



Downscaling of inundation extents

Filipe Aires (1,2,3), Catherine Prigent (2), and Fabrice Papa (4)

(1) Estellus, Paris, France (filipe.aires@estellus.fr), (2) LERMA, Observatoire de Paris, France (catherine.prigent@obspm.fr), (3) Department of Earth & Environmental Engineering, Columbia University, New York, USA, (4) IRD and IFCWS, Bangalore, India (fabrice.papa@ird.fr)

The Global Inundation Extent from Multi-Satellite (GIEMS) provides multi-year monthly variations of the global surface water extent at about 25 kmx25 km resolution, from 1993 to 2007. It is derived from multiple satellite observations. Its spatial resolution is usually compatible with climate model outputs and with global land surface model grids but is clearly not adequate for local applications that require the characterization of small individual water bodies. There is today a strong demand for high-resolution inundation extent datasets, for a large variety of applications such as water management, regional hydrological modeling, or for the analysis of mosquitos-related diseases.

This paper present three approaches to do downscale GIEMS: The first one is based on a image-processing technique using neighborhood constraints. The third approach uses a PCA representation to perform an algebraic inversion. The PCA-representation is also very convenient to perform temporal and spatial interpolation of complexe inundation fields. The third downscaling method uses topography information from Hydrosched Digital Elevation Model (DEM). Information such as the elevation, distance to river and flow accumulation are used to define a “flood ability index” that is used by the downscaling. Three basins will be considered for illustrative purposes: Amazon, Niger and Mekong.

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