Geophysical Research Abstracts
Vol. 14, EGU2012-1389-1, 2012
EGU General Assembly 2012

WISDOM: GNSS-R based flood monitoring - Preliminary results

J. Beckheinrich, M. Semmling, G. Beyerle, J. Wickert, and H. Apel
Germany (jamila.beckheinrich@gfz-potsdam.de)

[a4paper,10pt]article [T1]fontenc [latin1]inputenc [nooneline,bf]caption times multicol amsmath amssymb [dvips]graphicx epsfig

WISDOM: GNSS-R based flood monitoring - Preliminary results

J. Beckheinrich, M. Semmling, G. Beyerle, J. Wickert, H. Apel
GFZ German Research Centre for Geosciences, Germany

Abstract

The Water Related Information System for the Sustainable Development of the Mekong Delta (WISDOM) project is a German Vietnamese initiative. Its objective is to build an information system for the Mekong Delta that support decision making, assist planning and managing of land and integrated water resources and so contributes to the today necessary adaptations due to global climate change. Indeed, climate changes have caused, among other things, an increase in sea level and thus flooding. It therefore became important to monitor the coastal areas with dense population, like on the banks of the Mekong Delta. Since earth-reflected L-band signals from the Global Navigation Satellite System (GNSS) show a high reflectivity on water and ice surfaces or wet soil, GNSS-Reflectometry (GNSS-R) could contribute to monitor the water levels and be used as a possible complement, supporting already existing monitoring instruments. Altimetry applications using this new technique derive as the name already reveals altimetric information on the reflecting surface.
The main advantage of GNSS-R is the potential to full the gap between the temporal and spatial scales of ground based direct observations and observations obtained from classical remote sensing like radar altimetry. Ground based instrumentation produces high temporal resolution data, but for a point location only, remote sensing on the other hand covers a larger spatial scale but with low temporal resolution. GNSS-R offers properties of both above mentioned methods. Actually more than 24 GPS satellites transmit the signals of opportunity, an increase in the number of signals is expected because of the ongoing modernization of the GLONASS Satellites (GLObal NAvigation Satellites System) and the upcoming of Galileo, so that simultaneous multiple height measurement within a wide field of view, thus with high time and space resolution, is possible.
The poster presents simulation studies that analyze the effects of the measurement geometry and parameters like antenna heights, satellite elevation angles, signal amplitude on the reflected signal. Furthermore, a ground-based experiment was initiated to evaluate the adapted and extended functionality of the new generation of GORS (GNSS Occultation, Reflectometry and Scatterometry) JAVAD GNSS receivers and illustrates the proof-of-concept of a GPS reflectometry measurement within the WISDOM project.