Geophysical Research Abstracts
Vol. 12, EGU2010-12202, 2010
EGU General Assembly 2010

On the potential of RST approach for a continuous monitoring of flooded areas

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In recent decades many efforts have been made in the field of remote sensing for the management of flood risk. In fact, among all natural disasters floods are probably the most frequent, causing high human suffering and large losses.
All activities designed to mitigate and manage flood risk, in order to be effective and to help civil protection agencies in limiting losses of life, human suffering and damages, need of timely information about the onset of floods, their extent, intensity and duration.
At present, sensors aboard meteorological satellites, mainly thanks to their high temporal resolution, may furnish frequent and updated images, ensuring a continuous monitoring of areas involved by a flood. In particular, optical instruments on board polar satellites, like NOAA-AVHRR (National Oceanic and Atmospheric Administration-Advanced Very High Resolution Radiometer) and more recently EOS-MODIS (Earth Observing System-Moderate Resolution Imaging Spectroradiometer) have been used for dynamic flood monitoring.
A robust methodology for satellite based flood monitoring and detection, named RST (Robust Satellite Technique), has been recently developed and implemented using data acquired by AVHRR and MODIS to identify flooded areas with reliability and timeliness. Such an approach, based on a multi-temporal analysis of co-located satellite records and an automatic change detection scheme, has been used to analyze floods occurred in different geographic areas and observational conditions. In detail, in order to identify flooded areas within the region of interest, the spectral behavior of water in the visible (VIS) and near infrared (NIR) bands of such satellite systems has been successfully exploited. Starting from these satisfactory results, the main purpose of this paper is to show, in the case of several flooding events occurred recently in different parts of the world, the achievements arising from the use of such methodology also to data acquired in the thermal infrared (TIR) region in order to guarantee a continuous monitoring of flooded areas both during night and day.