



DESYCO: a Decision Support System for the assessment of coastal flooding and erosion risk due to climate change

Andrea Critto (1,2,3), Silvia Torresan (2,3), Alex Zabeo (2,3), Jonathan Rizzi (2,3), Valentina Gallina (1), Silvio Giove (4,2), and Antonio Marcomini (1)

(1) Department of Environmental Sciences, Informatics and Statistics, University Ca' Foscari Venice, Venice, Italy (critto@unive.it), (2) Euro-Mediterranean Centre for Climate Change, Venice, Italy (torresan@unive.it), (3) Consorzio Venezia Ricerche, Venice, Italy (alex.zabeo@gmail.com), (4) Department of applied mathematics, University Ca' Foscari Venice, Venice, Italy (sgiove@unive.it)

Sea-level rise, changes in storms and wave climate as a consequence of global climate change are expected to increase the size and magnitude of flooded and eroding coastal areas, thus determining profound impacts on coastal communities and ecosystems.

DESYCO is a GIS-based DEcision support SYstem for COastal climate change impact assessment which aims at assessing climate change impacts on coastal areas at the regional scale in order to provide policy planners and decision makers with appropriate information to define adaptation strategies. It is based on a Regional Risk Assessment (RRA) methodology that implements MultiCriteria Decision Analysis (MCDA) techniques in order to rank coastal areas and targets at risk in the considered region. The proposed methodology integrates the outputs of multi-scale climate, circulation, morphodynamic and biogeochemical models in order to represent the exposure to climate change hazards (e.g. sea level rise and storm surge flooding, coastal erosion, water quality changes) and evaluates the vulnerability of coastal communities and ecosystems analysing site-specific environmental and socio-economic features (e.g. land use, geomorphology, vegetation cover, population density). The main output of DESYCO include exposure, vulnerability and risk maps that allow the visualization of potential impact areas, the prioritization of vulnerable coastal receptors and the identification of areas and targets at higher risk in the coastal territory. All the outputs are GIS-based raster maps that allow to transfer relevant information about the potential implications of climate change in coastal areas to politicians and stakeholders, with the ultimate aim to underpin a sustainable management of coastal resources and reinforce the planning of adaptation actions. DESYCO was developed within the Euro-Mediterranean Centre for Climate Change (www.cmcc.it) and was applied to study coastal flooding and erosion risk due to climate change in the coastal area of the North Adriatic Sea (Italy), including the Po river Delta and the Venice Lagoon. The main components and functionalities of DESYCO and the main results of its application to the North Adriatic case study are here presented and discussed.