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 NNX08AT88G OSTM/SWT
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Near Real Time Monitoring of Global Reservoirs and Lakes

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NRT Splinter Session

2011 Jason-2/OSTM meeting

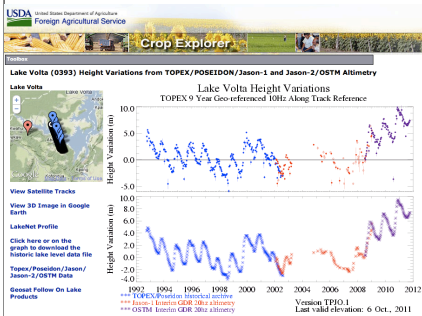
San Diego, USA

1. Introduction

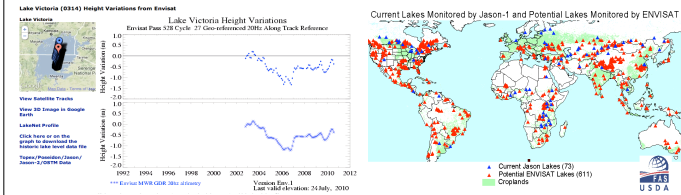
A USDA/NASA funded program is performing near-real time altimetric monitoring of the largest lakes and reservoirs around the world. The near-real time stage measurements are currently derived from incoming data from the NASA/CNES Jason-2/OSTM mission. Archived data from the NASA/CNES Topex/Poseidon and Jason-1 missions, and from the NRL GFO mission are also utilized to provide historical time series variations from 1992-2008. The program is currently being expanded and enhanced by including the ESA ERS and ENVISAT data sets which will allow the additional monitoring of ~500 lakes. Radar, lidar and ground-based data sets are all used for validation exercises. The USDA/FAS utilize the products for assessing irrigation potential (and thus crop production estimates), and for general observation of high-water status, short-term drought, longer-term climatic trends, and anthropogenic effects. Here, we report on the overall performance and contribution of the Poseidon-3 radar altimeter IGDR data set, in terms of overall product quality and quantity. We also present the first ENVISAT products and demonstrate how the Jason-2/OSTM and ICESat-1 data sets are being used as relative validation sources.

2. NRT from Jason-2/OSTM

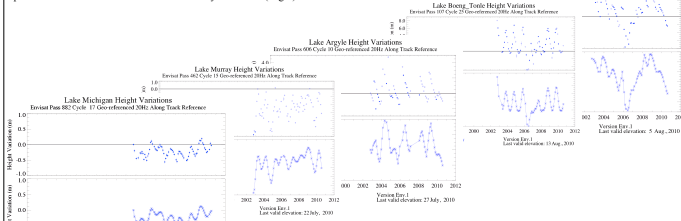
Acquiring targets ~150km², ~800m wide, within 0.1-2.5secs of the coastlines, and with resulting time series accuracies 3-35cm rms.



3. New ENVISAT products and their validation

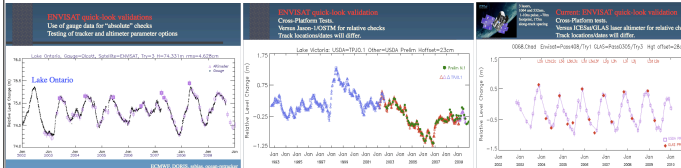


(Left) Preliminary ENVISAT products (Env.1) for Lake Victoria, 2002-2010 (to cycle 092). Such products will be available for ~500 lakes at 35-day resolution, while OSTM products are available for ~100 lakes at 10-day resolution (Right).

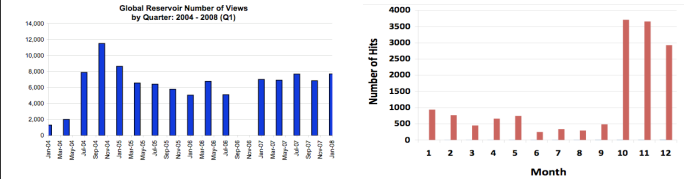


Env.1 products. The ESA ERS datasets will be integrated to extend the time line of observations back to 1994. ENVISAT, SARAL, and Sentinel-3 will extend the time line forwards, with SARAL and Sentinel-3 providing the near real time operational products. In the future product output will be done daily, not weekly, and may expand to include both river channels and inundated regions.

(Below) Validation of the ENVISAT time series. (Left) Lake Ontario and comparison with ground-based gauging data from Olcott, (Centre) Lake Victoria and relative validation via cross-platform checks with the Topex/Jason-OSTM product, and (Right) Lake Chad and relative validation via utilization of the ICESat-1 GLAS GLA14 laser data set.

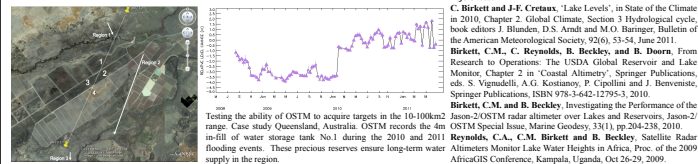


4. Benchmarking + End Users



(Above) Tracking of the Global Reservoir and Lake Monitor (GRLM). Web hits are recorded each month, and the statistics recorded as part of the benchmarking process. Numbers rise as each new near real time product (Jason-1 left, OSTM right) goes on-line.

GRIM end-users span *edu, *mil, *com, *gov, *org, including FAS foreign resource analysts, international governments, lake development agencies and networks, humanitarian organizations, conservation groups etc. Interests and applications include impoundment effects, water resources, droughts and floods, fish productivity, regional security, vegetation ecology. Researchers have utilized the products for hydrological modeling and studies of climate change, as well as a validation tool for wetland studies and ground water determinations from satellite imagery and GRACE. With a 20yr record, the lake level variations are also being seen as a new climatic index. End-user requirements vary according to application but there is a need for a homogeneous, consistent, global, water level data record across all platforms. Emphasis is product accuracy particularly range determination, and wind/tide effects. Focus is also on acquiring lakes/reservoirs/storage ponds in the 10-100km² range, and looking to the provision of a suite of catchment based parameters (lake extent, soil moisture, precip, ground water) to meet end-user needs.



References:
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