



SATFLOOD project: An integrated use of satellite remote sensing and hydraulic modeling for flood risk assessment at catchment scale in Cyprus

Diofantos Hadjimitsis (1), Dimitris Alexakis (1), Silas Michaelides (2), Adrianos Retalis (3), Ioannis Tsanis (4), Charalambos Demetriou (5), Athos Agapiou (1), Kyriacos Themistocleous (1), Stelios Pashiardis (2), and Filippos Tymvios (2)

(1) Cyprus University of Technology, Department of Civil Engineering and Geomatics, Limassol, Cyprus, (2) Meteorological Service, Nicosia, Cyprus, (3) National Observatory of Athens, Athens, Greece, (4) Department of Environmental Engineering, Technical University of Crete, Chania, Greece, (5) Water Development Department of Cyprus, Nicosia, Cyprus

Floods are considered to be one of the most devastating natural disasters worldwide. A flood can be determined as a mass of water that produces runoff on land that is not normally covered by water. Ecosystems and floods are closely related; any changes in the ecosystem, such as urbanization across the catchment's area, may trigger off a sequence of flood occurrence causes. During the last decades the integration of different geospatial methodologies such as Geographical Information Systems (GIS) and satellite remote sensing has lead to flexible and timely analysis in the scientific areas of flood mitigation, forecasting and assessment.

The main goal of the SATFLOOD project is the digital mapping of the urban sprawl in the island of Cyprus with the application of digital image analysis techniques to high spatial resolution satellite images (Quickbird, Ikonos, Landsat, etc). As a case study, the Potamia catchment area in the broader area of Nicosia–Cyprus has been selected. Advanced radar satellite images (ERS, ENVISAT) are used to record in detail the past flood zones of the local drainage network. Moreover, sophisticated algorithms concerning land use changes and urban expansion are developed. Also, different kinds of spatial and attribute data such as geological, cadastral, urban planning, aerial photos and multitemporal rainfall data are inserted and analyzed in GIS environment. Concerning hydraulics, dominant features of the studied channel such as depth, water perimeter, hydraulic radius and slope are calculated through the use of sophisticated hydraulic–hydrological models, such as HBV and MIKE-SHE. A Digital Elevation Model of high spatial resolution is created through the use of Laser Scanner and Global Positioning System (GPS). Flood risk assessment maps are constructed in GIS environment, in order to indicate the possible flood high risk zones. Through this multidisciplinary approach, the present and the past regime of Potamia catchment area is under assessment. The target is to develop predictive models that can be utilized by the local authorities as road maps for a future sustainable urban planning. The project is funded by the Cyprus Research Promotion Foundation.