Land Hydrology from Satellite Altimetry: Lakes, Rivers and Wetlands

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SUMMARY

We present a database (accessible via internet) of water level time series for big rivers and lakes around the world. These time series are mainly based on altimetry data from Topex/Poseidon, but ERS-1&2, Envisat and Jason-1 are also used when possible. The water level time series cover the period 1993 up to 2004. At the present, water level time series of about 40 lakes (in Europa, Asia, Africa, north and south America) including Aral and Caspian seas overflown by Topex/Poseidon are included. In addition water level time series of rivers and tributaries in the Amazon and La Plata (south America), Mekong and Ganges basins (east Asia) and also Congo basin (Africa). We also present a few water-level time series over floodplains. Additional rivers and lakes time series will be implemented soon.

RIVERS: DATA SELECTION, EDITING AND FILTERING

- Extractions of Topex/Poseidon altimetry data (1 Hz and 10 Hz) over the white basins.
- Applied corrections: dry tropo, wet tropo, iono doris, solid tide, polar tide, géoid.
- Criteria for elimination of 10 Hz altimetry measurement:
  - If the iono correction is flagged (one per second measurement)
  - If the 10 Hz altimetry measurement has default value
  - If backscatter has negative value.
- Use of 3σ (standard deviation) of the water level dispersion per cycle.

CONCEPT OF VIRTUAL STATION

We call virtual station the intersection between the satellite ground track and the river. Its geographical position is computed from those of selected data.

TIME SERIES OVER LAKES

- Lac Titicaca (south America)
- Lac Mweru (Africa)
- Lac Ladoga (Europa)
- Lac Venere (Europa)
- Lac Sarykamish (central Asia)
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TIME SERIES OVER MAJOR RIVERS

- Parana (South America)
- Rio Negro (South America)
- Ganges river (India)
- Ghaghara river (India)
- Brahmaputra river (India)
- Mekong basin (south east Asia)
- Ganges river (delta)
- Brahmaputra river (delta)
- Ganges river (delta)
- Brahmaputra river (delta)

TIME SERIES OVER WETLAND

- Amazon (South America)
- Congo river
- Oubangui river (Africa)
- Oubangui river (Africa)
- Congo river
- Congo river

ACTUAL DATABASE OF WATER LEVEL TIME SERIES

Actually the data base contains time series over:
- 46 lakes (14 in Europa, 14 in Asia, 25 in Africa and others over the rest)
- 5 river basins (South America, Africa, Asia)