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EVALUATION OF ERTS DATA FOR CERTAIN HYDROLOGICAL USES

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Objective:

The overall objective of this investigation is to evaluate ERTS data for hydrologic information in two areas in which extensive ground truth is available.

a. Sierra Nevada studies.--Here the objective is to evaluate ERTS data from a mountainous region with extensive ground truth and where a prolonged melting snowpack is the primary source of surface runoff to a highly managed river system. To determine--by comparing satellite and ground truth data--the feasibility of indirect quantitative assessments of water storage in reservoirs and possibly in the snowpack as snow. Snow mapping in mountainous terrain is an extremely challenging task.

b. Lake Ontario (IFYGL) studies: Here the objective is to assess in a quantitative way, the ERTS data from a temperate region lake and from its drainage basin, in terms of hydrologic information content, relating ground truth to spectral band, ground resolution, etc. Coincident use of ITOS-D imagery and data will permit evaluation of the effect of the 18-day revisit cycle on hydrologic phenomenologic monitoring.

Work Summary

a. Sierras.--Base maps at various scales have been examined for the preparation of appropriate basin maps in the Sierras. cursory examination of ERTS U-2 simulation aerial photography of the Feather and American River Basins reveal that snow cover is easily distinguished but mapping has not yet been attempted.

A visit to the study area revealed that the best hydrologic data available is in the American River Basin, which has eight stations that can provide near-real time data readout using remote telemetry coincident with the satellite transit. In addition a new radiometric snow-moisture equivalent metering device has been installed at the Blue Canyon Weather Service Office. This device can also be read out by land line directly as the satellite is overhead.

b. Lake Ontario Basin.--A remote sensing experiment was flown in the areas south of Auburn, N.Y., over a NOAA test site for soil moisture June 14 and 16, 1972. Extensive ground measurements of soil moisture and soil temperature were taken simultaneously with airborne multi-frequency microwave profiles and photography. Simultaneous overflight by the AEC's airborne radiological monitoring system (ARMS) was accomplished on 16 June. Although a telespectroradiometer and a 4-band camera were scheduled to be flown, they were abandoned at the last minute, because their position in the aircraft caused an aerodynamically undesirable shift in the center of gravity of the aircraft.

Establishment of soil-moisture "baselines" and snow-moisture "baselines" for comparison of ERTS 1 imagery to ground truth is a vital prerequisite to this project.

Work Plans

The multispectral Color Viewer is expected to arrive in August. The Zoom Transfer Scope is also scheduled for delivery in August. Several weeks of indoctrination and training will be necessary on these instruments before detailed analysis can begin. The 1971-72 Sierra snow season is depicted on the U-2 simulations and will be mapped for comparison with the ERTS-1 mass imagery. In the Lake Ontario Basin multispectral underflights (not U-2) are planned for October and will be coordinated with NWS and IFYGL measurements as well as on ERTS-1 pass.