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Climate change impact on flood hazard in a central Portugal alluvial plain

Author(s): Sandra Mourato; Paulo Fernandez; Luisa Pereira; Madalena Moreira; Cristina Andrade

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Paper Abstract

This paper presents the flood hazard projections under climate change scenarios, for a period between 2021 and 2050, in the Lis river alluvial plain located at the Centre of Portugal. Furthermore, the paper also aim at understanding the hydrological processes in the study area by coupling a hydrological (HEC – HMS) and hydrodynamic model (HEC – RAS). The Lis river basin is becoming more favourable to the production of high water flows, due to the increase of impervious areas and deforestation which have reduced the time concentration on the river basin, empowering flood events with high flood peaks and water flood levels with serious consequences for the facilities (pumping stations, centre pivots) and infrastructures (irrigation networks and roads) in the alluvial plain. The methodology was developed using the daily outputs of the ALADIN and HIRHAM from the EURO-CORDEX project with a 12.5 km horizontal resolution for the RCP4.5 scenario and coupled calibrated hydrological–hydrodynamic models. The results indicated that the annual rainfall would vary for the ALADIN model between a decrease of -24% and an increase of 22% and for the HIRHAM model between a decrease of -85% and an increase of 24%. The results also projected increases in higher runoffs and water level under future climate change scenarios. The HIRHAM model was considered unsuitable for flood impact assessment.

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