EARTH AND PLANETARY REMOTE SENSING GROUP
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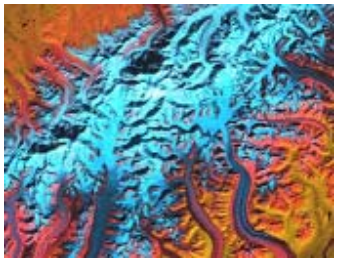
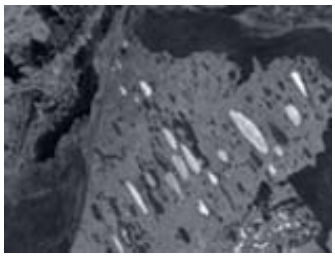
Earth and Planetary Remote Sensing at UAF

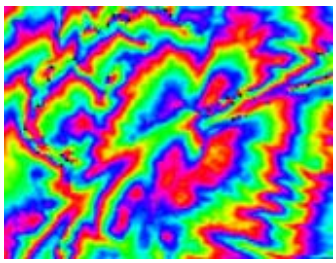
Remote sensing at UAF consists of analyzing satellite data to study environmental conditions in cold regions, including those on other planets. Volcanoes, permafrost, snow, glaciers, the frozen ocean, lakes, rivers, geology are studied using visible, infrared and microwave data. The strikingly beautiful and pristine landscape of Alaska provides a unique laboratory to observe and study these environments. UAF is one of only a few universities that have their own stations that receive satellite data and is the most northern American university where field measurements in our backyard confirm satellite observations.



Landsat satellite image showing the glacial complex around Denali National Park, Alaska



Synthetic Aperture Radar-SAR image showing oriented lakes in Alaska. © ESA



Interferometric SAR is used for creating DEMs and mapping subsidence

Snow and ice are important components of the Earth system. Remote sensing techniques, ranging from the analysis of hyperspectral reflectance spectra to active/passive microwave remote sensing, are being applied by faculty and researchers at UAF to study the cryosphere. Unprecedented changes in the distribution of snow and ice on Earth, in particular in Alaska, makes this research both timely and exciting.

Remote sensing images are being used extensively in conjunction with GIS techniques to study modern sedimentary environments which provide a model for ancient sedimentary environments. We study the Arctic River systems by monitoring the development of sand bars, channel migration, sediment load, ice breakup time and its control in sediment distribution and much more.

Remote sensing of Arctic lakes helps to study climate variability and changes using ice cover and water temperature as indicators. We are developing and improving numerical ice growth and heat transfer models. We are simulating lake ice growth for lakes of various sizes under present and future climates.

Remote Sensing is a critical component to the Alaska Volcano Observatory. AVHRR and MODIS imagery received daily by the International Observatory of North at UAF, are used to analyze 100 active volcanoes in this region. Thermal anomalies and eruption clouds are observed monthly from volcanic craters, calderas and domes. Field studies validate and calibrate observations.

The Alaska Satellite Facility at UAF acquires near real-time SAR data for Alaskan and neighboring regions which are being used by researchers to generate DEMs and to monitor subsidence due to earthquakes, volcanic eruptions, landslides etc.

Planetary remote sensing involves the integration and analysis of NASA data sets to understand the formation and evolution of Earth and its planetary neighbors. Image feature extraction/characterization, spectral studies, and image classification techniques are used in conjunction with terrestrial field constraints to assess the fundamental processes that shape planetary landscapes.

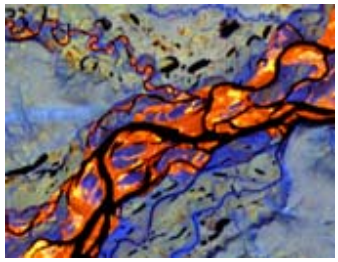
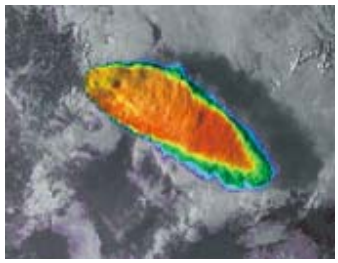


Image of a part of the Colville River in Alaska showing meanders and sand bars



Composite AVHRR image of the ash cloud from the 1992 eruption of Mt. Spur, Alaska. © AVO

Earth and Mars at the same scale. © NASA

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