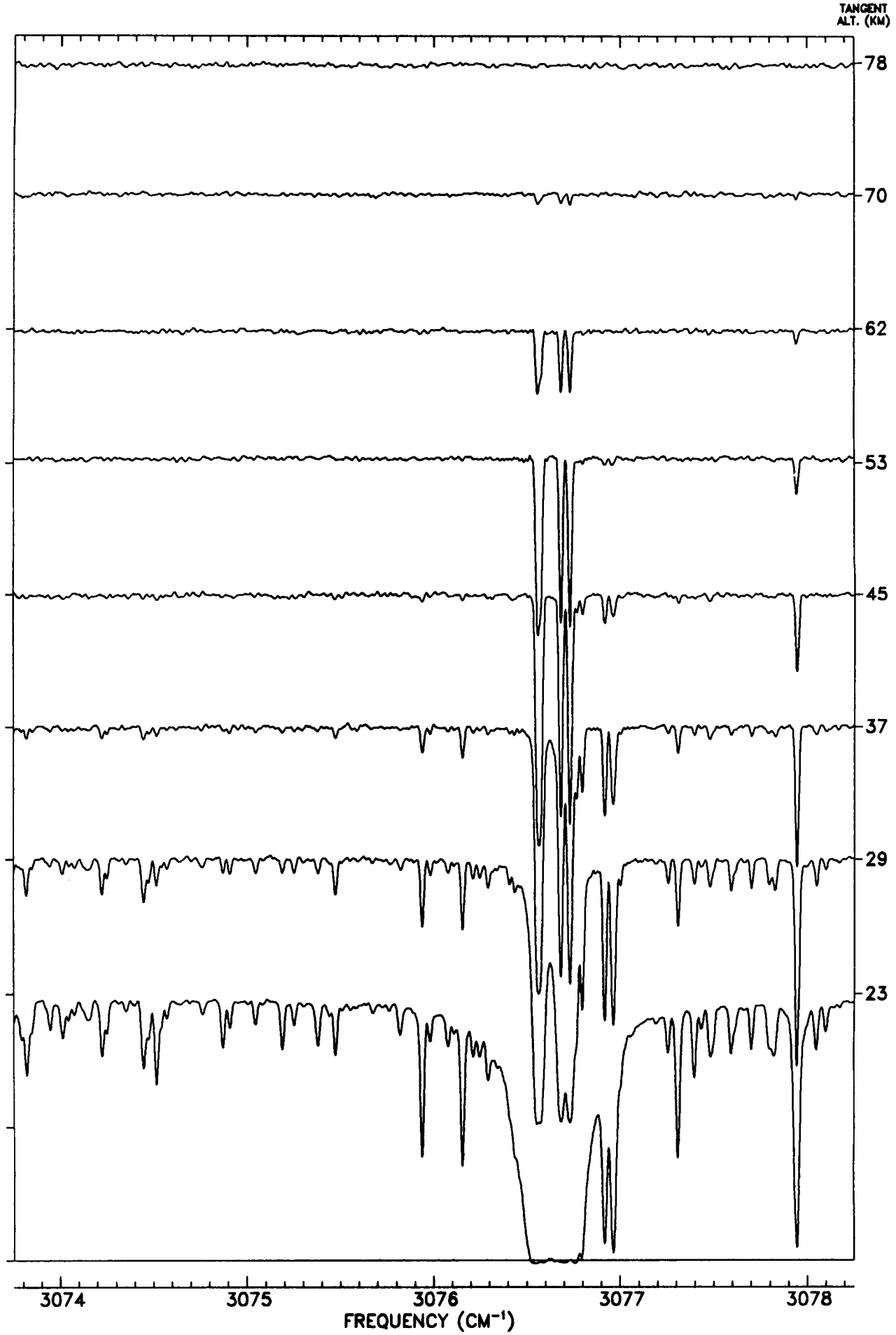
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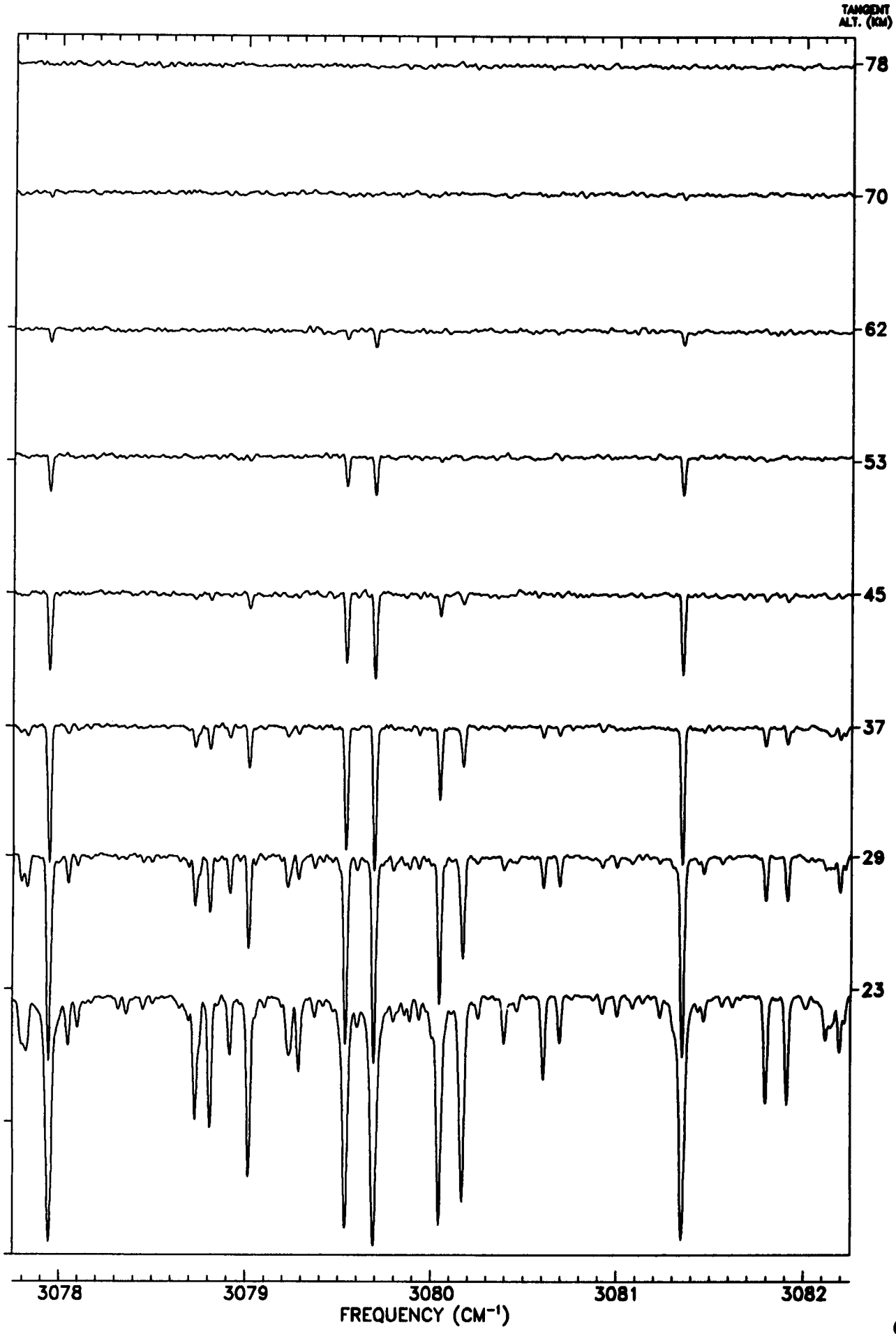
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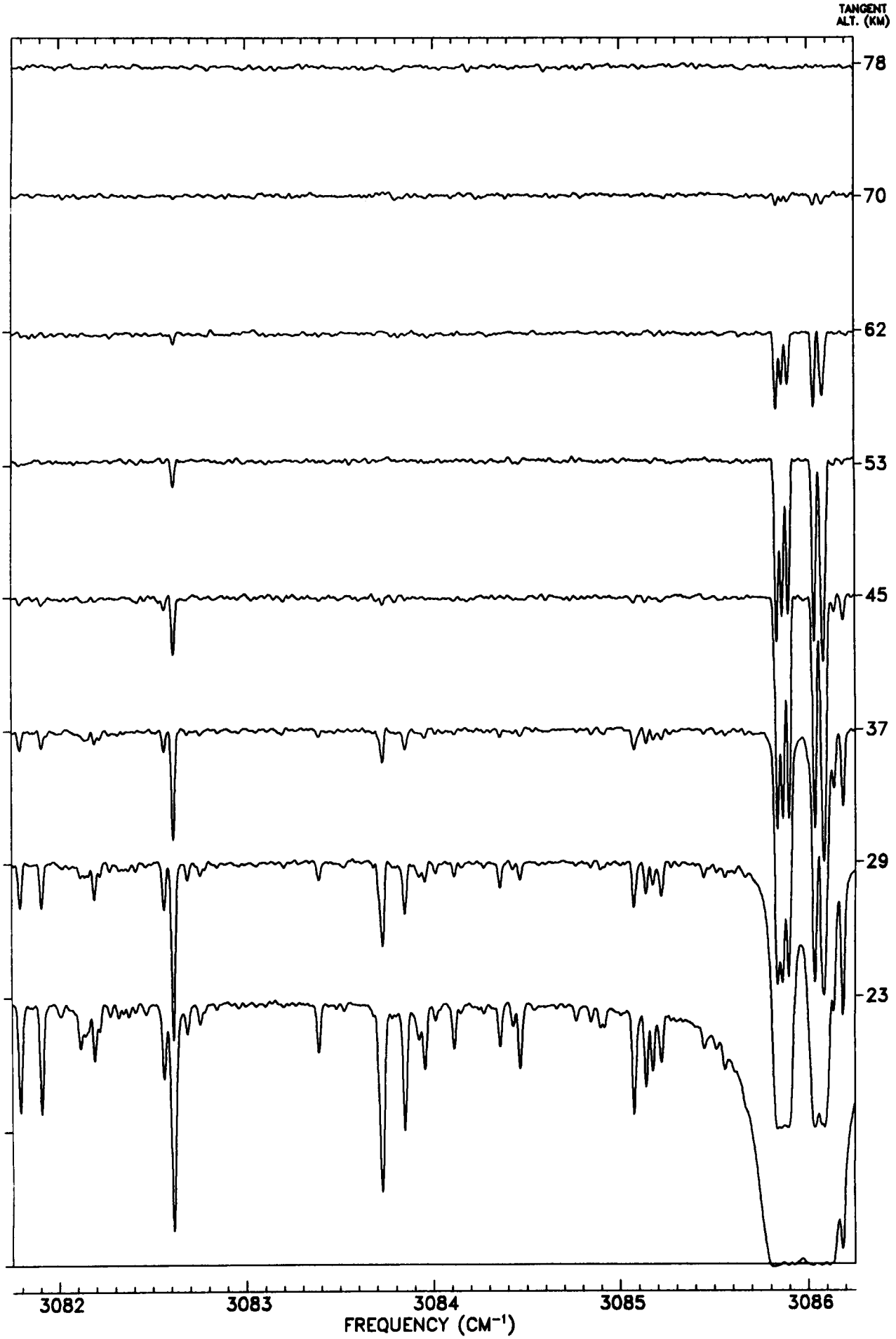
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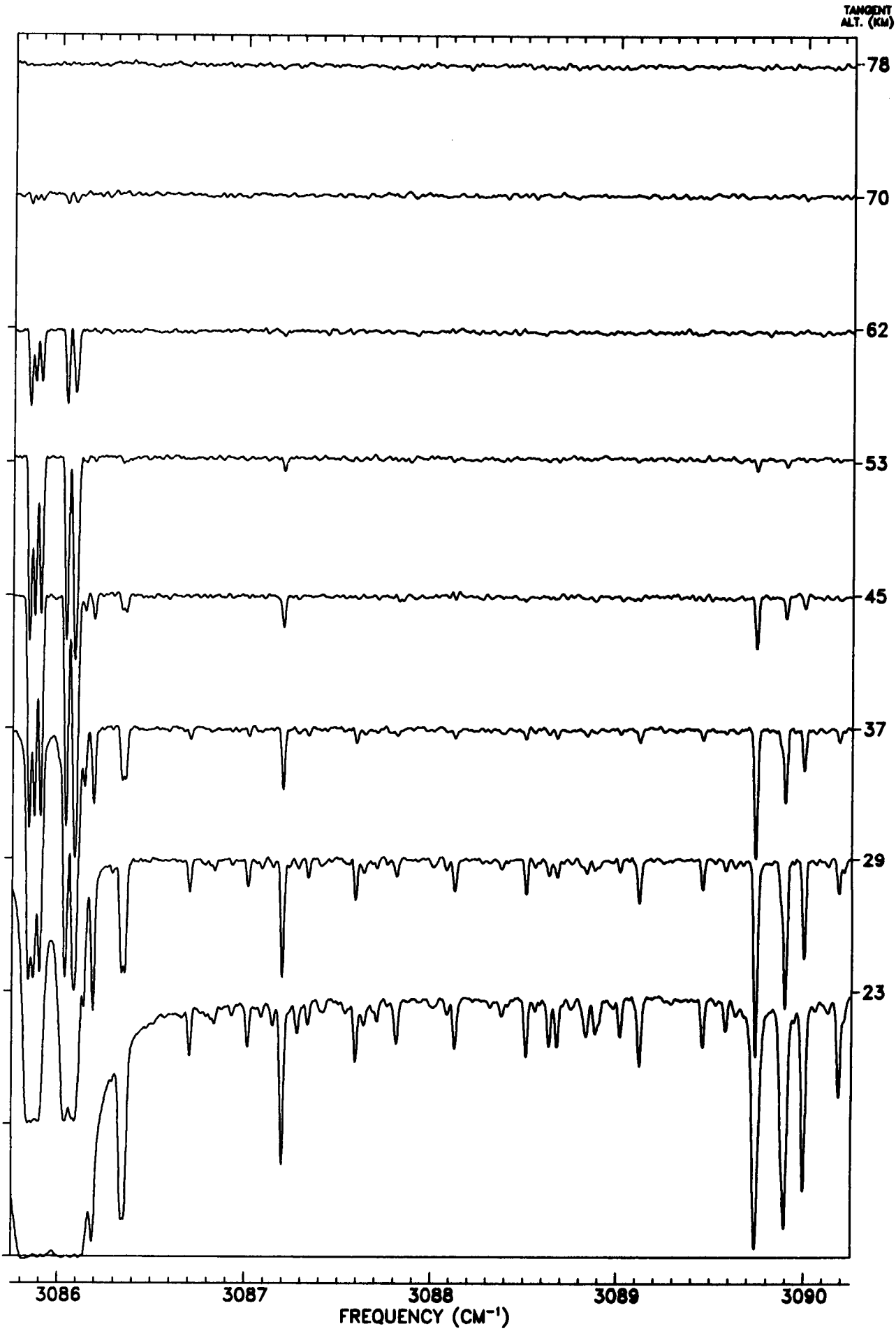
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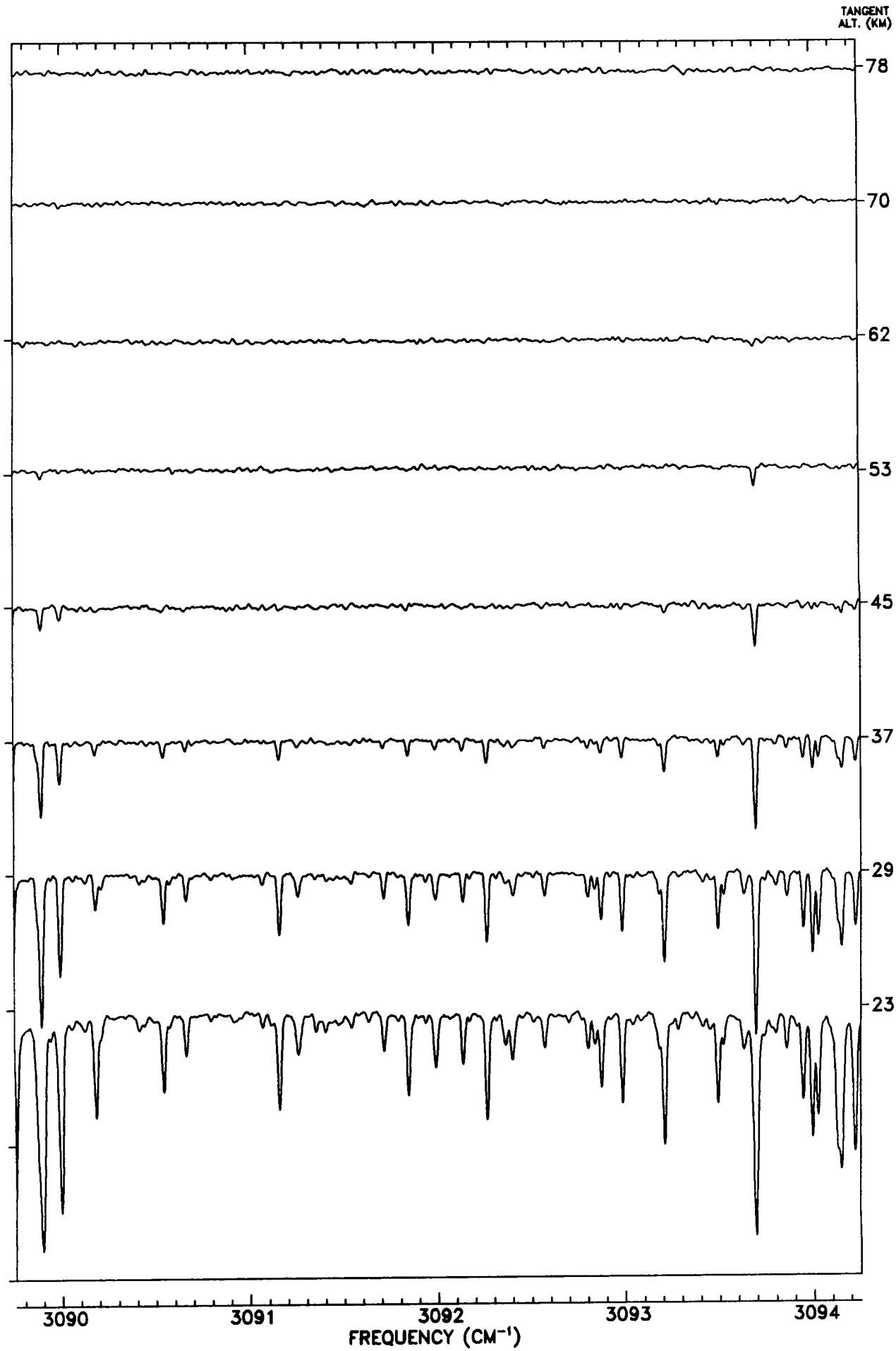
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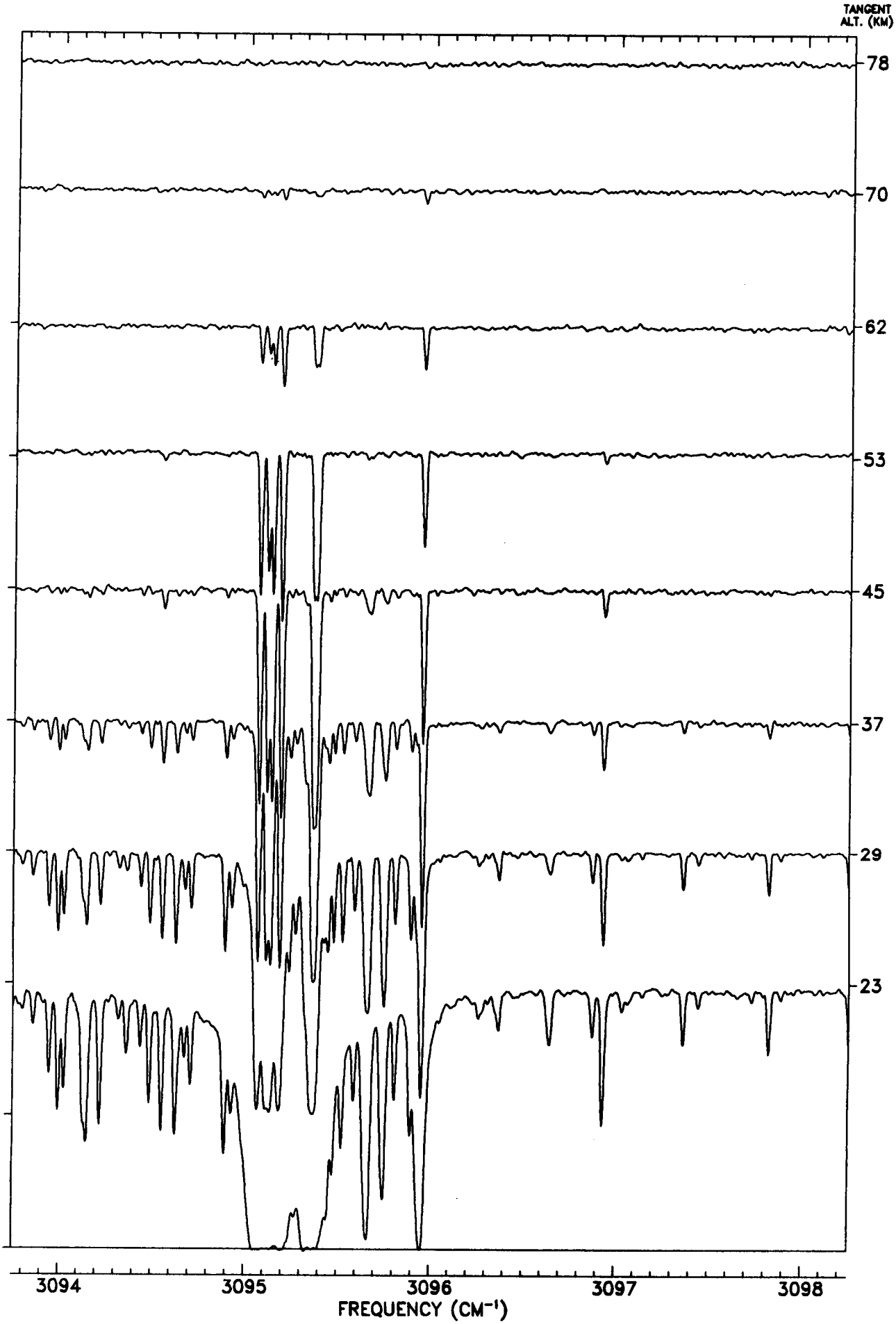
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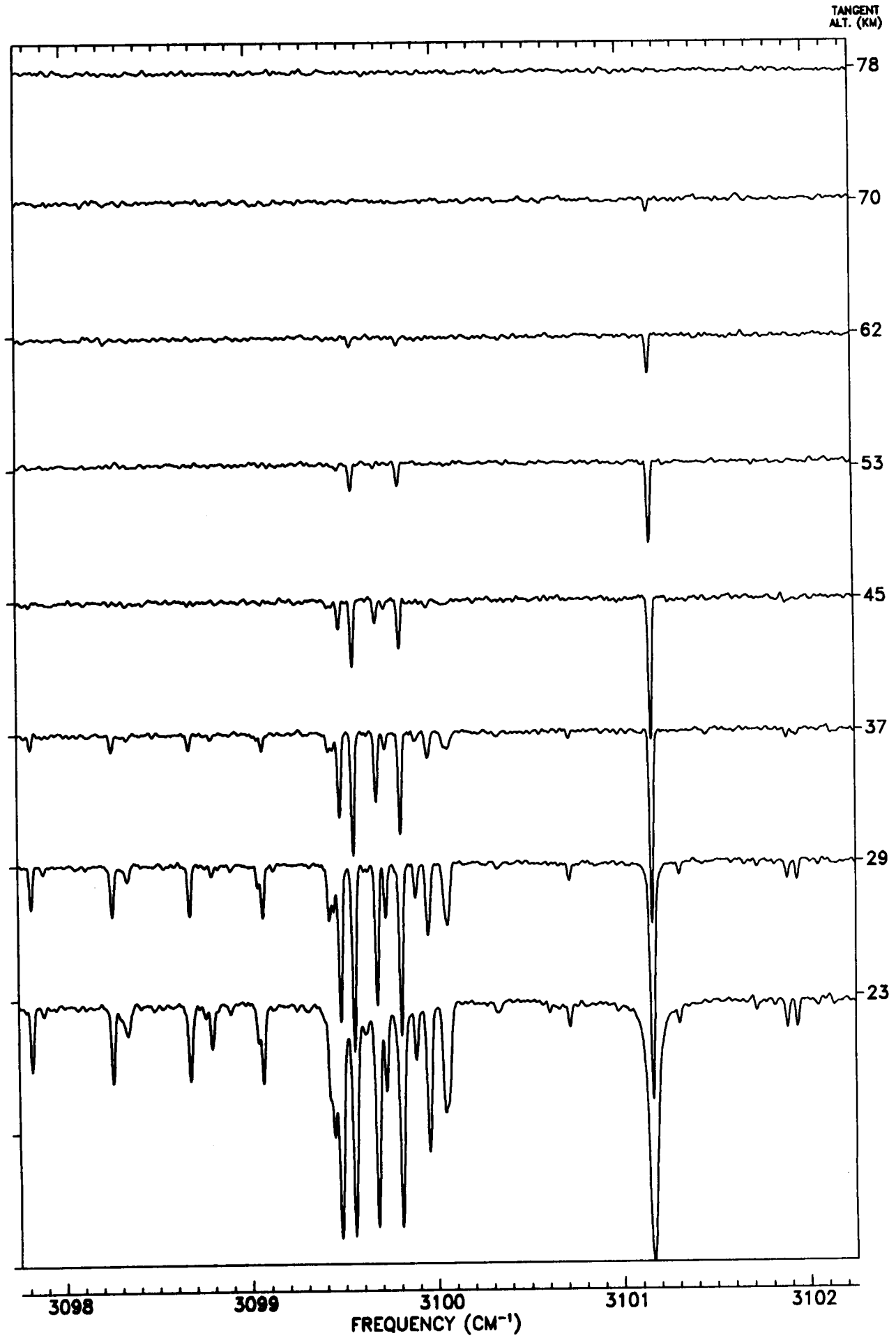
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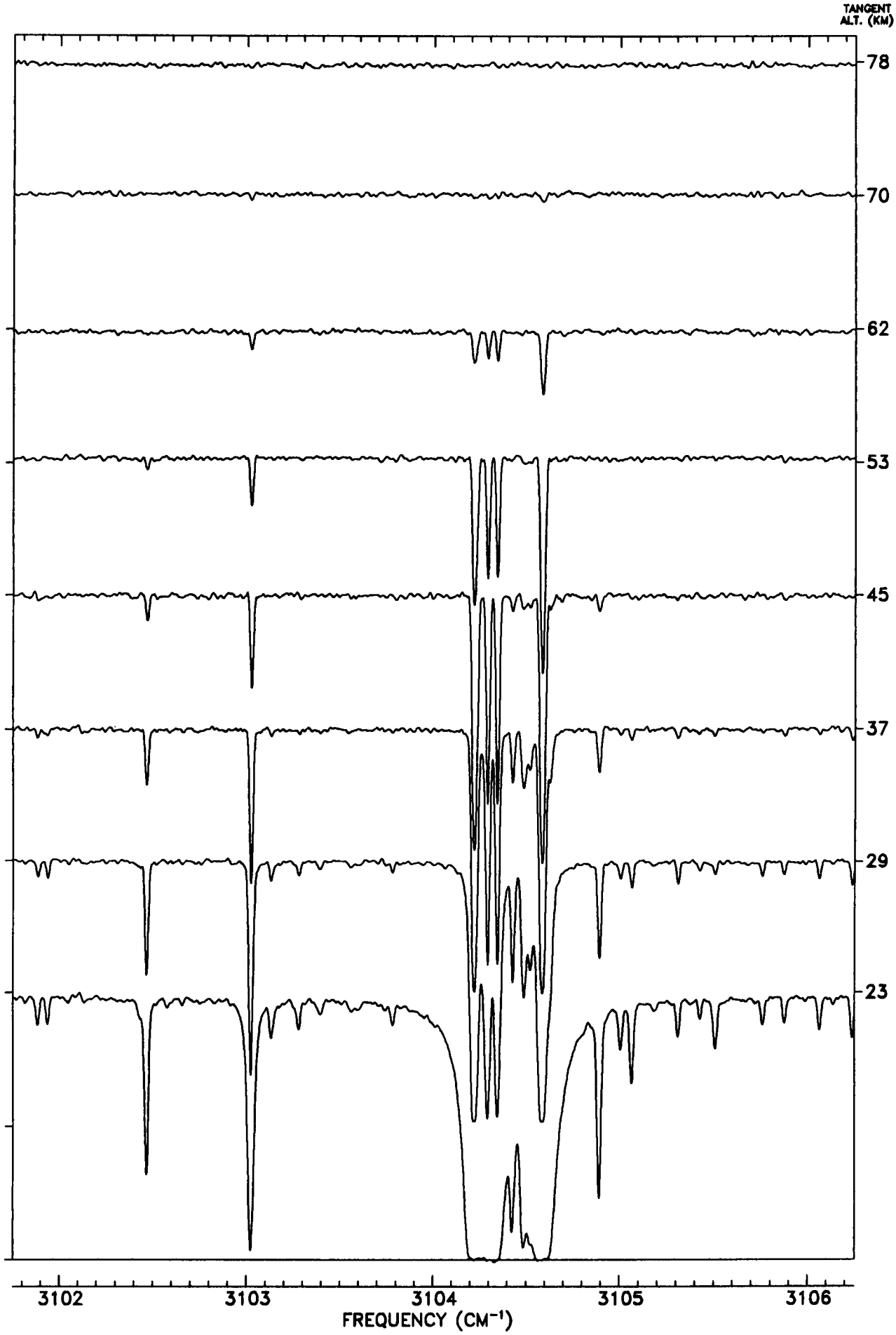
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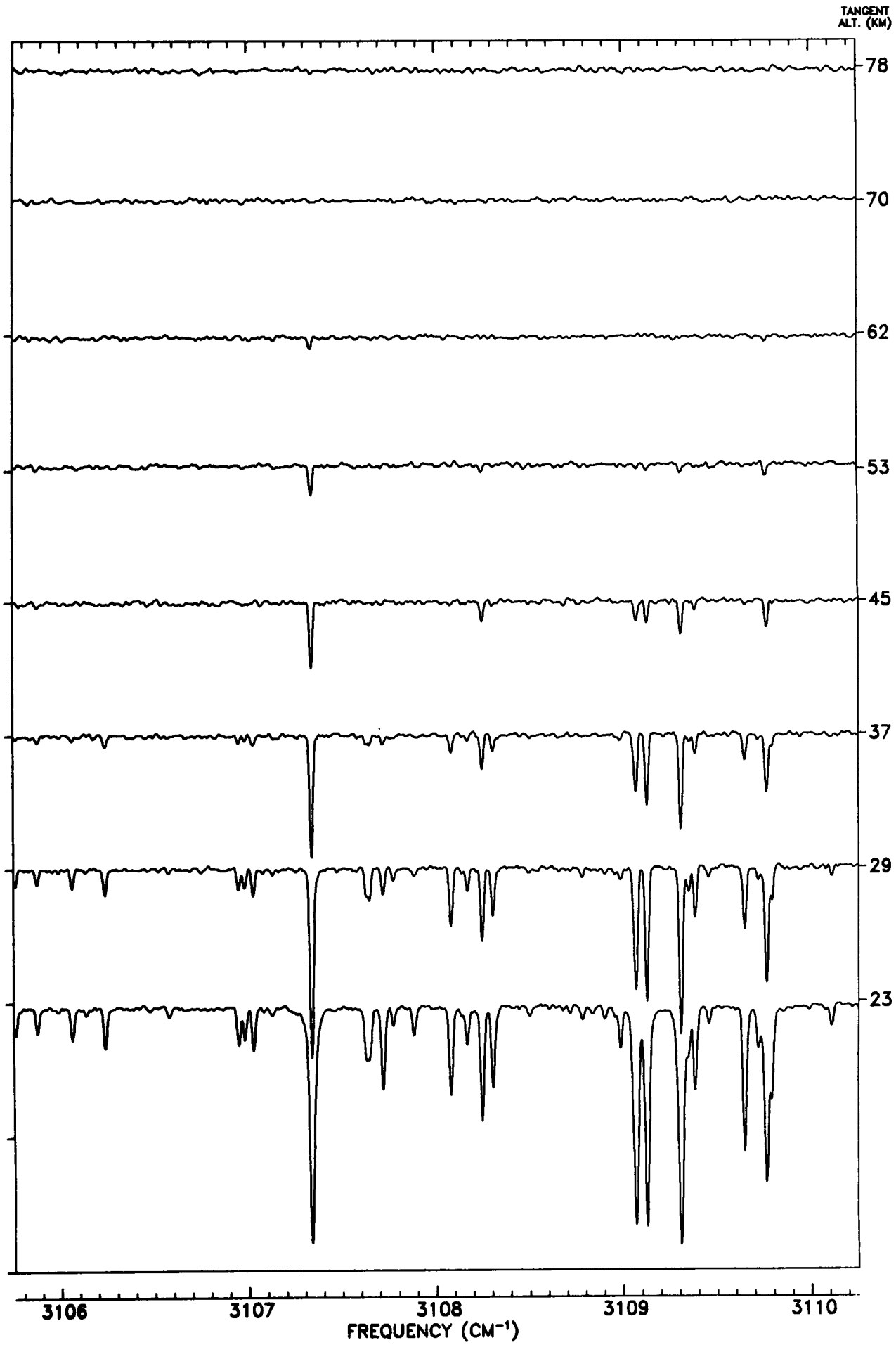
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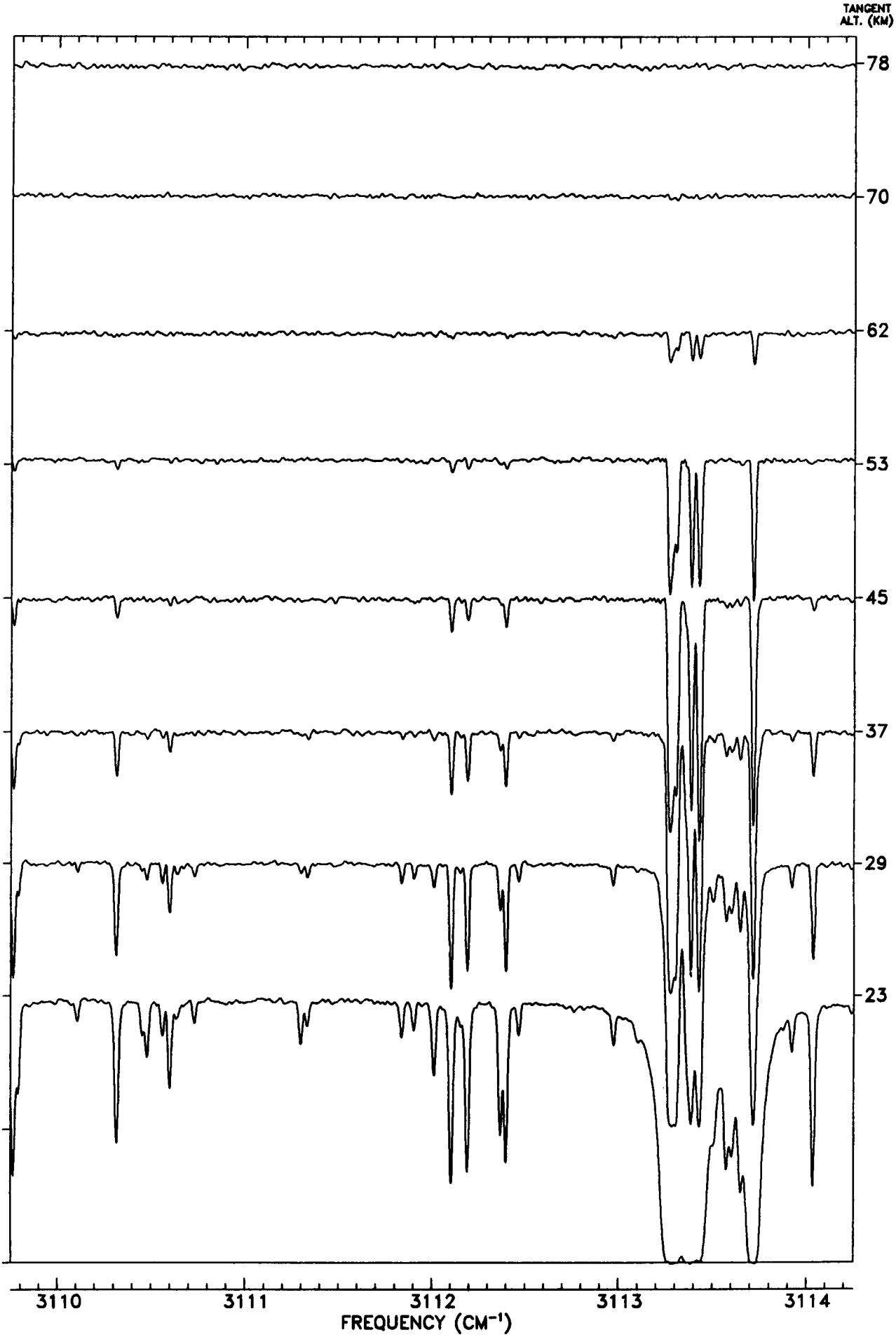
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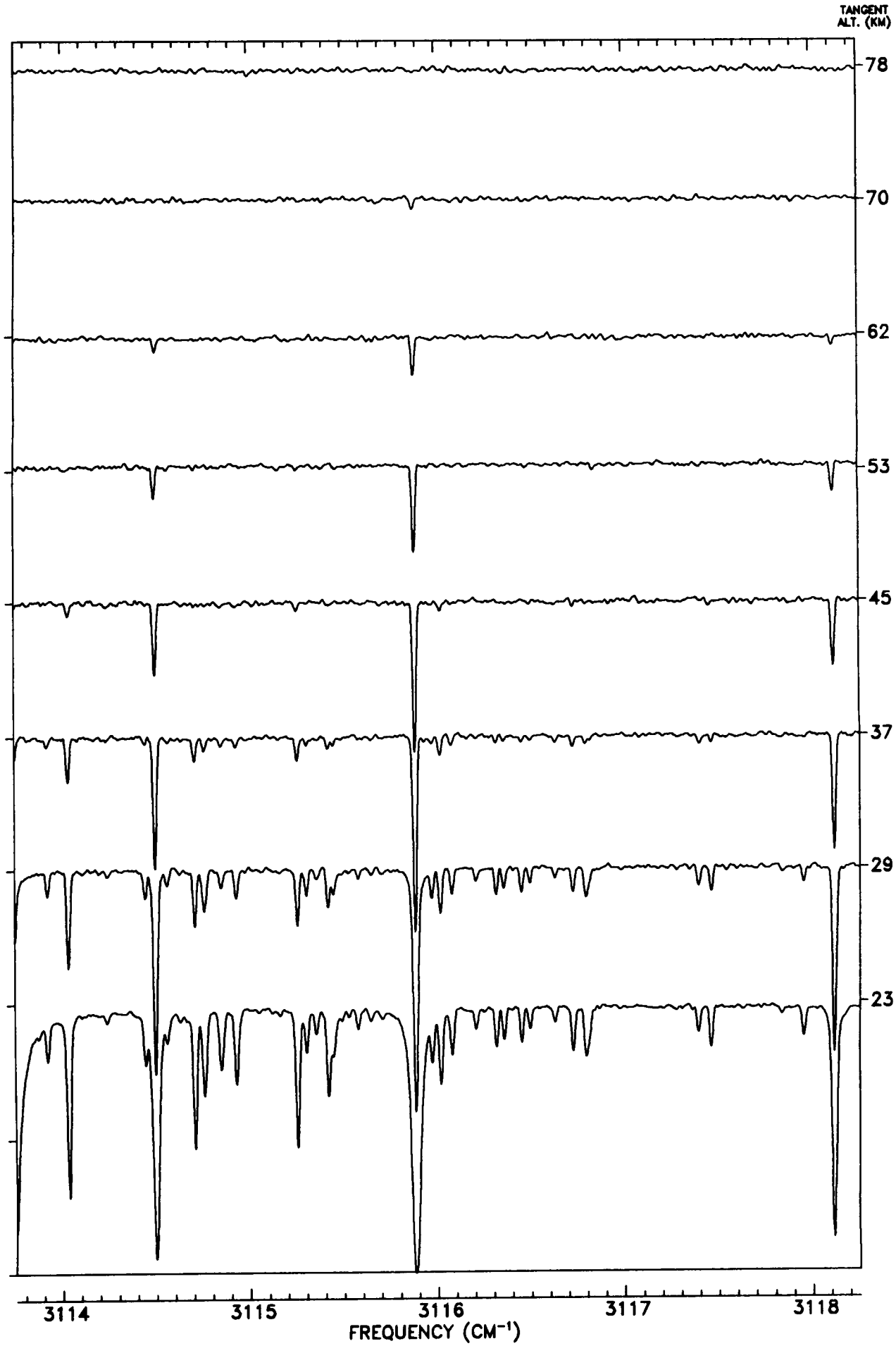
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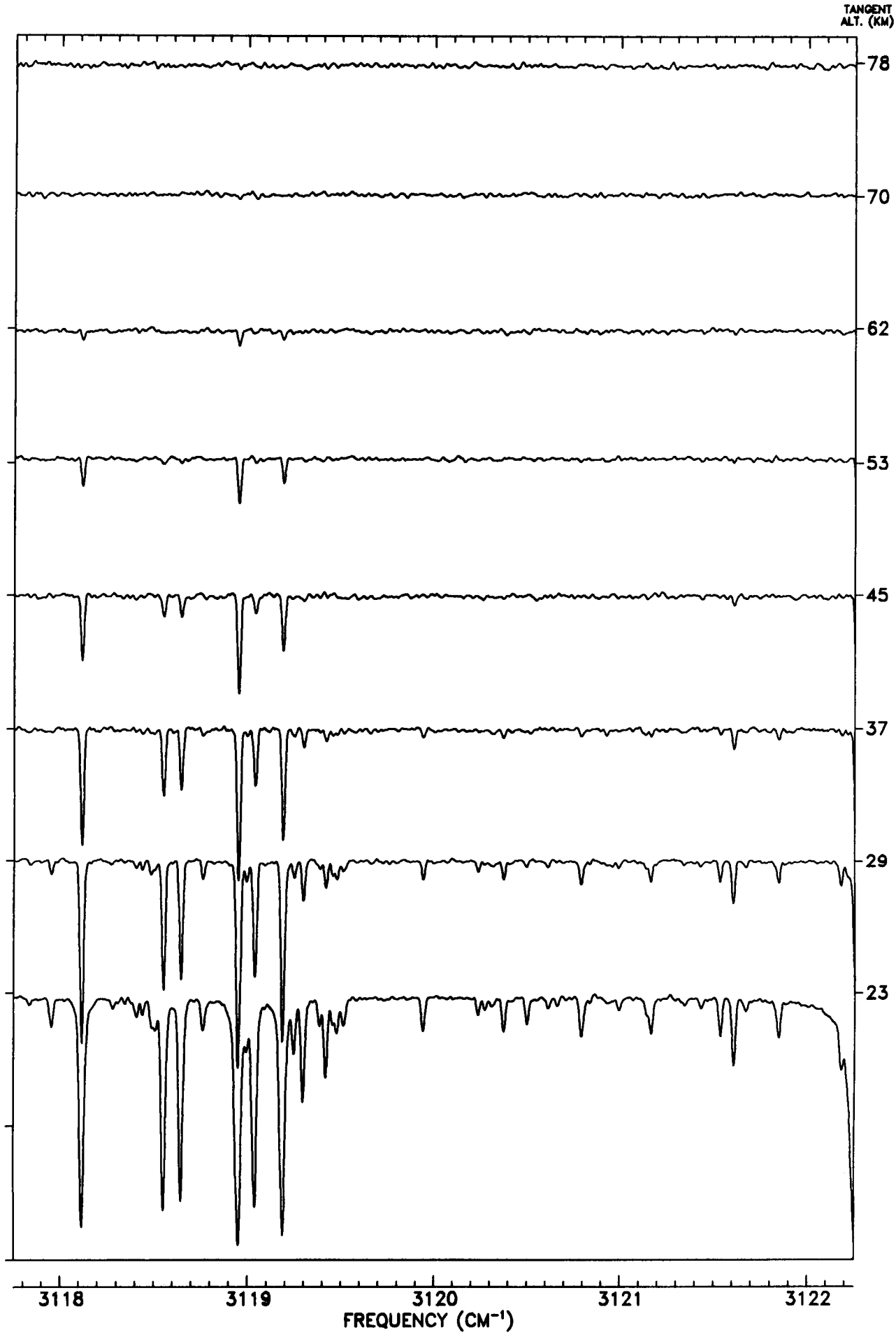
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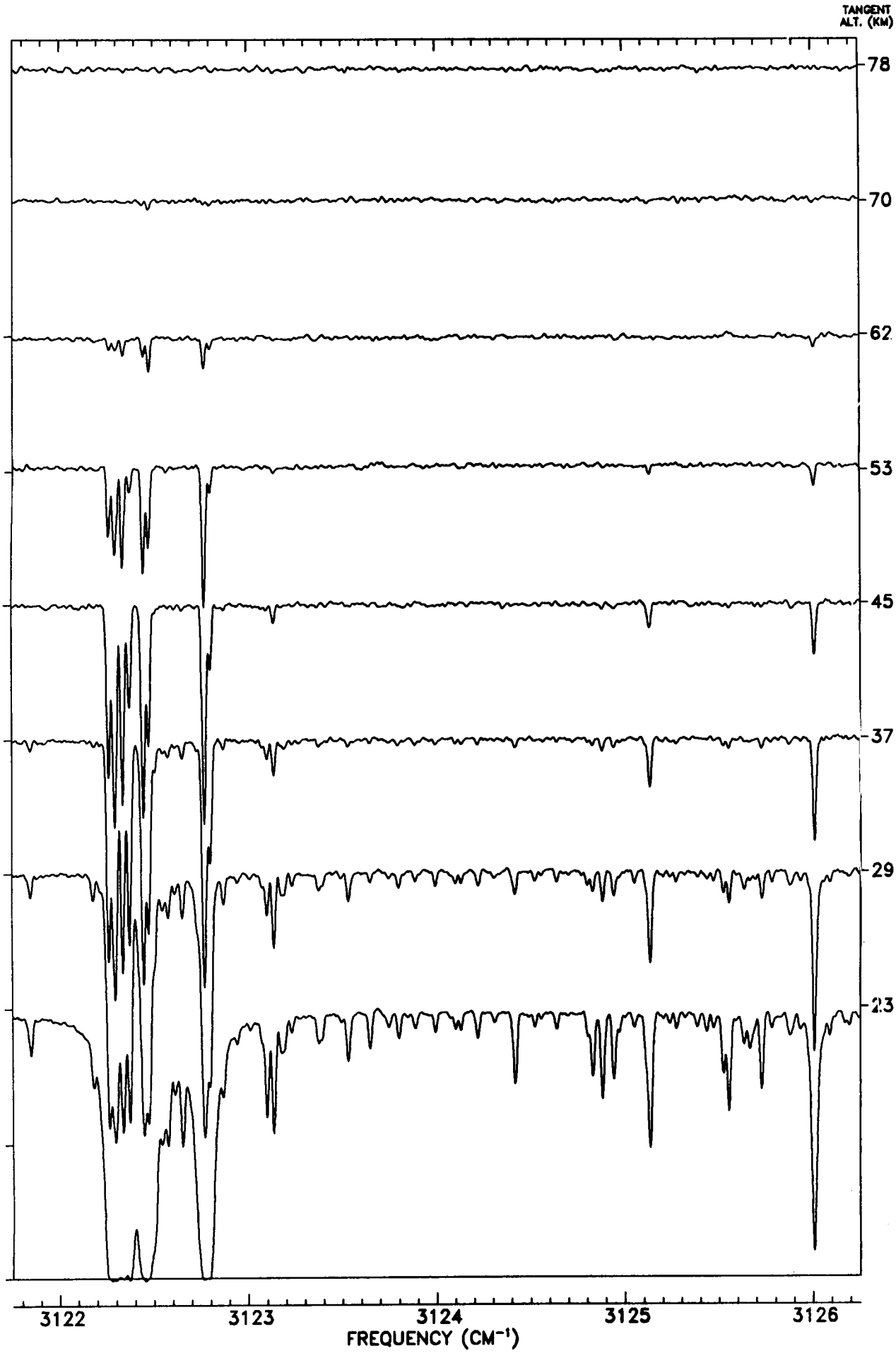
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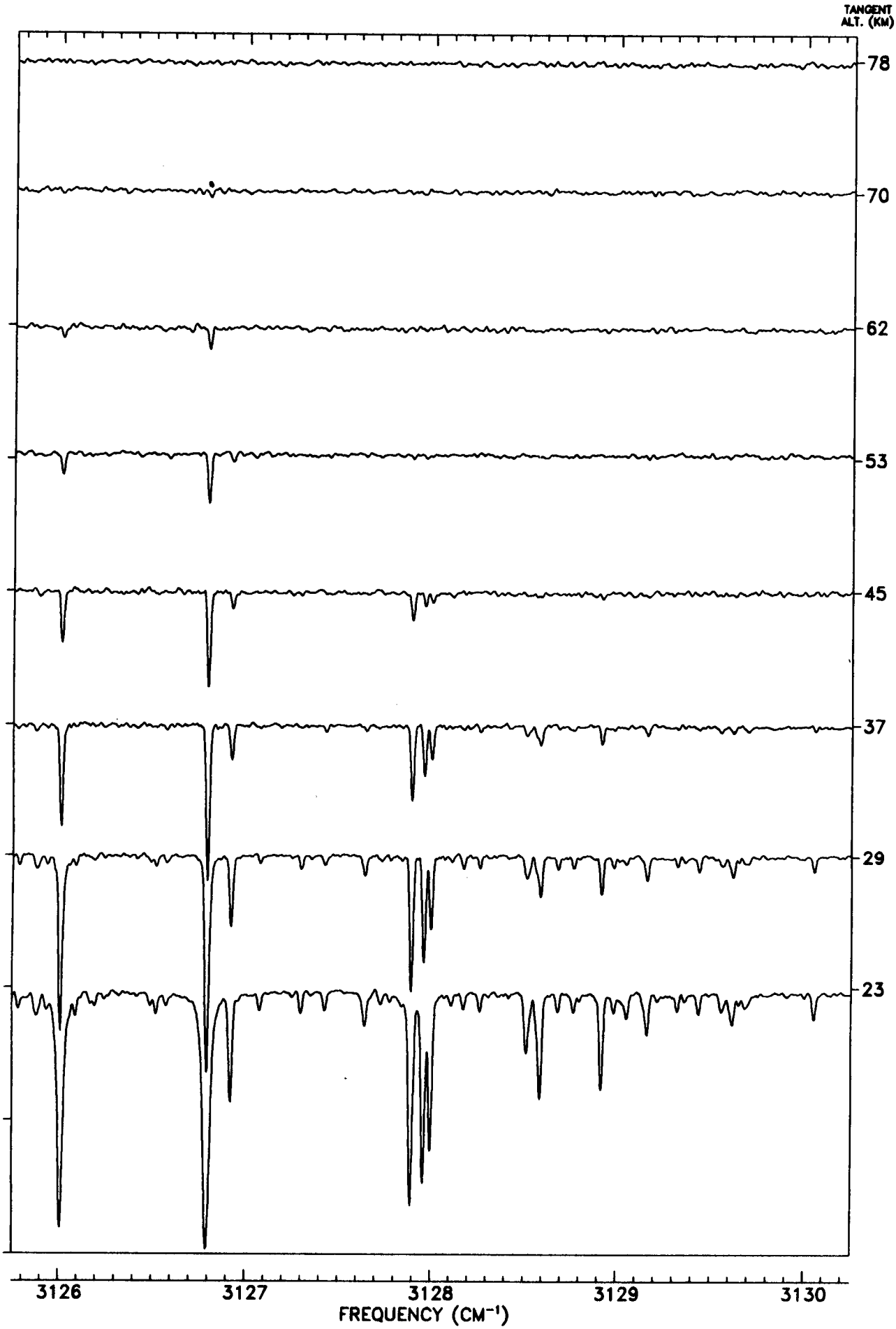
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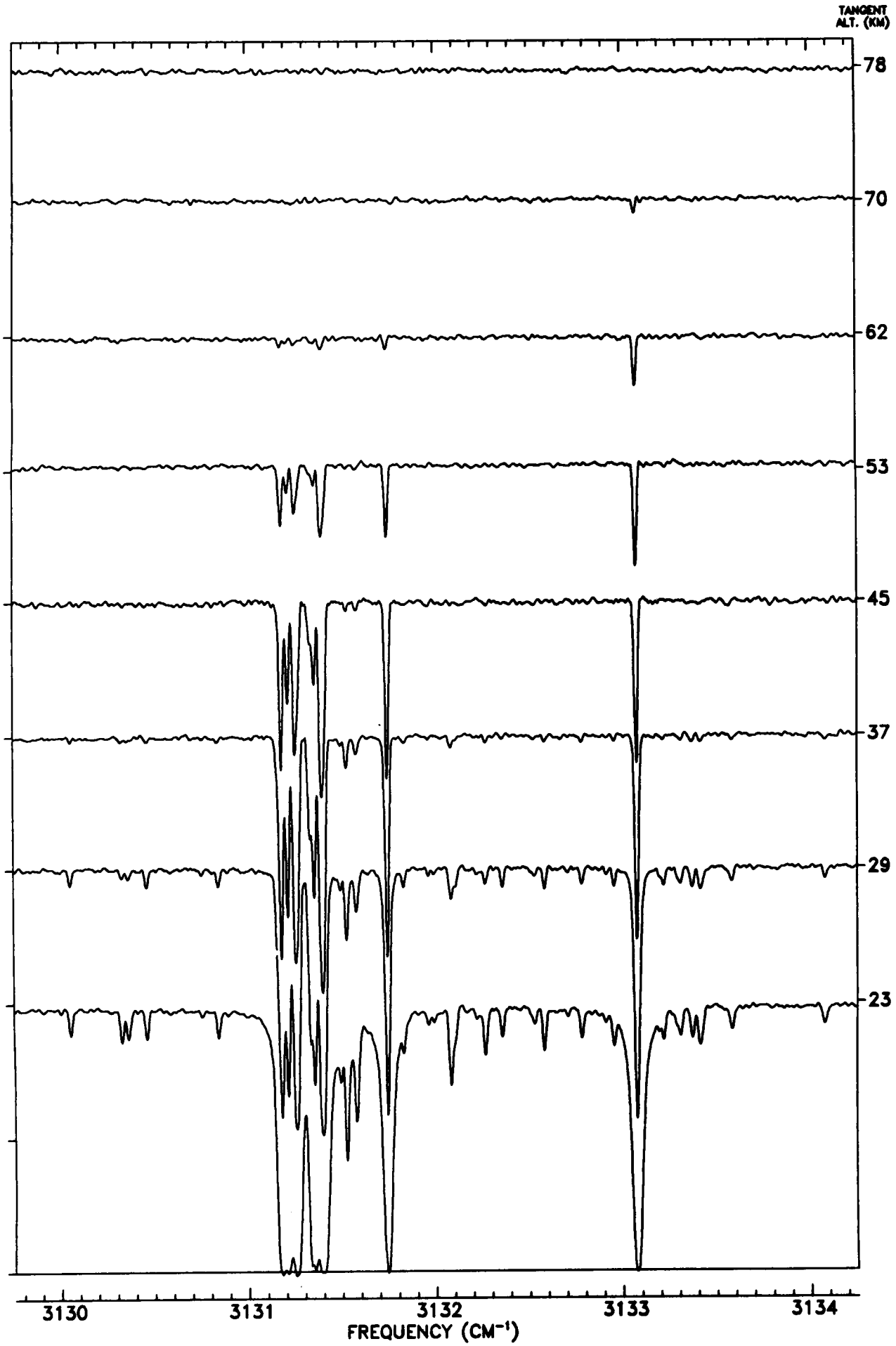
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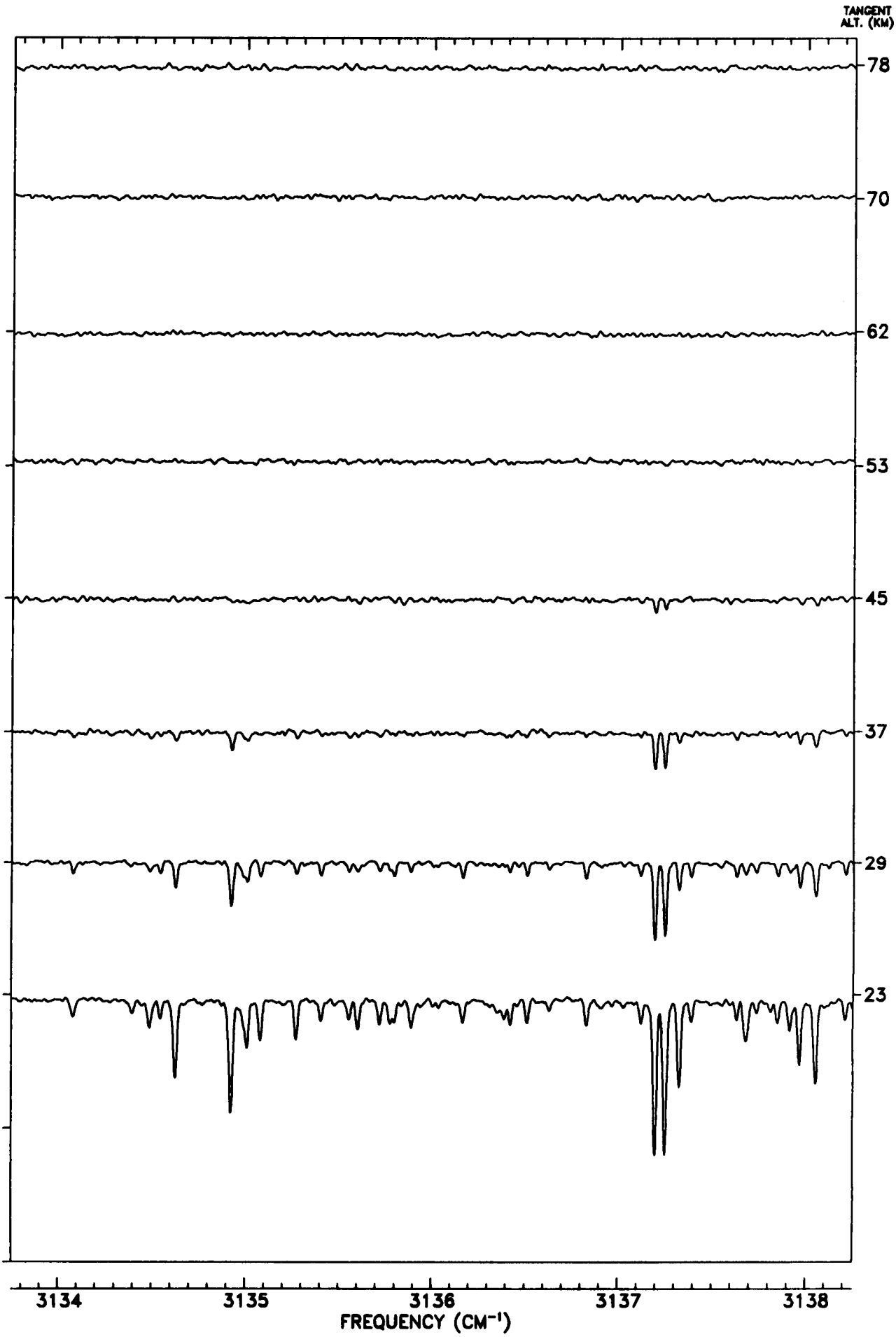
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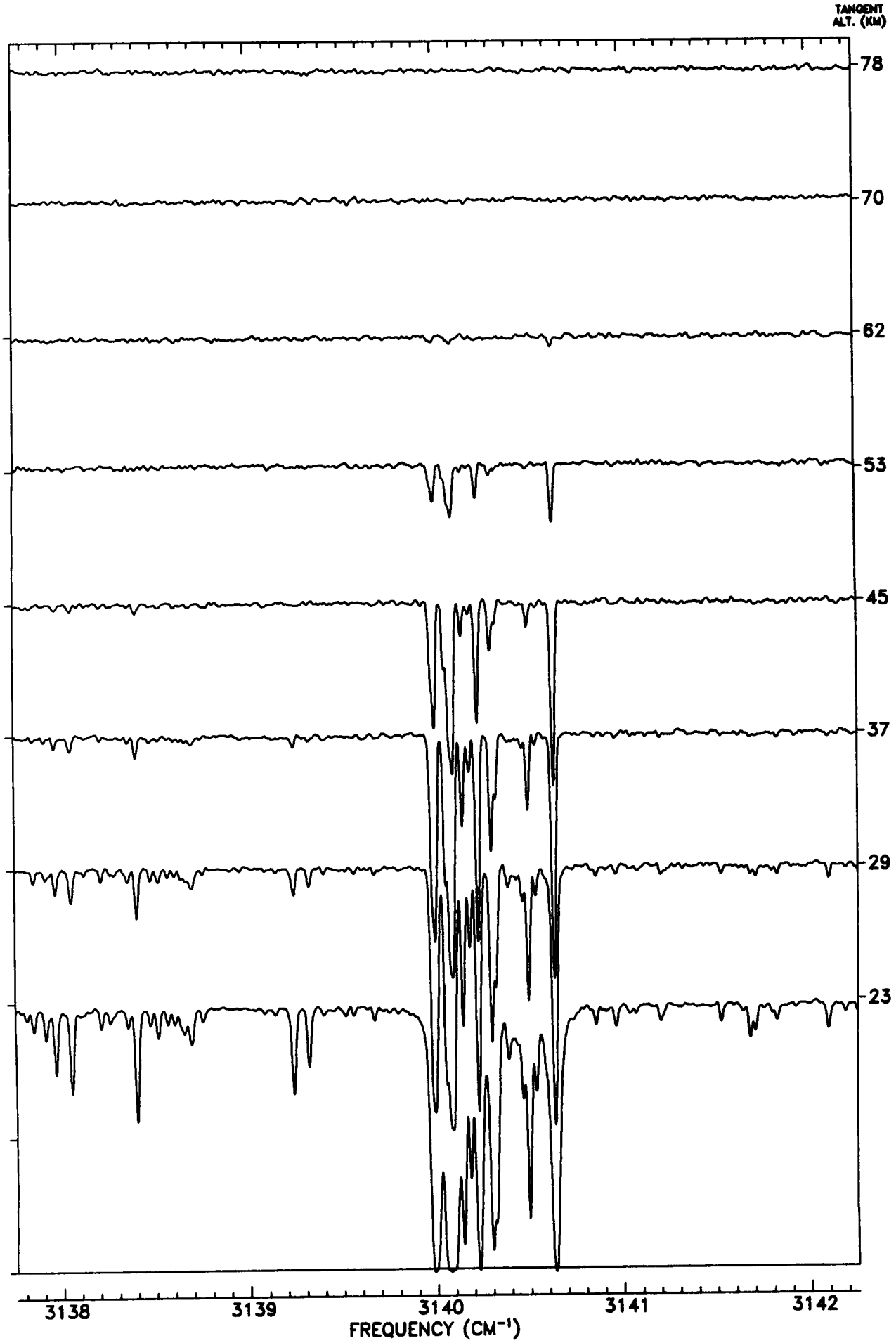
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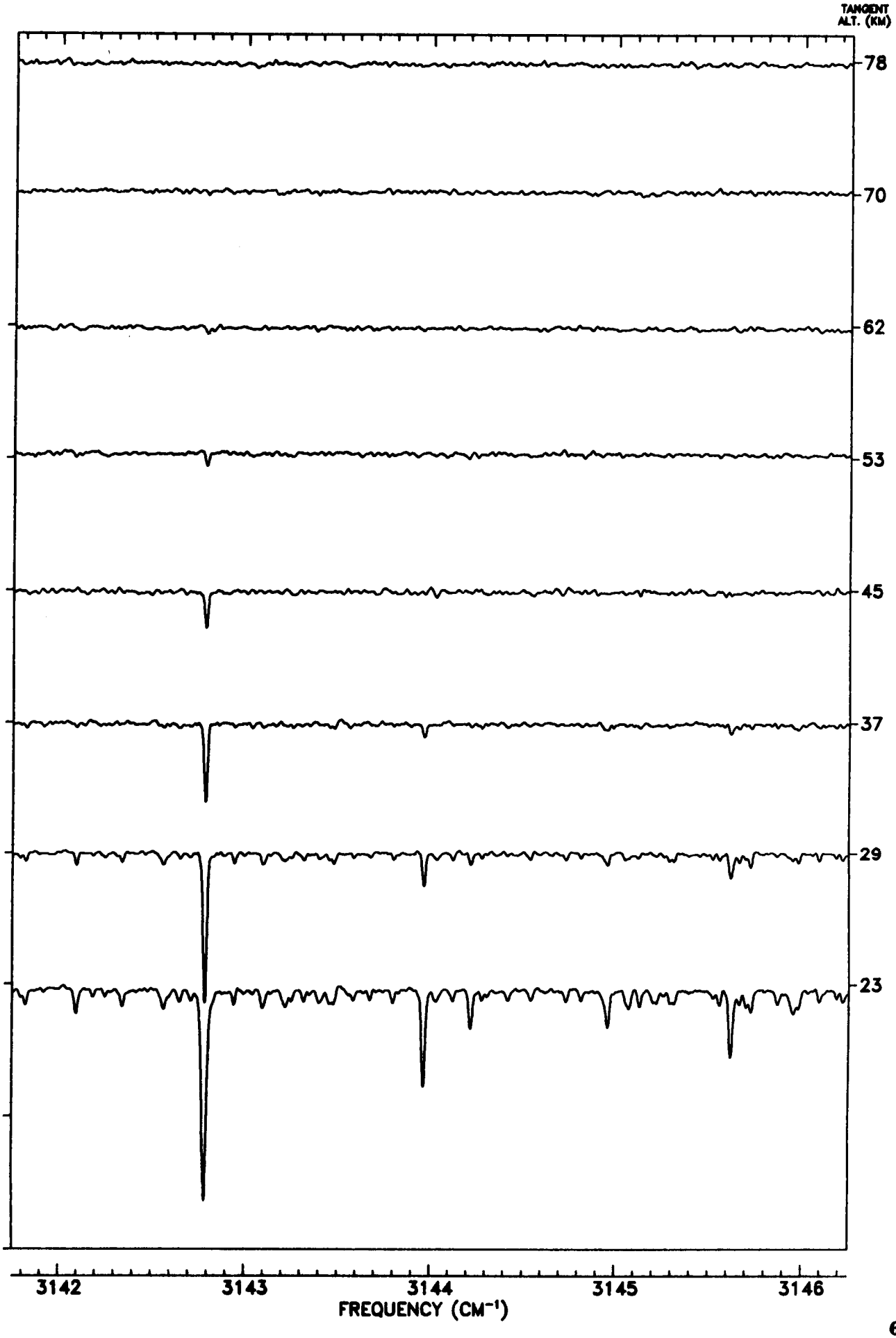
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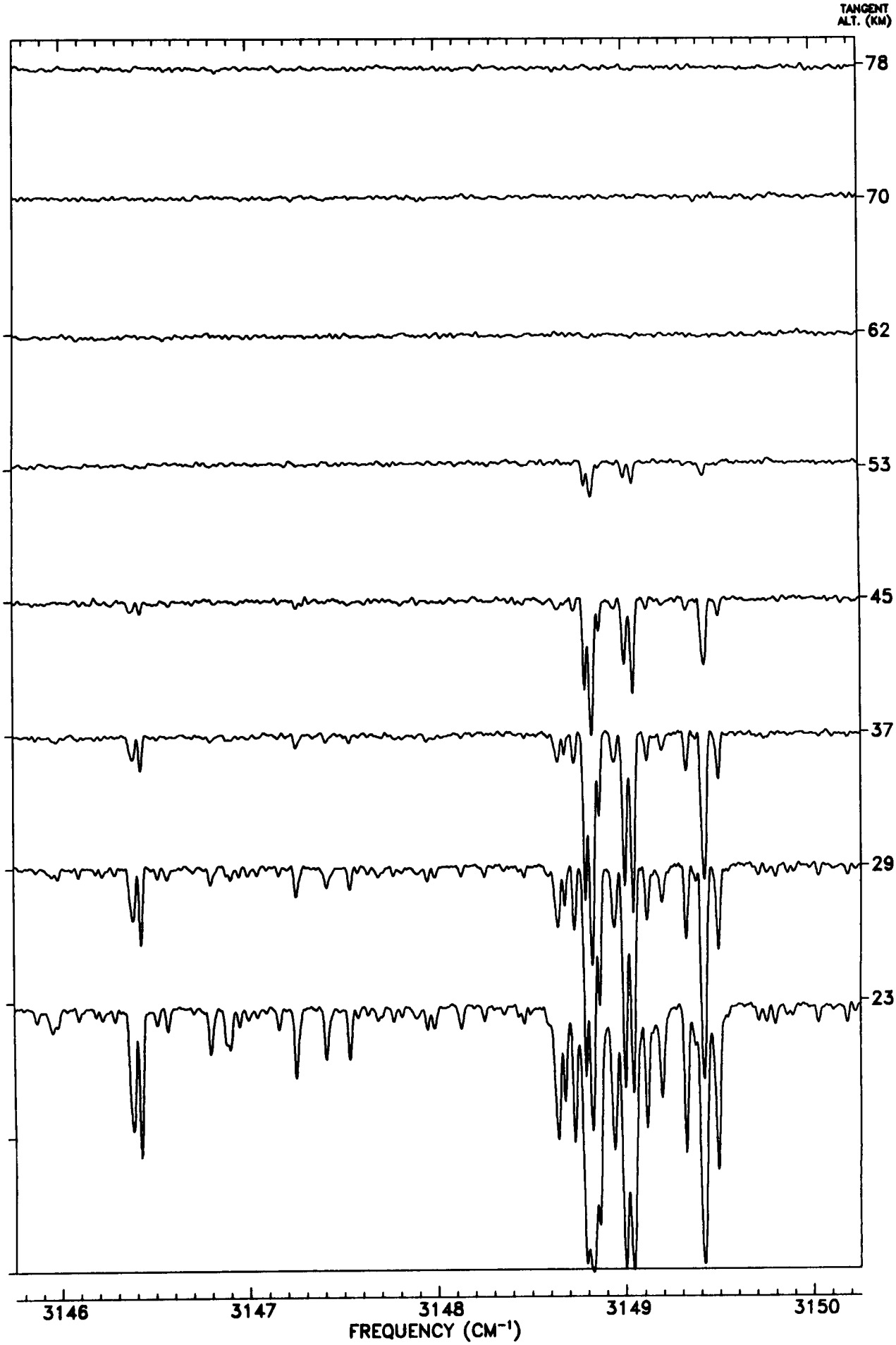
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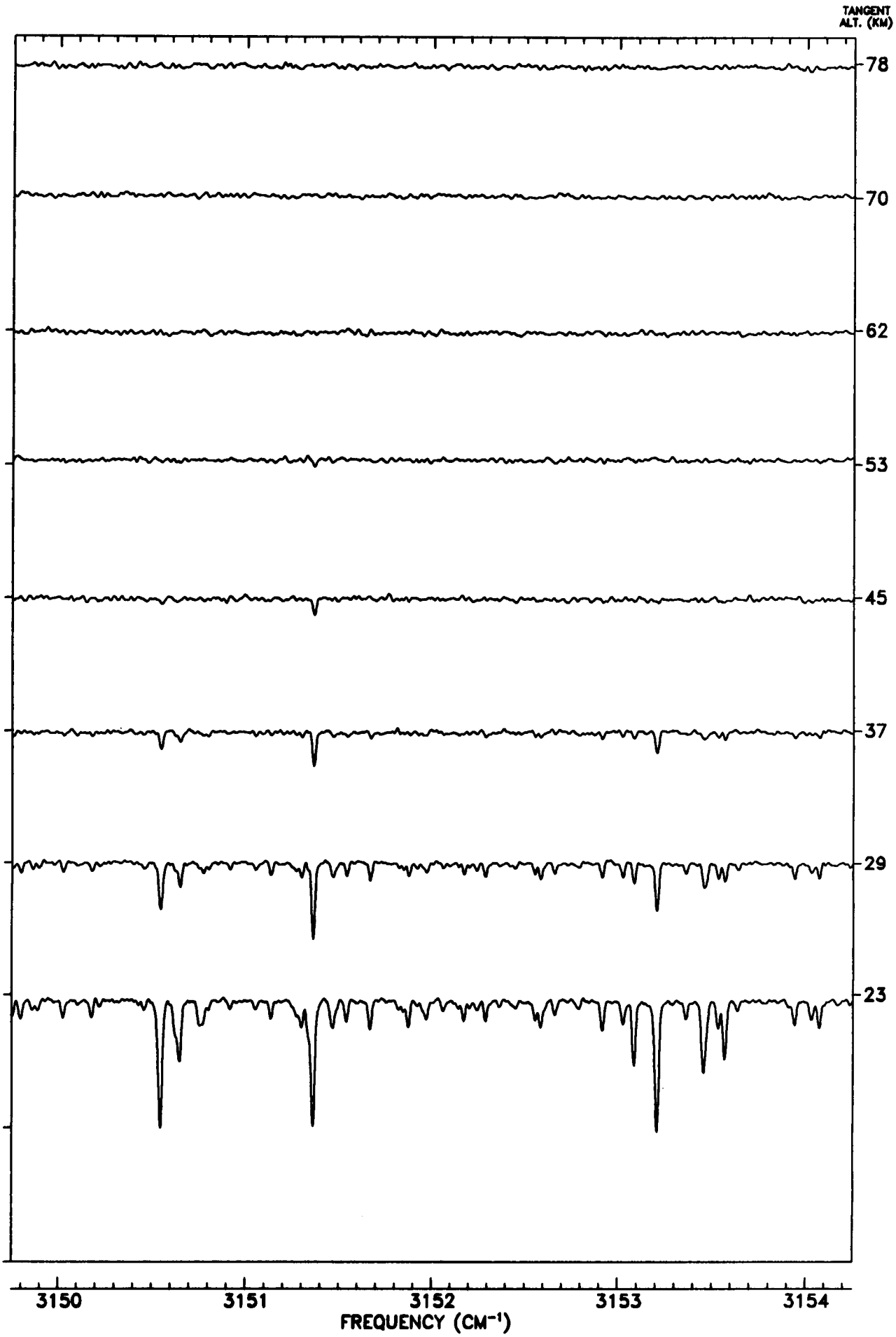
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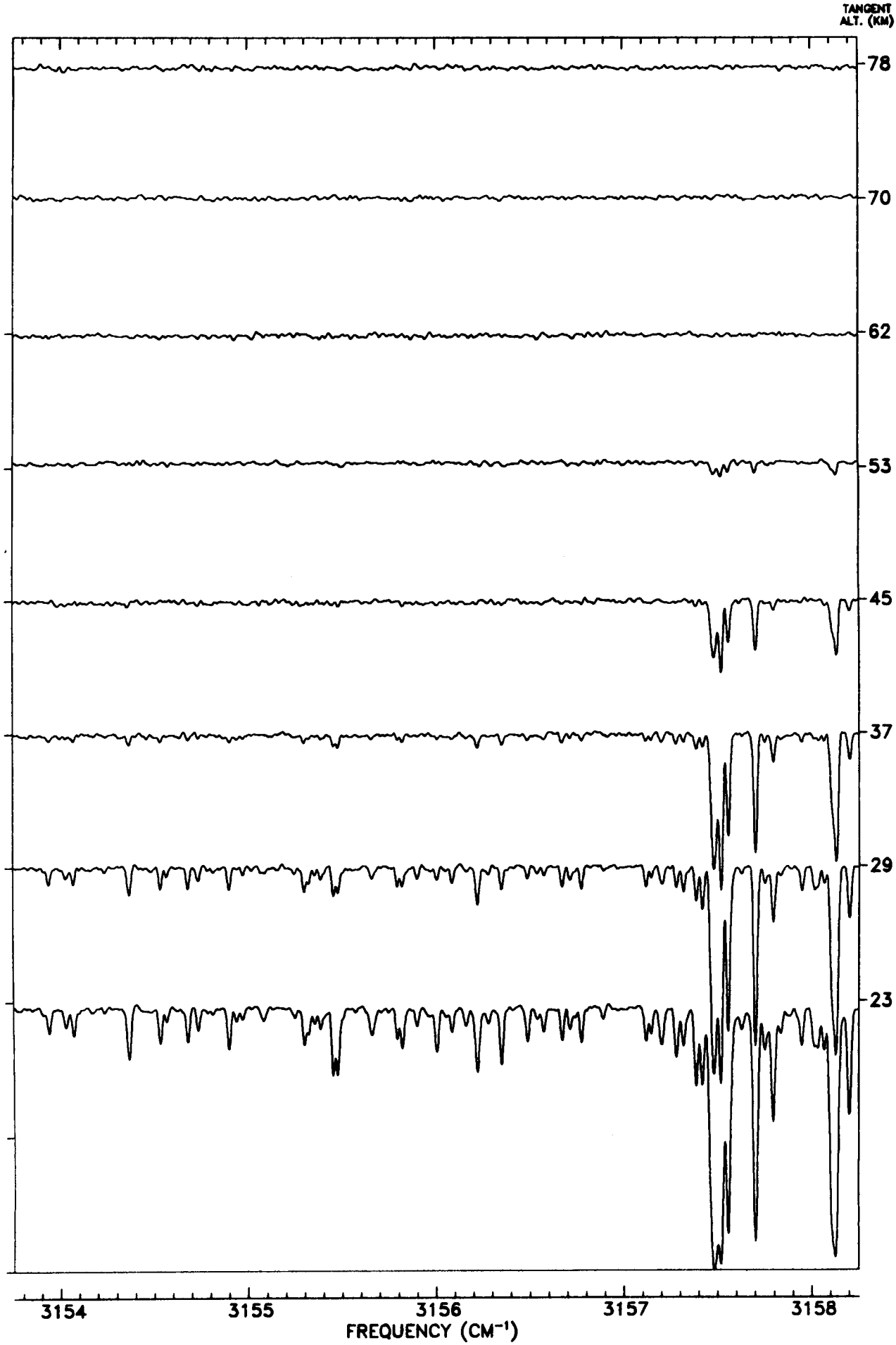
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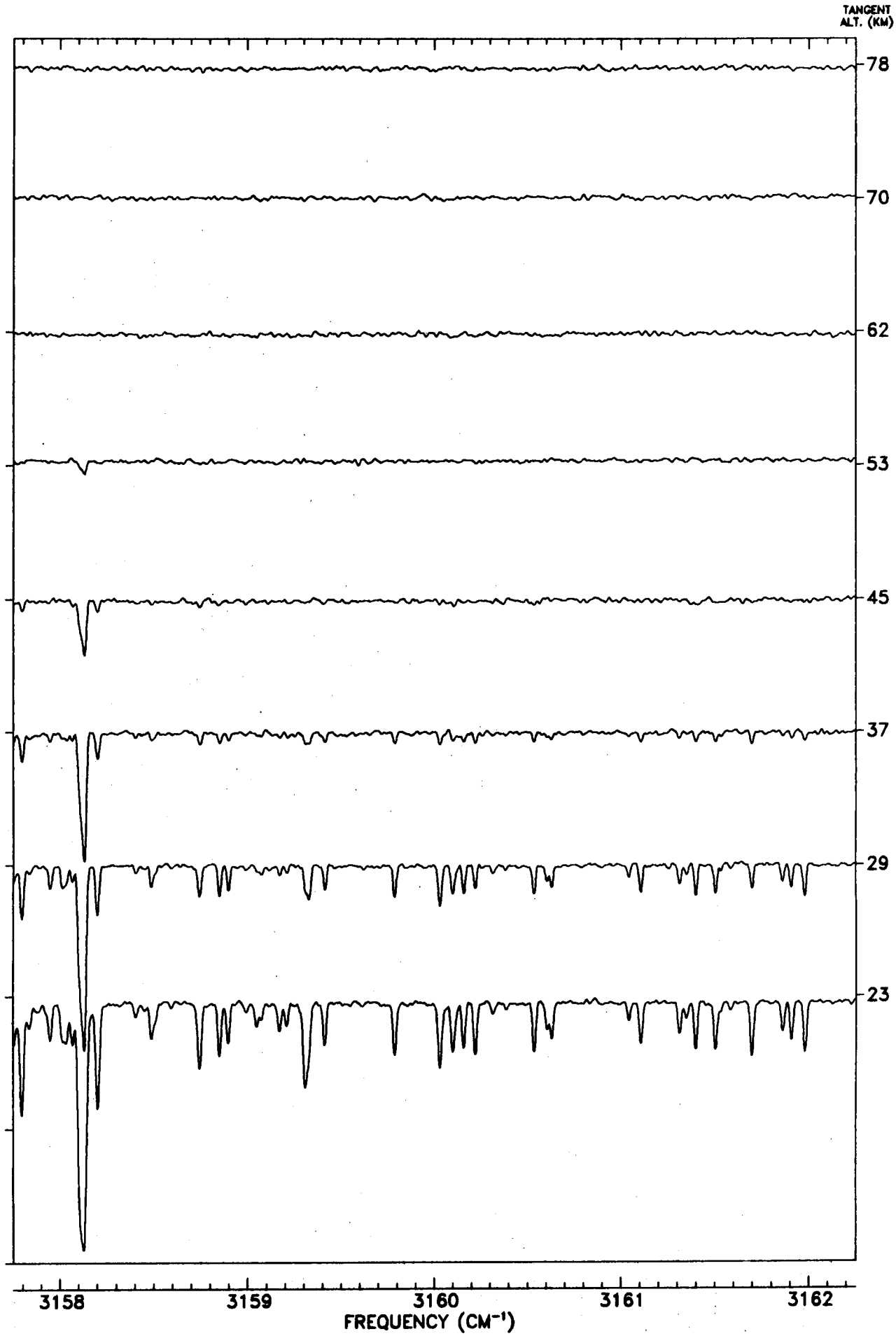
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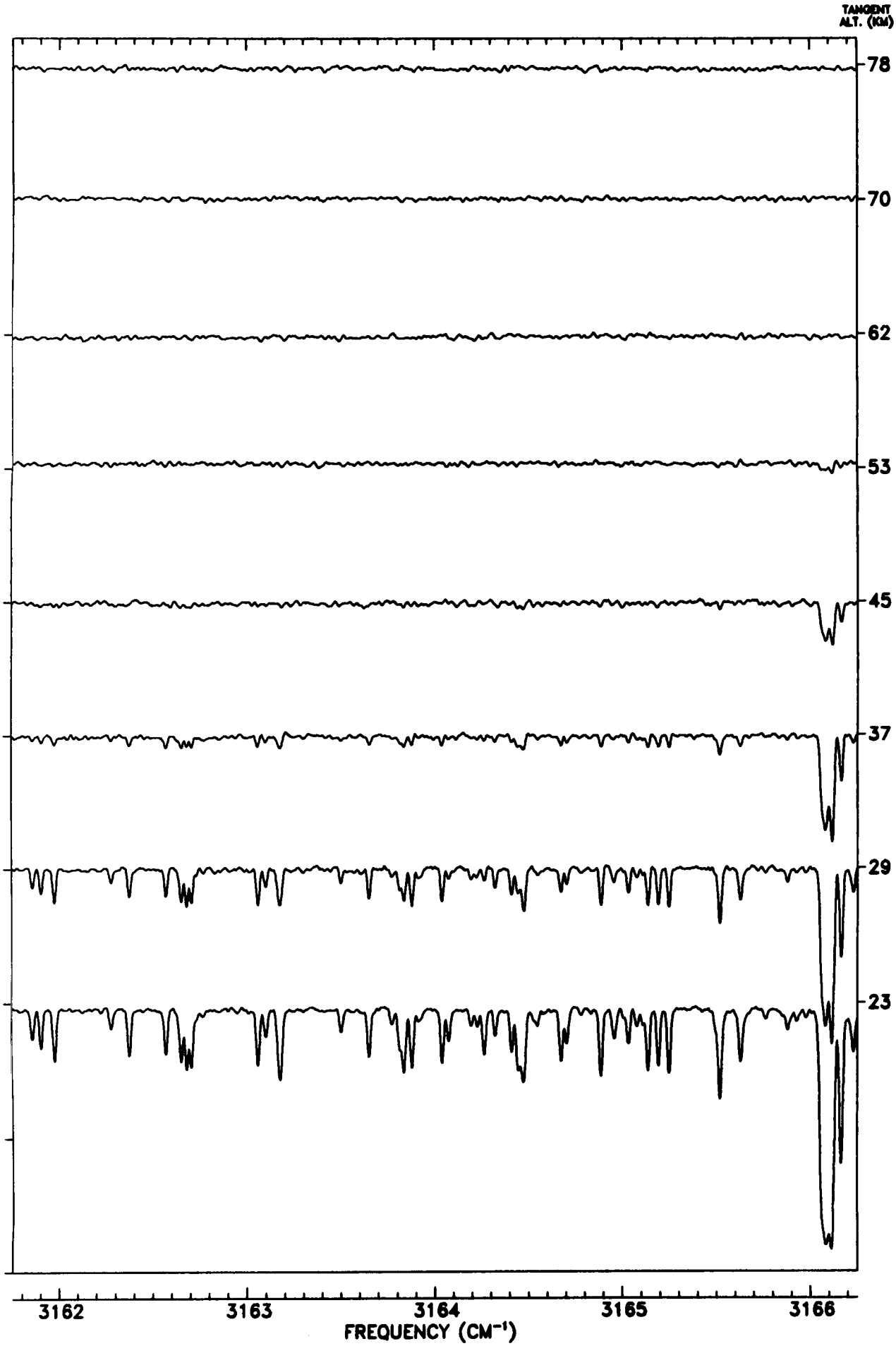
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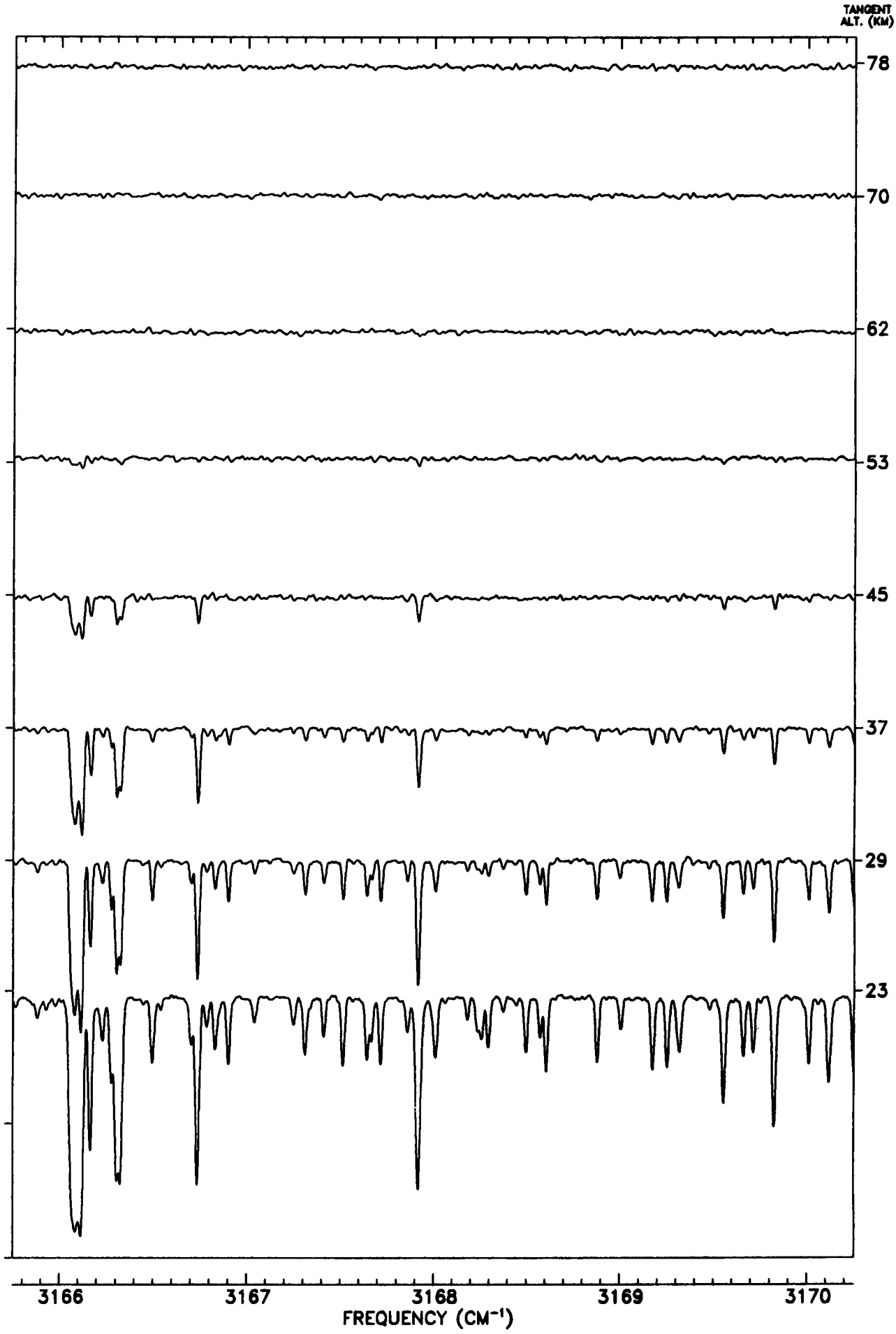
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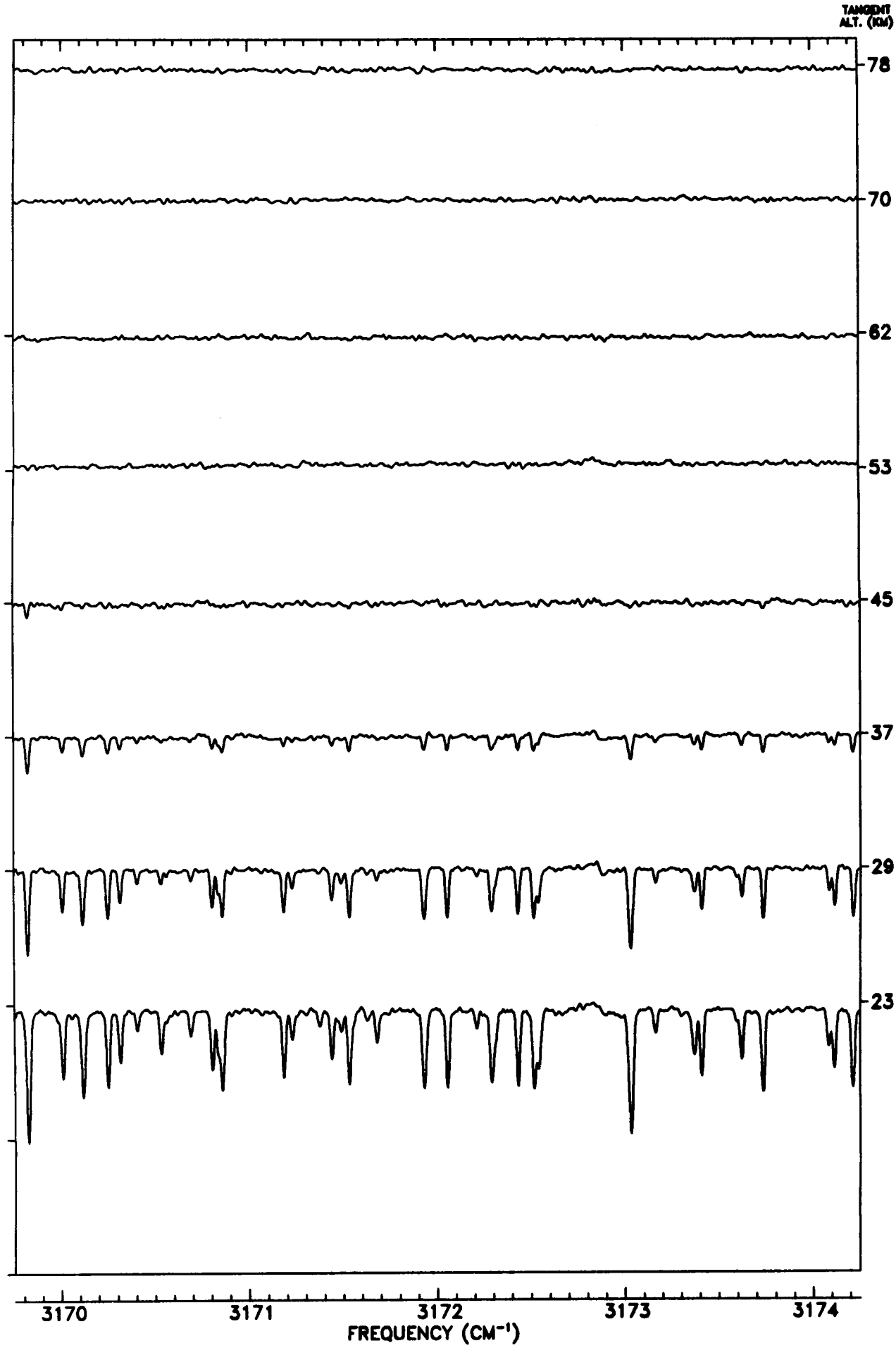
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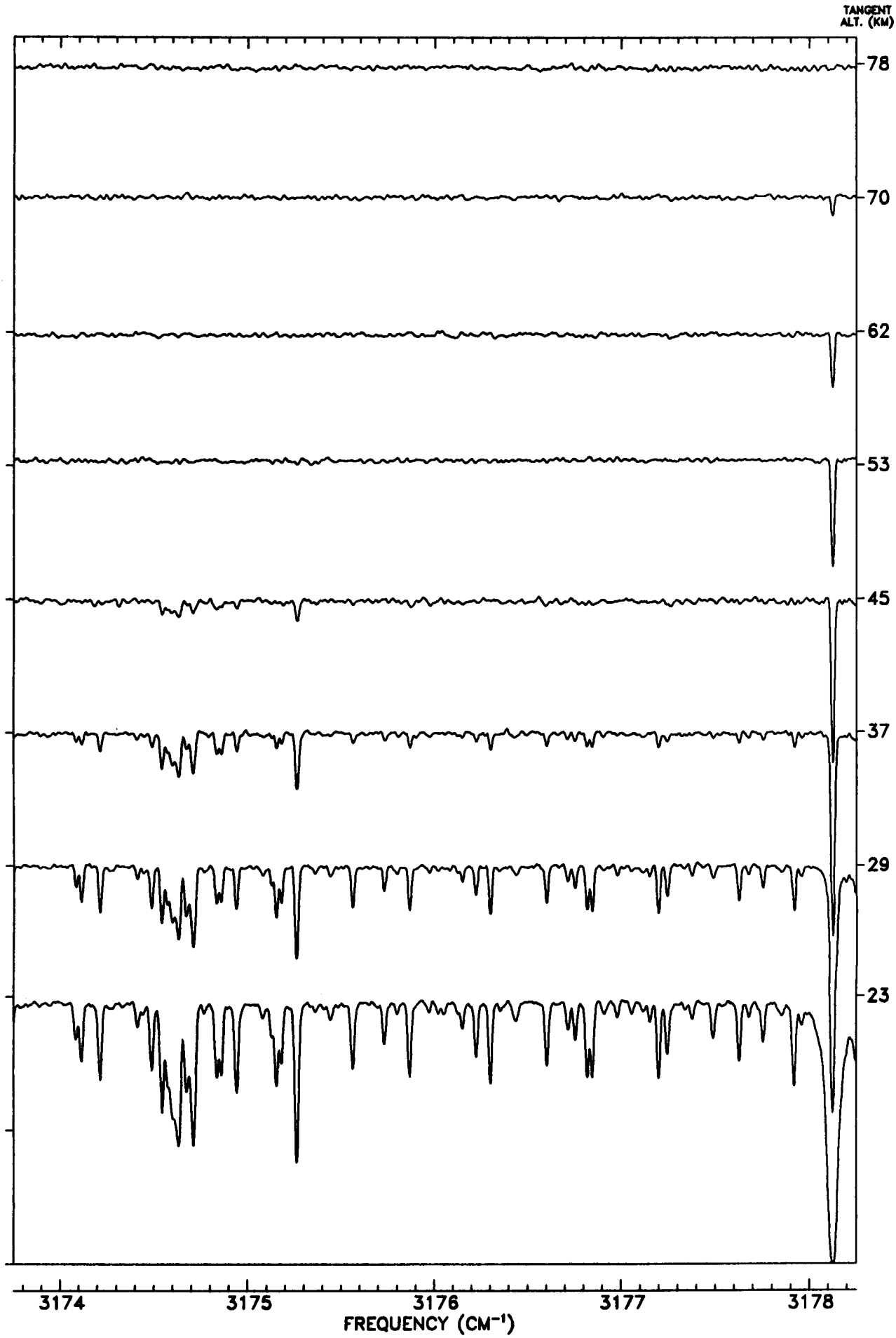
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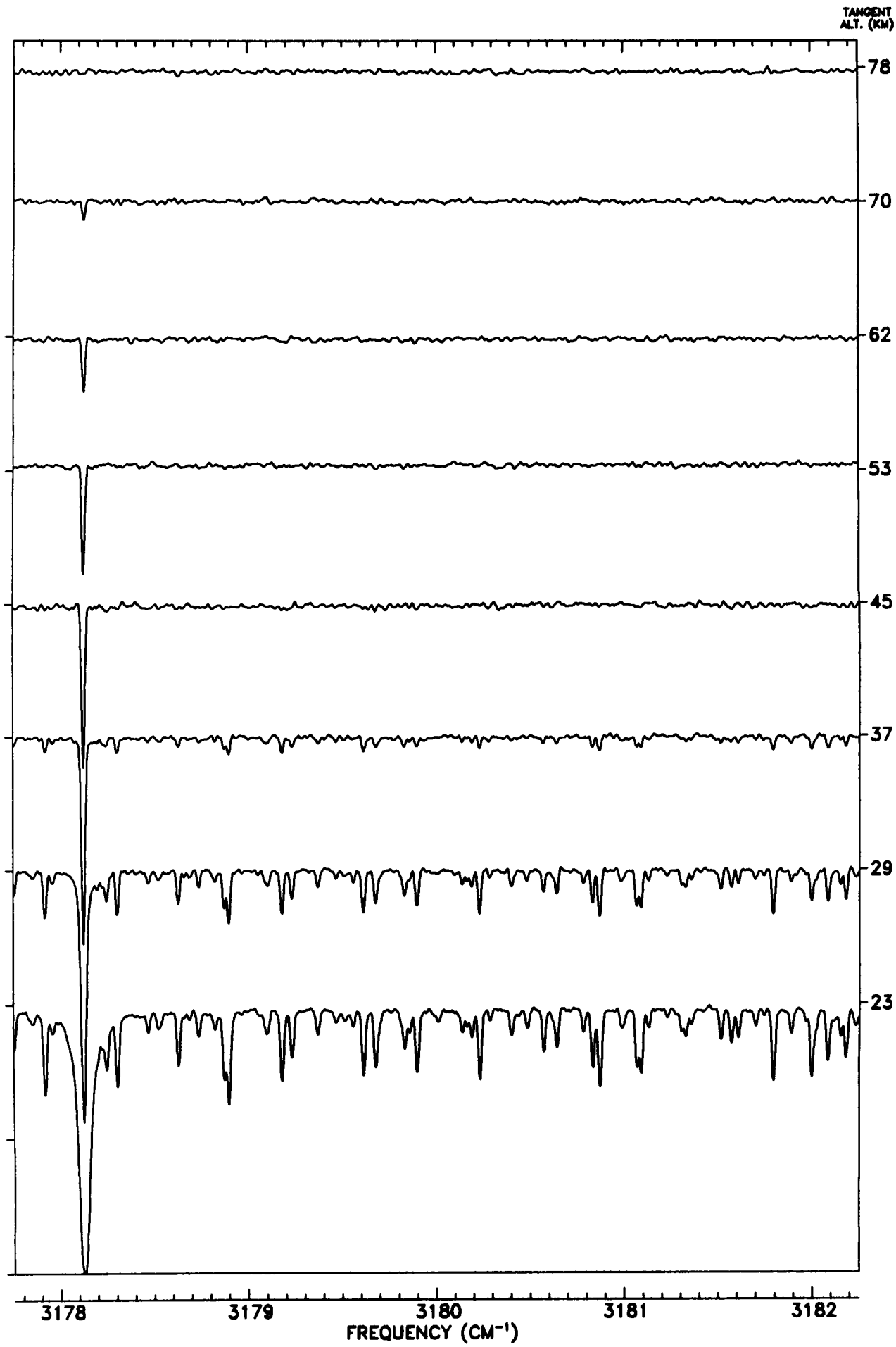
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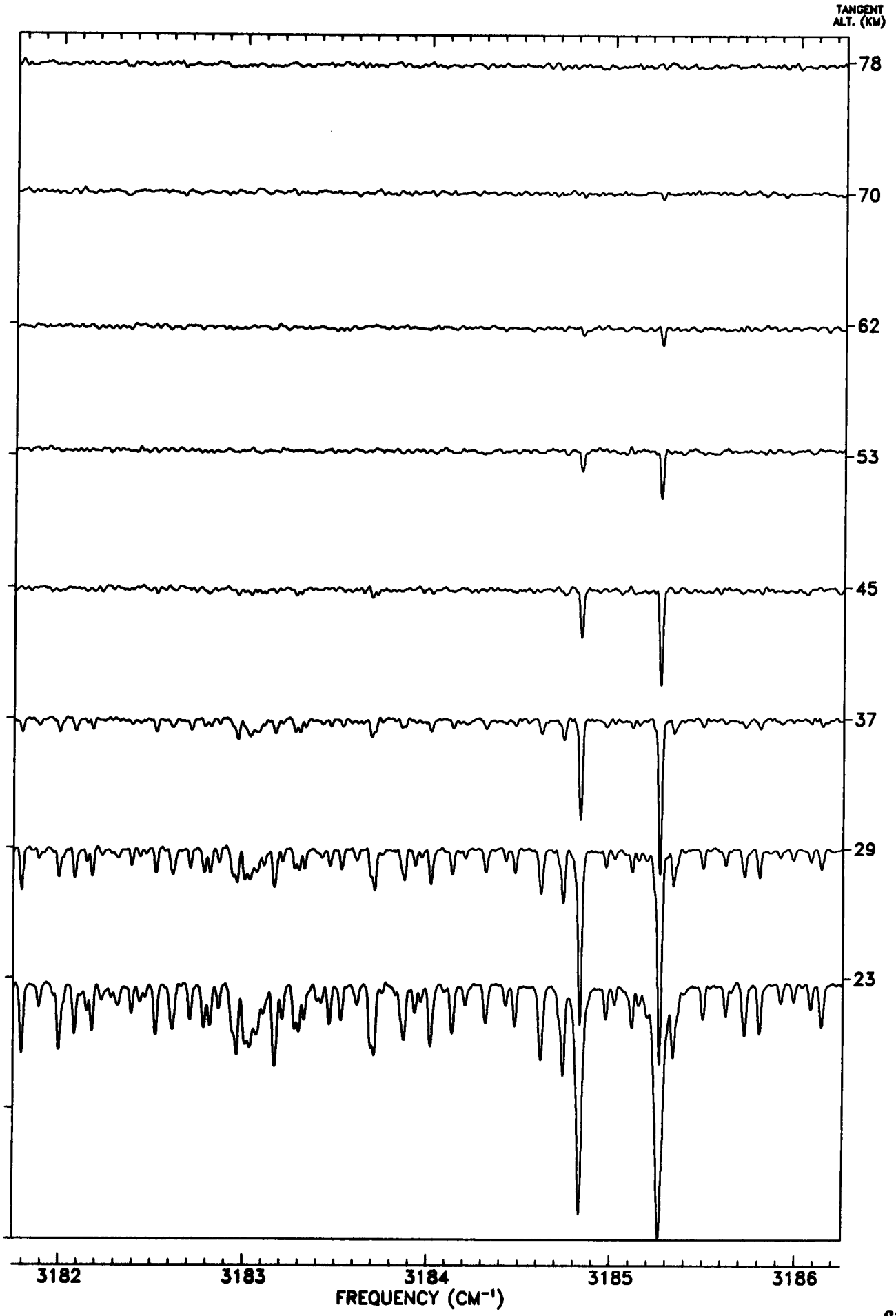
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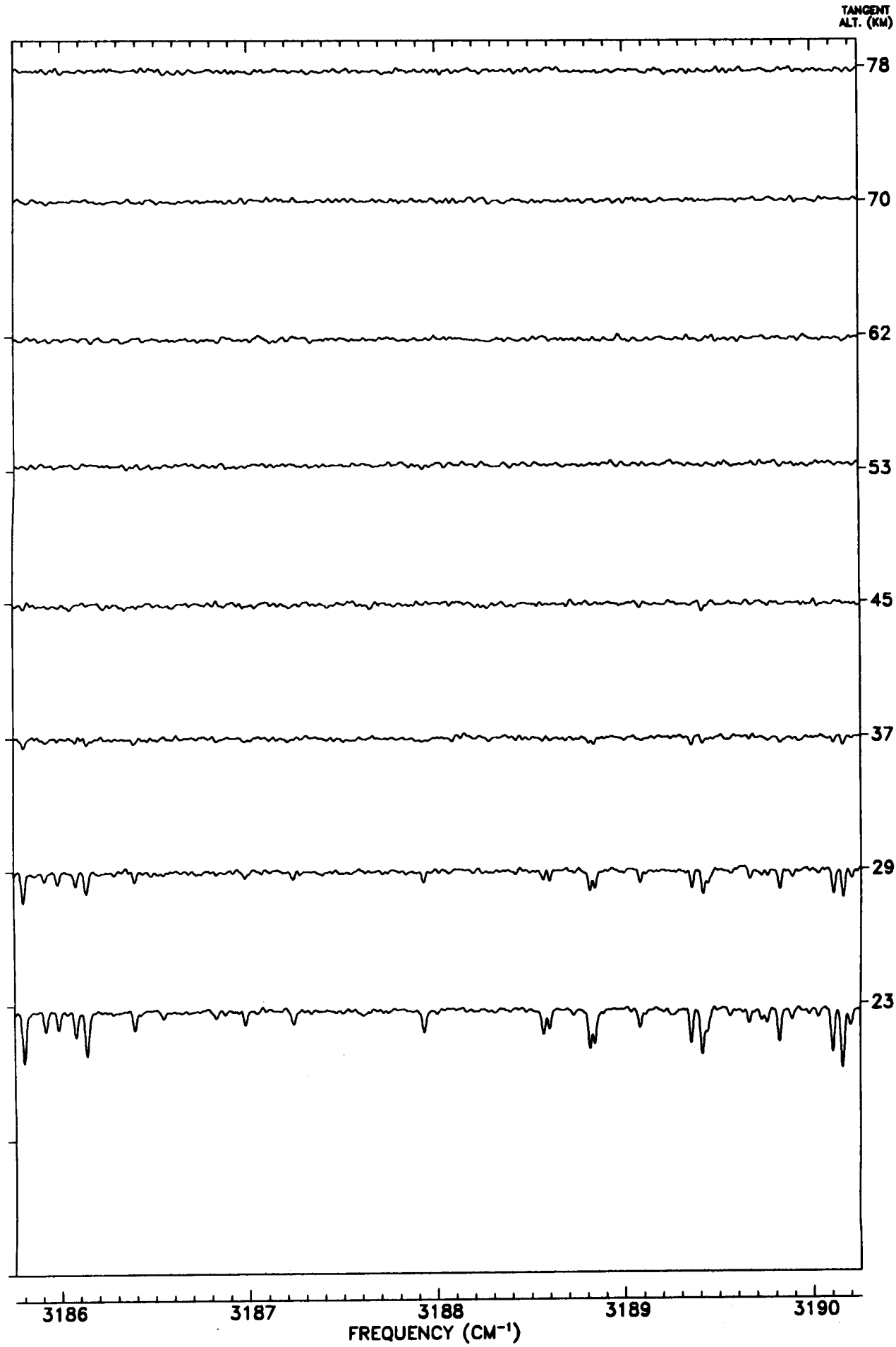
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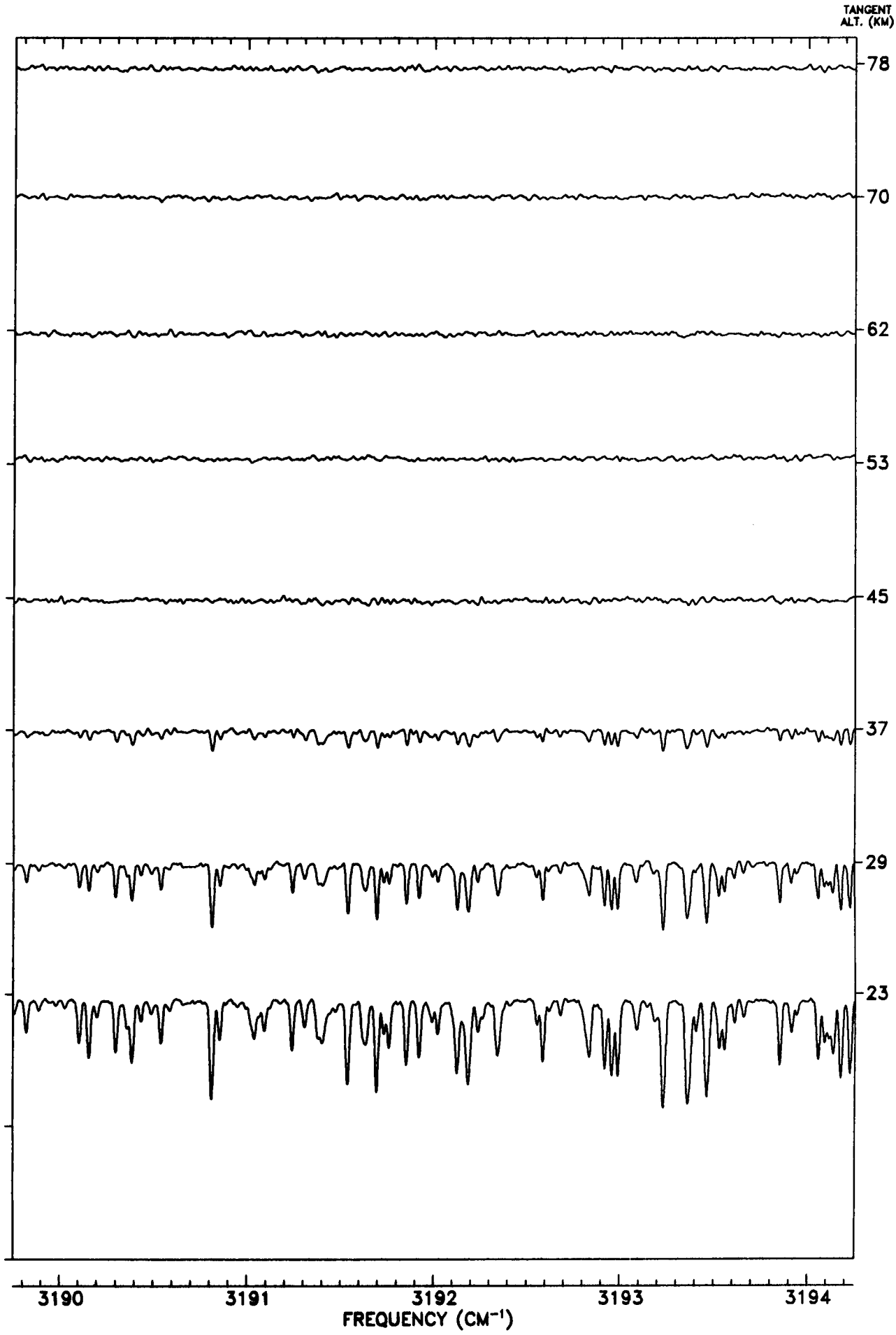
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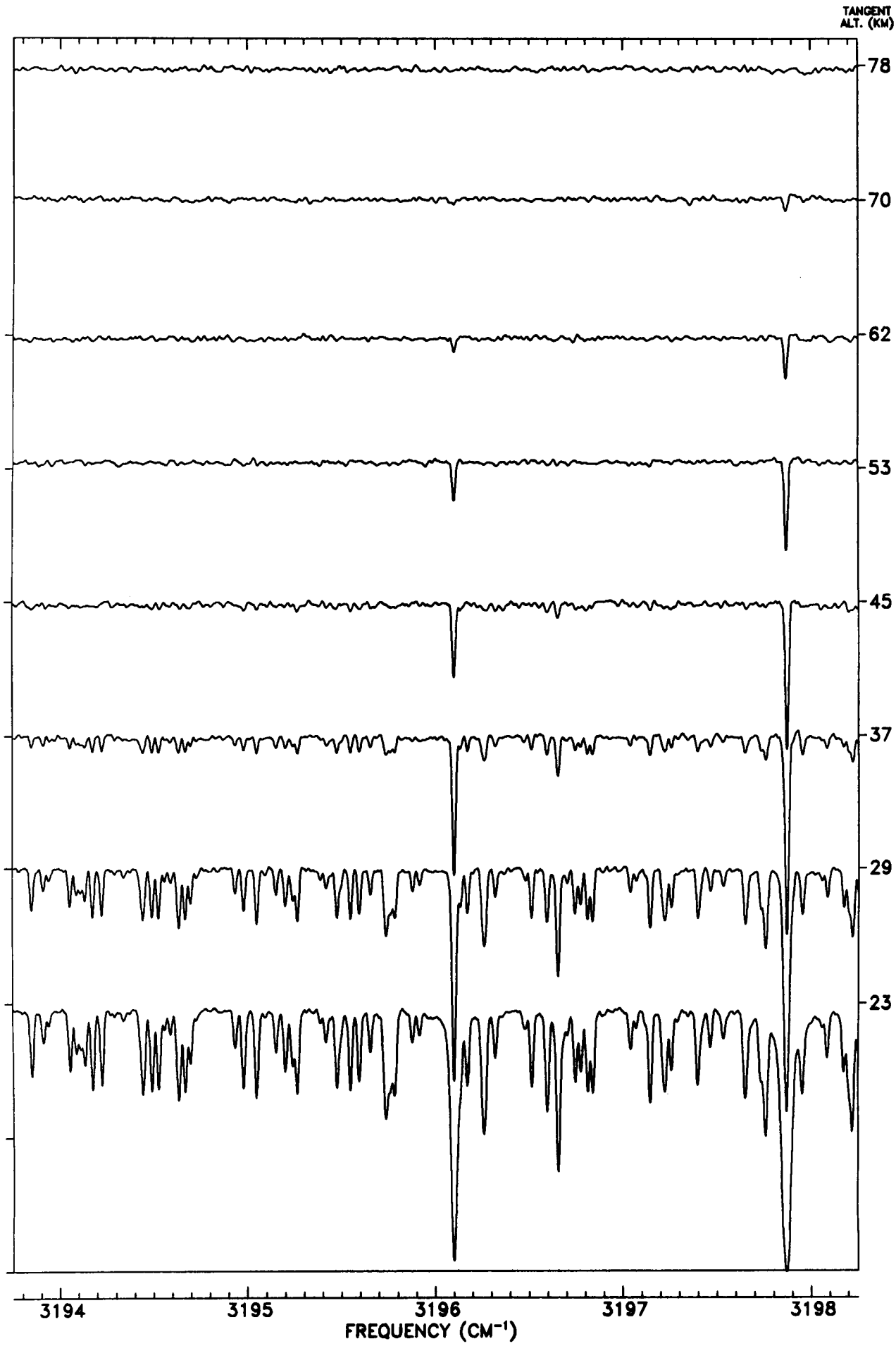
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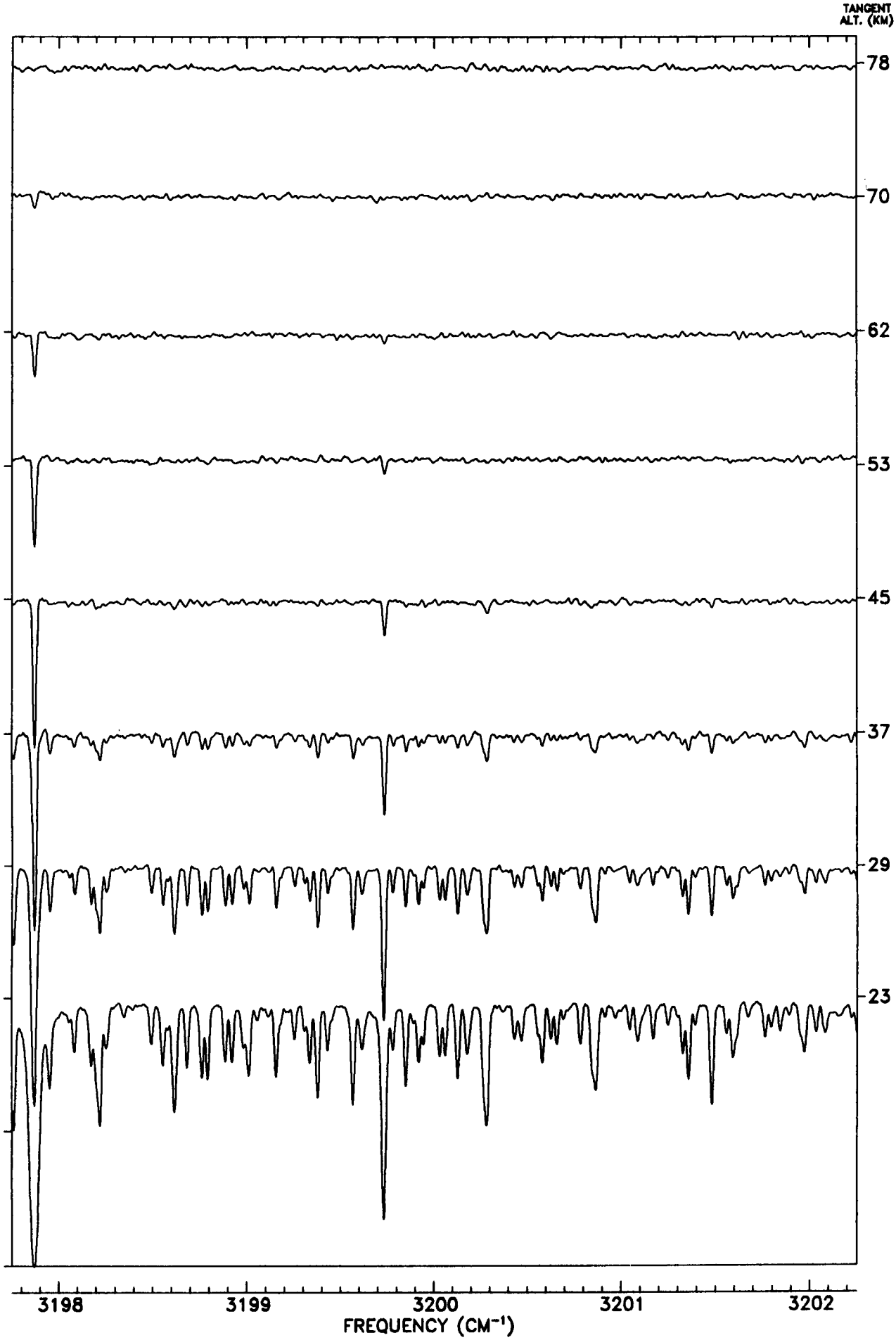
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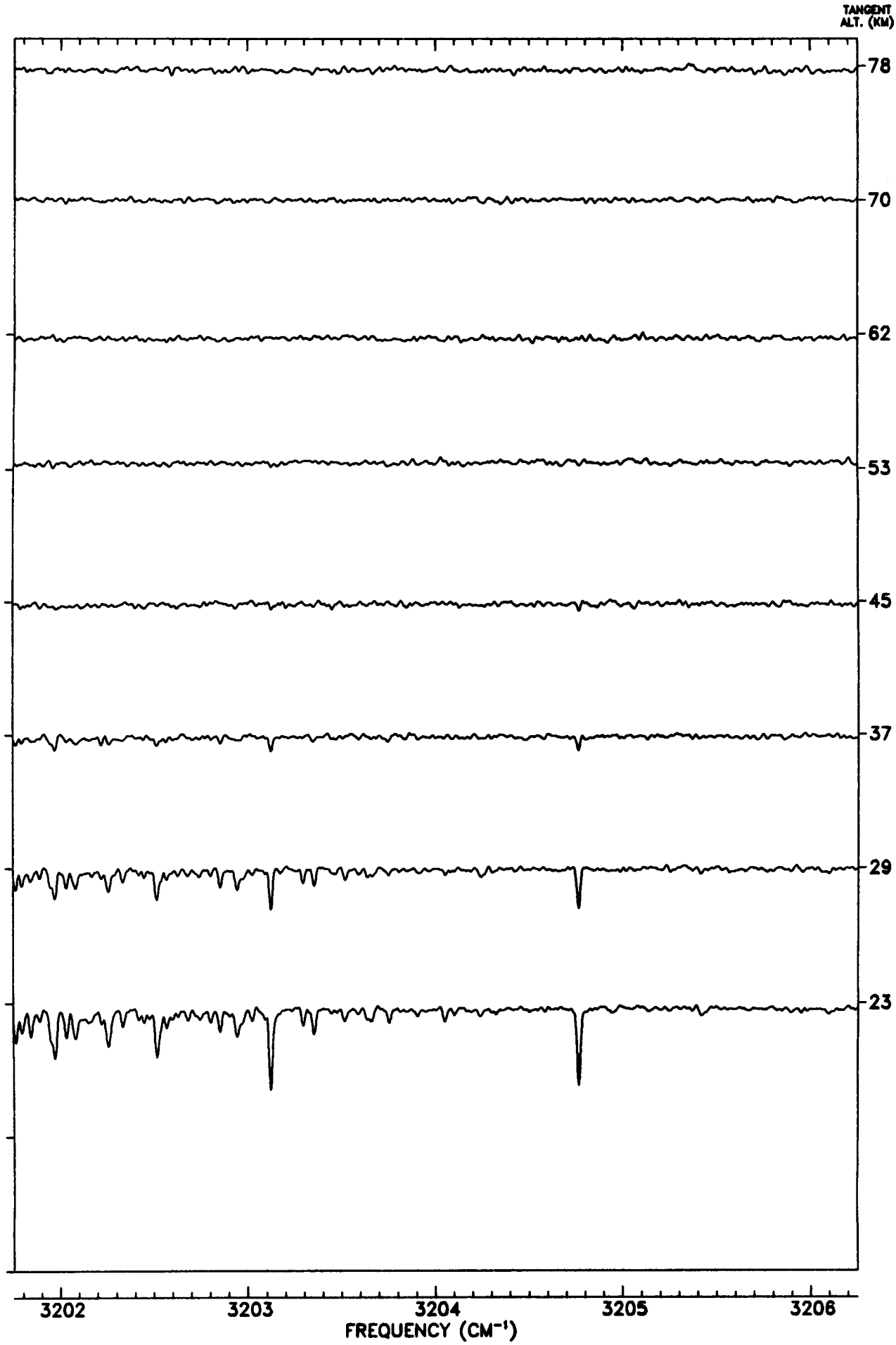
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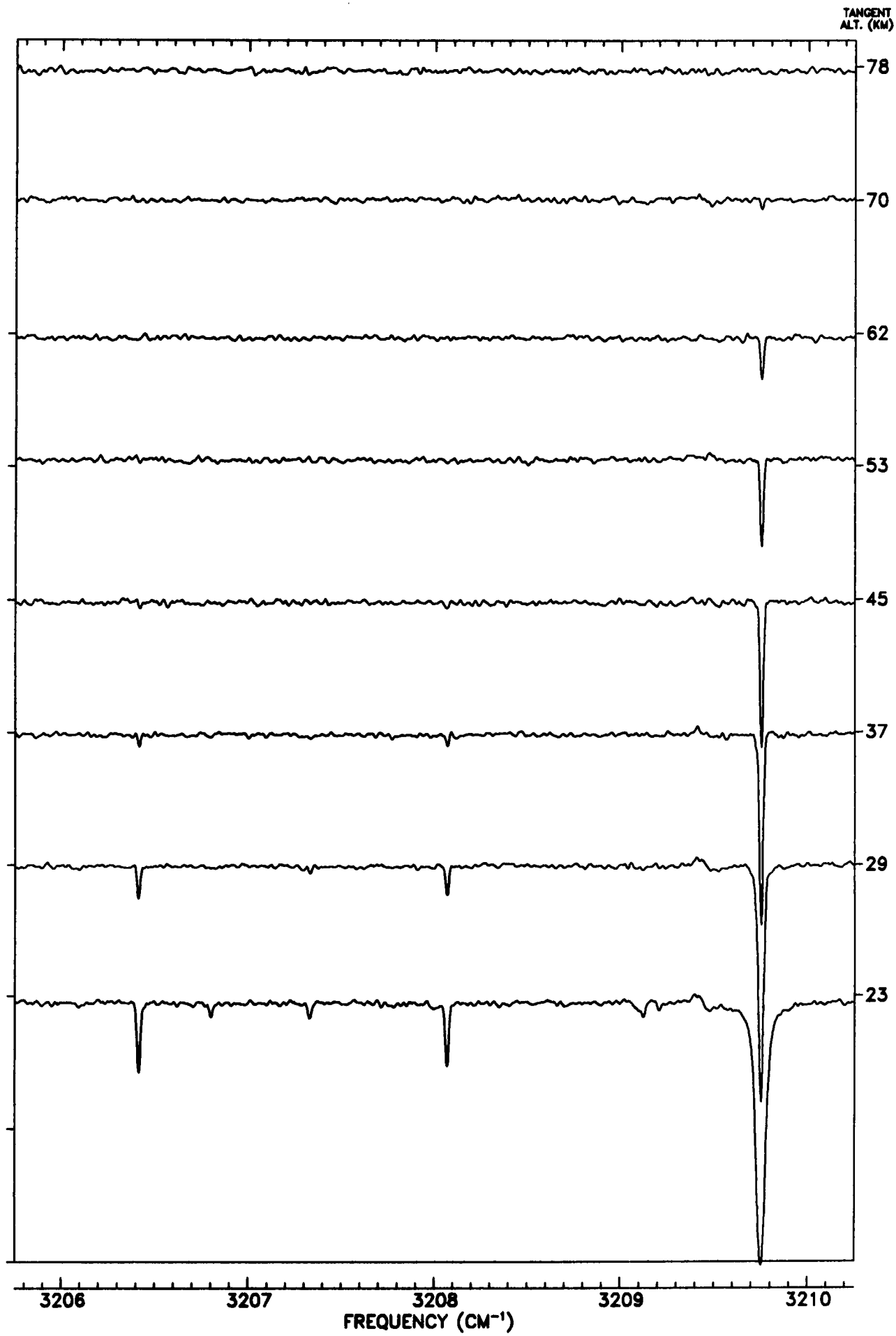
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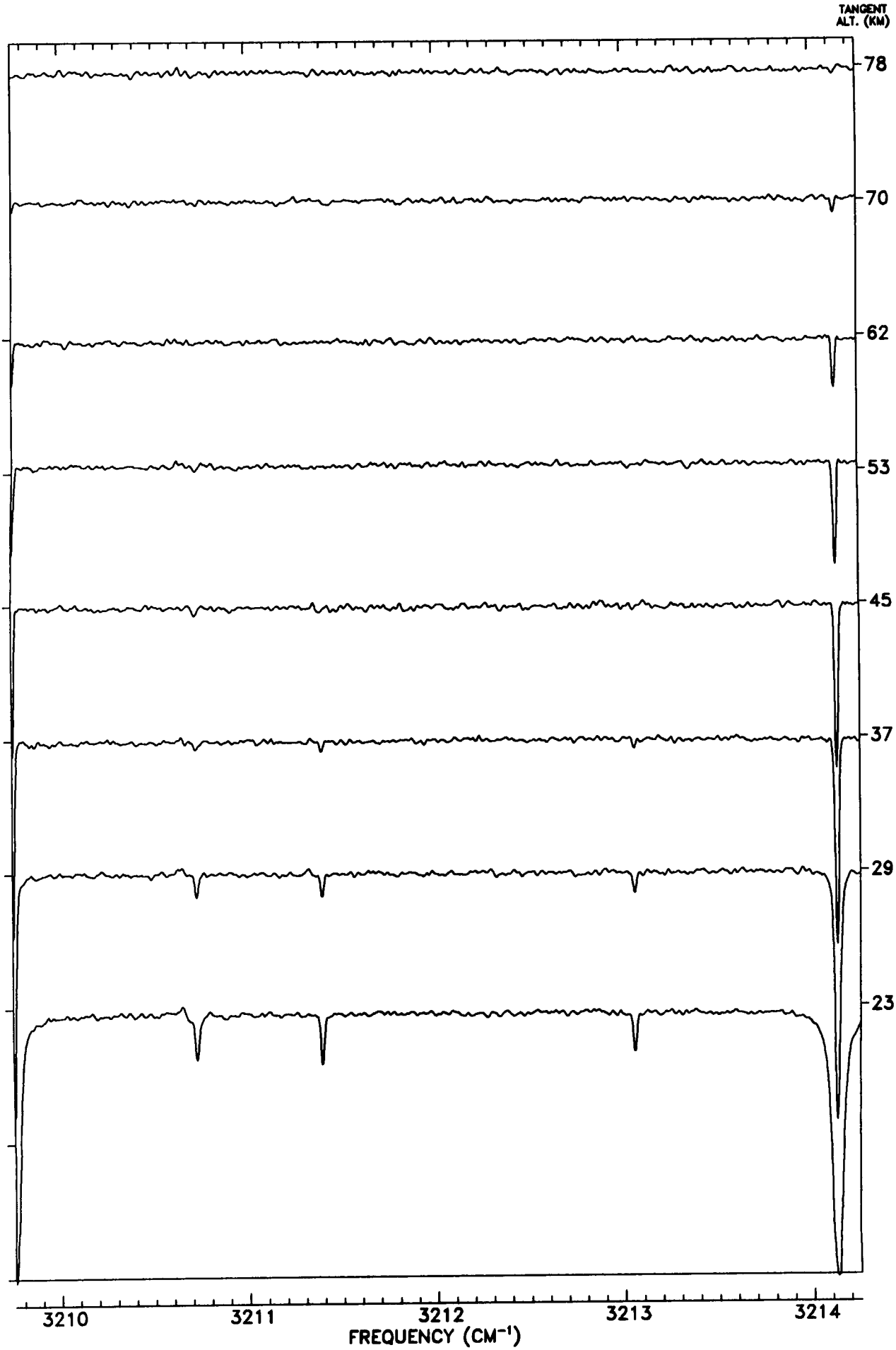
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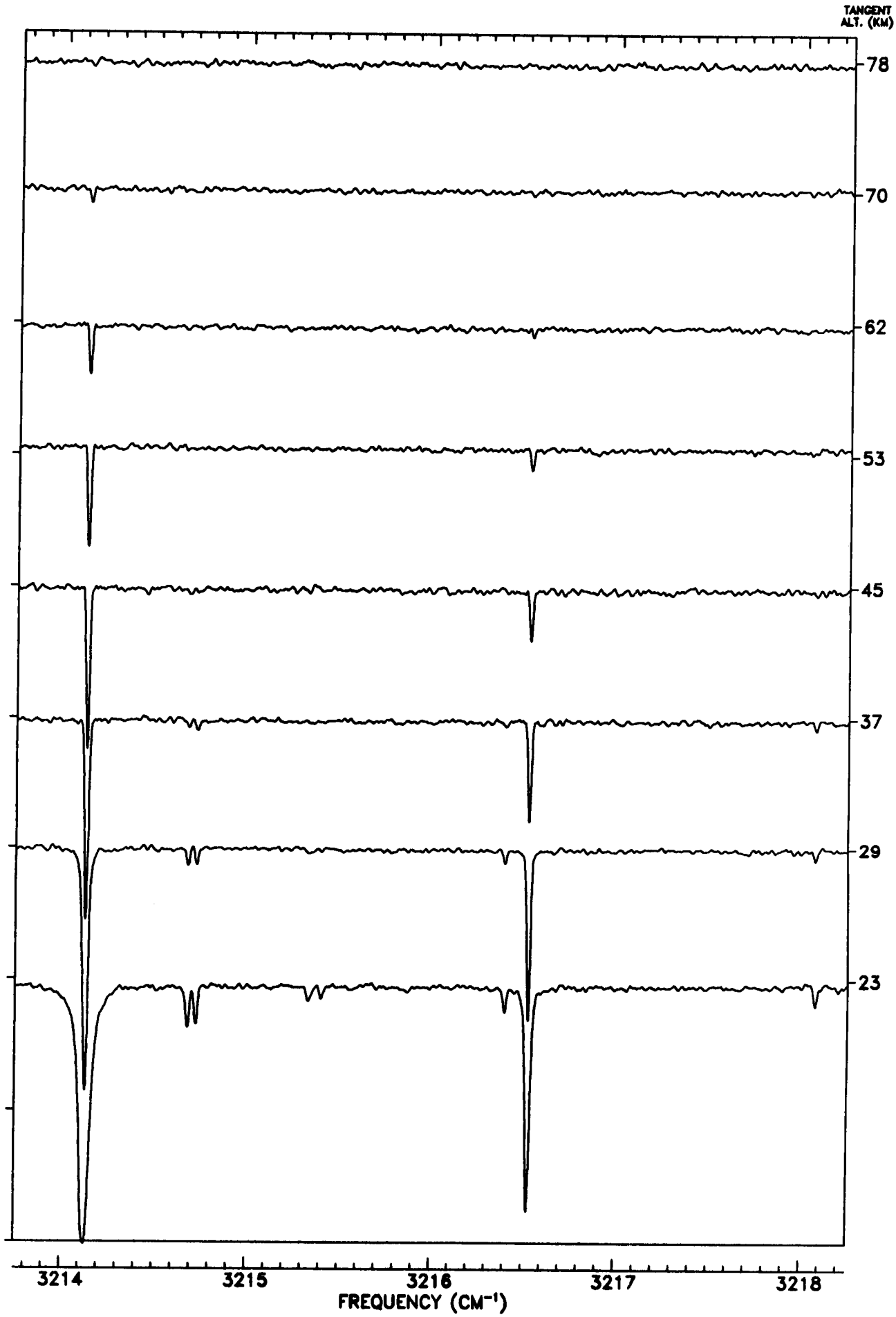
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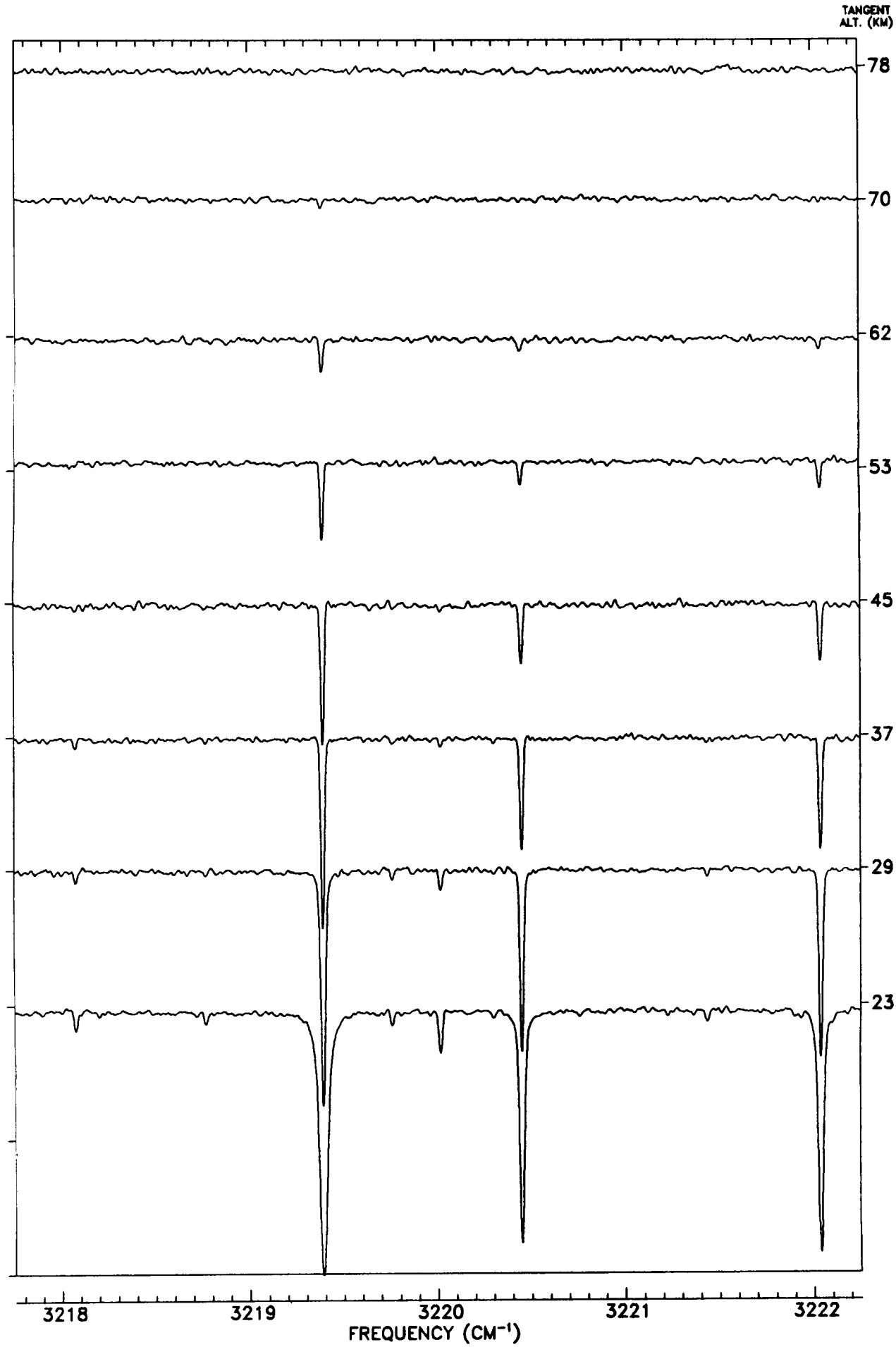
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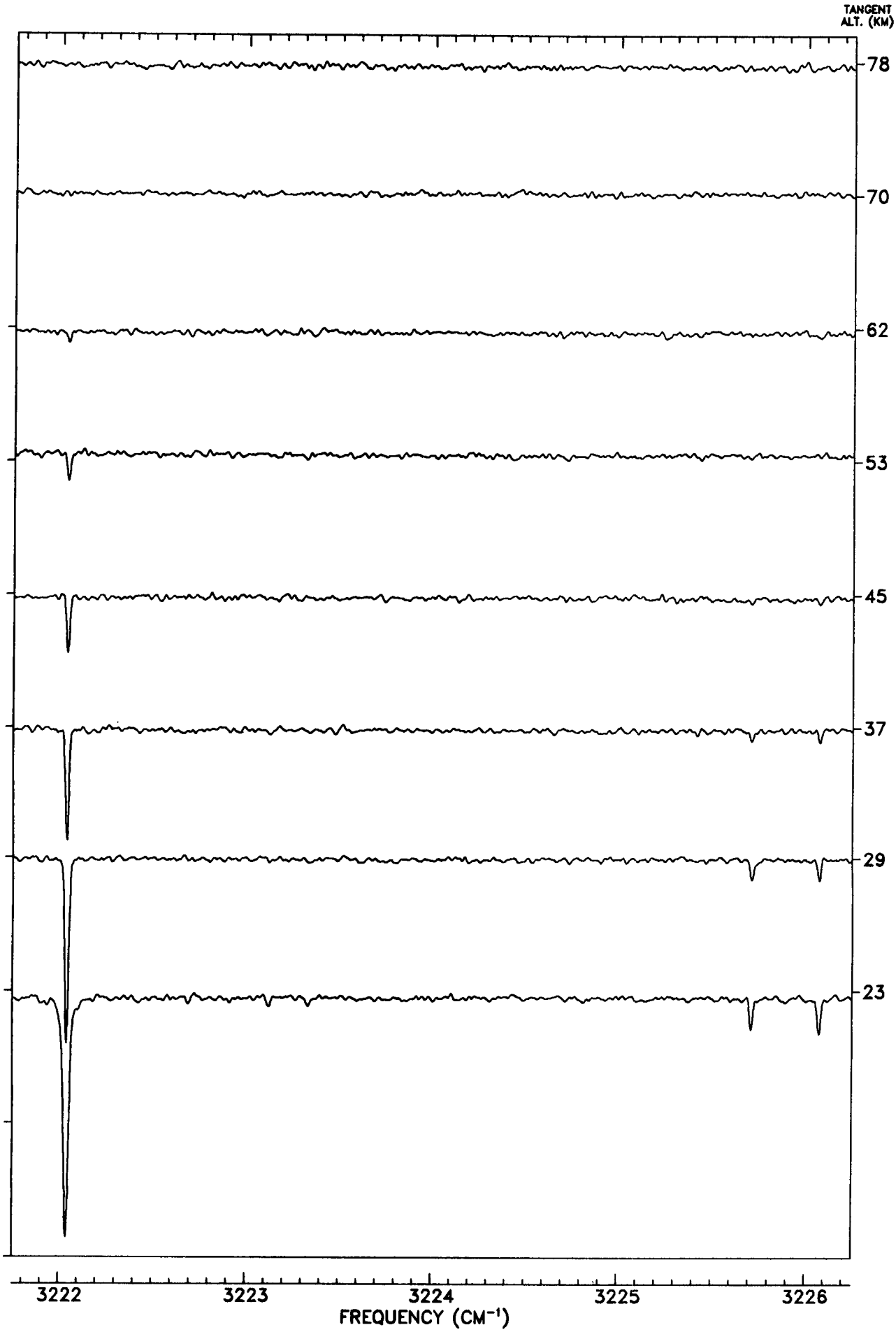
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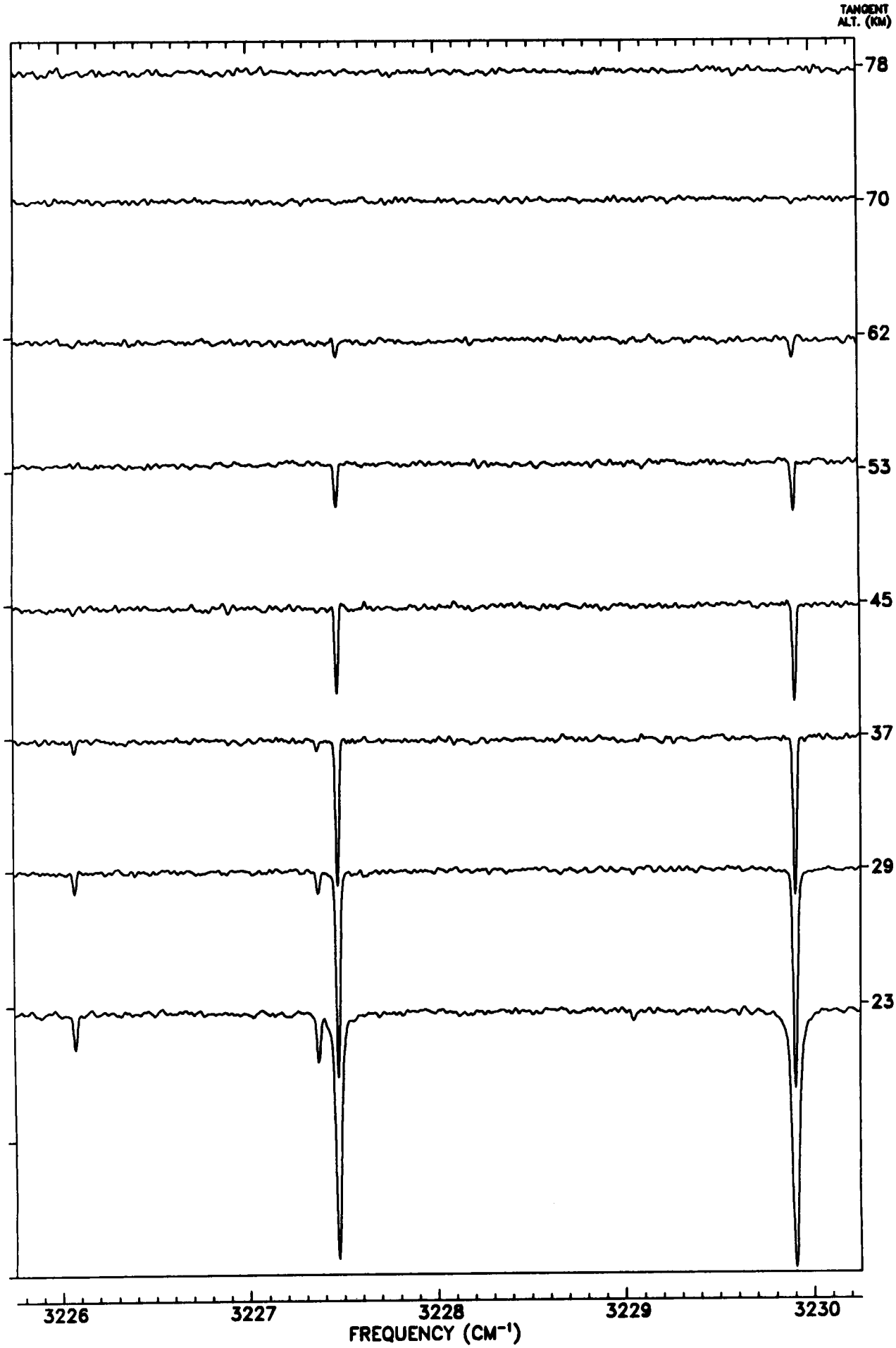
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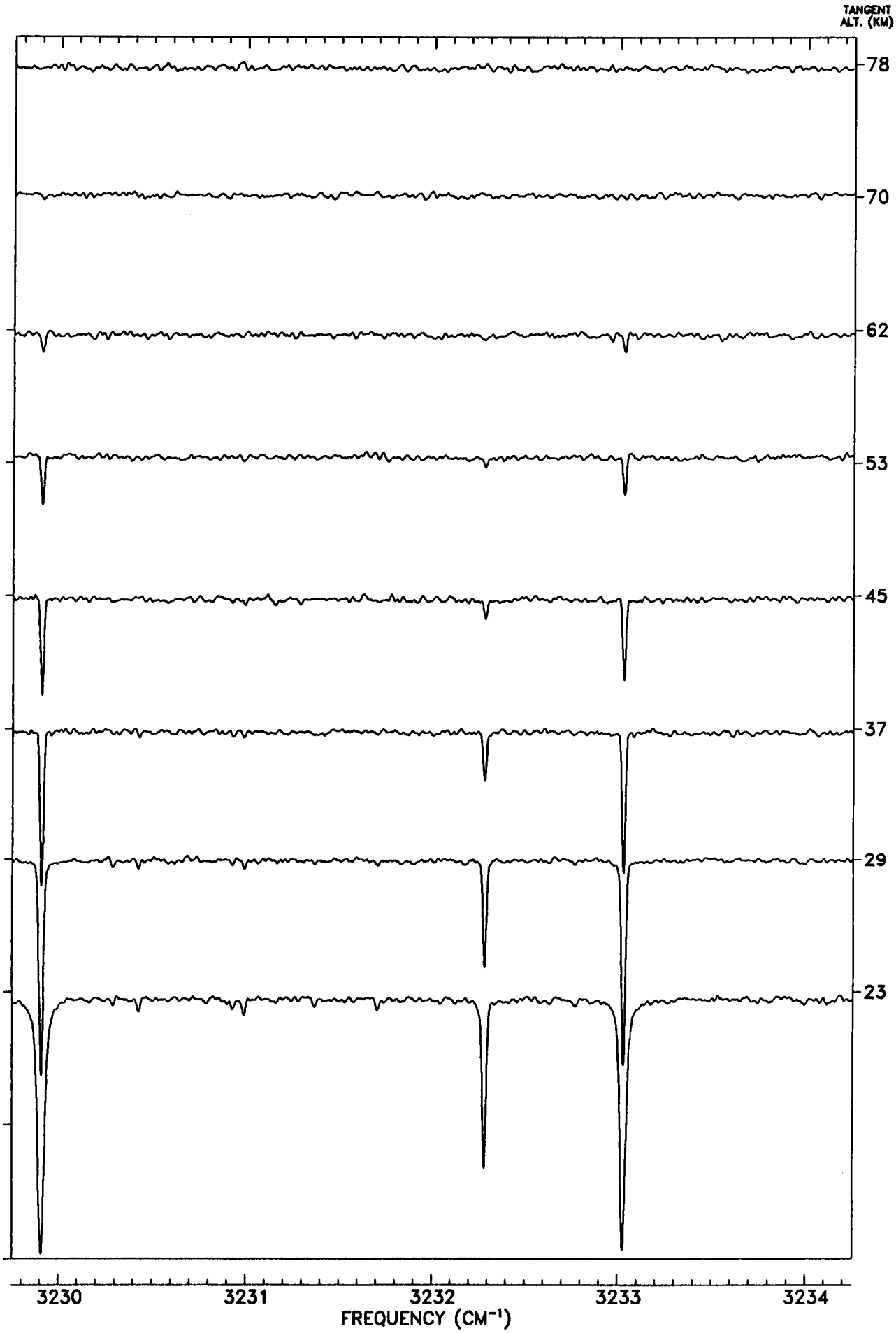
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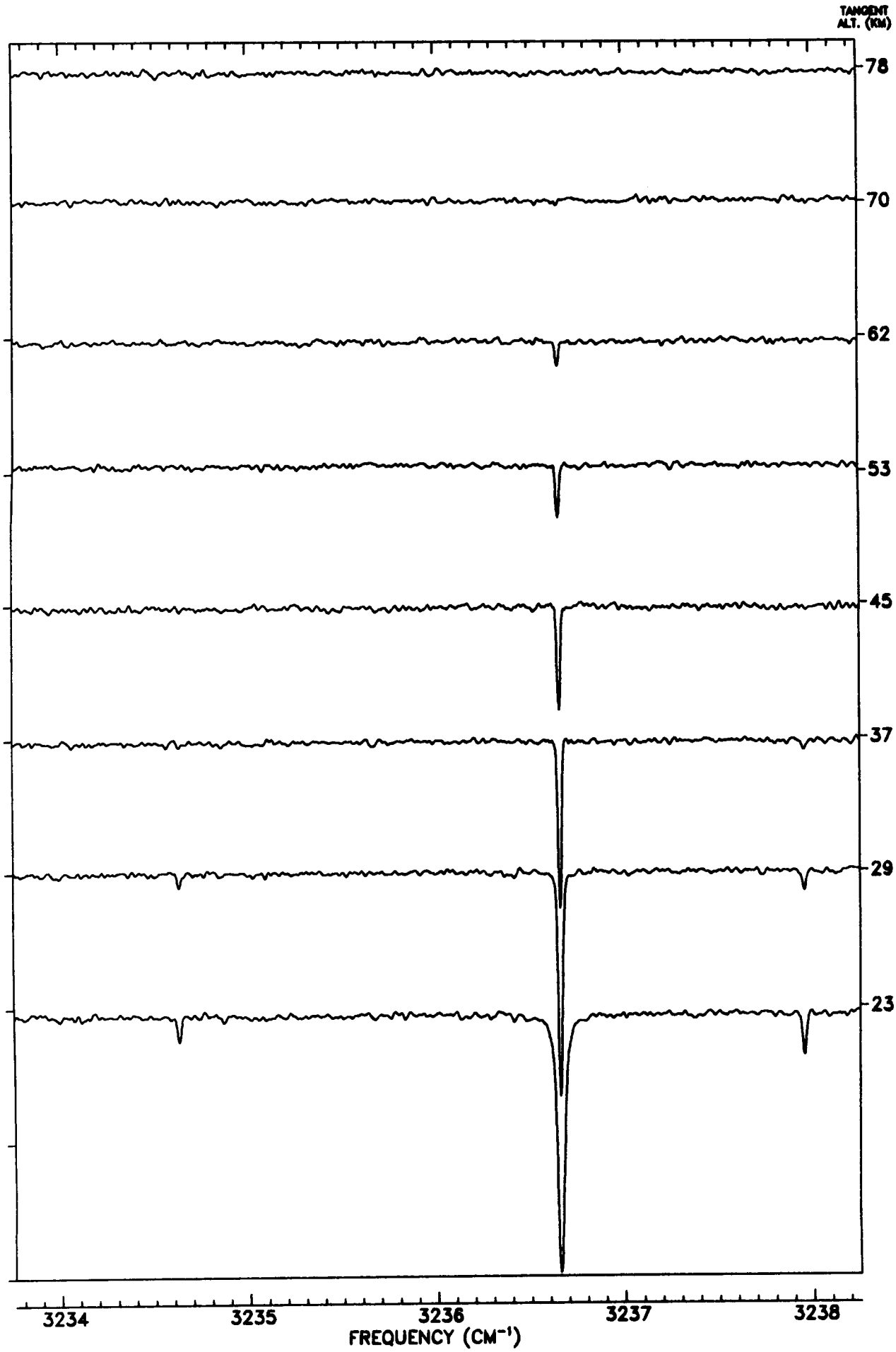
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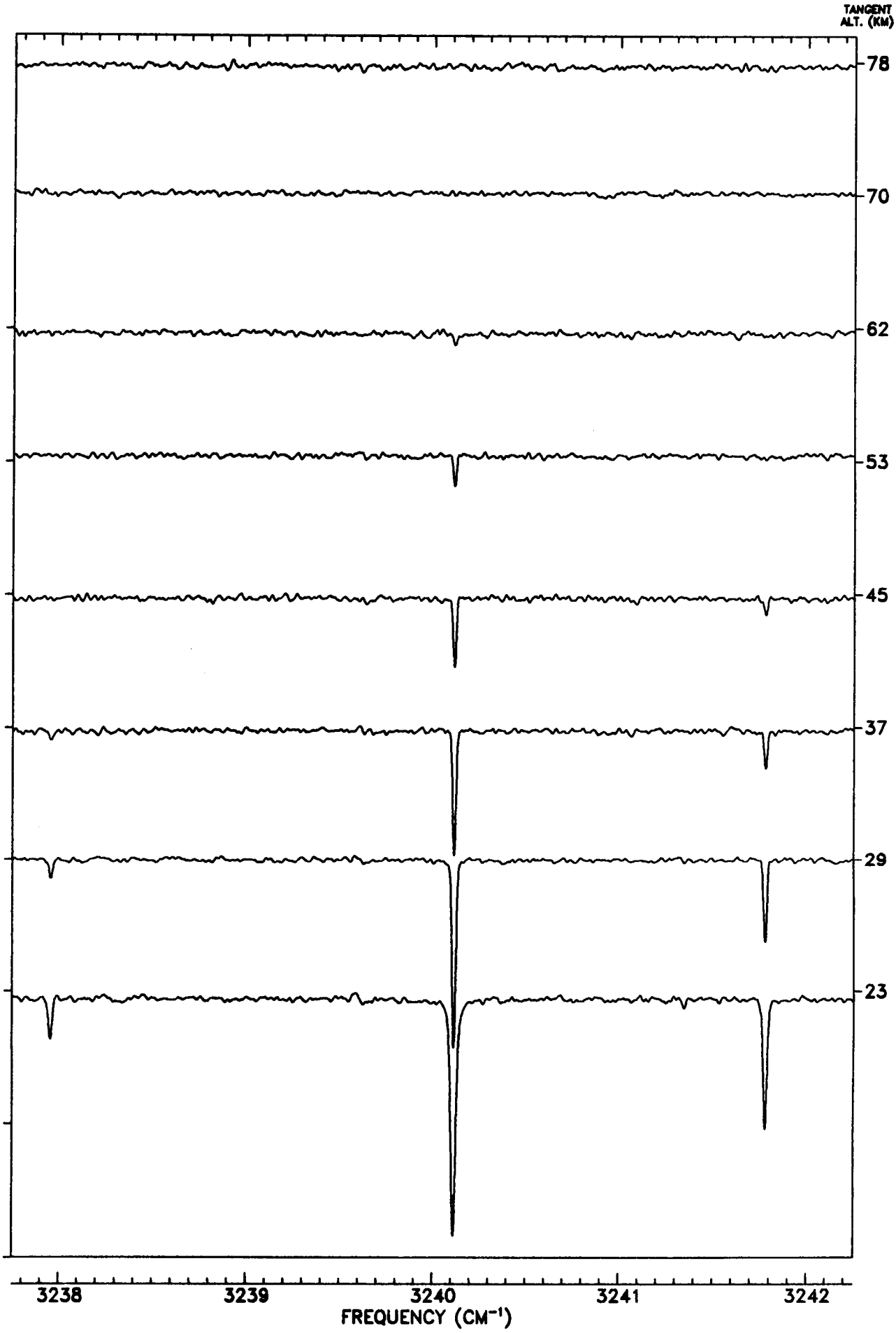
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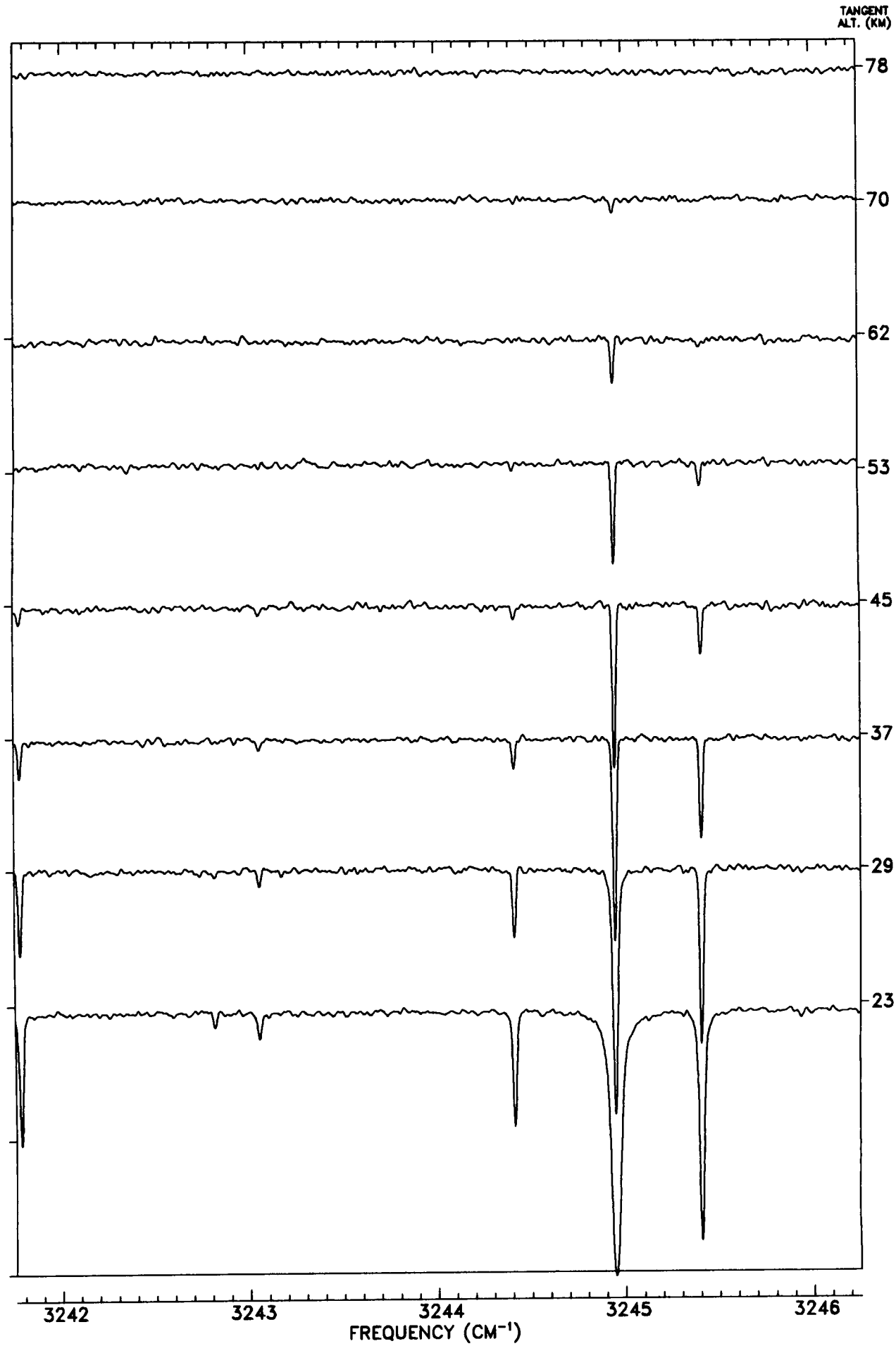
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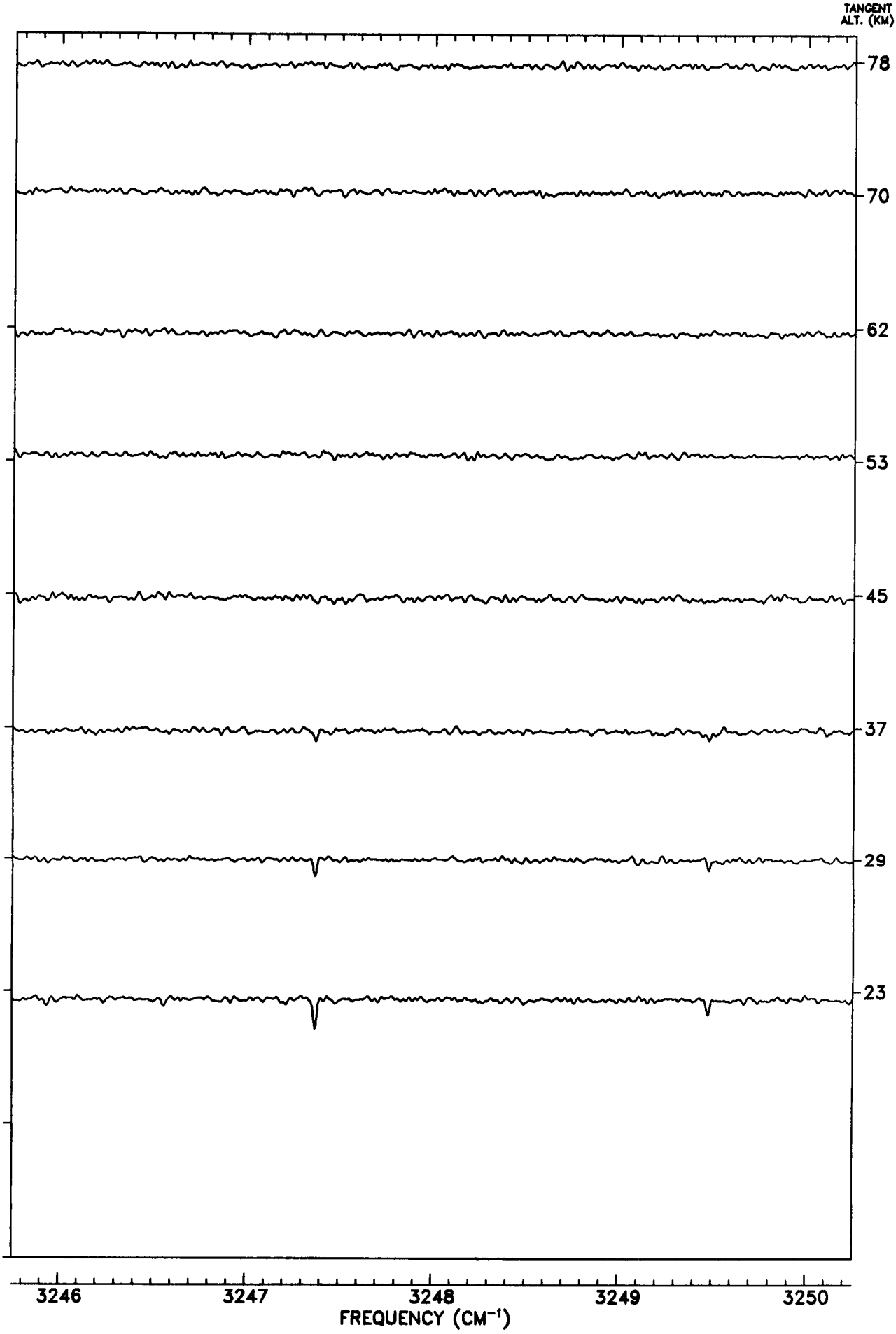
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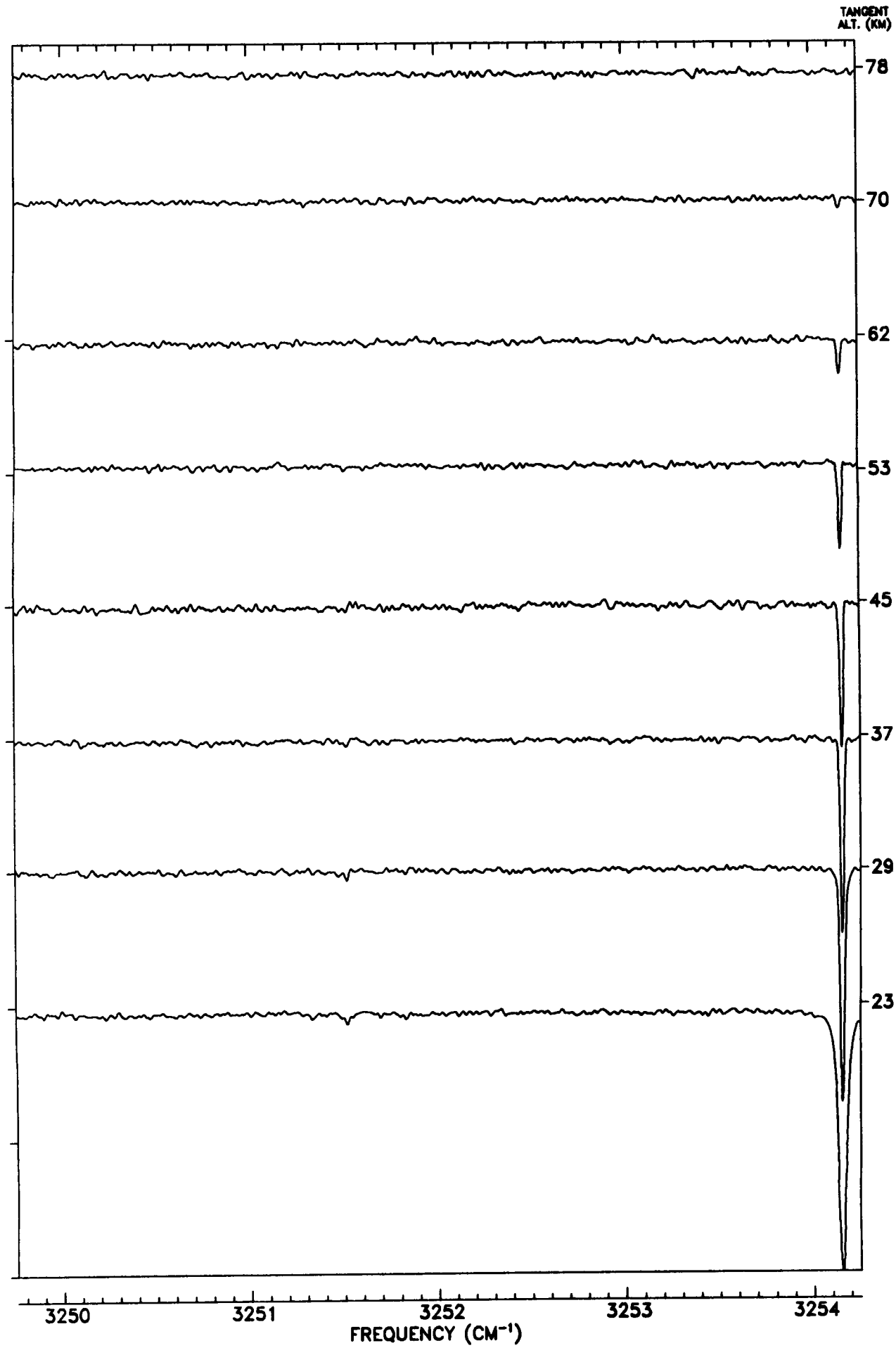
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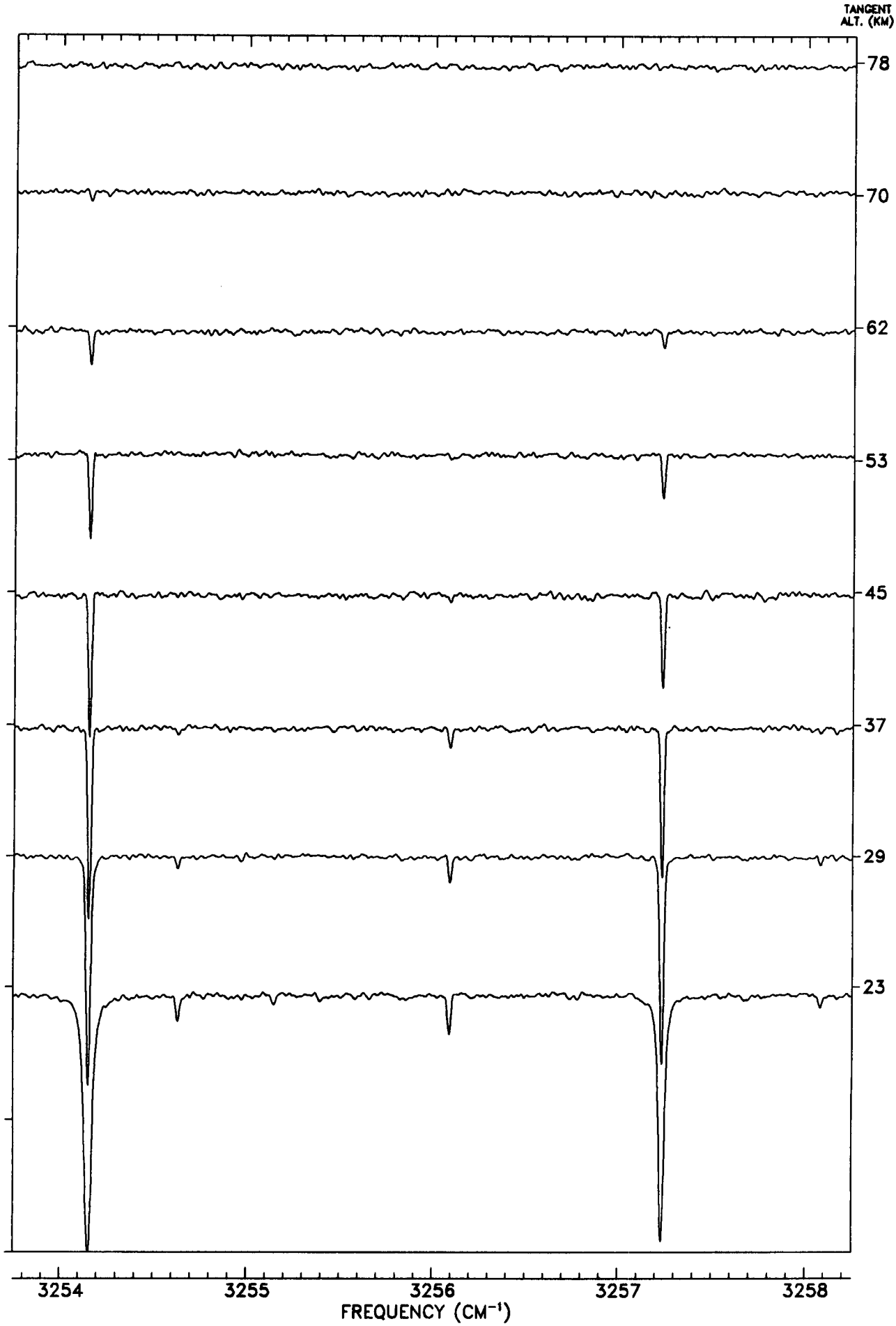
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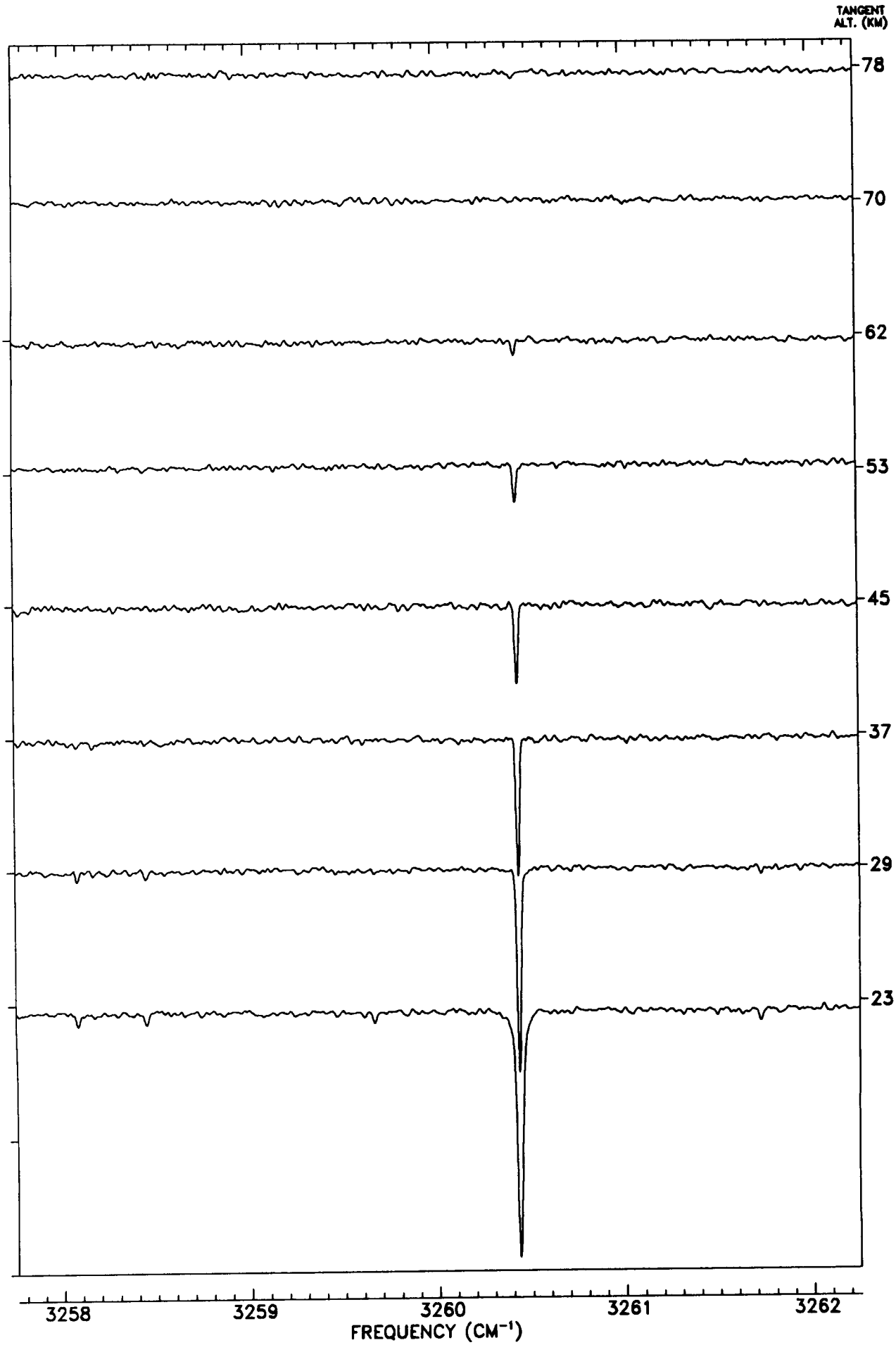
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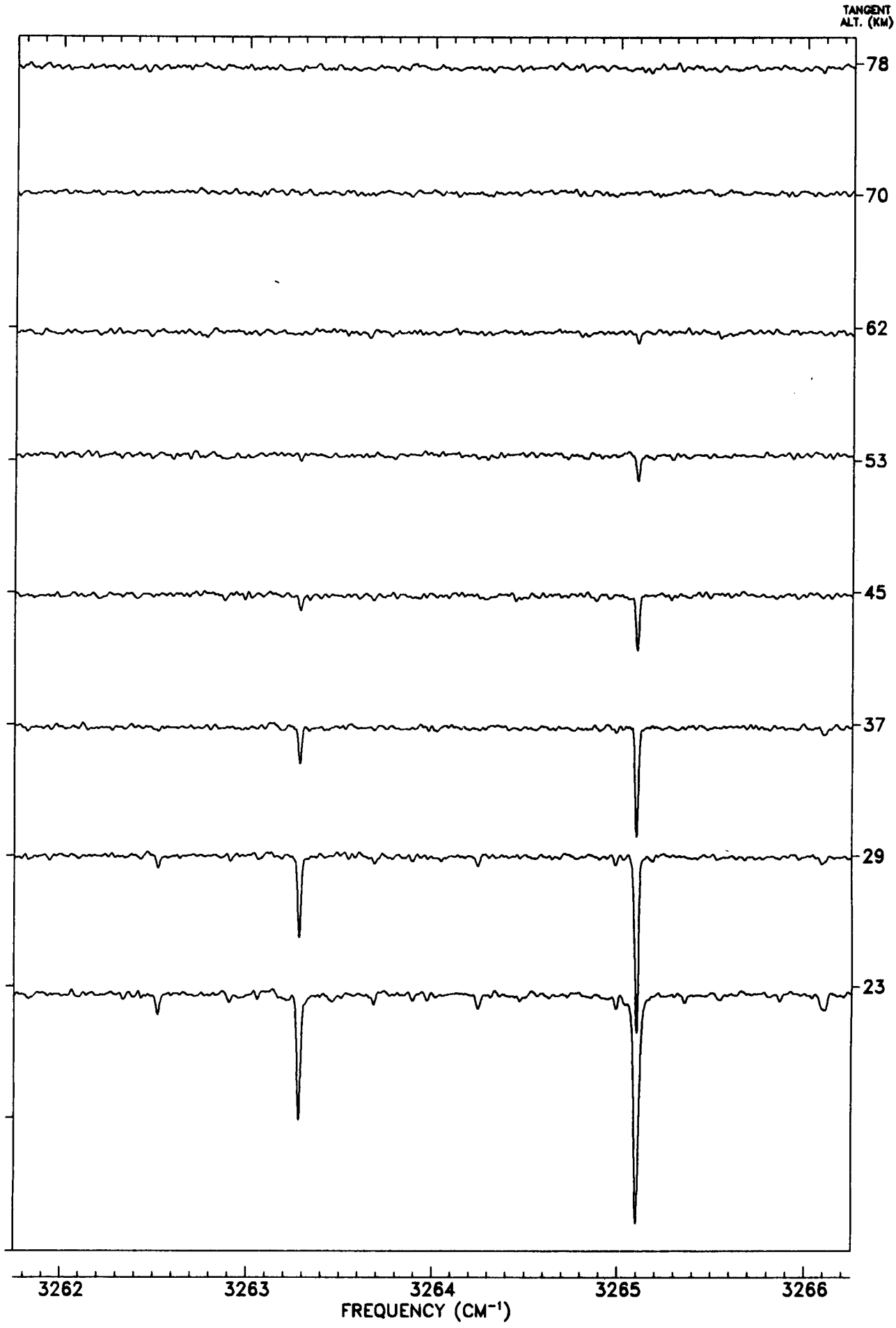
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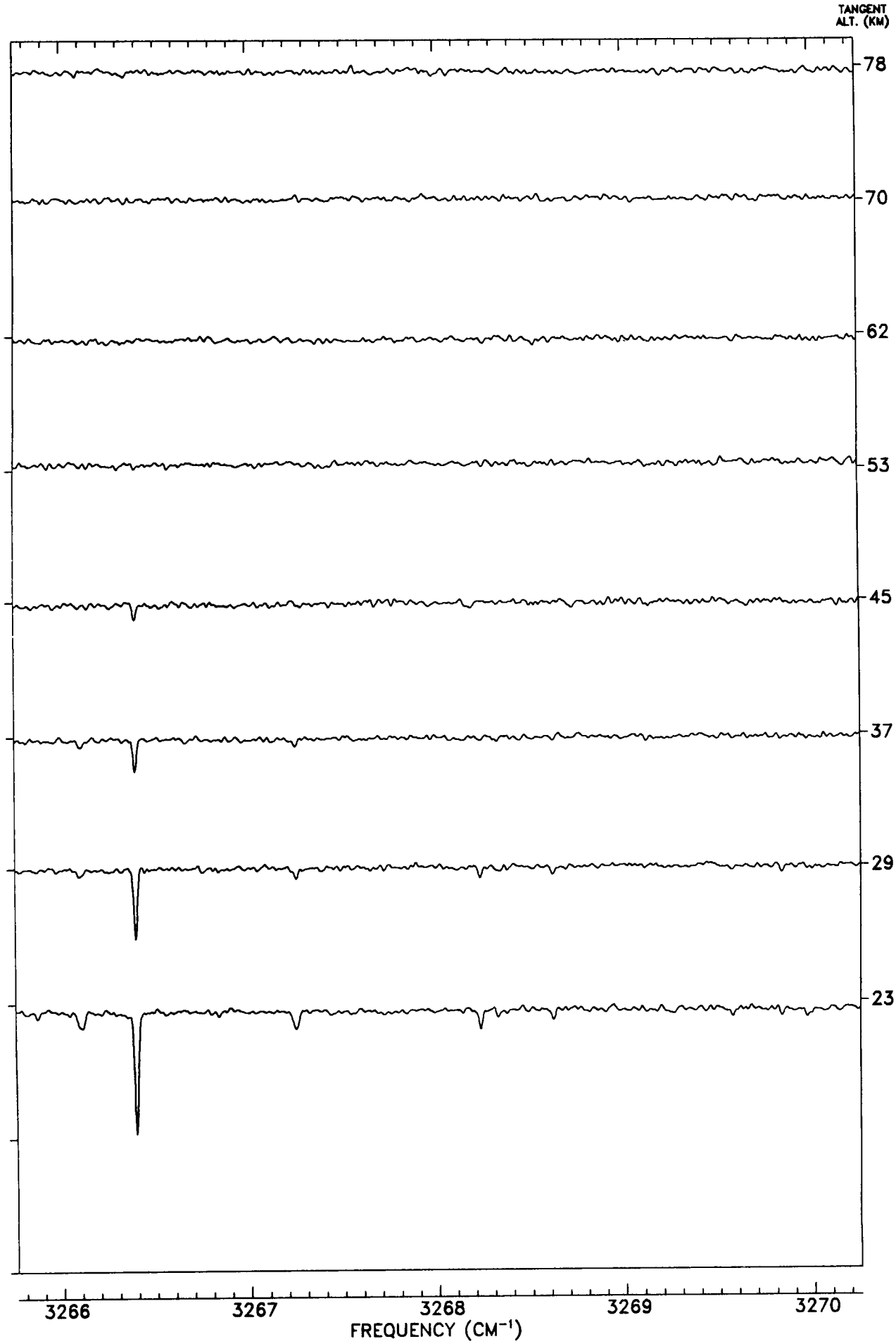
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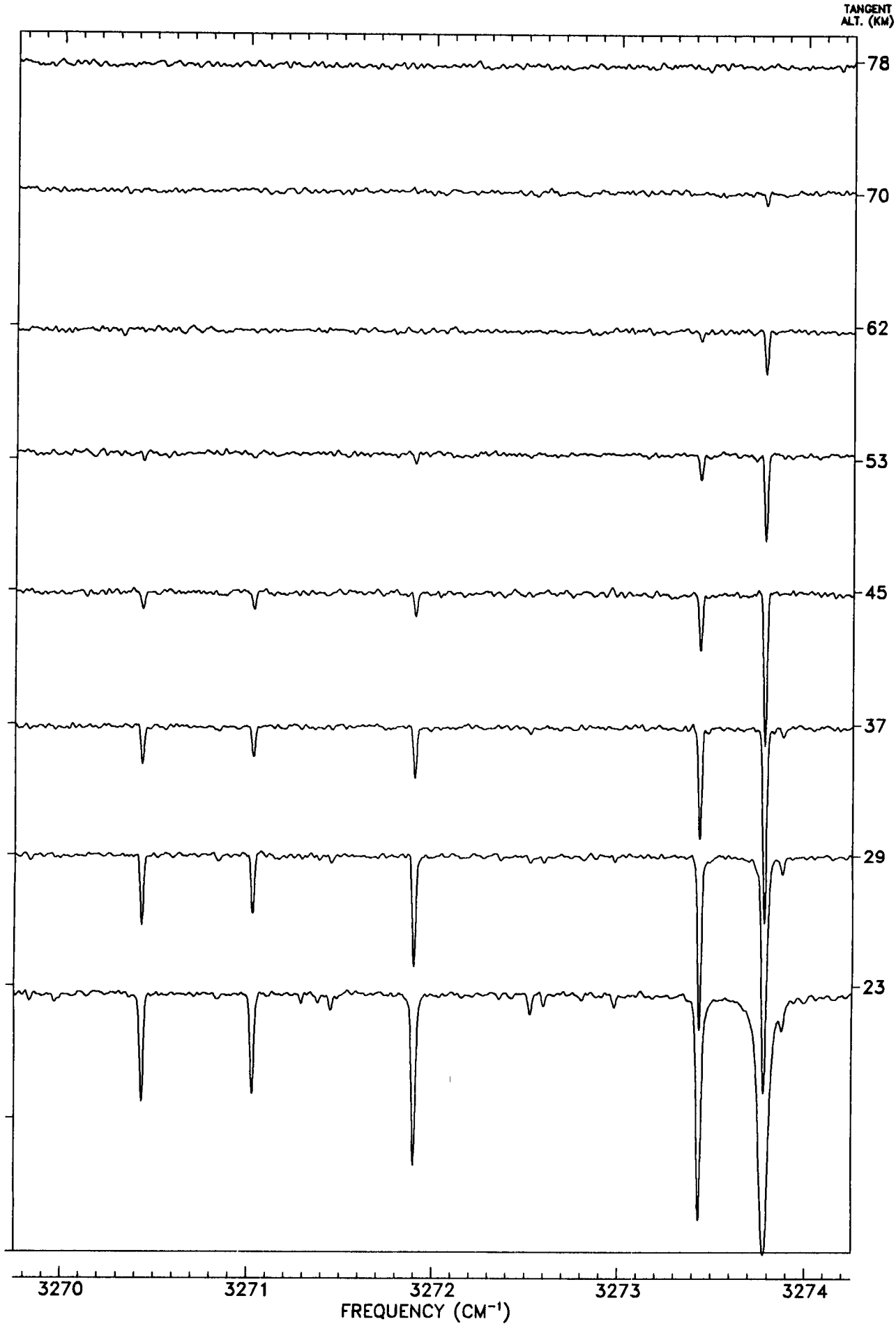
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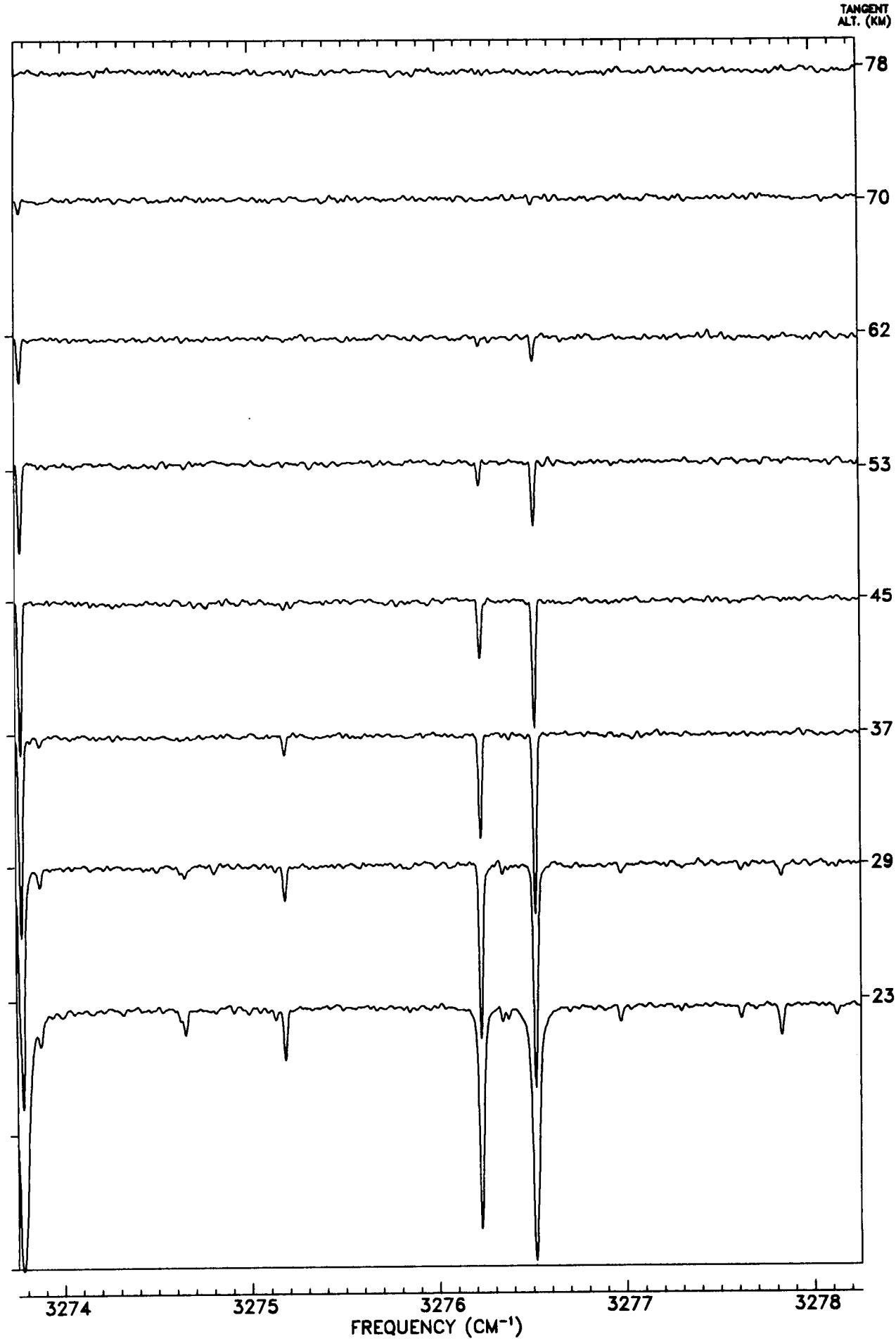
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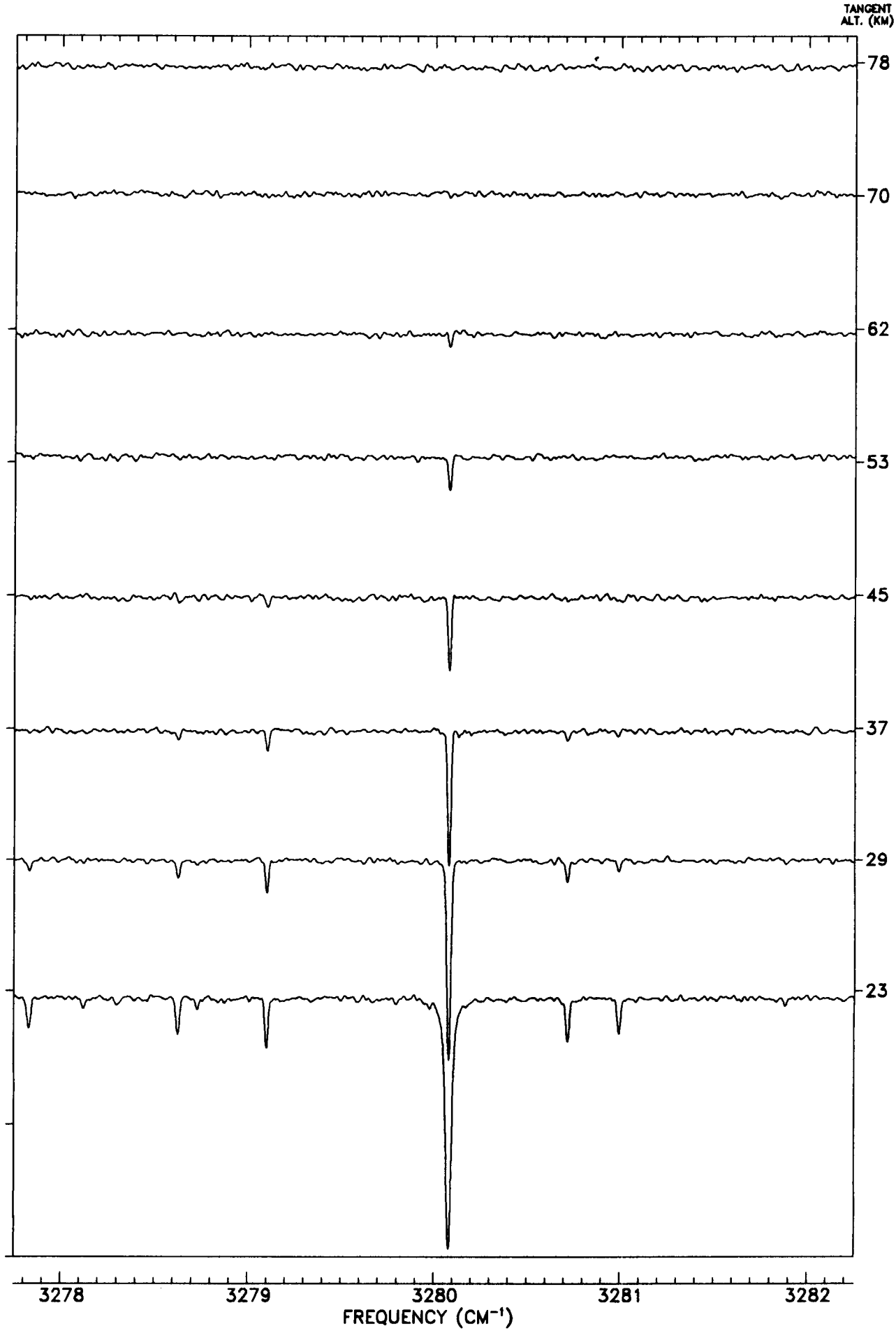
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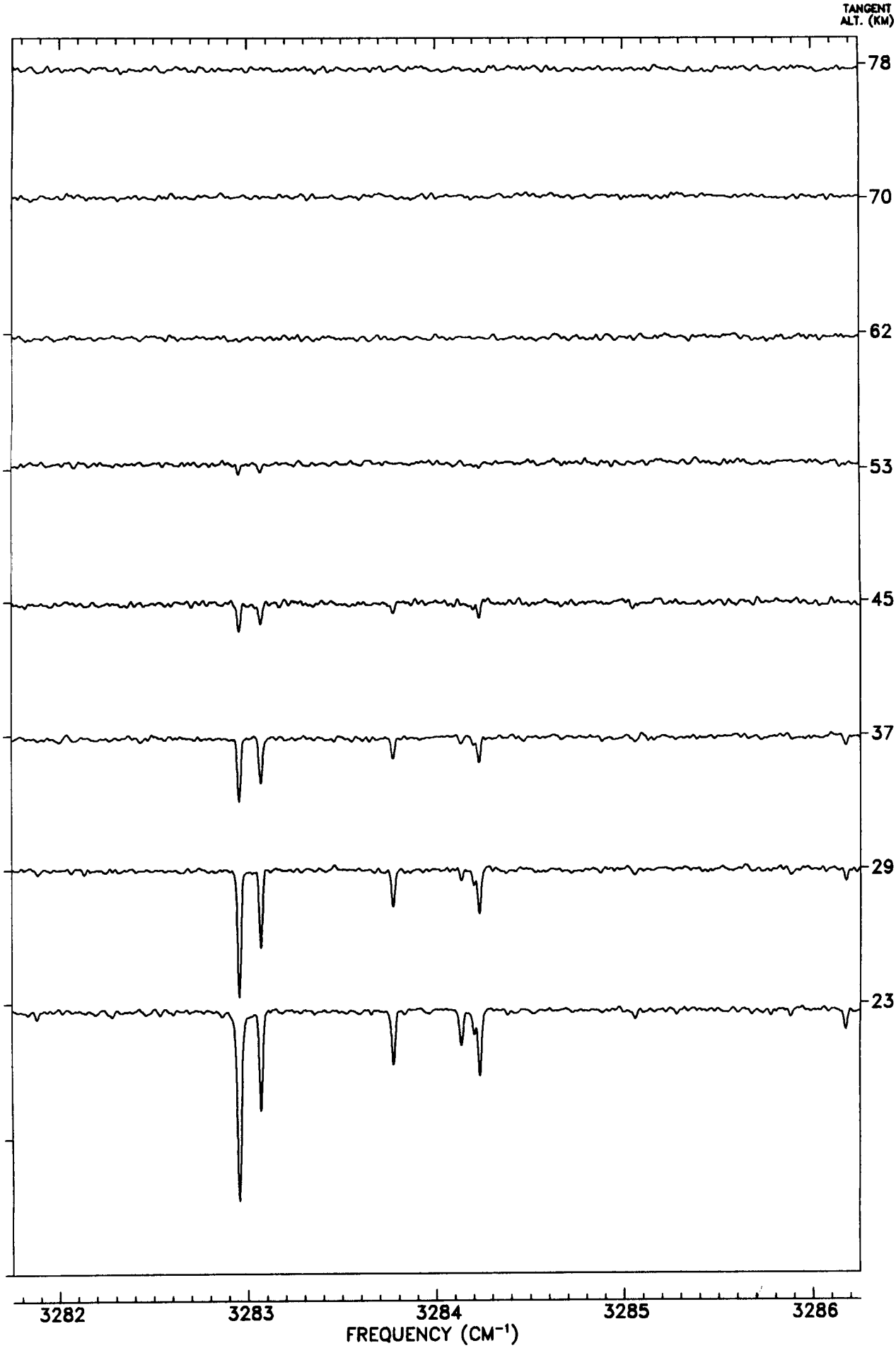
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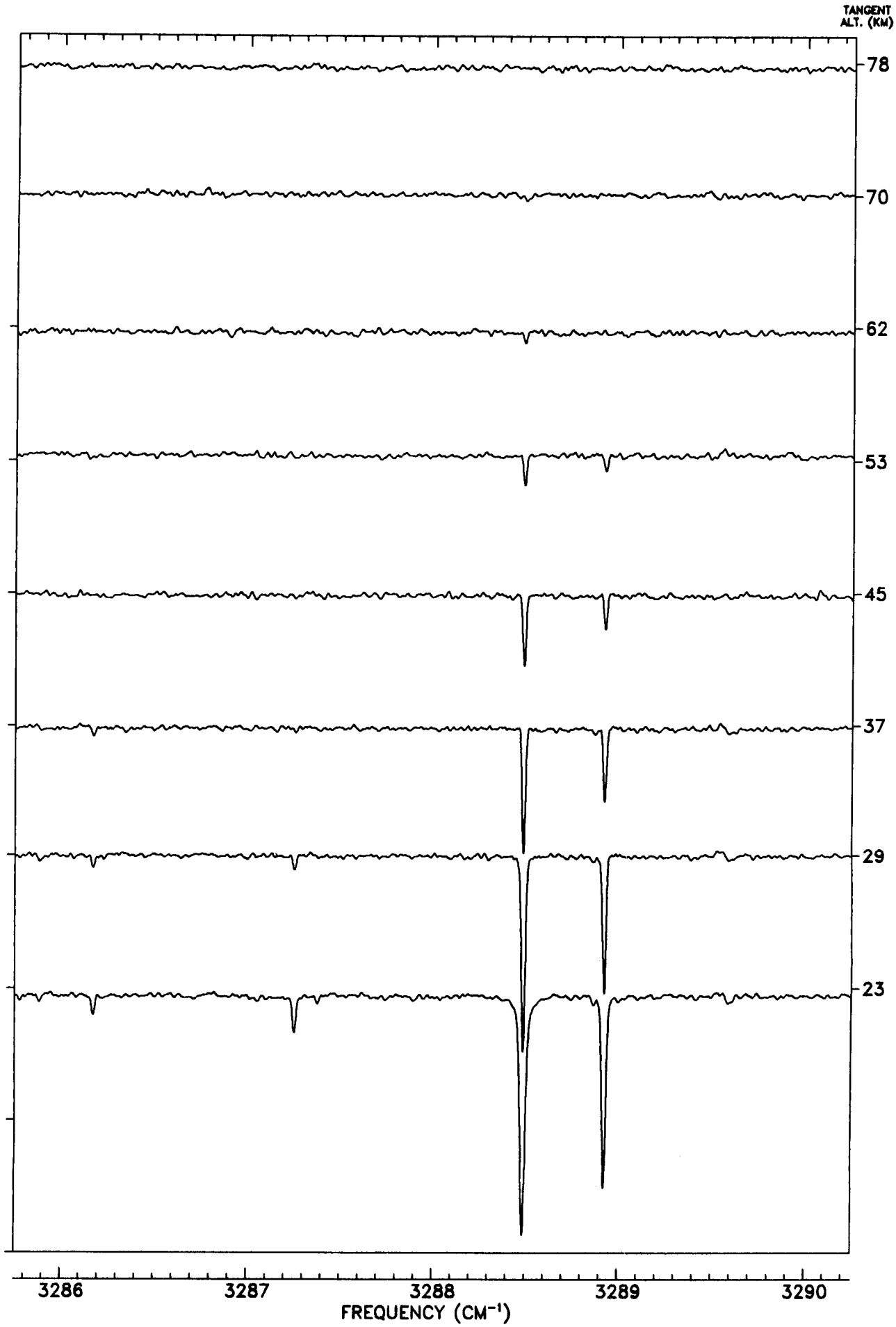
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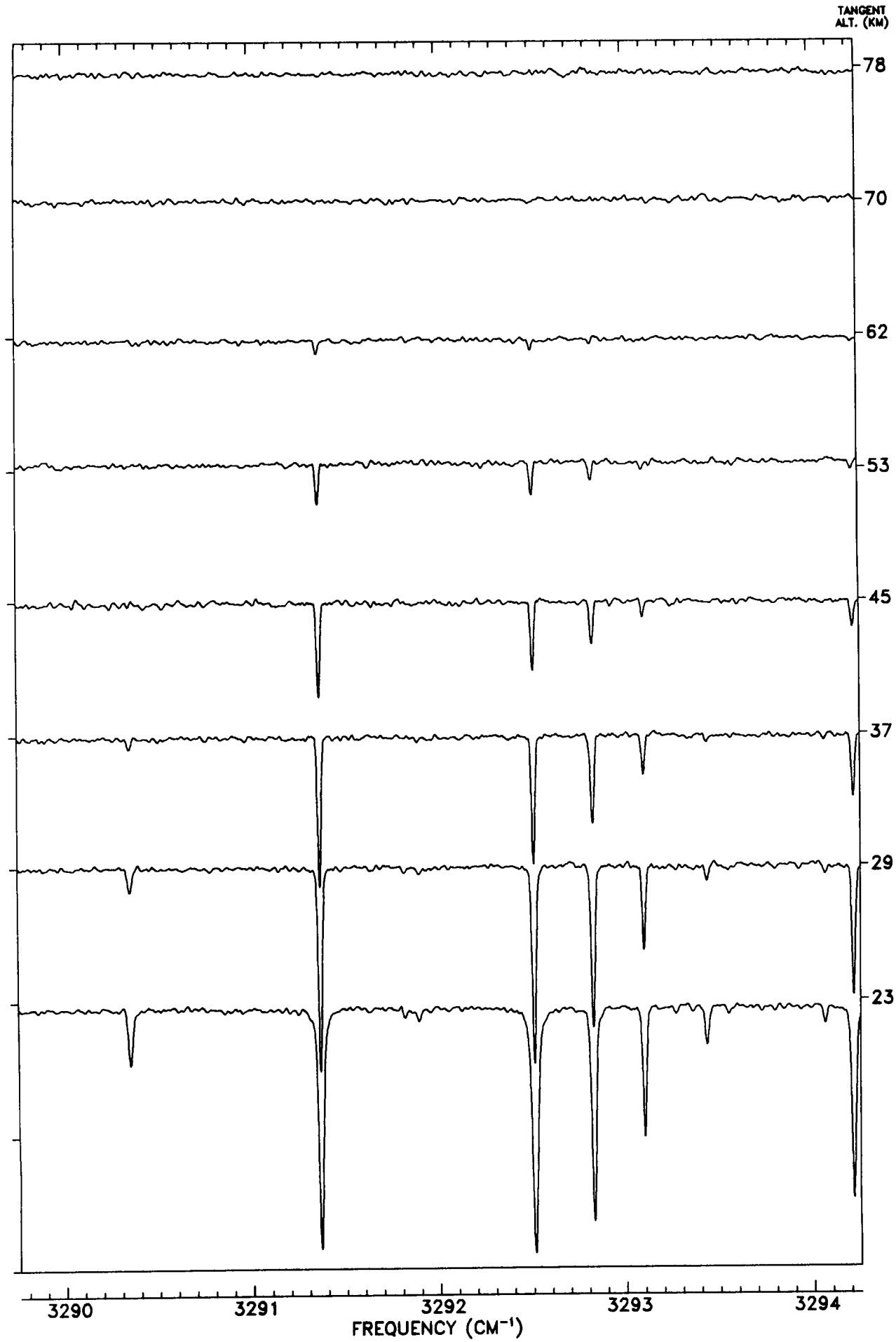
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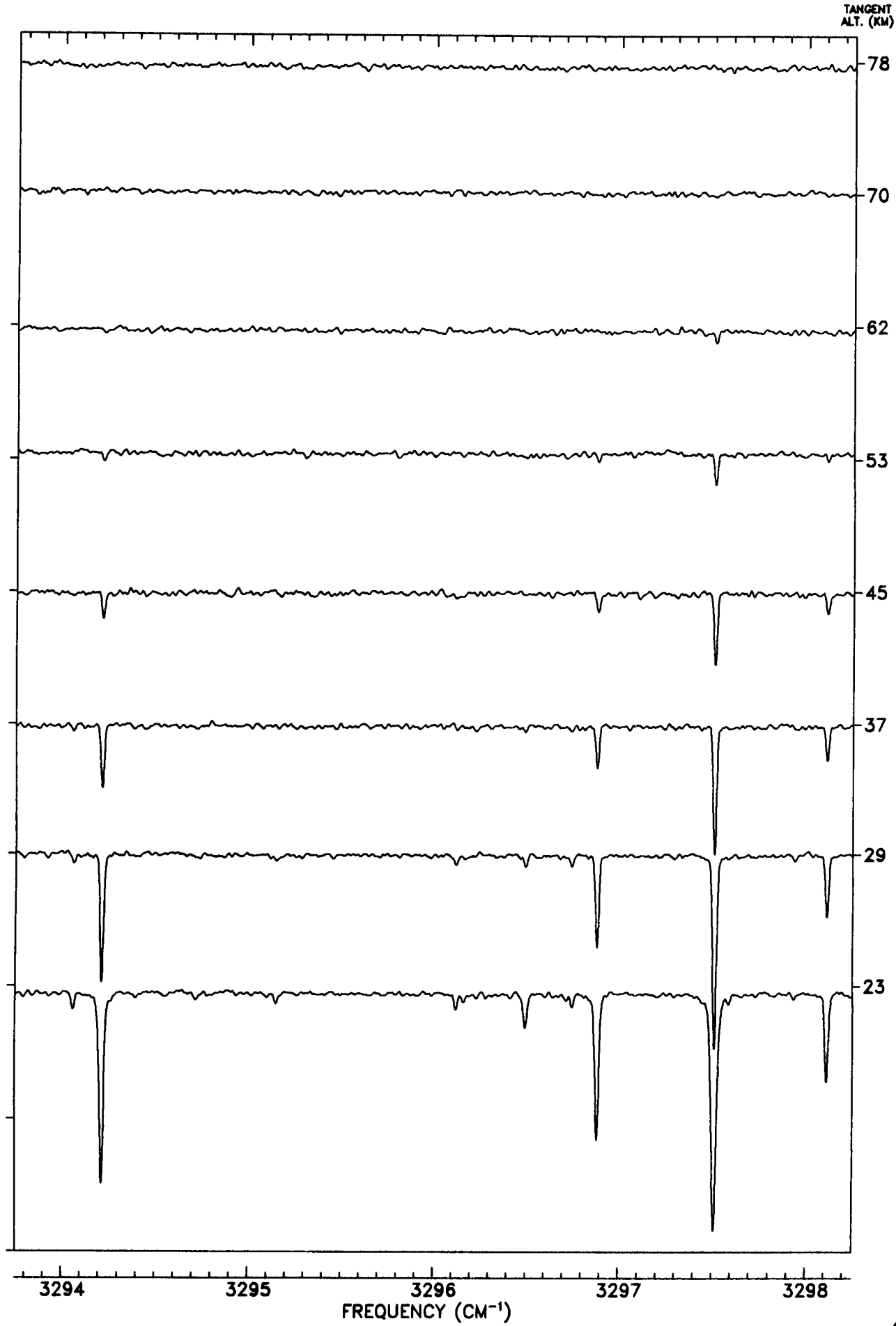
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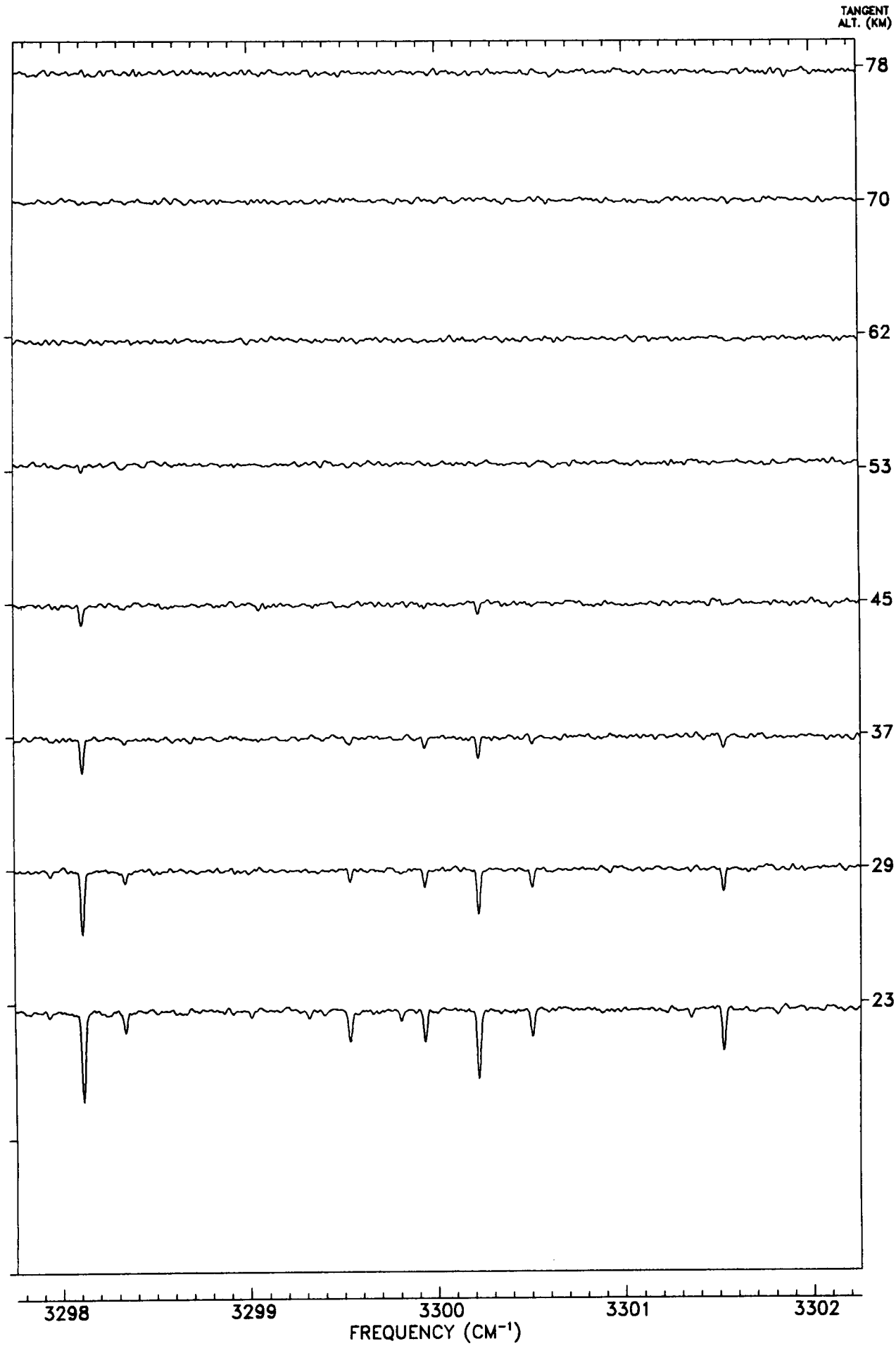
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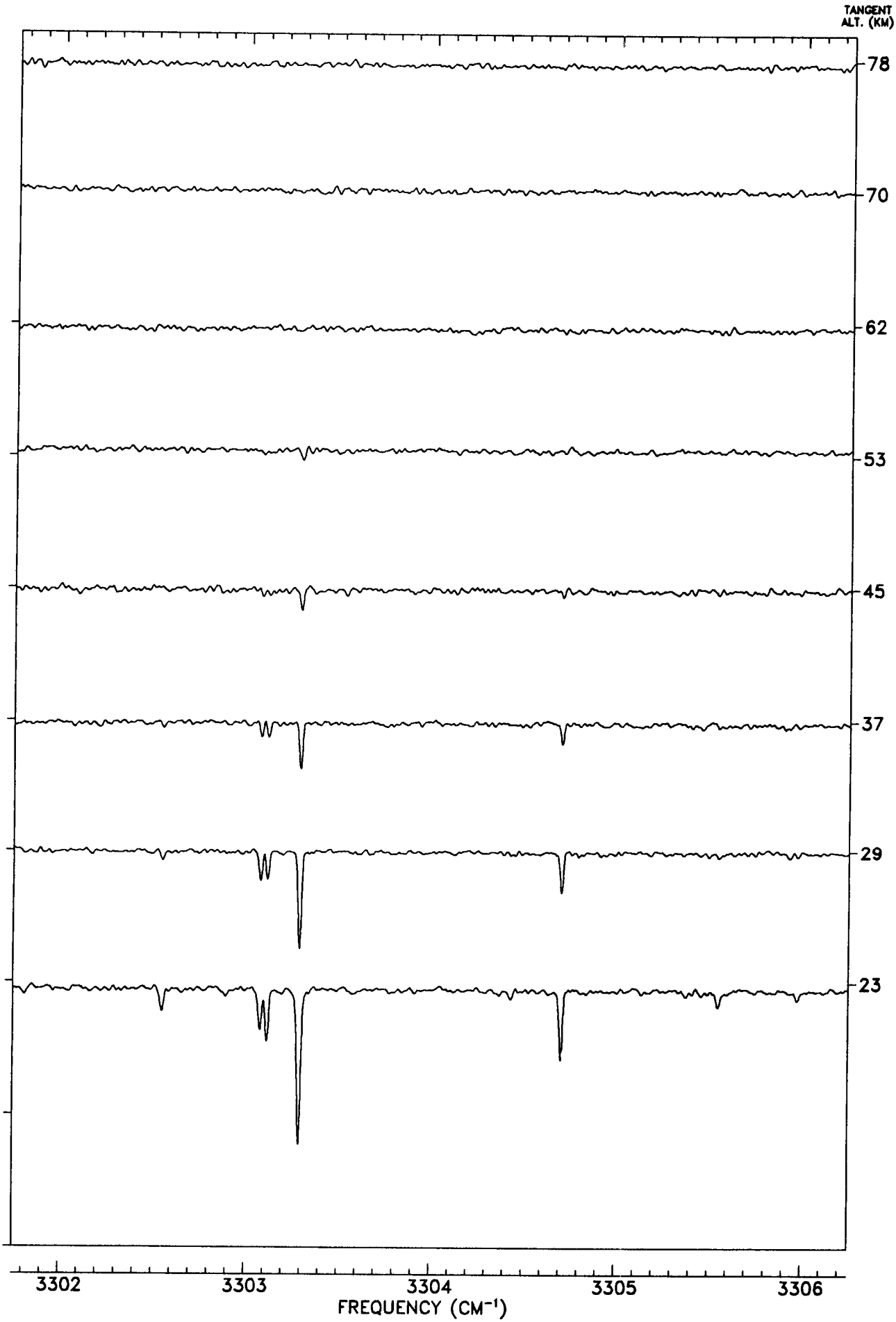
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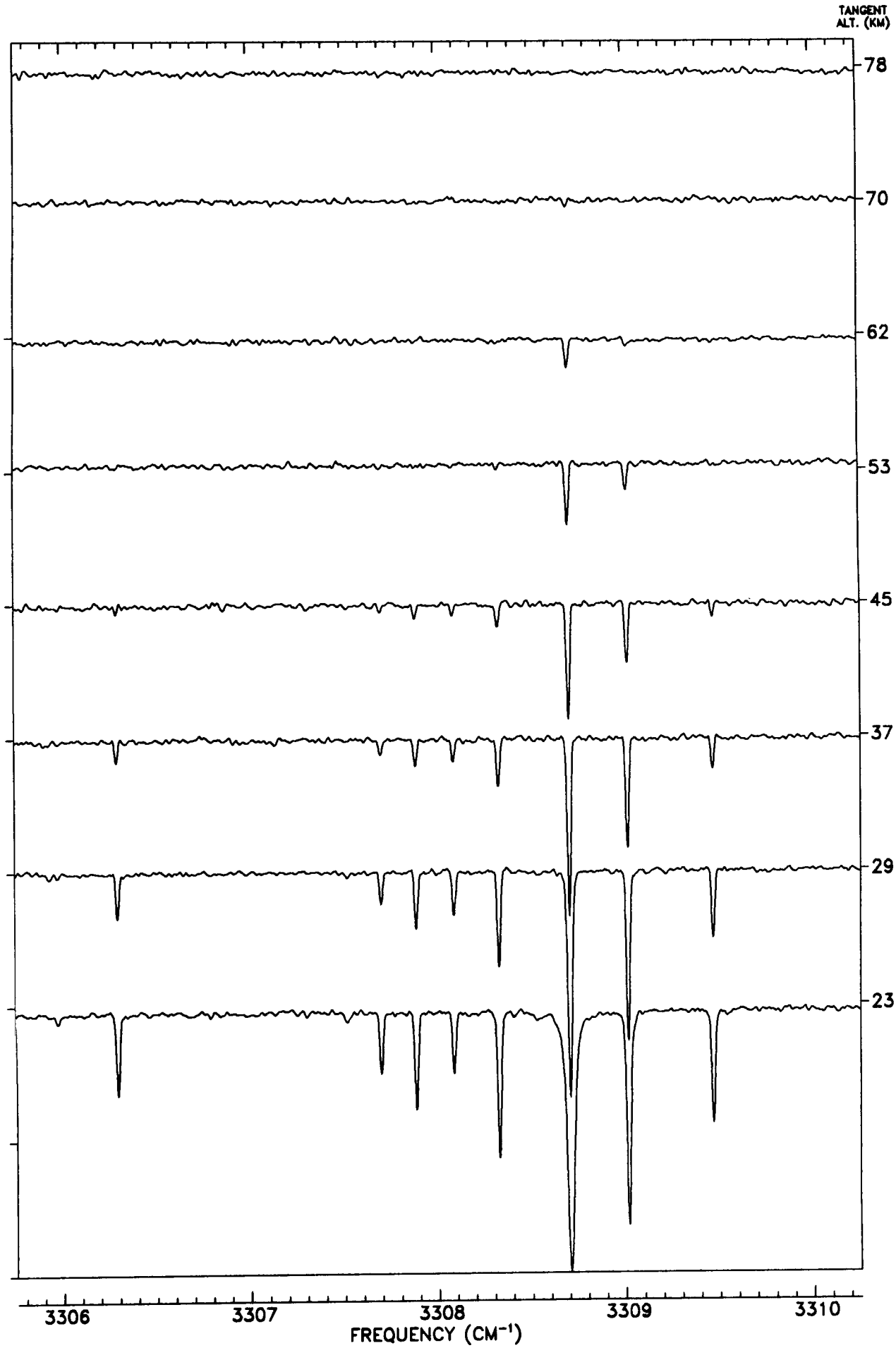
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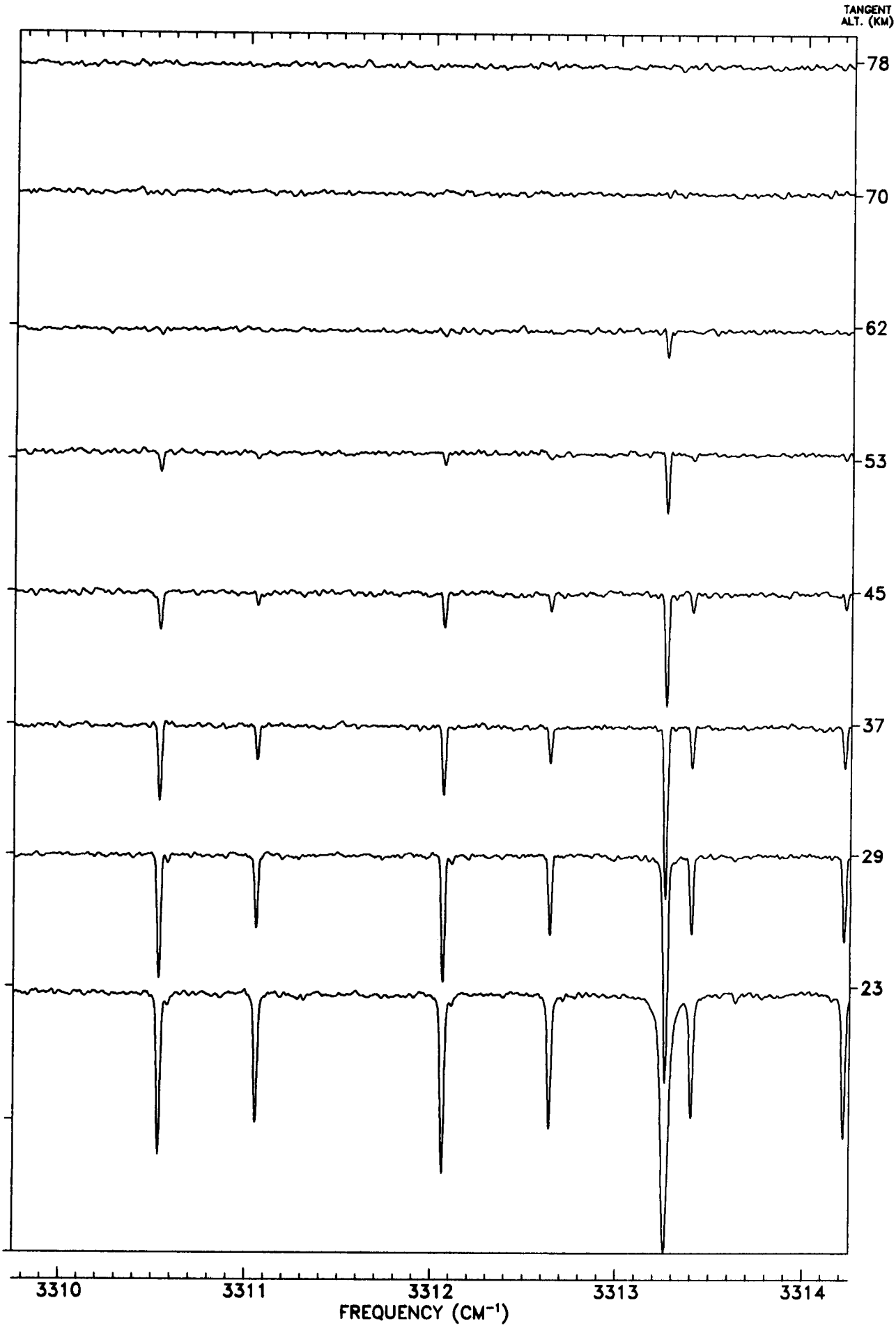
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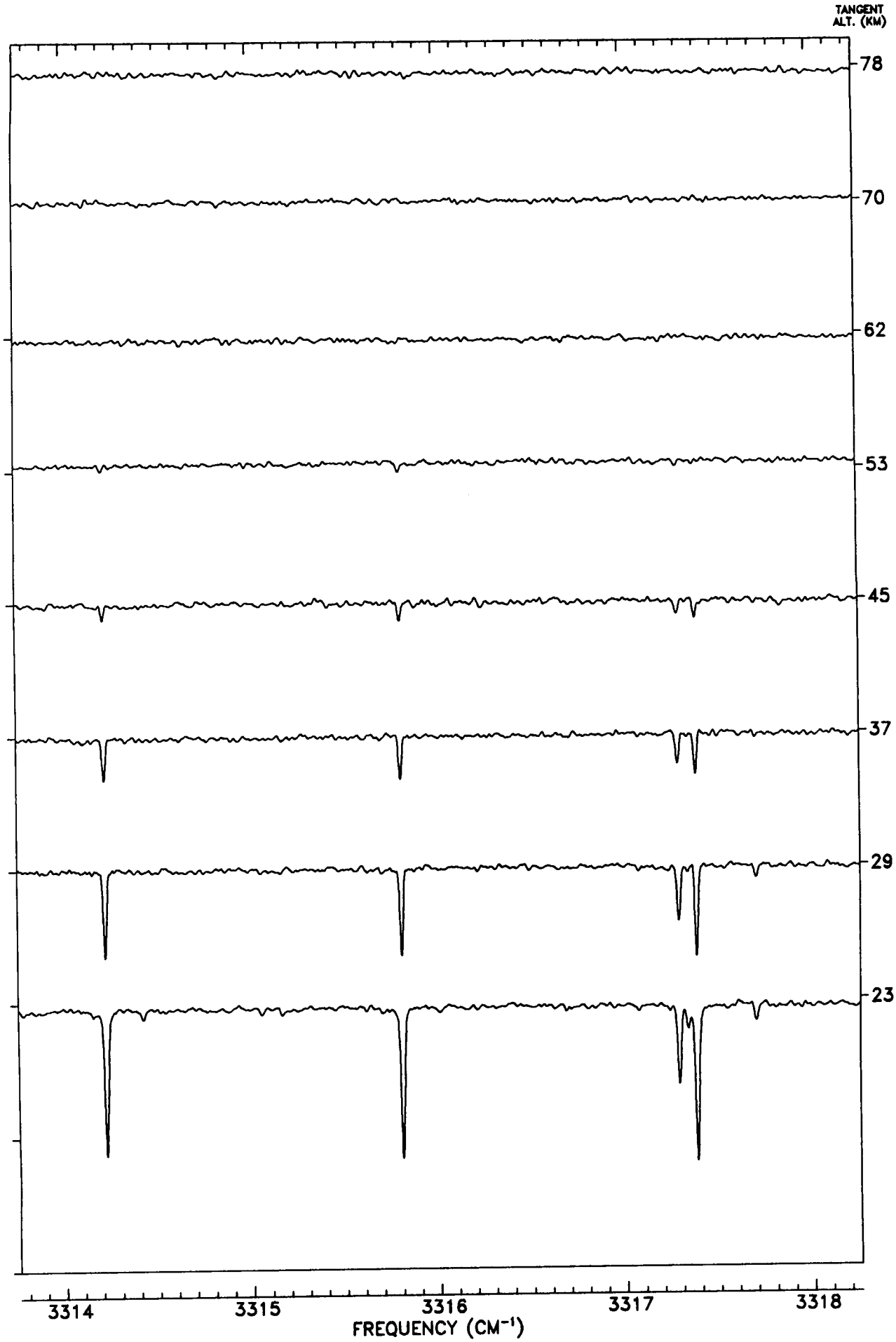
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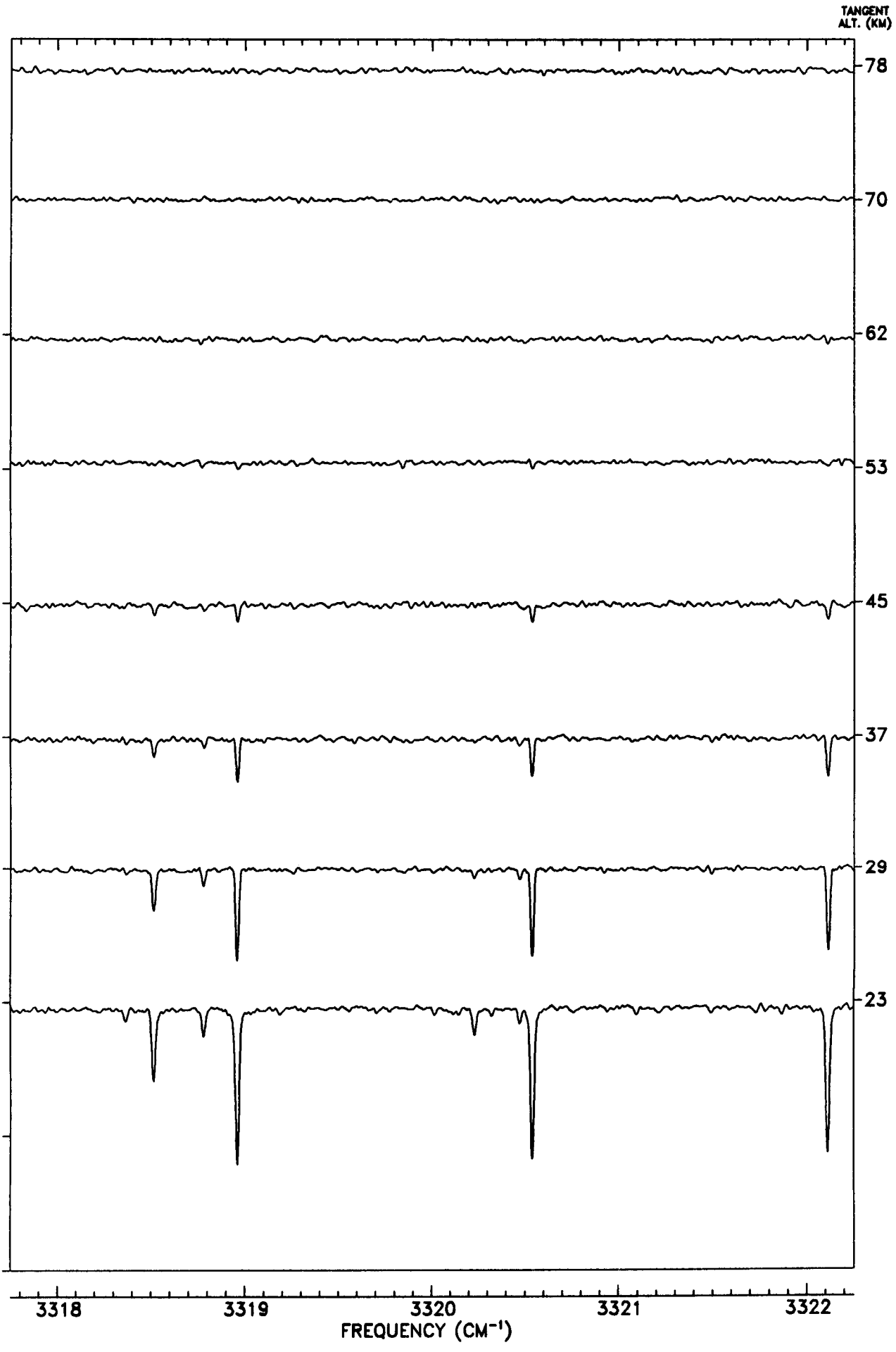
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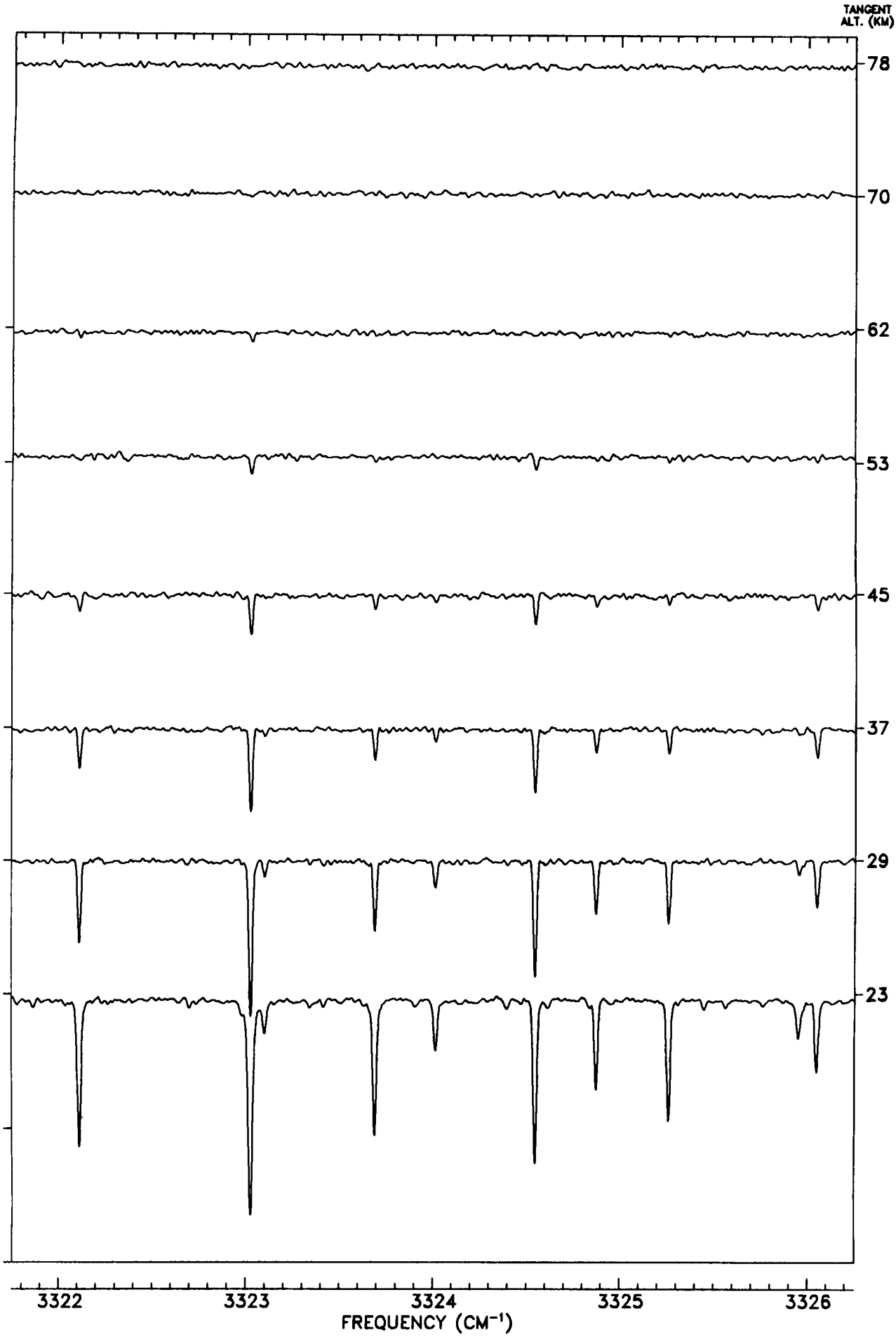
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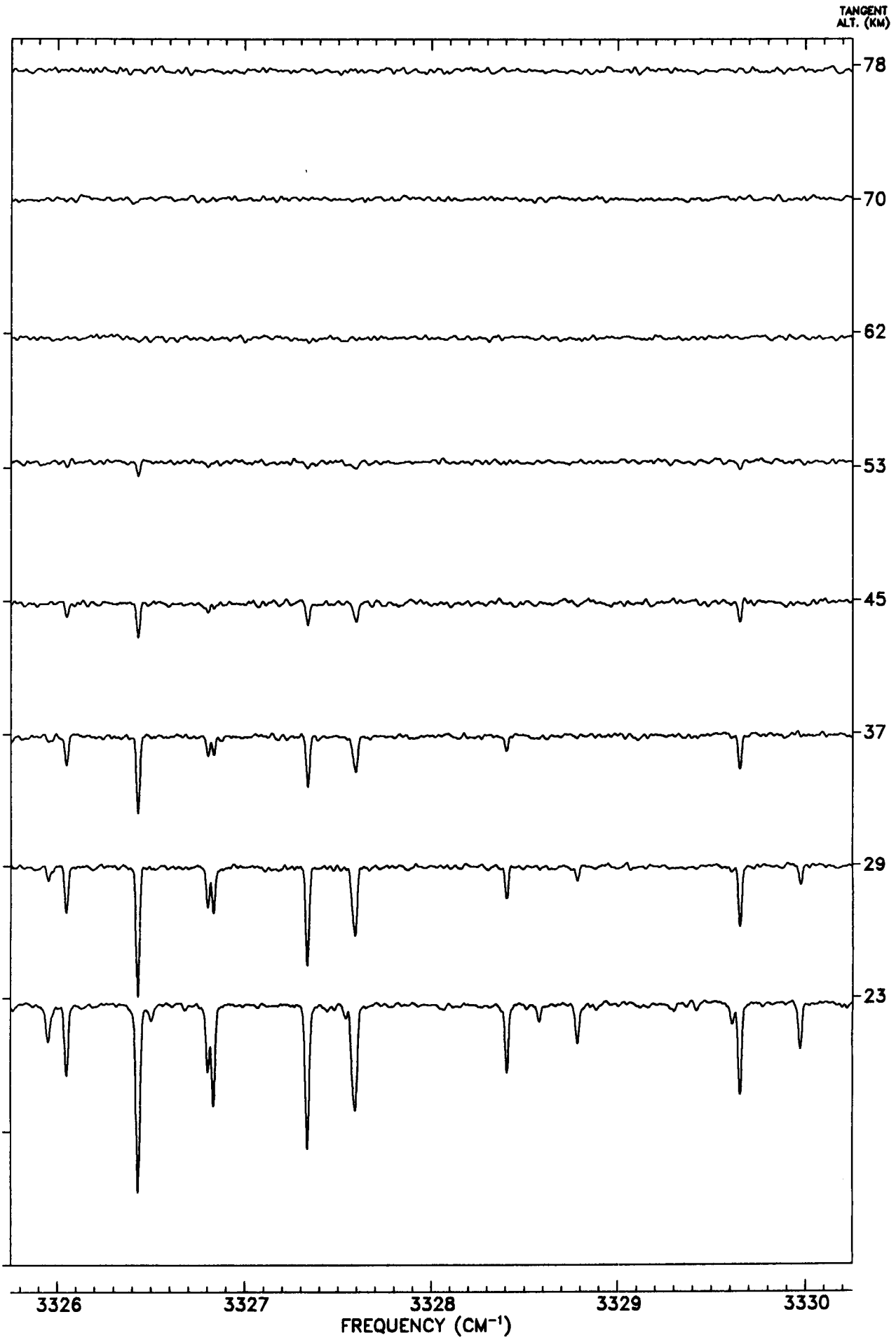
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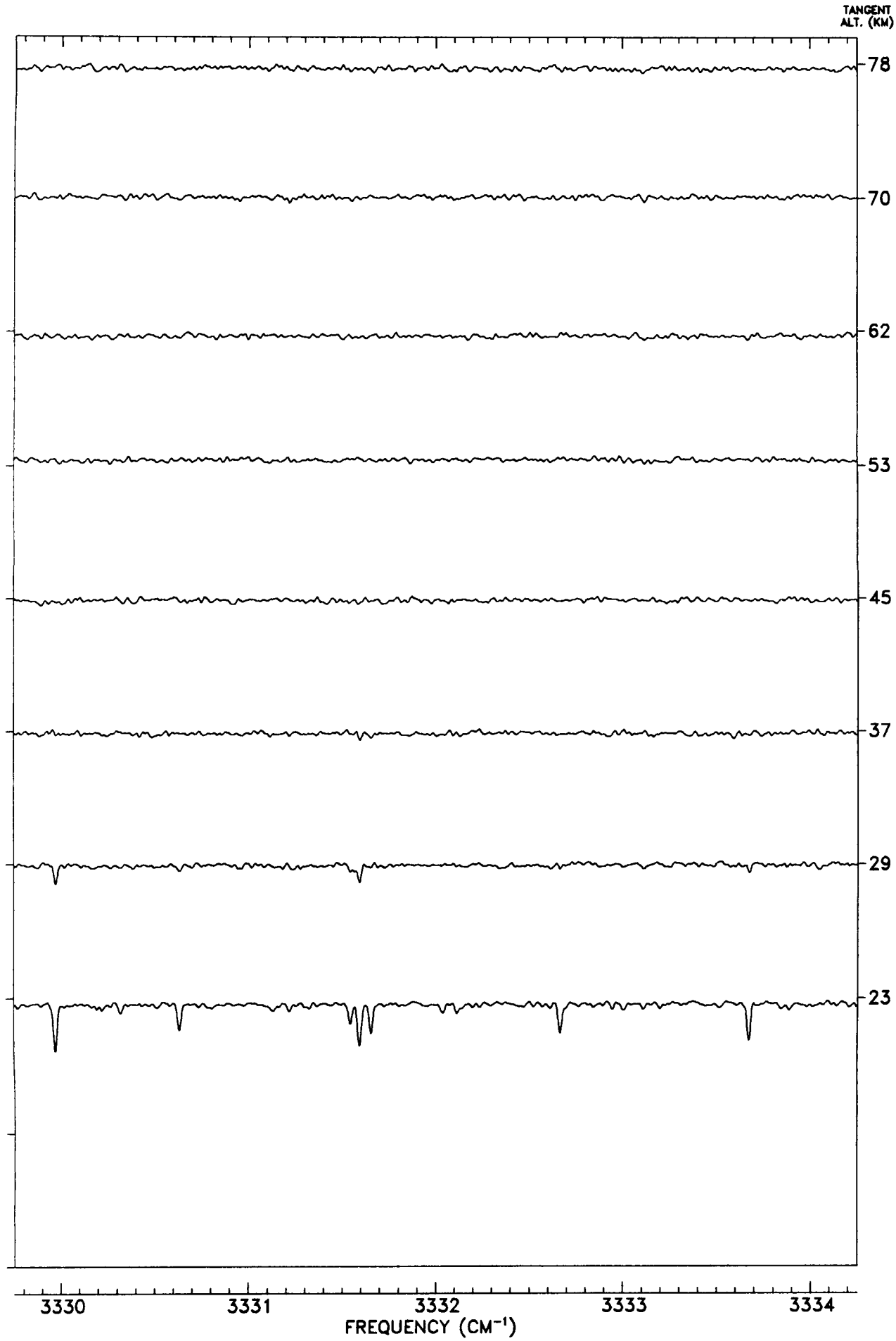
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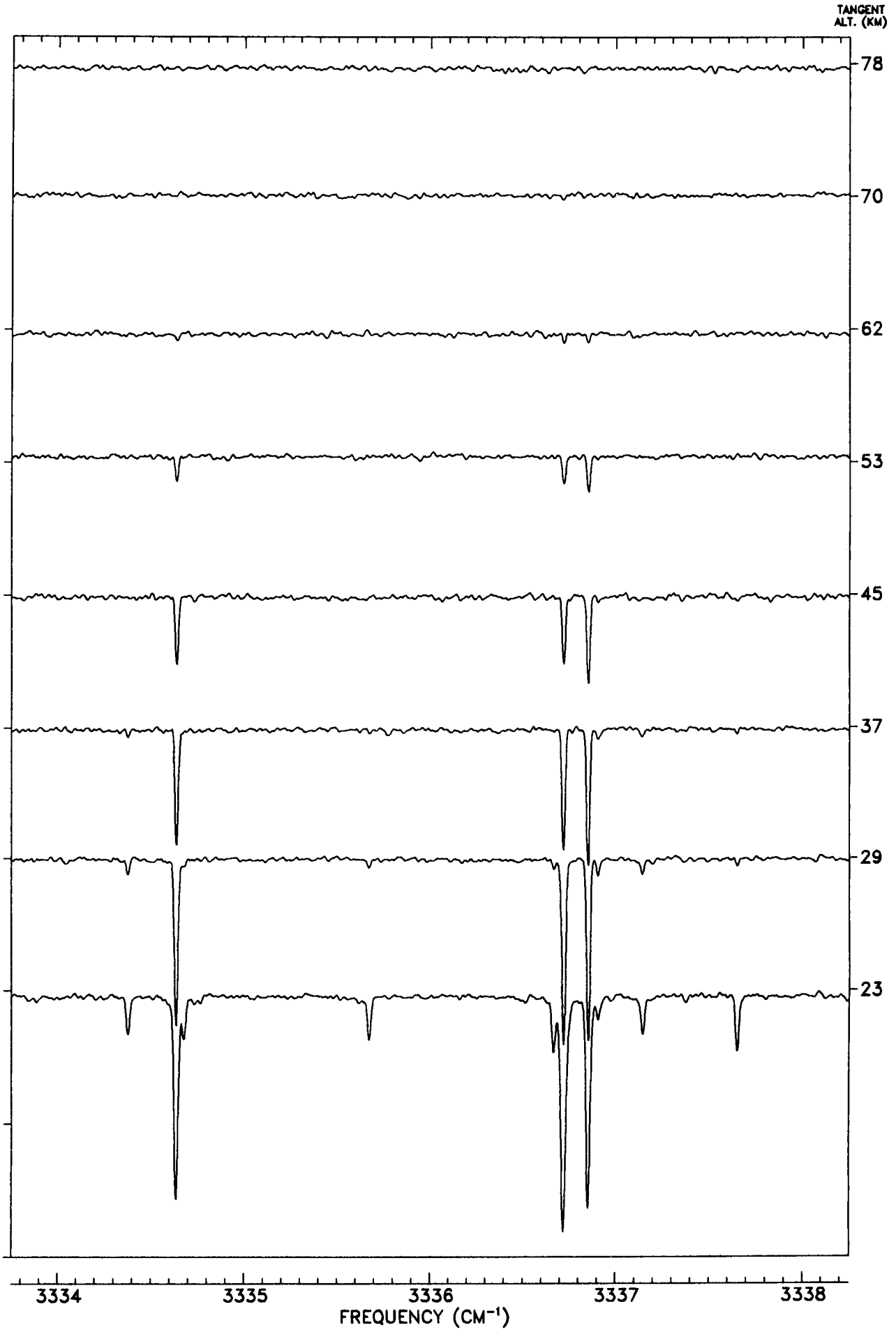
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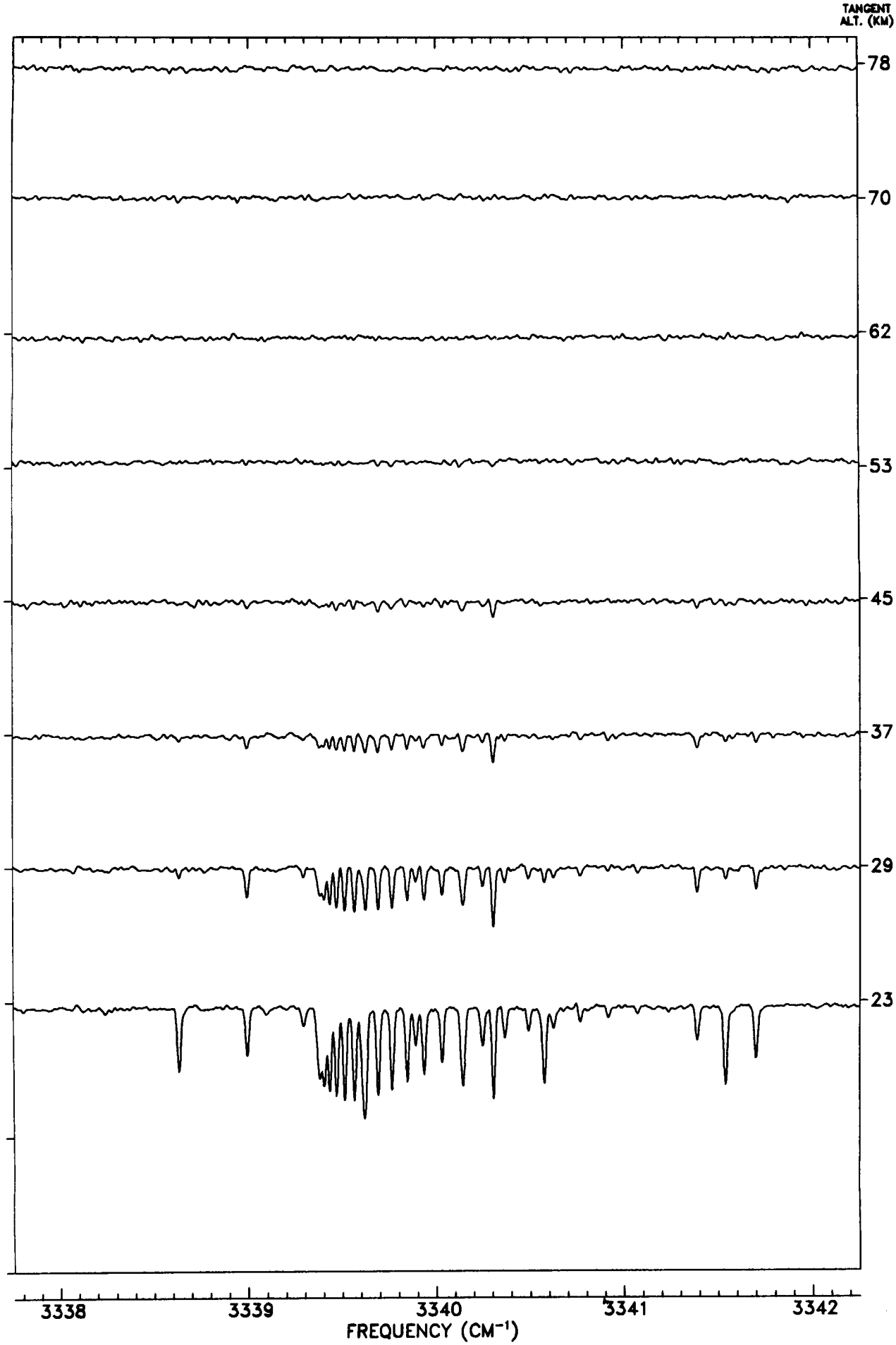
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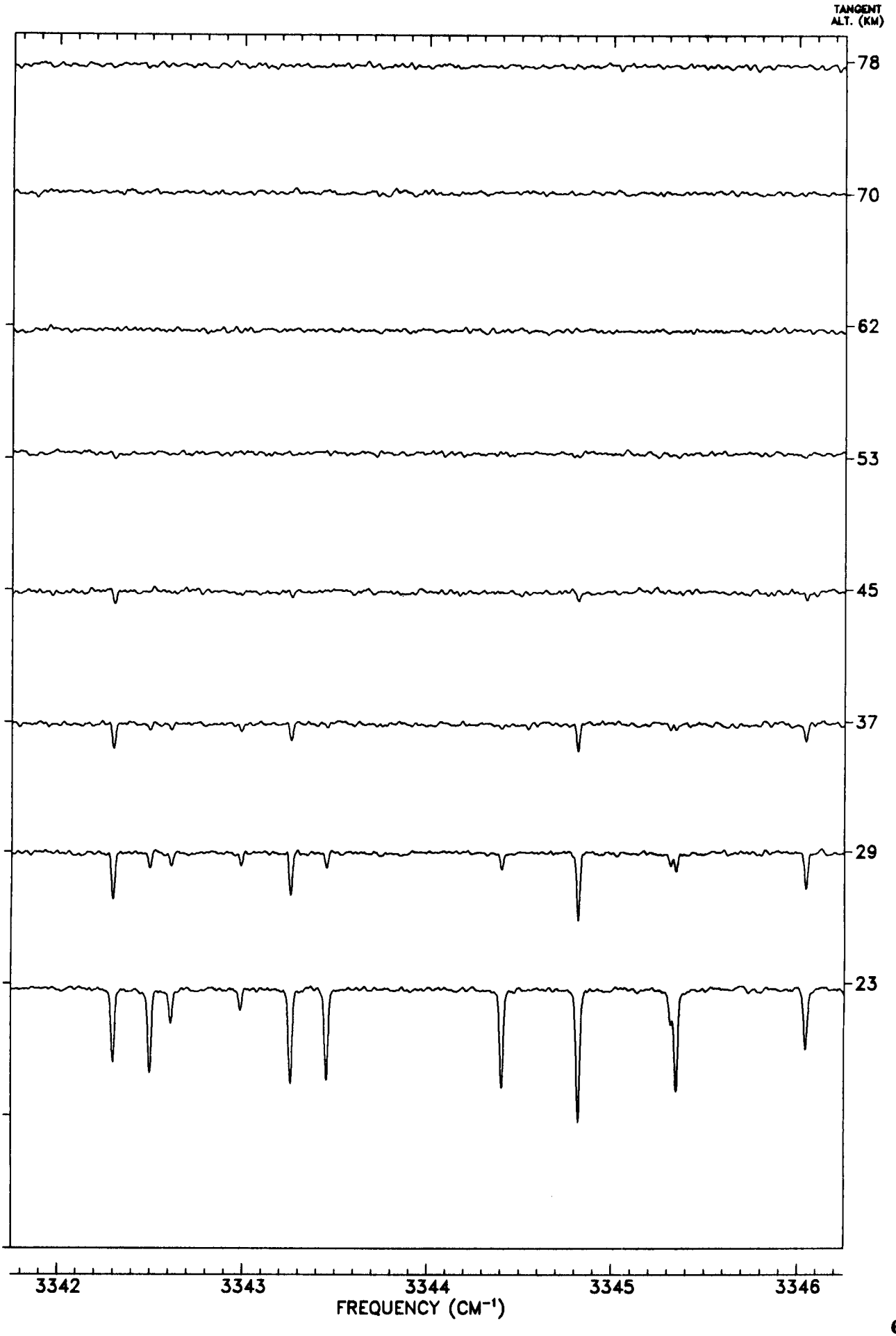
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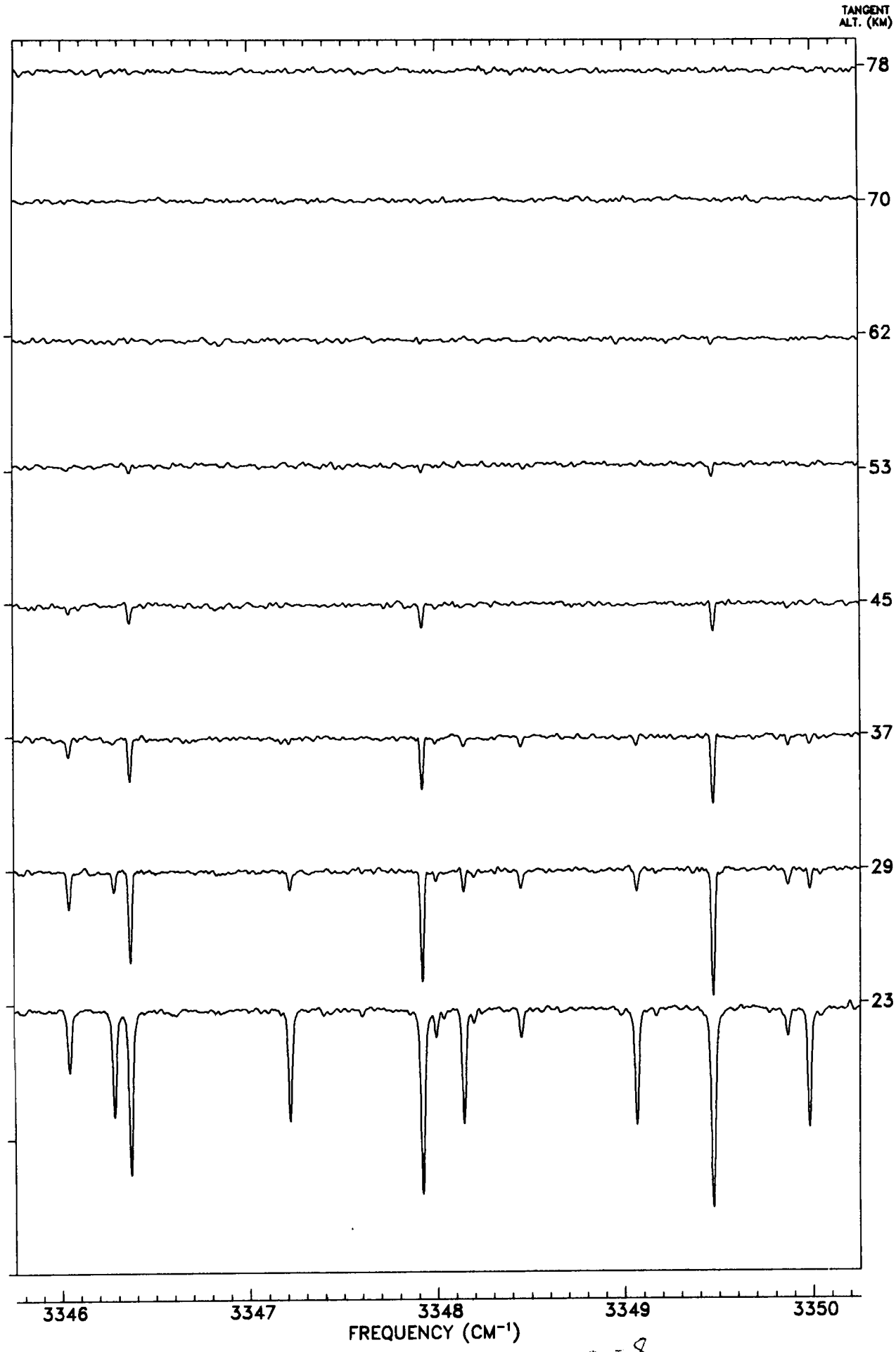
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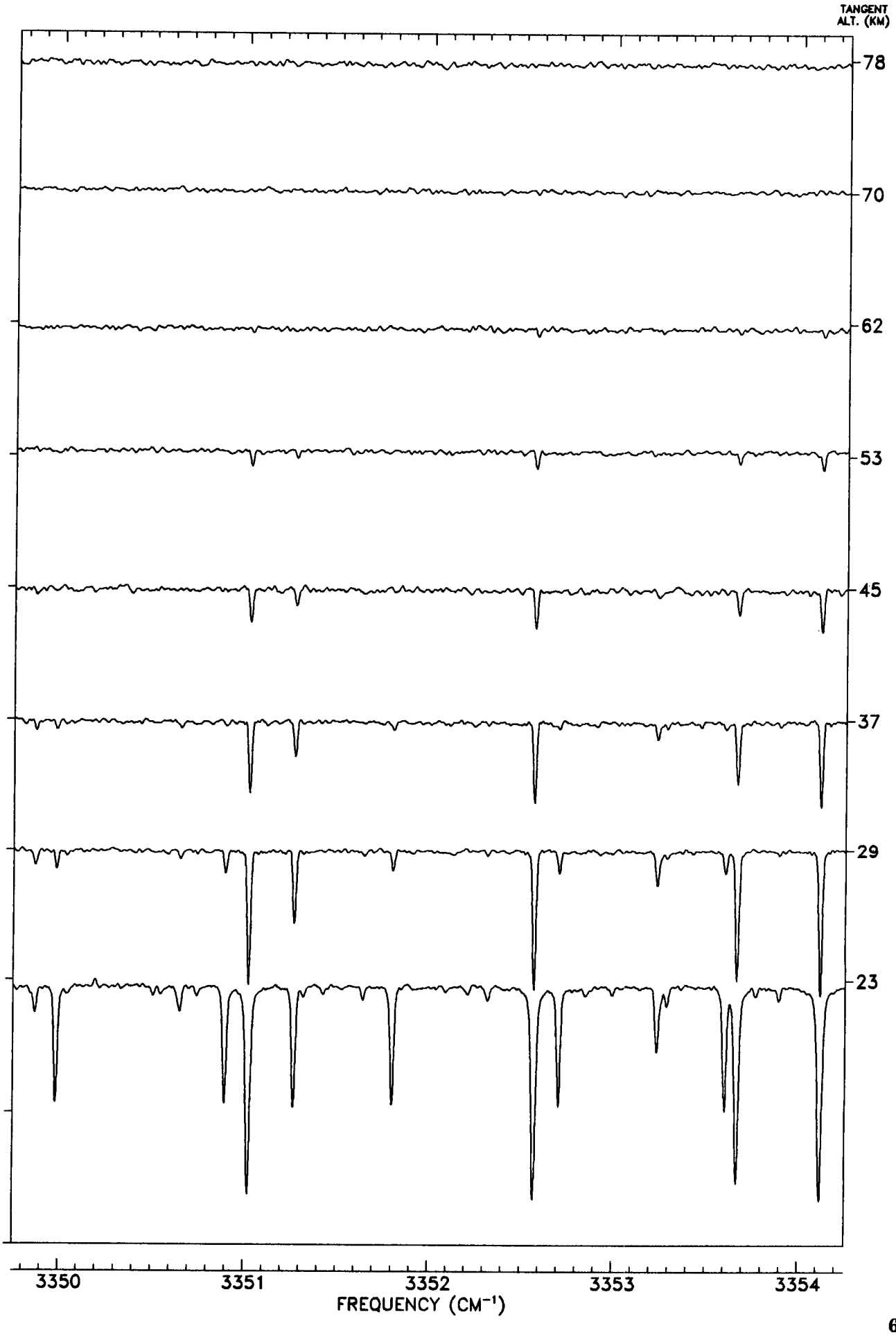
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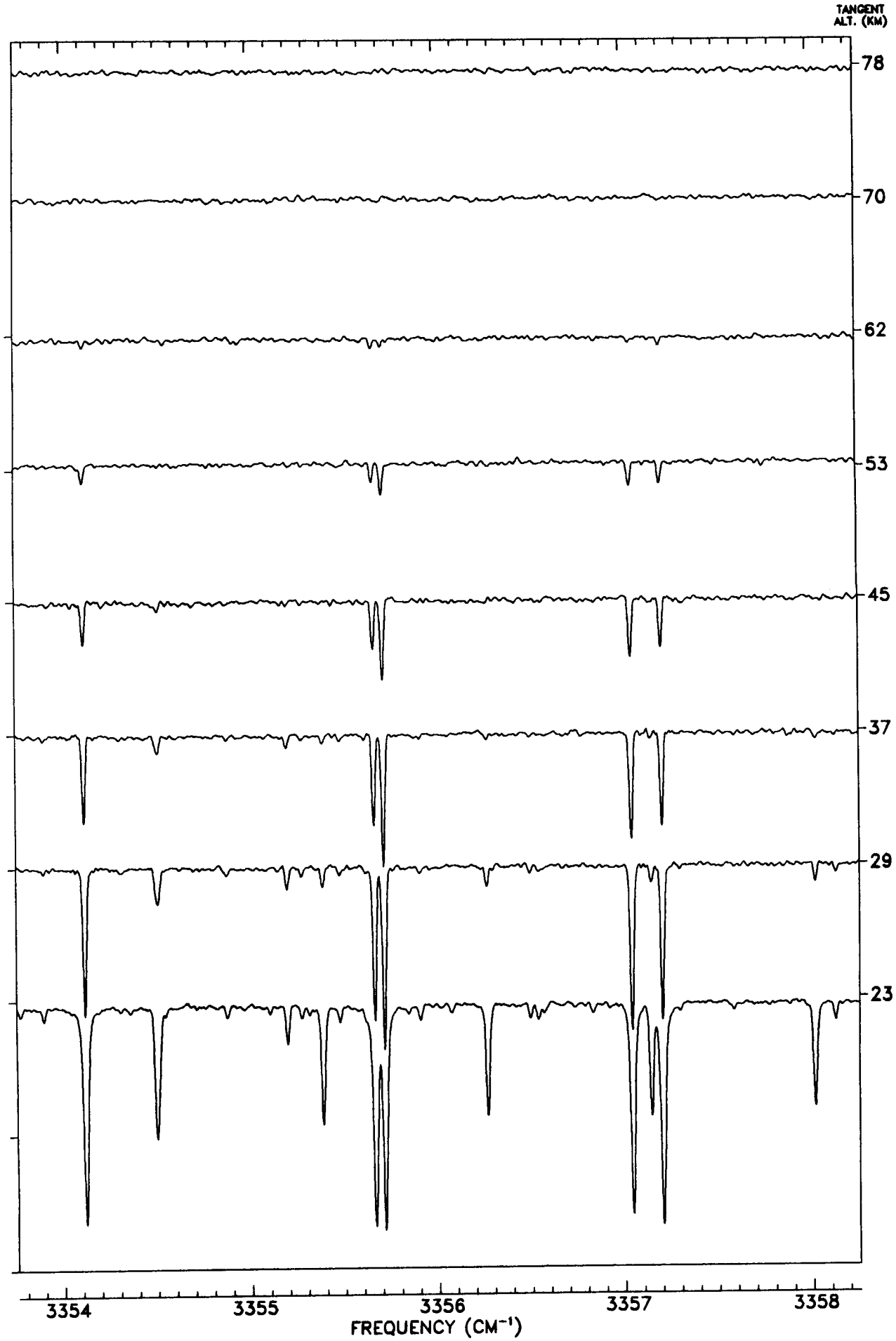
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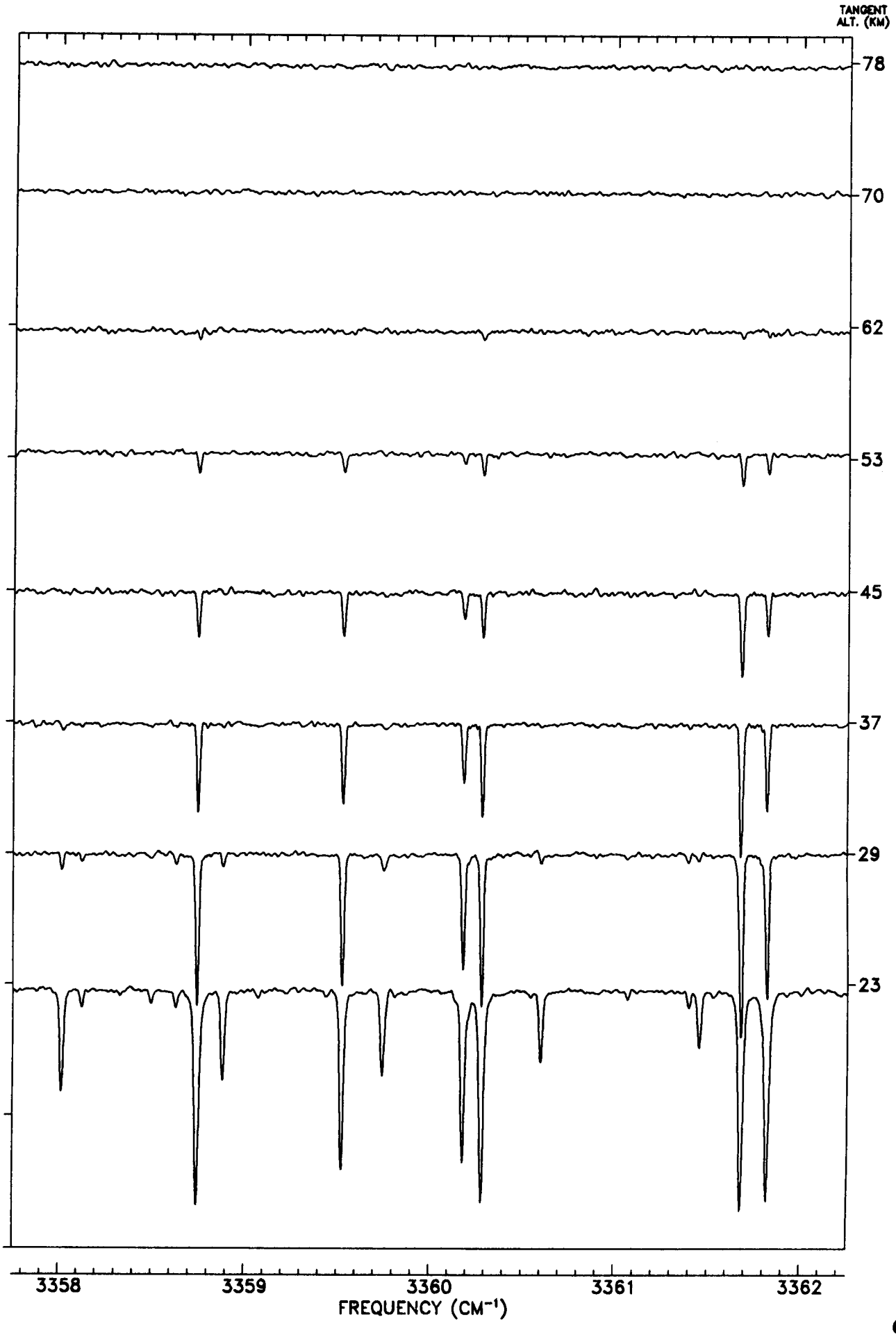
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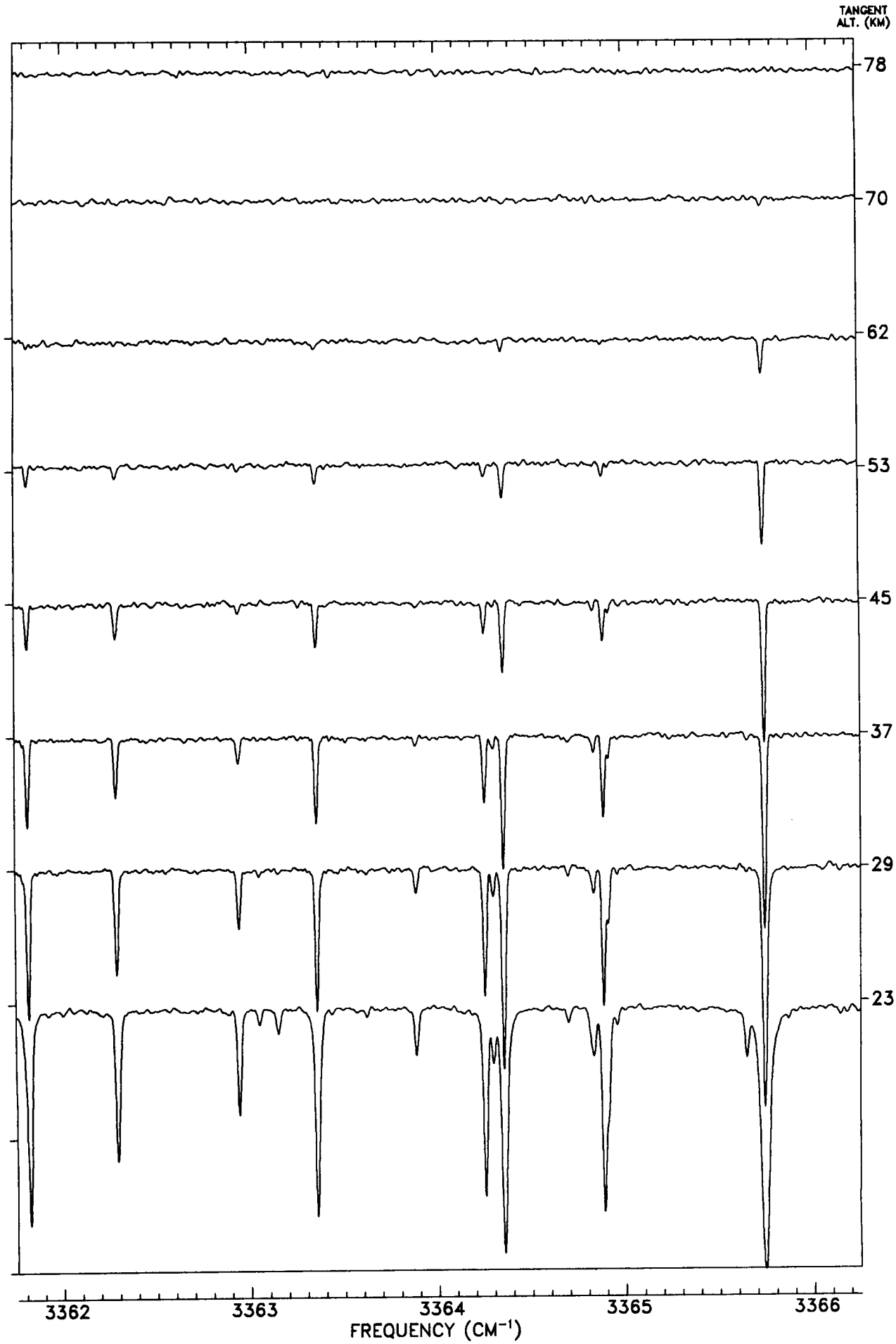
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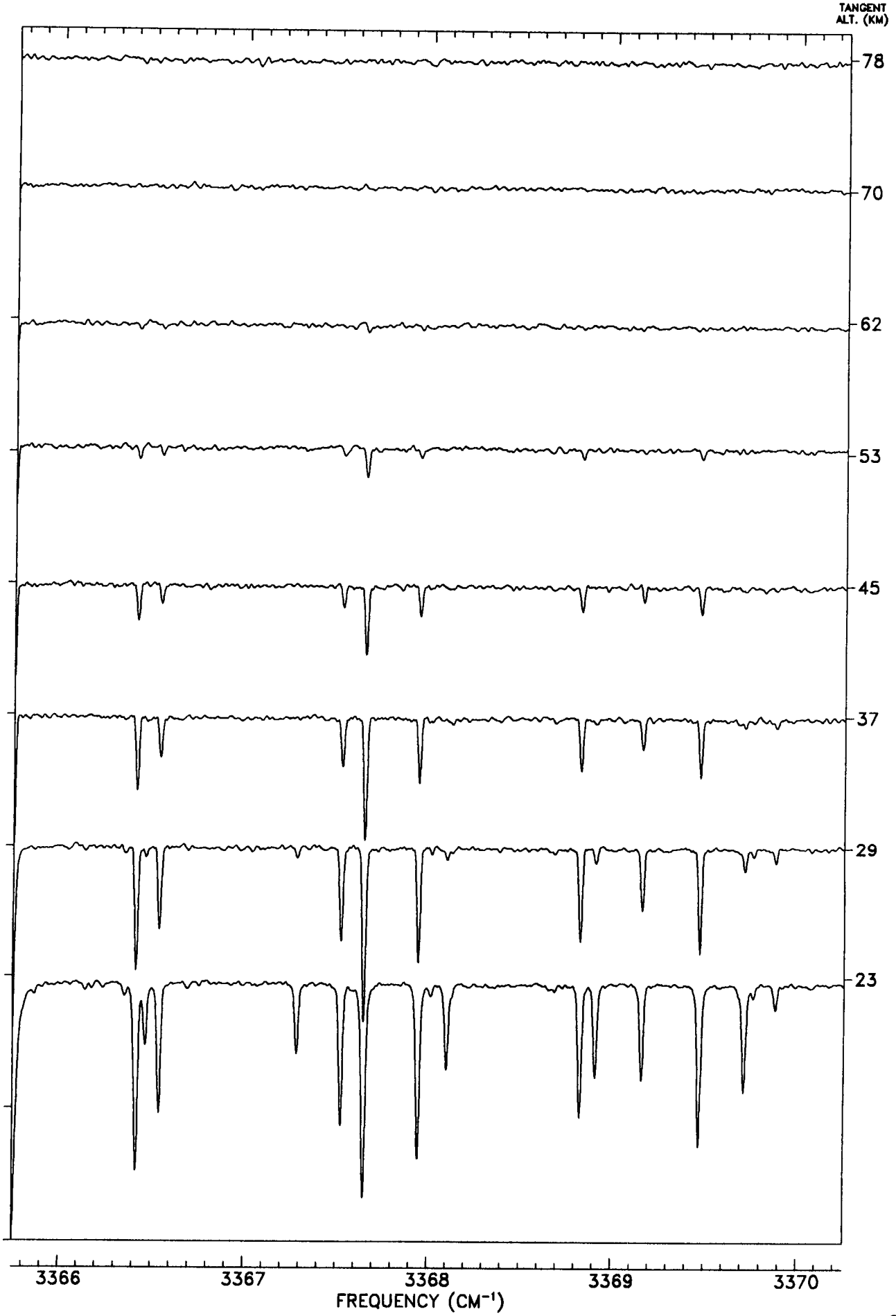
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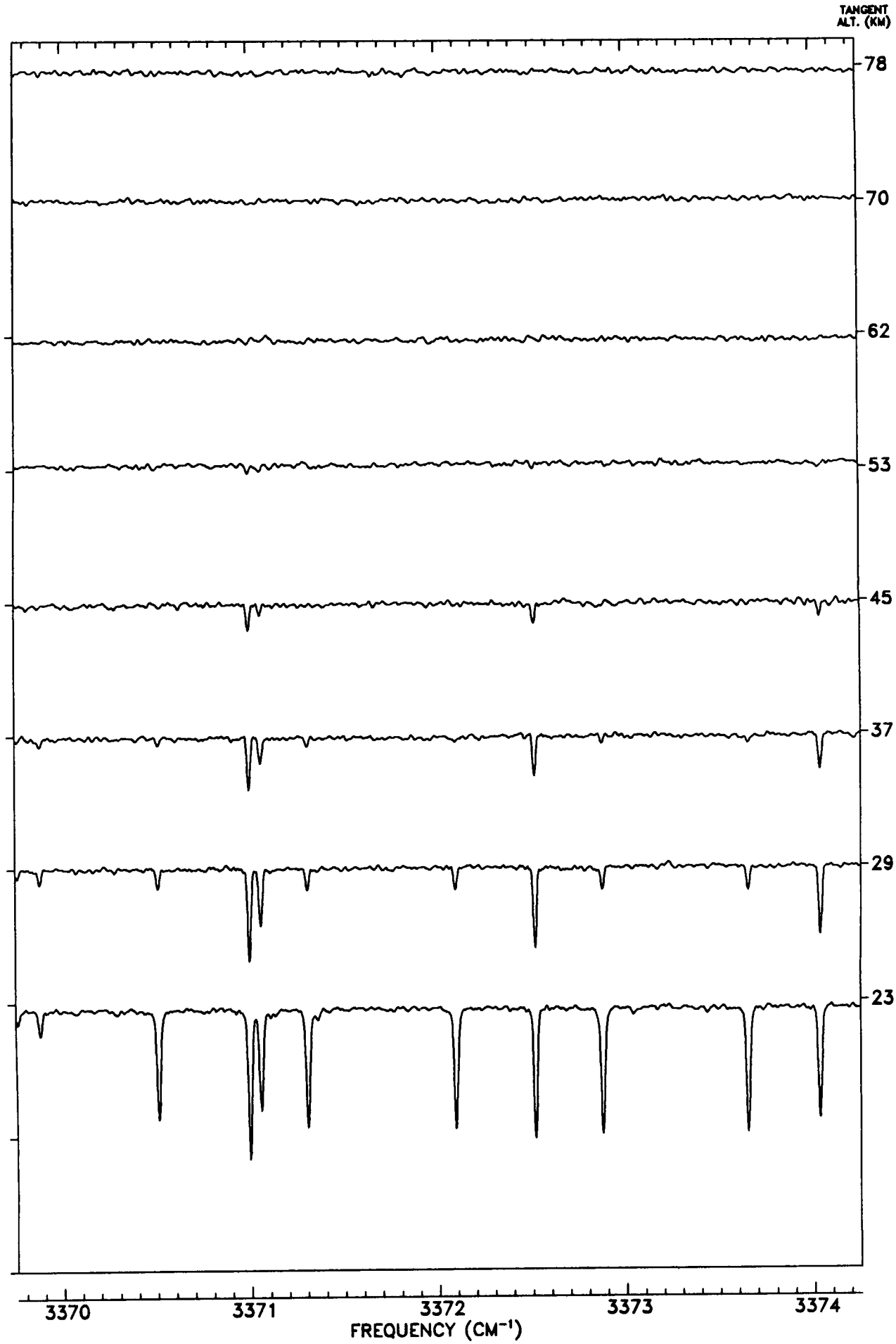
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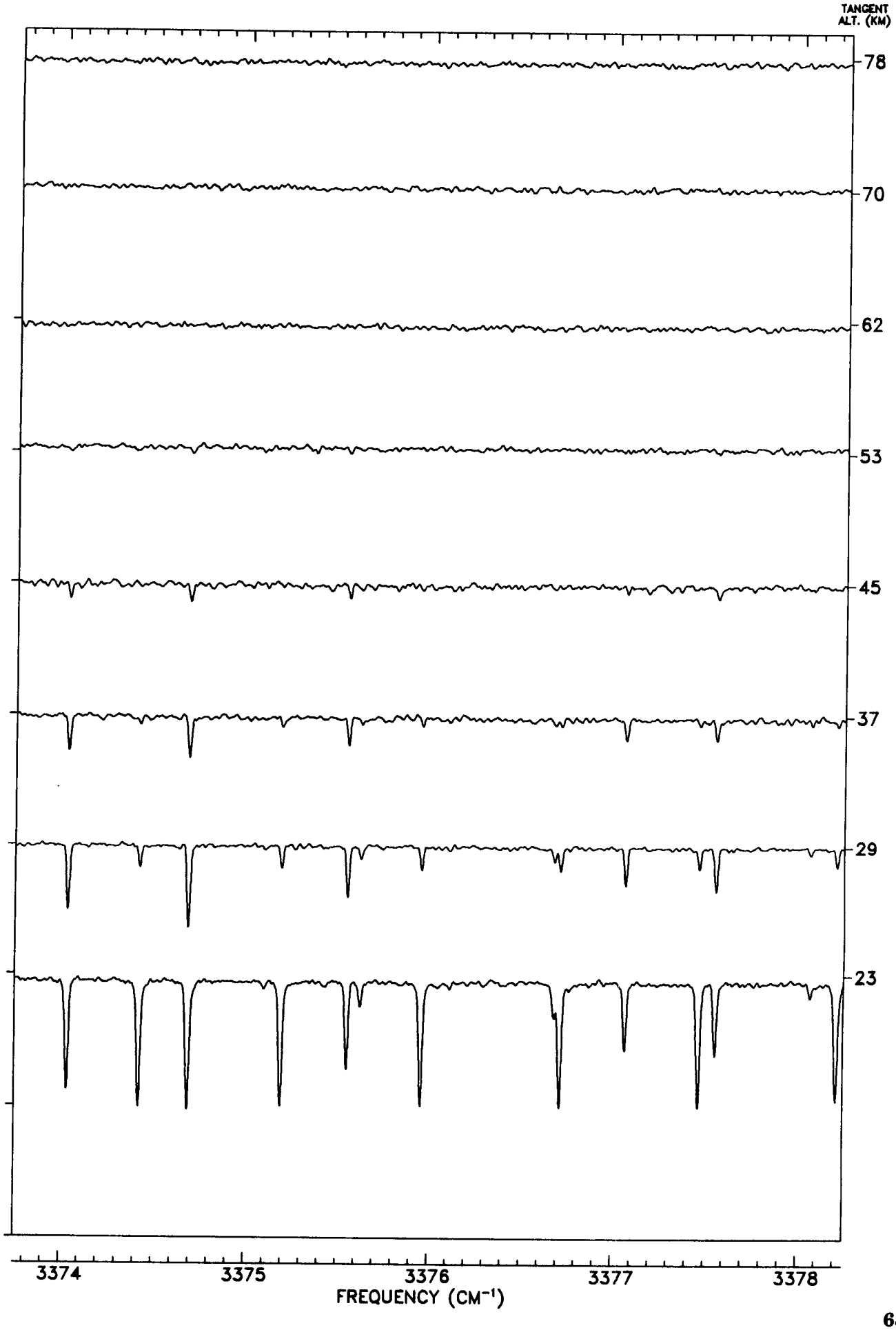
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16. Abstract

During the period April 29 to May 2, 1985, the Atmospheric Trace Molecule Spectroscopy (ATMOS) experiment was operated for the first time, as part of the Spacelab-3 payload of the shuttle Challenger. The principal purpose of this experiment was to study the distributions of the atmosphere's minor and trace molecular constituents. The instrument, a modified Michelson interferometer covering the frequency range from 600 to 5000 cm^{-1} at a spectral resolution of 0.01 cm^{-1}, recorded infrared absorption spectra of the Sun and of the Earth's atmosphere at times close to entry into and exit from occultation by the Earth's limb. Spectra were obtained that are free from absorptions due to constituents of the atmosphere (i.e., they are "pure solar" spectra), as well as spectra of the atmosphere itself, covering line-of-sight tangent altitudes that span the range from the lower thermosphere to the bottom of the troposphere. This atlas presents a compilation of these spectra arranged in a hardcopy format suitable for quick-look reference purposes. Volume I gives the solar spectrum from 650 to 4800 cm^{-1}, and Volume II covers the stratosphere and mesosphere (i.e., tangent altitudes from 20 to 80 km) for frequencies from 650 to 3350 cm^{-1}.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
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