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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Geo-hydrological hazard and urban development in the Mediterranean area: an example from Genoa City (Italy)" *by* F. Faccini et al.

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First of all, thank you very much for the useful discussions and for all the advices made and designed to improve our scientific paper, but we believe that the objectives and in particular the complexity of the manuscript have not been fully understood. We have replied, point by point, all the notes of the referees, both general both specific level, trying to expose our point of view. We want to underline once again that our paper is not a paper on the climatology of Genoa, which have already been studied by many authors until 2001. The goal of the article is to evidence at the scientific community the reality of the floods in Genoa: we want to underline the disastrous effects on the

ground, as shown in the title of the manuscript: "Geo-hydrological hazard and urban development in the Mediterranean area: an example from Genoa City (Italy)". The paper has been prepared on the basis of research that since 2011 the group of authors is conducting about geo-hydrological risks in the North-West of Italy. Our interest has had a quick boost after the umpteenth flooding of Genoa: those of 9 October 2014 (famous as "Shame flood") and the subsequent November 15, 2014. The distribution of the floodings for period of fifty years shown in Figure 12, we believe it's more meaningful to define Genoa a great international case for geo-hydrological risk. The tables 2, 4 and 5 show all Genoan floods from the nineteenth century and in our opinion speech for themselves. We have therefore analyzed briefly the geo-hydrological hazards caused by heavy rains and the vulnerability of the Genoa's area, as a first contribution to knowledge: from this one we are starting to write more and more specific manuscripts about geo-hydrological risk factors. In fact we are studying both climatological aspects of the Genoa metropolitan area (there are several gauges that measure rainfall and air temperature since the beginning of the last century), in collaboration with experts of the specific sector and the aspects of land vulnerability and urban sprawl. In this case we are focusing on some specific "key-basins", as the Bisagno Stream and Chiaravagna Creek, always in the metropolitan area of Genoa, with attention to the study of changes in land use and anthropogenic change over the last 200 years, thanks to the use of old maps of the entire catchment. The paper submitted is therefore the product of a synthesis of our great effort to illustrate on the one hand the "rain history" that characterizes flood events of the city, on the other hand the increased vulnerability of the territory. If floods are historically determined by the depression of the Gulf of Genoa, known as the "Genoa Low", the last events of the Third Millennium highlight rains much more concentrated in time and space; this aspect was discussed in section 4, where we compared and discussed the six severe flood events of the past 45 years. The good series thermo-pluviometric of Genoa University was taken like example because it allows observations of nearly 200 years; the average annual temperature of the air shows a progressive increase, while rainy days show a gradual decrease. There is

no evidence whether the recent increase in flooding is linked mainly to changes in the rainfall regime or to urban sprawl in areas clearly exposed to risk and human-induced changes in the territory. For this reason we first carried out a multi-temporal maps comparison that allowed us to extrapolate qualitative data (urbanization and changes in land use) and quantitative (section width of the riverbed at key points). In the discussion and in the conclusions we have duly put in evidence that the factor on which it will be necessary to focus for a effective risk reduction is mainly to land use management. Finally, we regret not having included our research within the project "Flood change" in cities, one of the goals of the new IAHS decade "Panta Rhei", but in spite internet... we did not know this initiative. We await some instructions from the Associate Editor.

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