Geophysical Research Abstracts
Vol. 12, EGU2010-3803, 2010
EGU General Assembly 2010

Validation of satellite-based operational flood monitoring in Southern Queensland, Australia

Ben Gouweleeuw (1), Catherine Ticehurst (1), Julien Lerat (1), and Peter Thew (2)
(1) CSIRO Land and Water, Canberra, Australia (ben.gouweleeuw@csiro.au), (2) CSIRO ICT Centre, Canberra, Australia

The integration of remote sensing observations with stage data and flood modeling has the potential to provide improved support to a number of disciplines, such as flood warning emergency response and operational water resources management. The ability of remote sensing technology to monitor the dynamics of hydrological events lies in its capacity to map surface water. For flood monitoring, remote sensing imagery needs to be available sufficiently frequently to capture subsequent inundation stages.

MODIS optical data are available at a moderately high spatial and temporal resolution (250m-1km, twice daily), but are affected by cloud cover. AMSR-E passive microwave observations are available at comparable temporal resolution, but coarse spatial resolution (5-70km), where the smaller footprints corresponds with the higher frequency bands, which are affected by precipitating clouds.

A novel operational technique to monitor flood extent combines MODIS reflectance and AMSR-E passive microwave imagery to optimize data continuity. Flood extent is subsequently combined with a DEM to obtain total flood water volume.

The flood extent and volume product is operational for the lower-Balonne floodplain in Southern Queensland, Australia. For validation purposes, two moderate flood events coinciding with the MODIS and AMSR-E sensor lifetime are evaluated.

The flood volume estimated from MODIS/AMSR-E images gives an accurate indication of both the timing and the magnitude of the flood peak compared to the net volume from recorded flow. In the flood recession, however, satellite-derived water volume declines rapidly, while the net flow volume remains level. This may be explained by a combination of ungauged outflows, soil infiltration, evaporation and diversion of flood water into many large open reservoirs for irrigation purposes. The open water storage extent unchanged, the water volume product is not sensitive enough to capture the change in storage water level. Additional information on the latter, e.g. via telemetered buoys, may circumvent this limitation.