

## **Application of EOS MODIS and ASTER Data to Lake Monitoring**

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### **Abstract**

In December 1999 and May 2002 the first and second Earth Observation System (EOS) platforms termed Terra and Aqua were successfully launched into earth orbit. Each platform includes a suite of instruments for monitoring the Earth. The Terra spacecraft has a morning equatorial orbit crossing and the Aqua spacecraft has an afternoon equatorial crossing. Two of the instruments make measurements that can be used for lake monitoring: the Advanced Spaceborne Thermal Emission and Reflectance Radiometer (ASTER) and the Moderate Resolution Imaging Spectroradiometer (MODIS). Terra includes the ASTER instrument and both Terra and Aqua include a MODIS instrument.

Each instrument produces a set of standard products and some of these products are particularly suited to lake monitoring. The products particularly useful for lake monitoring are the surface temperature and color (chlorophyll) products of MODIS and the surface temperature product of ASTER. The ASTER instrument also makes visible and near-infrared (VNIR) measurements which can be used to derive lake clarity although this is not a standard product. The two instruments have very different spatial resolutions and repeat visit times. The MODIS instrument has a daily revisit and the surface temperature and color products have a spatial resolution of 1km while the ASTER instrument has a 5 day revisit time for the VNIR channels which have a spatial resolution of 15 m and a 16 day revisit time for the temperature channels which have a spatial resolution of 90 m. These different characteristics are very complementary with ASTER providing the necessary detail to understand the lower spatial resolution, but more frequent, MODIS data.

The utility of these products for monitoring a single lake with complementary in situ measurements will be examined together with the application of these data for global monitoring of certain lake properties such as the annual temperature cycle.

### **Acknowledgements**

The work described in this paper was carried out in part at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration as part of the Earth Observing System Mission to Planet Earth Program.

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### **Keywords**

ASTER, MODIS, Lake Monitoring, Lake Tahoe, Limnology, Remote Sensing

### **Oral Presentation Preferred**

**Topic/s:** MODIS B32 or Water Resources A38