Spatio-Temporal Estimation of Surface Deformation as a Factor of Relative Sea Level Change in Coastal Urban Environments and Protected Areas With the Contribution of SENTINEL 1 Images

The rise of waters can be caused both by the rise of sea level and by the subsidence of Earth surface. The combination of these two factors is the "Relative Sea Level rise".
The rise in sea level is expected to considerably aggravate the impact of coastal hazards caused in the coming years. Potential impacts are expected to be significant, for example the increase in the frequency of floods, the acceleration of coastal erosion, as well as the imminent slump of coastal areas from salty waters. The impact depends not only on the intensity and extent of coastal changes, but also on human response and adaptability to hazards including the type of exposure.
Coastal areas with very low altitudes are particularly vulnerable to the relative sea level change. In particular, for coastal urban centers the risk is increased due to high exposure. Coastal protected areas are also of great interest due to the high conservation and protection of the special characteristics of the natural environment. Land settlement on a local scale can make a significant contribution to the relative sea level rise, so it is necessary to understand the rhythm and spatial distribution of potential surface deformation in coastal areas.
The current project aims at the implementation of interferometric techniques such as PSI and SBAS based on SLC SAR images from Sentinel 1 A & B satellites. The interferometric results will be combined in a GIS environment with the rates of sea level changes derived from Altimetry, morphology (using a high resolution digital embossed model), and land use types for study area.
The scope of the project is to create a scenario of future relative sea level rise through cartographic imaging with the aim of spatially-time assessment of vulnerability of coastal areas.
The pilot coastal area of Thermaikos Gulf at northern Greece is presented which is characterized by the presence of the city of Thessaloniki (established as the second most important urban centre of Greece), an extended industrial zone, locally tourism infrastructure, an international port that constitutes the centre of merchant shipping for the Balkan countries, the Axios river delta and the smaller Gallikos river delta. Their deltaic plains, with a bird-foot shape, indicate the dominance of fluvial over marine process in forming the most active part of the Thermaikos shoreline.
The project, to which academic advisor is Prof. Issaak Parcharidis, is in progress with a duration of 15 months is co-financed by Greece and the European Union in the framework of the Operational Programme: Human Resources Development, Education and Lifelong Learning. The contribution of this research to scientific knowledge is primarily the determination of land deformation using SAR Interferometry (from 1992 till today), which combined with existing altimetry data, will allow the relative sea level to be calculated in three pilot cases: the of city of Alexandroupolis and the Evros Delta, the coastal zone of Thermaikos Gulf and the coastal area of Killini-Araxos which bring together the characteristics of interest.

E-Poster Session - 2

Wednesday, September 11, 2019

6:05 PM - 7:30 PM

Big Hall - Building 14

E-poster Presentation

Perrou T. [1] , Benekos G. [1] , Elias P. [2] , Parcharidis I. [1]

[1] Harokopio University/ Dep. of Geography, Athens, Greece

[2] NOA/IAASARS, Athens, Greece