Macro-economic assessment of flood risk in Italy under current and future climate

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This paper explores an integrated methodology for assessing direct and indirect costs of fluvial flooding to estimate current and future fluvial flood risk in Italy. Our methodology combines a Geographic Information System spatial approach, with a general economic equilibrium approach using a downscaled modified version of a Computable General Equilibrium model at NUTS2 scale. Given the level of uncertainty in the behavior of disaster-affected economies, the simulation considers a wide range of business recovery periods. We calculate expected annual losses for each NUTS2 region, and exceedence probability curves to determine probable maximum losses. Given a certain acceptable level of risk, we describe the conditions of flood protection and business recovery periods under which losses are contained within this limit. Because of the difference between direct costs, which are an overestimation of stock losses, and indirect costs, which represent the macro-economic effects, our results have different policy meanings. While the former is relevant for post-disaster recovery, the latter is more relevant for public policy issues, particularly for cost-benefit analysis and resilience assessment.