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INVESTIGATIONS IN PROGRESS SL2 AND SL3

Analysis of the data received from Skylab missions to date is continuing. Further published background information has been located and is being assimilated. From the information available in the literature, attempts are underway to develop expected temperature curves for appropriate frequencies at various soil moistures. Further, efforts are being directed toward understanding brightness temperature variations as they vary with topographic, biologic, and soil type changes. In conjunction with latter efforts, work is continuing on a general soil map for the entire Texas test site, since it is known from previous research efforts that at higher frequencies, radiometric measurements are influenced by soil type changes. Similarly, topographic profiles with some soil and vegetation information superimposed are being constructed as a possible means of dealing with anomalous measurements.

RADAR ECHOES VS. SOIL SAMPLE SITES (TEXAS 6-5-73)

Radar echoes were compared with 38 soil sample locations. The time periods used prior to overflight were as follows: 0-19 hours, 0-3 days, 0-5 days and 0-11 days. The average moisture value by per cent of weight for the 1st inch of soil for all 38 sites was 6.4, for all sites covered by radar echoes 10.5 and for all sites not covered by echoes 3.1. Breaking the echo covered sites down, the 0-19 hour period covering 2 sites showed 25.7%, the 0-3 day period covering 7 sites--12.2%, the 0-5 day period covering 9 sites--10.2% and the 0-11 day period covering 17 sites--10.5%.

For the 6 inch layer of soil, the average moisture value by per cent weight for all 38 sites was 10.4%, for all sites covered by radar echoes 12.3% and for all sites not covered by echoes 8.9%. Breaking the echo covered sites down, the 0-19 hour period covering 2 sites showed 18.7%, the 0-3 day period covering 7 sites--13.9%, the 0-5 day period covering 9 sites--12.7% and the 0-11 day period covering 17 sites--12.3%.

Therefore, preliminary results indicate that radar echoes provide useful supplementary soil moisture information where higher soil moisture content exists approximately one day prior to collecting the soil samples.

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(E74-10126) DETECTION OF MOISTURE AND
MOISTURE RELATED PHENOMENA FROM SKYLAB:
INVESTIGATIONS IN PROGRESS SL2 AND SL3
(Kansas Univ. Center for Research, Inc.)
3 p HC \$3.00

SOIL SITE LOCATIONS VS. S-194 TEMPERATURE COVERAGE

In order to determine if soil sample sites were adequately distributed within the S-194 coverage, maps were drawn showing the distribution of soil sites in S-194 circles. The center points for each S-194 measurement were approximately $3\frac{1}{2}$ miles apart resulting in 51 S-194 circles in the test site.

The soil sample path was a zig zag line running through the circles with approximately equal coverage given to each circle except for the first 5 and the last 5 circles. In these, S-194 circles the soil sites are concentrated in one half of the circle with the other half extending past the sampling sites. The effect of this on the results reported last month as well as comparisons of S-194 and soil moisture from Skylab 3 should be finished by next month.

S-194 ANTENNA TEMPERATURE IN DEGREES K (TEXAS 8-8-73)

The S-194 Antenna Temperature was plotted at $3\frac{1}{2}$ miles intervals along the test track from NW to SE. The lowest value 250.1 occurs at the beginning of the test track. The temperature steadily increases until a value of 274.3 is reached 63 nautical miles down range. This value remains constant for 38 miles then descends slightly to 271.6 at 112 nautical miles where it remains constant through the 164 mile point. The last two temperatures descend gradually to 269.7. Further analysis of these data and correlation with soil moisture should be completed by next month.

RADAR ECHO COVERAGE (TEXAS 8-8-73)

Radar echoes have been recorded in the test site area from the Midland radar site. Most of these echoes are isolated cells and fairly sparse in extent. However, the Midland station echoes only cover about one third of the test site. For more complete coverage radar film will be obtained from Fort Worth. This film has a 250 mile range and should cover the entire test site.

S-194 AND SOIL MOISTURE CORRELATIONS (TEXAS 8-8-73)

The correlation coefficients between S-194 antenna temperature and soil moisture were calculated for varying soil layers in depth for the SL3 data obtained on August 8, 1973 in the Texas test area. The coefficients show that the 0-1 inch layer has the highest values, $r=0.956$. The 1-2 inch layer has a fairly high coefficient, $r=0.842$. Below this layer, the coefficients decrease below the values reported last month for the SL2 data. The high coefficients through all the six surface layers of the soil reported for the SL2 data may have been produced by high correlations between the 0-1 inch layer and deeper layers. Further analyses and comparisons are in progress and should be available by next reporting time.

We are still awaiting the arrival of photographic data from SL3 and S193 data from SL2. We are in a state of readiness for obtaining the ground truth data for the snow cover and freeze-thaw line experiment for SL4.