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Can ASAR GM data be used to improve water balance estimation in areas receiving surface water inflows?

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Major flooding occurred in Dec/Jan 2010/2011 in Queensland, Australia. The flood event was identified as Queensland's single biggest natural disaster, resulting in loss of life and billions of dollars damage to agriculture, resources exports and infrastructure, to a degree the national and even global economy were affected. Recently, a flood monitoring system was developed at the Australian Commonwealth Scientific and Research Organisation (CSIRO), that uses satellite imagery to identify surface water, such as floods, in the Condamine-Balonne River catchment, Queensland, Australia.

The flood monitoring system relies on MODIS optical reflectance and AMSR-E microwave brightness temperature data in combination with a Digital Elevation Model to estimate water volume. The main objective is to support regional water management, environmental monitoring and emergency response. To increase the system's daily operational reliability and accuracy, a requirement for additional data sources was identified to compensate for the limiting factors of clouds on the MODIS imagery and the coarse resolution of the AMSR-E data (8x14km).

In this presentation, the complementary characteristics of the ASAR Global Mode (GM) data for flood area detection are assessed, using the example of the 2010/2011 flood event in the Condamine-Balonne catchment. Both ASAR GM and AMSR-E sensors operate at microwave frequency and demonstrate capabilities for cloud penetration. It is anticipated that the addition of ASAR GM provides supplementary information to the flood monitoring products.

The ASAR GM microwave imagery (radar) monitors the land mass at 1 km resolution with a 2-3 day temporal resolution. Even higher resolution ($\sim$75 m) is available in Imaging Mode (IM), but with low temporal resolution (up to 35 days). A future mission Sentinel-1 is planned for 2012 that should carry on the monitoring efforts of ASAR GM on operational basis. The mission will map the European continent once every four days and the global land surface at least once every 12 days with a spatial resolution up to 5m by 20 m. The high temporal sampling rate and operational configuration make Sentinel-1 of interest for operational monitoring.