RiskKAN Working Group: *Compound Events*

Working Group Leads

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Rationale

The climate and risk-management community has recently been devoting increased attention to cases where multiple weather/climate hazards or episodes, happening simultaneously or sequentially, amplify total hazard, risk, and impact. These compound events can also derive from the societal or environmental response to combinations of hazards, sometimes at a significant time lag. As compound events often span multiple hazard types and locations and cause complex impacts to communities, ecosystems, and economies, connecting scientific disciplines at an international level is critical for furthering our collective understanding. This wide view has the potential to improve how researchers study impacts that compound across many societal sectors and elements of the climate system, an objective essential for informing business, policy, emergency management, and climate-change-adaptation decisions that often hinge on socio-ecological context.

Recent advances have been multifarious but concentrated in certain channels, and many important questions remain unanswered, in part due to natural self-segregation tendencies that inhibit scientists from discovering the latest work — especially in adjacent disciplines or at distant institutions — that may inspire new directions. With continuing growth in computing power and data resolution, the bottleneck in effective compound-event analysis lies more and more in innovative concepts, techniques, and novel applications of datasets, yet there are few ongoing forums to facilitate these exchanges and the relationships that underpin them.

Aims

The aim of the compound events working group is to create and sustain an international community with an interest in weather/climate compound events, including their characteristics, risks, and impacts. Our focus is mostly on the physical science of high-impact compound events, but we encourage contributions and insights from all fields, including but not limited to policy, social science, infrastructure, emergency management, and insurance. We also aim to host discussions around the possible future evolution of hazards and hazard interactions under climate change, and to take into account the dynamic nature of vulnerability and exposure for health, economic, and environmental impacts.

Cross-cutting sharing of scientific outcomes and best practices, from systematic surveys as well as case studies, would greatly benefit the development of efficient methods for tackling the challenges that compound events pose. Additionally, solutions to address evolving risks from compound events under climate and socio-economic changes, whether by adaptation and/or risk-management techniques, must be developed to translate hard-won insights to the solutions space. As a network, and in dialogue with related initiatives, we aim to build elements of this framework, at a time when the univariate trend signal of many

variables has not yet emerged as significant, whether due to the incompleteness of the observational record or the rarity of the most extreme values. We aim to bring together multidisciplinary perspectives and critical thinking about amplification of climate-system risk, and its high-dimensional characteristics, to spur further progress and to build new productive directions for compound-events research.

Activities

The working group's most regular and longstanding activity is a series of webinars that take place approximately every two months. We also produce, through curation and crowdsourcing, a newsletter containing relevant journal articles, newsworthy events, and conferences and workshops of interest. Another keystone is the organization of social gatherings — in-person during major conferences such as AGU and EGU, as well as virtually. Beginning in 2025, we envision creating a guide to dataset and code resources of specific value for the compound-events research community; supporting early-career training opportunities such as summer schools and proposal development; and thinking strategically about how compound-events research fits within the international science landscape, including at the conceptual level and prosaically in terms of funding for capacity-building activities.

Logistically, we will take a team approach. Co-leads will coordinate overall efforts, in consultation with active members, who will lead, advise, and/or assist in the organization of specific activities according to interest and availability.

Our overarching aim is to serve as a helpful forum for professional socialization and advancement for the compound-events community, independent of researchers' discipline, physical location, or career stage.