



Increasing impacts of climate extremes on critical infrastructures in Europe

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The projected increases in exposure to multiple climate hazards in many regions of Europe, emphasize the relevance of a multi-hazard risk assessment to comprehensively quantify potential impacts of climate change and develop suitable adaptation strategies. In this context, quantifying the future impacts of climatic extremes on critical infrastructures is crucial due to their key role for human wellbeing and their effects on the overall economy. Critical infrastructures describe the existing assets and systems that are essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact as a result of the failure to maintain those functions. We assess the direct damages of heat and cold waves, river and coastal flooding, droughts, wildfires and windstorms to energy, transport, industry and social infrastructures in Europe along the 21st century. The methodology integrates in a coherent framework climate hazard, exposure and vulnerability components. Overall damage is expected to rise up to 38 billion €/yr, ten time-folds the current climate damage, with drastic variations in risk scenarios. Exemplificative are drought and heat-related damages that could represent 70% of the overall climate damage in 2080s versus the current 12%. Many regions, prominently Southern Europe, will likely suffer multiple stresses and systematic infrastructure failures due to climate extremes if no suitable adaptation measures will be taken.