Geophysical Research Abstracts, Vol. 8, 02342, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02342

Worldwide validation of satellite altimetry-based water level time series

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A worldwide data base of water level time series on rivers, lakes and flood plains has been constructed using satellite altimetry data from Topex/Poseidon, ERS-2 and ENVISAT (http://www.legos.obs-mip.fr/fr/soa/hydrologie/hydroweb/). Over rivers and floodplains, most water level time series (computed from the Topex/Poseidon data) start in January 1993 and are provided at 10-day interval. A few others, based on ERS-2 and ENVISAT, have a 35-day time resolution and start in 1996. To date, $\sim$200 virtual stations on rivers as well as a few tens of sites in floodplains areas, distributed across 18 river basins, are available. Time series for more than 100 lakes and man-made reservoirs are also available. In this study we focus on rivers and floodplains stations and present a validation of the satellite-derived water level time series by comparing with available in situ gauging records (most of them from worldwide data bases). A minimum of one year overlap is considered for the validation. Statistics are presented for each studied river basin. The quality of satellite-based water level time series is discussed according to the comparison context (e.g., distance between in situ gauging station and satellite track, length of the overlapping records, river width and morphology, etc.).