

# NEON prototype airborne mission over Bodega to Tahoe Transect (COMET):

Hyperspectral data to assess water stress of major ecosystems along an elevation gradient from coastal California to the summit of the Sierra Nevada.



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## COMET Project

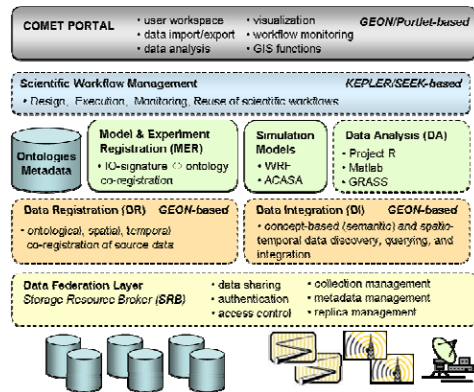
(COast-to-Mountain Environmental Transect)

COMET is developing a practical cyber-infrastructure prototype that facilitates knowledge about the ways multiple environmental factors, including climatic variability, affect major ecosystems along an elevation gradient from coastal California to the summit of the Sierra Nevada.

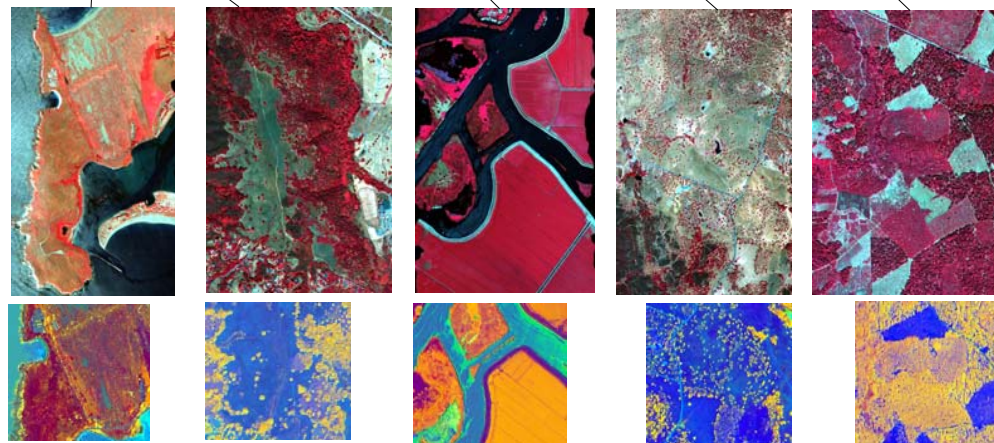
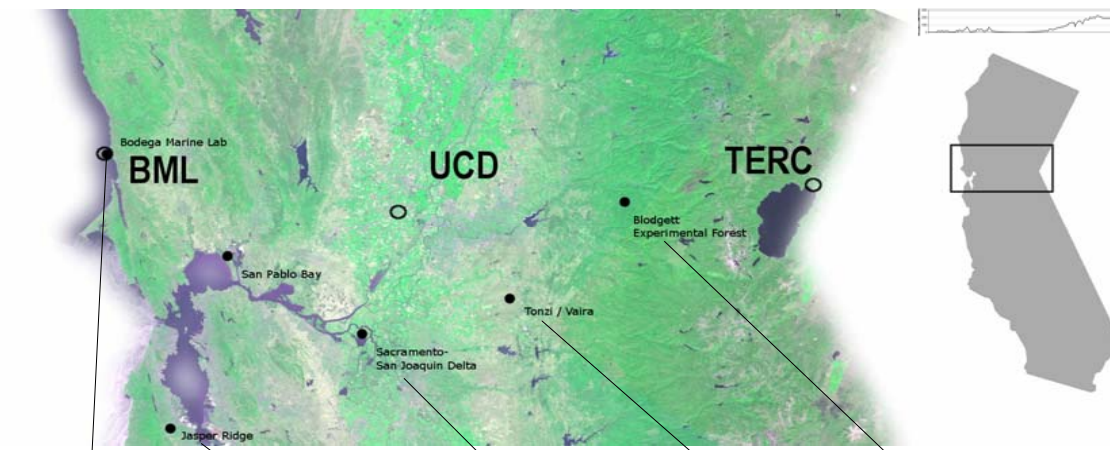
The heterogeneous and distributed nature of environmental data that is needed to answer complex multidisciplinary questions requires a new level of integrated cyberinfrastructure that facilitates state-of-the-science research,

A major objective of COMET is to provide scientists with a uniform platform to access, manage, and query different types of real-time and historical data, and to feed these data into models relevant to understanding ecosystem responses to climate variability over a wide geographical transect encompassing major ecosystems in California. COMET data users access and manipulate data through an integrated framework with open GIS standards.

COMET is an NSF Cyberinfrastructure for Environmental Observatories: Prototype Systems to Address Cross-Cutting Needs (CEO:P) initiative.



CyberInfrastructure System for data Assimilation and Model management for the Environment



Figures: Shown above are false color infrared images from the AVIRIS 2007 flights for Bodega Marine Lab, Jasper Ridge, the Sacramento/San Joaquin Delta, the Tonzi/Vaira ranches and the Blodgett Experimental Forest. The smaller images are false color subsets using Vegetation indices (Red: NDVI, Green: NDWI, Blue: NDNi), where NDVI is the Normalized Difference Vegetation Index, NDWI is the Normalized Difference Water Index, and NDNi stands for Normalized Difference Nitrogen Index and is highlighting senescent vegetation.

The National Ecological Observatory Network (NEON) is a continental-scale research program to measure and monitor environmental characteristics to better understand the impacts of climate change, land-use change, and invasive species on ecology. Among the questions of interest are how ecosystems composed of different functional types respond to common climate conditions and how the gradient of ecosystems distributed across a region are influenced by climate and feedback to climate conditions. Within the COMET transect are grasslands, shrublands and forests located at elevations from sea level to 3000m exposed to a wide range of subclimate regimes.

The 2007 AVIRIS mission was flown as a NEON prototype mission, to provide AVIRIS cover over Bodega Marine Lab, Jasper Ridge (Stanford), Tonzi/Vaira Ranch (Dennis Baldocchi, UC Berkeley, Ameriflux site), Blodgett Forest (Alan Goldstein, UC Berkeley, Ameriflux site). These sites are located across the COMET Transect. AVIRIS is a 224 band VIS-NIR-SWIR hyperspectral with 3m pixels in it's current configuration. AVIRIS data was collected in August 2007. The hyperspectral data are used to assess MODIS predictions of canopy water content along the COMET transect. The AVIRIS data provides the key for developing validation of canopy water content from MODIS. Water content decreases with summer drought across California but will likely differ along the elevational transect.

