The role of event attribution in compound flood-related displacement and anthropogenic climate change

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Compound events lead to substantial risks to societies around the globe. As climate change is increasingly exacerbating the intensity and frequency of many hazards in vulnerable regions, ex situ responses to climate change including human mobility and displacement are starkly moving into the spotlight. Whilst proactive migration is often used as an adaptation response to the impact of climate and weather events, reactive migration following unprecedented climatic shocks is often involuntarily and can seriously disrupt livelihoods and undermine human security. The extent to which human mobility (here, measured by internal displacement) can be attributed to extreme weather and compound events and in turn, whether and to what extent extreme weather events and consequently human mobility can be attributed to anthropogenic climate change, has been largely unexplored.

Applying a framework based on probabilistic event attribution (PEA) of extreme weather events, we investigate, for the first time, human mobility responses attributed to anthropogenic climate change along a causal chain from anthropogenic climate change and changing frequencies and intensities of extreme weather and climate events to human mobility outcomes. We use the April 2020 extreme precipitation which lead to flooding and associated displacement in Somalia as a feasibility study to present the state of the art of this method. Our attribution model investigates two locations: First, we attribute extreme precipitation at the origin region of the extreme event to then attribute the resulting flood event in the displacement impact region. Event though the analysis shows no attributable link to anthropogenic climate change, our method advances the field of climate impact research regarding statistical approaches, model development and evaluation. For our feasibility study, we also find that sparsity of climate observations reveal one of many reasons for a lack of a climate change signal, which suggests an application of our model to other climate event contexts is needed to further test our method.