

Risk KAN Working Group Compound Events and Impacts

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Rationale

Multi-risks are an emerging theme within the Climate- and Risk Management community; the amplification of risks due to the compounding effects of multiple hazards happening simultaneously or sequentially. Risks can also derive from attributes of the societal or environmental response to multiple unrelated events which, sometimes at a significant time lag, result in the straining of resources or the disruption of markets. Often, compound events are studied within the confines of a single field (e.g. multiple hydrological threats from a tropical cyclone) or across adjacent fields (e.g. heat waves and droughts). This status quo precludes the possibility of disentangling impacts that compound across a broader range of societal sectors and elements of the climate system, an objective which is challenging but absolutely essential for informing business, policy, emergency management, and climate-change adaptation. In practice, decisions related to compound extreme events often hinge on local infrastructure or political considerations within the societal context, so identifying and incorporating such constraints when producing climate information is crucial for its usefulness.

Aims

The aim of this working group is to bring together multidisciplinary insights on compound events' physical characteristics, risks, and impacts. We also aim to address the possible future evolution of hazards under climate change, and take into account the dynamic nature of vulnerability and exposure for health, economic, or environmental impacts. In addition, serious efforts to entrain decision-makers in the design of extreme-event-impact research are necessary, spanning fields including infrastructure, agriculture, ecosystem, and water management. The international sharing of results and best practices that derive

from such projects, both case studies and efforts that are more systematic in nature, will be important in developing efficient methods for tackling these very complex problems.

Consequently, solutions to directly address risks from compound events under climate and socio-economic changes, whether by adaptation and/or risk-management techniques, need to be developed to translate hard-won insights to the solutions space. In this context we will consciously aim to build elements of a broad conceptual and methodological framework to detect, quantify, and understand changes in compound-event impacts, at a time when the signal of many variables has not yet emerged as a significant trend when considered univariately, whether due to the incompleteness of the observational record or the rarity of the most extreme events. In other words, we ask if there are ways in which the impacts structure has changed in the past several decades so as to amplify risk beyond what would be expected from conducting a traditional univariate, physical-system-focused risk analysis.

Activities

A first action envisioned to promote the exchange of different perspectives on compound events in an inclusive, carbon-free manner is a series of webinars that will take place on a monthly-to-semimonthly basis. Upcoming webinars will be announced on the [Risk-KAN events page](#) and details on how to participate are shared via the mailing list, for which the sign-up form is at https://docs.google.com/spreadsheets/d/1Z4tkZRZzhUSkxy8m_x-eVdh4MTFtMLanLudxw_GHnWs/edit#gid=0

A newsletter is also planned containing relevant research papers authored by group members (approximately 140 members at present).

In-person networking events will also take place in association with major conferences such as AGU and EGU, when such things are again possible.