Collaborative Study for Analysis of high Resolution Infrared Atmospheric Spectra Between NASA Langley Research Center and the University of Denver

NASA Langley Research Center
Contract NCCI-48
Final Report
Summary of Research

Submitted by
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Summary of Research

The Langley-D.U. collaboration on the analysis of high resolution infrared atmospheric spectra covered a number of important studies of trace gases identification and quantification from field spectra, and spectral line parameters analysis.

The collaborative work included:

* Quantification and monitoring of trace gases from ground-based spectra available from various locations and seasons and from balloon flights.

* Studies toward identification and quantification of isotopic species, mostly Oxygen and Sulfur isotopes.

* Search for new species on the available spectra.

* Update of spectroscopic line parameters, by combining laboratory and atmospheric spectra with theoretical spectroscopy methods.

* Study of trends of atmosphere trace constituents.

* Algorithms developments, retrievals intercomparisons and automatization of the analysis of NDSC spectra, for both column amounts and vertical profiles.

Listed in the following are joint publications completed over the years under this project.


Rinsland, C.P., A. Goldman, and G.M. Stokes, "Identification of Atmospheric C₂H₆ Lines in the 3230-3340 cm⁻¹ Region of High Resolution Solar Absorption Spectra Recorded at the National


Goldman, A., F.J. Murcray, F.H. Murcray, D.G. Murcray, and C.P. Rinsland, "Quantification of Several Atmospheric Gases from


Rinsland, C.P., M.H. Smith, A. Goldman, and V. Malathy Devi, "Measurements of Lorentz Air-Broadening Coefficients and Relative Intensities in the H₂¹⁶O Pure Rotational and ν₂ Bands


Goldman, A., J.R. Gillis, C.P. Rinsland, and J.B. Burkholder, "Improved Line Parameters for the \chi^{2}\Pi - \chi^{2}\Pi \ (1-0) Bands of \textsuperscript{35}ClO and \textsuperscript{37}ClO," JQSRT, 52, 357-359, 1994.


Perrin, A., J.-M. Flaud, C. Camy-Peyret, B.P. Winnewisser, A. Goldman, F. J. Murcray, R.D. Blatherwick, F.S. Bonomo, D.G. Murcray, and C.P. Rinsland, "First Analysis of the 3\nu\textsubscript{9}-\nu\textsubscript{9}, 3\nu\textsubscript{9}-\nu\textsubscript{8} and 3\nu\textsubscript{9}-2\nu\textsubscript{8} Bands of HNO\textsubscript{3}: Torsional Splitting in the \nu\textsubscript{9} Vibrational Mode," J. Molec. Spectrosc., 166, 224-243, 1994.

Goldman, A. C.P. Rinsland, B. Canova, R. Zander, and M. Dang-Nhu, "Improved Spectral Parameters for the \textsuperscript{16}O\textsubscript{2} Infrared Forbidden Lines in the \chi^{3}\Sigma_{g}^{-} (0-1) Band," JQSRT, 54, 757-765, 1995.


Goldman, A., K.V. Chance, M.T. Coffey, W.G. Mankin, and C.P. Rinsland, "Improved Line Parameters for the $X^1S^+$ (0-0) and (0-1) Bands of HI," JQSRT, 60, 869-874, 1998.


Gillis, J.R., A. Goldman, and C.P. Rinsland, "Line parameters for the \( A^2\Sigma - X^2\Pi \) bands of OH," to be submitted to JQSRT, 1999.
Nov. 15, 1999

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Dear Sir,


A copy was also sent to the grants officer (Mr. R.T. Lacks) and to the technical officer (Dr. C.P. Rinsland).

NASA's continuing support and encouragement are greatly appreciated.

Sincerely Yours,

Aaron Goldman
Dr. Aaron Goldman
Senior Research Physicist
Professor of Physics