Geophysical Research Abstracts
Vol. 18, EGU2016-6520-1, 2016
EGU General Assembly 2016

Land-use, climate and floods dynamics in Northeastern Italy (Veneto)

Giulia Sofia, Giulia Roder, and Paolo Tarolli
University of Padova, Department of Land, Environment, Agriculture and Forestry, Legnaro (PD), Italy (giulia.sofia@unipd.it)

The Veneto Region in North-eastern Italy is today one of the most extensive inhabited and economically competitive urban landscapes in Europe, where infrastructure transformations have been recently accompanied by a number of serious hydraulic dysfunctions. Major concerns arise for frequent rainfall events which can couple with land-use changes with consequences on flooding (Sofia et al. 2014). The aim of this work is to propose a preliminary long-term, region-scale analysis of land-use, rainfall regime and flood dynamics in the region. To investigate the changes in floods, we considered the events registered in Veneto starting from the ∼1900 to the year 2000 (Guzzetti and Tonelli, 2004). For this time frame, we analyzed trends in the number of flooded locations, flood events, as well as trends in the number of flooding days. We then investigated the accumulated percentages of flooded sites contributed by the accumulated percentage of flooding days in each year. The idea is to investigate, for the given period, the presence of drastic changes in the curve steepness (knickpoints), implying that less days of flood contribute to a notable increase in the percentage of the flooded locations. For the land-use dynamics we considered the urban area extent for three timeframes in the last century (60s, 90s, 2000s). From these, we created area cartograms in which the sizes of each drainage catchment in Veneto was deformed in proportion to the urban areas in each municipality, as well as in proportion to changes in soil sealing, and we related these maps to the number of flooded locations. For the climatic characterization, we considered a measure of the aggressivity and irregularity of the rainfall regime, to quantify the incidence of intense rainfall events on the yearly amount of precipitation. In spite of the limitations due to the different awareness of the impact of floods on the territory during the years, the floods analysis shows some recent knickpoints, indicating a drastic increase of flooded sites despite a small increase of the number of days of flood. We then related these knickpoints to the land-use datasets, and to the climatic analysis. The preliminary results show that climatic inputs might act concomitantly to land-use changes, contributing to a large number of locations showing hydraulic criticalities and being involved in floods.

Guzzetti, F. and Tonelli, G. (2004). Information system on hydrological and geomorphological catastrophes in Italy (SICI): a tool for managing landslide and flood hazards, Nat. Hazards Earth Syst. Sci., 4, 213-232, doi:10.5194/nhess-4-213-2004, 2004.
Sofia, G., Prosdocimi, M., Dalla Fontana, G., Tarolli, P. (2014). Evidences and effects of changes in the artificial drainage network during the past half-century: a case study in the Veneto floodplain (Italy), Anthropocene, 6, 48-62, doi:10.1016/j.ancene.2014.06.005.