



A multi-disciplinary approach to evaluate vulnerability and risks of pluvial floods under changing climate: the case study of the municipality of Venice (Italy).

Anna Sperotto (1,2), Silvia Torresan (1,2), Valentina Gallina (1,2), Erika Coppola (3), Andrea Critto (1,2), Antonio Marcomini (1,2)

(1) Department of Environmental Sciences, Informatics and Statistics, University Ca' Foscari Venice, Venice, Italy. (anna.sperotto@unive.it), (2) Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Lecce, Italy. (silvia.torresan@cmcc.it), (3) International Centre for Theoretical Physic (ICTP), Trieste, Italy.

Global climate change is expected to affect the intensity and frequency of extreme events (e.g. heat waves, drought, heavy precipitations events) leading to increasing natural disasters and damaging events (e.g. storms, pluvial floods and coastal flooding) worldwide. Especially in urban areas, disasters risks can be exacerbated by changes in exposure and vulnerability patterns (i.e. urbanization, population growth) and should be addressed by adopting a multi-disciplinary approach. A Regional Risk Assessment (RRA) methodology integrating climate and environmental sciences with bottom-up participative processes was developed and applied to the urban territory of the municipality of Venice in order to evaluate the potential consequences of climate change on pluvial flood risk in urban areas. Based on the consecutive analysis of hazard, exposure, vulnerability and risks, the RRA methodology is a screening risk tool to identify and prioritize major elements at risk (e.g. residential, commercial areas and infrastructures) and to localize sub-areas that are more likely to be affected by flood risk due to heavy precipitation events, in the future scenario (2041-2050). From the early stages of its development and application, the RRA followed a bottom-up approach to select and score site-specific vulnerability factors (e.g. slope, permeability of the soil, past flooded areas) and to consider the requests and perspectives of local stakeholders of the North Adriatic region, by means of interactive workshops, surveys and discussions. The main outputs of the assessment are risk and vulnerability maps and statistics aimed at increasing awareness about the potential effect of climate change on pluvial flood risks and at identifying hot-spot areas where future adaptation actions should be required to decrease physical-environmental vulnerabilities or building resilience and coping capacity of human society to climate change. The overall risk assessment methodology and the results of its application to the territory of the municipality of Venice will be here presented and discussed.