



NATIONAL SCIENCE FOUNDATION  
2415 EISENHOWER AVENUE  
ALEXANDRIA, VIRGINIA 22314

**NSF 23-125**

## Dear Colleague Letter: Extreme, Compound, and Cascading Hazards (EC<sub>2</sub>H)

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June 29, 2023

Dear Colleagues:

Accelerated climate and environmental change, and increased solar activity, can result in a strengthening or increase in frequency of hazards that, along with ongoing solid earth processes, exact a heavy toll on natural and human systems. The National Science Foundation's (NSF) Directorate for Geosciences (GEO) is interested in supporting fundamental research to inform adaptive and/or resilient responses to natural hazards and disasters<sup>1</sup>, such as hurricanes, marine and atmospheric heat waves, marine and terrestrial ecosystem shifts, droughts, floods, wildfires, landslides, earthquakes, volcanic eruptions, tsunamis, permafrost melting, ice sheet and glacier loss, and space weather events.

This Dear Colleague Letter (DCL) encourages submission of proposals that advance our fundamental understanding of natural disasters, extreme events, and other natural hazards. The focus is on: 1) exploring system-of-systems approaches to understanding drivers of extreme events (e.g., Sun-Earth or land-ocean-atmosphere-ice interactions); 2) cascading or compound hazards (e.g., submarine landslide-triggered tsunamis); 3) interactions between longer-term trends and extreme events (e.g., climate change and wildfires); and 4) processes occurring at multiple scales ranging from local to regional to planetary, and at time scales that incorporate long-term changes in the characteristics of short-term extreme events. Investigators are urged to involve multiple disciplines and stakeholders and include the participation of the full spectrum of diverse talents in STEM (see National Science Board Vision 2030 Report<sup>2</sup>). Projects must also demonstrate a clear societal benefit. This DCL encourages projects that rely on existing NSF/GEO facilities and/or data resources, plan for new research infrastructure, and/or pursue partnerships with stakeholders to accelerate innovation and the development of new technologies and/or data sets.

Proposals are strongly encouraged in areas of research that align with programs within two or more GEO units (AGS, EAR, OCE, OPP). Interdisciplinary activities that bring together the

geoscience community such as, workshops<sup>3</sup>, research networks, or planning proposals are also welcome. Any of the mechanisms available in the [NSF Proposal & Award Policies & Procedures Guide](#) (PAPPG) may be used for submission of proposals to relevant programs within GEO units in accordance with program guidelines. To receive feedback on whether a proposal idea is responsive to this DCL, it is recommended that PIs submit a Concept Outline via the NSF ProSPCT tool (<https://suitability.nsf.gov/s/>) or email [geohazards@nsf.gov](mailto:geohazards@nsf.gov).

This DCL does not constitute a new competition or program and is subject to availability of funds.

Participating GEO Divisions/Offices:

Division of Atmospheric and Geospace Sciences (AGS)

Division of Earth Sciences (EAR)

Division of Ocean Sciences (OCE)

Office of Polar Programs (OPP)

Sincerely,

Alexandra R. Isern

Assistant Director

Directorate for Geosciences

## REFERENCES:

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1. National Academies of Sciences, Engineering, and Medicine. 2022. Next Generation Earth Systems Science at the National Science Foundation. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26042>
2. National Science Board Vision 2030. Report #: NSB-2020-15. <https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf>
3. Also referred to as conferences in PAPPG Chapter II.F.9.