Geophysical Research Abstracts,
Vol. 11, EGU2009-2713, 2009
EGU General Assembly 2009

Controls on satellite altimetry over non-ocean surfaces for hydrological purposes

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Over the past two decades, satellite altimetry has been used to measure non-ocean water level variation for hydrologic studies. Non-ocean surfaces are much rougher than oceans. Moreover, satellite corrections for atmospheric propagation normally include errors in non-ocean surfaces. Hence, due to (1) the effect of topography and heterogeneity of reflecting surface and (2) atmospheric propagation, the expected echo shape for altimeter returns over land differs from that over ocean surfaces. As a result, measurements over non-ocean area include erroneous and missing data. We discuss several methods to retrieving the missing data through retracking. We show water level variations at two test locations: Balaton Lake (Hungary) and Urmia Lake (Iran). Finally we validate the obtained time series from satellite altimetry over mentioned area against in-situ measurements.