



GLOBAL IMAGING

Land Use Application Note

Remote sensing products have been used to: 1) Monitor the state of crops and help establish agricultural estimates (e.g. yields of cereal grains); 2) Determine the areal extent of snow cover and provide input to snow-water equivalent estimates; 3) Monitor both flooding and drought conditions and help establish management policy for river basin and drainage systems; 4) Provide information for managing forestry-related businesses; 5) Provide a variety of land-use indices (e.g. fire burning index, fire curing index, and quality of pasture land index).

Recent advances in satellite remote sensing, coupled with fine resolution Digital Elevation Models (DEMs) and Geographical Information Systems (GISes), now make the use of remotely sensed satellite data extremely beneficial in a wide range of terrestrial applications.

Land Use Applications

Polar orbiting (AVHRR), geostationary (GVAR, GMS and Meteosat), and Landsat (MS or TM) satellite data can be used in a variety of ways.

1. Precipitation Estimates

Estimates of precipitation, especially in non-irrigated areas, are important for assessing water/moisture availability. The new water vapor channels on GOES-8/9 and Meteosat will be especially useful.

2. Insolation Estimates

Incoming solar radiation and a related quantity, photosynthetically active radiation (PAR), can be used to estimate crop-yield, potential evapotranspiration rate and soil moisture.

3. Land Surface Temperature

Land Surface Temperature (LST) is an important variable for most terrestrial applications.

4. Vegetation Indices

A variety of useful vegetation indices such as Normalized Vegetation Index (NDVI), and the Bush Caring Index (BCI) have been developed using both AVHRR and Landsat data.

5. Water Quality

Increased turbidity results in a decrease in light transmission and a shift in the wavelength of maximum transmittance. Landsat (MSS or TM) data are very useful in determining the condition of natural water bodies (sediment-free vs. sediment-laden). This information, in concert with NDVI estimates, can be used to identify sources of soil erosion and deforested land.

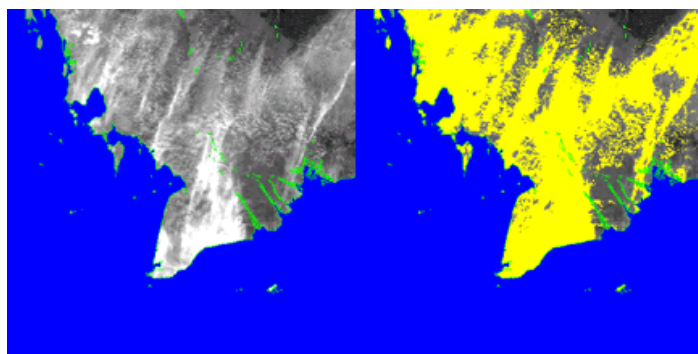
The Global Imaging Solution

- Real-time capture and archiving of full resolution satellite data using state-of-the-art antenna and RF downlink equipment, powerful Hewlett-Packard UNIX workstations, and modern data analysis and visualization software.
- Accurate co-registration of coastal and elevation contours with image data.
- State-of-the-art atmospheric correction procedures to minimize the effects of atmospheric contaminants such as water vapor and aerosol on LST.
- State-of-the-art cloud detection algorithms to remove cloud cover from both daylight and nighttime AVHRR scenes prior to computation of LST.

- Accurate estimates of cloud shadow in the scene. Failure to detect cloud and cloud shadow in the scene can produce false biome boundaries.
- Accurate thermal gradient analysis. Both the position and magnitude of the thermal fronts are accurately computed.
- Ancillary data field overlays for visually integrating data such as crop yields and soil conditions with the satellite data products. All ancillary data are co-registered to the same user-selected navigation grid.
- A flexible library-based software design which allows users to build their own custom analysis and display functions.
- Both interactive and batch modes of data analysis and display.

Areas of Potential Use

- Agrometeorology
- Agricultural Crop Estimation
- Hydrology and Hydrometeorological Modeling
- Forestry
- Insect Defoliation Monitoring
- Wildlife Habitat Monitoring
- Tropical Deforestation and Land-type Conversion
- Urban Planning
- Flood Monitoring and Floodplain Studies
- Time Variation in River Delta Sediment Loading and Location.
- Atmospheric Studies of Radiation Balance and Radiative Transfer
- Volcanic Plume Detection and Monitoring
- Estimating Evaporation Over the Landscape
- Desertification



Left Panel: AVHRR Channel 4 image showing part of Southeast Asia. Ocean is masked in blue, coastline in green.

Right Panel: Same as left, except cloud mask shown in yellow.



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