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Flood risk mitigation benefits: a case study in Florence, Italy

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Justifying the investment of public resources in flood hazard mitigation works requires the quantification of flood risk in absence of measures and risk in presence of mitigation works. In this work, current inundation scenarios are compared to future scenarios with operational mitigation works in terms of flood losses. A single-building scale is adopted to estimate direct tangible flood damages to several building classes (e.g. residential, industrial, commercial, etc.) and respective contents, exploiting various sources of public open data in a GIS environment. The RASOR platform enables flood damage assessment through the selection of libraries of stage-damage curves. Recovery and replacement costs are estimated based on insurance data, market values and socio-economic proxies. The methodology is applied to the case study of Florence (Italy), a large (70 km2) and densely urbanized area, where a system of retention basins upstream of the city in the Arno river catchment is under construction to reduce flood risk. According to the estimated annual expected damage (EAD) current flood risk in the study area is just slightly reduced with the retention basins, although the hydraulic works are cost effective. Therefore, a significant residual risk has to be managed.