Climate change impacts and adaptation strategie

Climate Change Impacts On Marine Water Quality In The Adriatic Sea

Jonathan Rizzi [(1)], Silvia Torresan [(2)], Alex Zabeo [(2,3)], Andrea Critto [(2,4)], Daniele Brigolin [(1,5)], Sandro Carniel [(6)], Roberto Pastres [(1,7)] and Antonio Marcomini [(1,8)]

(1) Department of Environmental Sciences, Informatics and Statistics, University Ca' Foscari Venice, 30123 Venice, Italy
Telephone: +39-0412348629 Email: jonathan.rizzi@unive.it
(2) Euro-Mediterranean Centre for Climate Change , 30123 Venice, Italy
Telephone: +39-0412348629 Email: torresan@unive.it
(3) Telephone: +39-0412348629 Email: alex.zabeo@unive.it
(4) Telephone: +39-0412348629 Email: critto@unive.it
(5) Telephone: +39-041 234 8674 Email: brigo@unive.it
(6) Institute of Marine Science - National Research Council, 30122 Venice, Italy
Telephone: +39 041 2404742 Email: sandro.carniel@ismar.cnr.it
(7) Telephone: +39-041 234 8674 Email: pastres@unive.it
(8) Telephone: +39-0412348548 Email: marcom@unive.it

Global climate change is likely to pose additional pressures on coastal ecosystems by accelerating sea level rise, increasing storminess flooding episodes, erosional processes and water quality variations. In particular, climate change can induce variations in water biogeochemical and physical parameters (e.g. primary production, pH, salinity) that may exceed the thresholds of ecosystem tolerance, and thus lead to aquatic ecosystem degradation. In order to analyze the potential consequences of climate change on marine water quality and evaluate the related impacts on coastal receptors (e.g. marine biological systems and aquaculture), a Regional Risk Assessment (RRA) methodology was developed and applied to the marine water bodies of the Northern Adriatic coast (Veneto and Friuli Venezia regions, Italy). The methodology has been implemented within the DEcision support SYstem for COastal climate change impact assessment (DESYCO). Climate induced hazards were analyzed by means of regional models that provided information about the main marine water biogeochemical and physical parameters (i.e. primary production, macronutrients, dissolved oxygen, pH, salinity and temperature) under future climate change scenarios (i.e. regional climate projections). Site-specific environmental and socio-economic indicators (e.g. Evenness index, presence and extension of seagrasses, presence of fishing prohibited areas) and biogeochemical and physical parameters derived from numerical models implemented in future scenario (2070-2100), were aggregated in the RRA methodology in order to develop exposure, susceptibility, risk and damage maps that identify and prioritize hot-spot areas and vulnerable targets at the regional scale. The methodology uses Geographic Information Systems to manage, process, analyse, and visualize data and employs Multi-Criteria Decision Analysis to integrate stakeholders preferences and experts judgments into the

analysis, in order to obtain a relative risk index in the considered region. The final outputs are represented by GIS-based risk maps which support the communication of the potential consequences of water quality variations to decision makers and stakeholders. Moreover, these maps allow to establish relative priorities for intervention, to identify hot-spot areas and to provide a basis for the definition of adaptation and management strategies. The contribution presents the main results of the application of the RRA in the marine water bodies of the Northern Adriatic area.