Remote Sensing Applications

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1 Hydrology, Hydrochemical Modeling, and Remote Sensing of Seasonally Snow-Covered Alpine Drainage Basins

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- Develop hydrologic model, driven by spatially distributed data and calculations of surface energy balance, to estimate snow melt, drainage through snow pack, and routing through basin.
- Couple hydrologic model with "chemical hydrograph" that estimates spatial and temporal distribution of concentration of chemical species in snow pack, and assess effects of snow-melt chemistry on streams and lakes.
- Snow properties (coverage, grain size, reflectance, wetness, water equivalence) are spatially variable; some can be measured remotely from aircraft or satellite.

Remote Sensing of Alpine Snow Properties

- Subpixel coverage, albedo, and grain size (approximately) from Landsat Thematic Mapper (30 m spatial resolution, 7 spectral bands, 185 km swath—$6000 \times 6000 \times 7$ 8-bit pixels).
- Coverage verified by precise, high-resolution aerial photography.
- Subpixel coverage, albedo, and grain size precisely from AVIRIS (20 m spatial resolution, 224 spectral bands, 11 km swath—$614 \times 512 \times 224$ 12-bit pixels.
- Snow wetness and water equivalence from AIRSAR still in research stage (3 frequencies, 4 polarizations, swath and resolution depend on flight altitude, 16-bit pixels).

2 Mapping and Monitoring of Terrestrial Vegetation

Frank Davis, UCSB

- Assess effect of wild fires on California vegetation.
- Investigate changes in vegetation caused by topography, hydrology, and climate.

Remote Sensing

- Daily AVHRR data (1 km resolution at nadir, 1500 km swath, 5 spectral bands).
- AVHRR data can detect forest fires and can make movie of vegetation changes.
- Map-guided classification of vegetation with Thematic Mapper data.

3 Evaluation of Global Mixed-Layer Heat Budgets and In-Water Solar Radiation Fluxes

David Siegel, Catherine Gautier, Ray Smith, UCSB

- Quantify the role of solar radiation penetration in air-sea heat budgets using remotely sensed data.
- Evaluate where solar radiation processes are important to the mixed layer heat budget.
- Investigate whether ocean biogeochemistry (phytoplankton chlorophyll) influences ocean thermal climate.

Remote Sensing

- Cloud data derived from AVHRR (ISCCP data set).
- Ocean properties derived from CZCS (now) and SeaWiFS (future).

4 Generic Requirements

- Lots of easily accessible storage.
- Networks to get to the storage.
- Data base management system that handles satellite data and surface observations.
- Visualization tools.
- Easy integration with existing software (e.g. S Plus, IDL, AVS).