Detection of Moisture and Moisture Related Phenomena from Skylab

Joe R. Eagleaman
Principal Investigator

Technical Report 239-17
Monthly Progress Report, September, 1974

Atmospheric Science Laboratory
Center for Research, Inc.
University of Kansas

Detection of Moisture and Moisture Related Phenomean from Skylab

Joe R. Eagleman
Principal Investigator

Norman Hardy
Graduate Research Assistant

Atmospheric Science Laboratory
Space Technology Center
Center for Research, Inc.
University of Kansas
Lawrence, Kansas 66045

Clayton D. Forbes, Technical Monitor
Principal Investigations
Management Office
Lyndon B. Johnson Space Center
Houston, Texas 77058

EREP NO. 540-A2 March 19, 1973 to August 31, 1974
Contract Number. NAS 9-13273

Technical Report 239-16

During the month of September, several efforts were in progress which will require additional time to complete. These include the generation of complete maps of ground truth for the various passes and test sites, weighting the ground truth values according to the antenna pattern of the S194 sensor, generating computer maps of the S193 antenna temperatures and scattering coefficient across the various test sites, developing a computer program for handling the aircraft underflight data, generating vegetation maps for the various test sites and developing a computer program which considers the effects of atmospheric conditions and vegetative cover on the S194 and S193 sensors. Most of these will be reported later except for a detailed vegetation mapping for one of the passes.

On August 5, 1973 (day 217), Skylab III passed over Kansas, Oklahoma and Arkansas. During the time the S190 A and B, S192 and S194 were functioning. Simultaneously, ground crews were gathering soil moisture information for the test site.

On the basis of imagery obtained from the on-board sensors, a land use-vegetation and drainage base map (Fig. 1) has been prepared for the test site. The Skylab imagery has been supplemented by ERTS imagery of the area and by some ground based photography. The land use-vegetation characteristics have been categorized,

as in the past, using the UNESCO classification scheme, (see the July Report).

The area mapped extends over a distance of approximately 500 nautical miles. Although this is significantly greater than the area covered by soil samples, soil mositure characteristics are being simulated on the basis of recent precipitation history and soil type.

Figure 2 indicates the number of S194 footprints and their postions with respect to one another. Each footprint is 66 nautical miles in diameter, the half power points of the sensor.

The position of the footprints with respect to the land use is indicated by the composite pattern of Figure 3. It is from this that relative percentages of each land use type within each footprint can be extracted for further analysis of the contribution of vegetation to the S193 and S194 measurements.

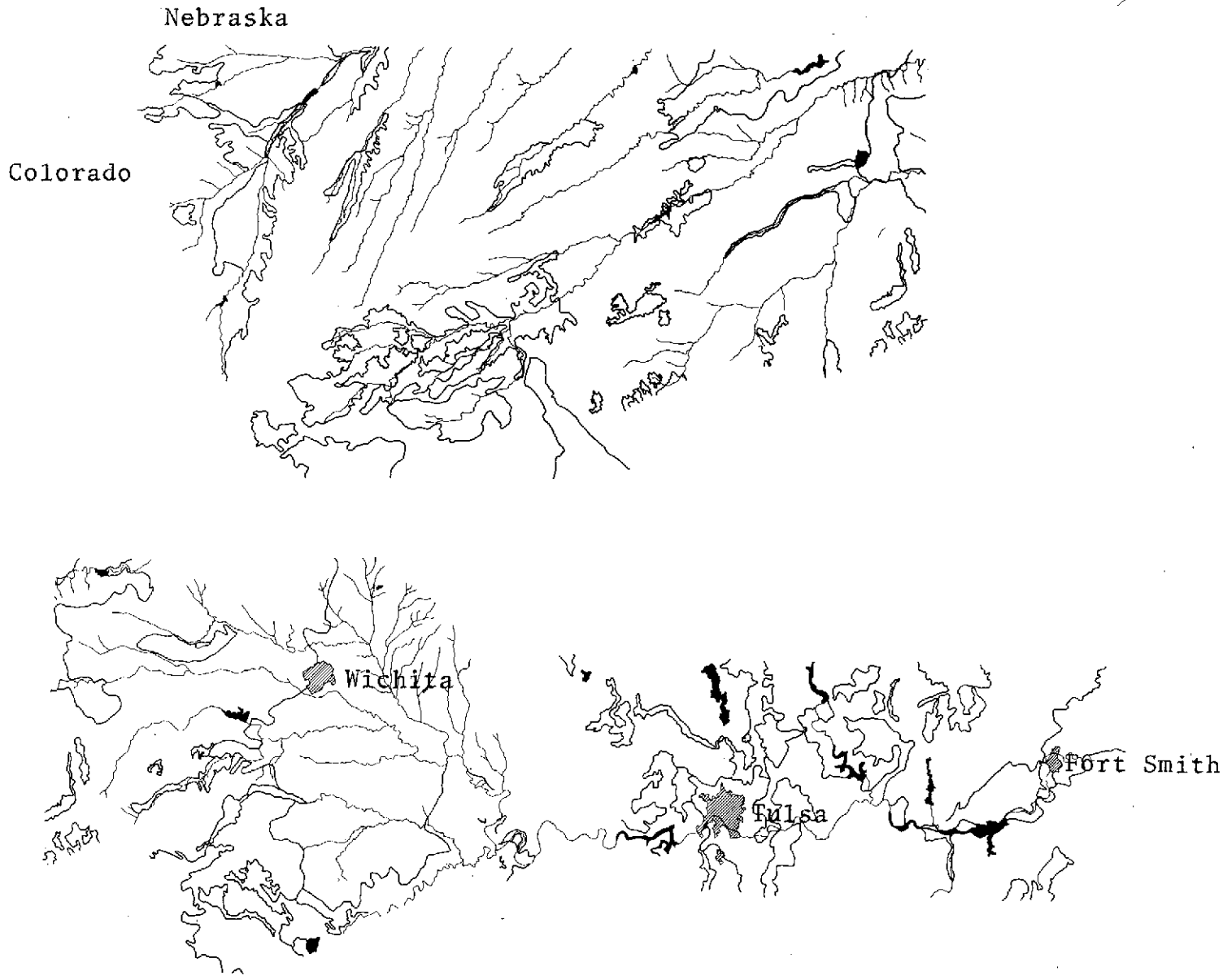

Fig. 1 Land-use and vegetation base map of a transect from north-west Kansas to Fort Smith, Arkansas(Prepared from ERTS and S190B imagery).

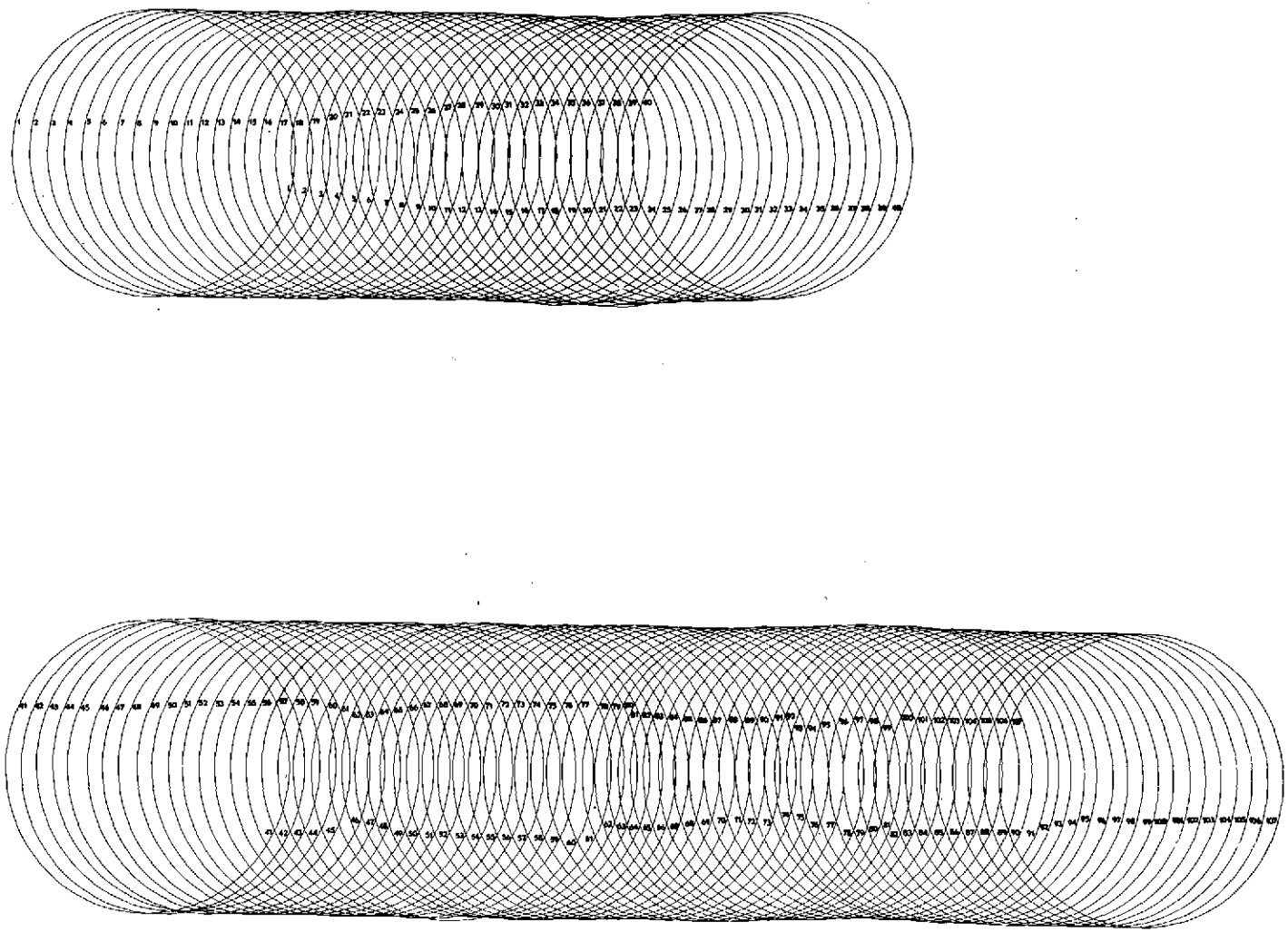

Fig. 2 Circles representing the footprints of the S194 L-Band radiometer.

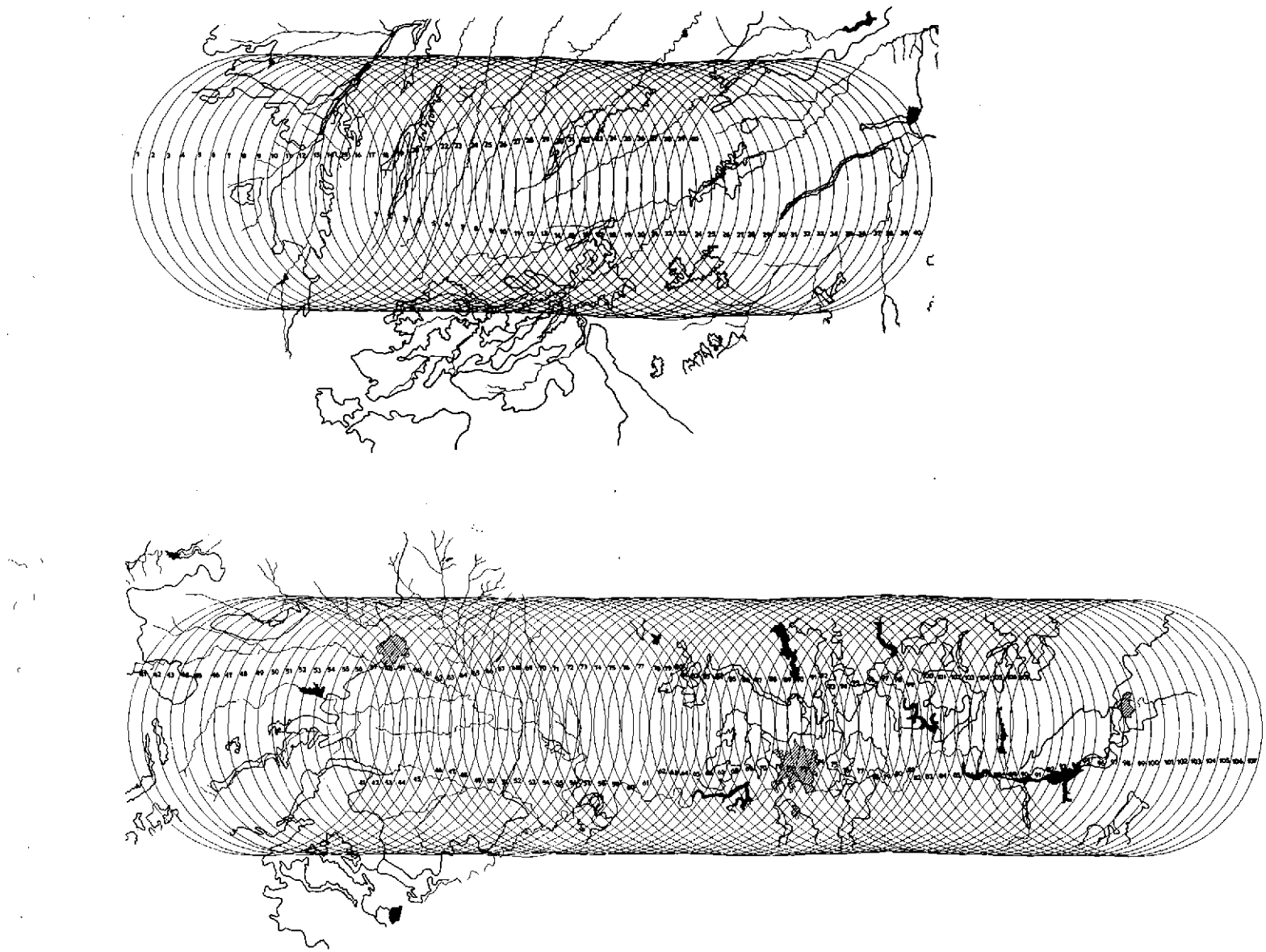

Fig. 3 Map showing the positions of S194 footprints relative to one another and to the land-use and vegetation changes for August, 1973.