

Land Hydrology from Satellite Altimetry : Lakes, Rivers and Wetlands

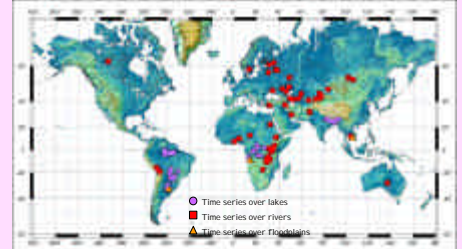
M-Claude Gennero, J-François Crétaux, Caroline Maheu, Stéphane Calmant, Anny Cazenave

LEGOS - Observatoire Midi-Pyrénées - Toulouse (F)
(contact : marie-claude.gennero@cnes.fr)

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.

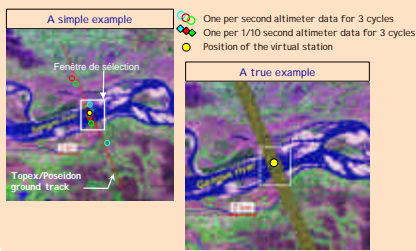
ACTUAL DATABASE OF WATER LEVEL TIME SERIES



Actually the data base contains time series over
 ○ 48 lakes (14 in Europa, 14 in Asia, 15 in Africa et 5 over the rest)
 ○ 5 river basins (South America, Africa, Asia)

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.

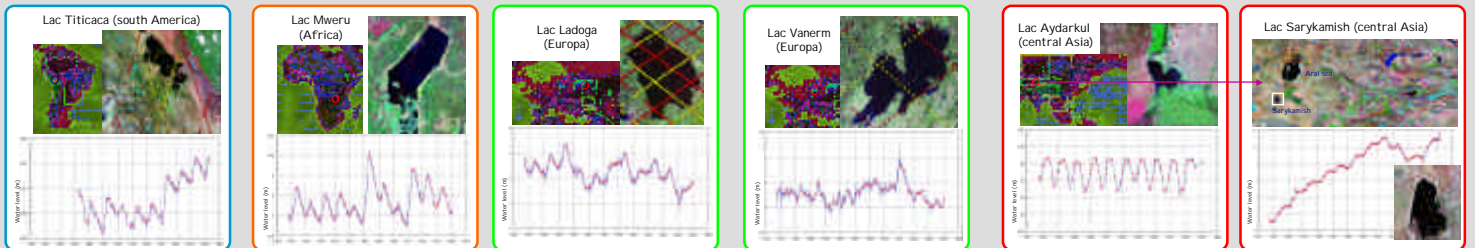


RIVERS : DATA SELECTION, EDITING AND FILTERING

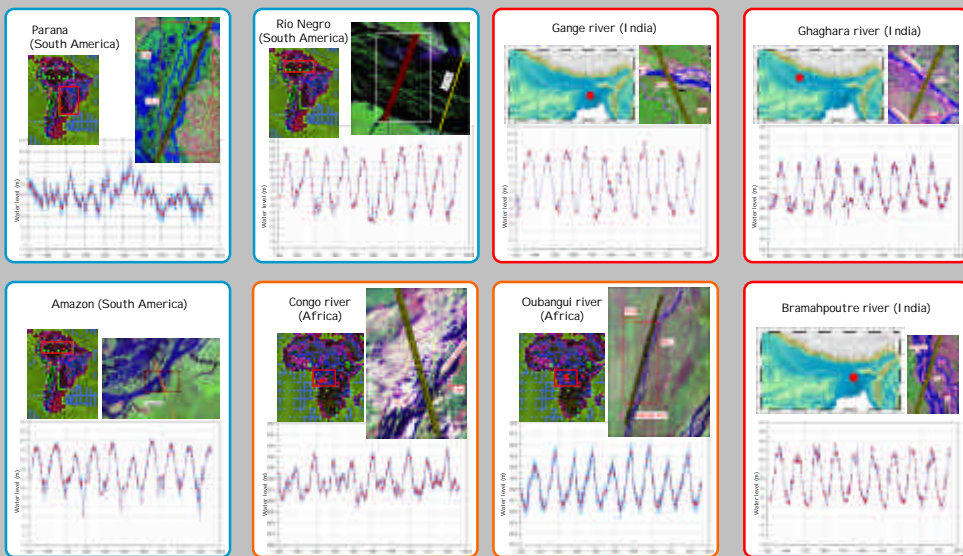
- Extraction of TopexPoseidon altimetry data (1 Hz and 10 Hz) over the whole basin.
- Applied corrections : dry tropo, wet tropo, iono doris, solid tide, polar tide, géoid.
- Criteria for elimination of 10 Hz altimetry measurement :
 - ✓ If the iono correction is flagged (one per second measurement)
 - ✓ 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.

In addition to revealing the spatial and temporal signature of climate variability on water levels, systematic use of satellite altimetry in large river basins might support initialization and verification of models used in forecasts of hydrological variability, and, possibly, estimates of river discharge where rating curves can be established by surface-based methods.

TIME SERIES OVER LAKES



TIME SERIES OVER MAJOR RIVERS



TIME SERIES OVER WETLAND

