SMD Earth Sciences Division

NASA SMD Earth Science Division (ESD) Research Topics to Address Earth System response to disasters

SMD requests that EPSCoR include research opportunities focused on understanding the response of the Earth System to disasters. The ESD, in order to address its strategic goals and core near-term objectives, regularly collects data on unforeseen events or events of unique and novel character (scale, extent, complexity or impact) in the Earth system using remote sensing measurements from on-orbit satellites and airborne platforms. Such events may include wild fires, hurricanes and tropical storms, volcanic eruptions, floods, earthquakes, tsunamis, landslides, environmental emissions, pollution and toxic releases, oil spills, harmful algal blooms, coral bleaching events, crop failure, energy and transport disruption, and other large-scale, extraordinary, events. These data are used to address specific science questions in response to the event; improve the understanding related to natural or anthropogenic extreme events or similar unanticipated or unpredictable disasters and cascading impacts; and/or advance application readiness, disaster risk management, and disaster resilience. However, there is vast and untapped potential in science and applications of those data even after the event has long passed, which can significantly advance the understanding of the Earth System, and provide societal benefits.

Proposals seeking to respond to this EPSCOR Research Topic should focus on utilizing existing data (including outputs and predictive capabilities from models associated NASA products) relating to past unforeseen events or events of unique and novel character to further the understanding of such events within the Earth System, advancing the readiness of application science, and/or provide advancements in risk management and disaster resilience. A description of NASA's fleet of Earth observing satellites and sensors can be found at https://science.nasa.gov/missions-page/, with more details about related airborne missions at https://airbornescience.nasa.gov/. Information about data access and discovery can be found at https://earthdata.nasa.gov/.

Instrument-specific airborne data in addition can be found through the different airborne data sites; examples suitable to this call include:

AVIRIS (Airborne Visible InfraRed Imaging Spectrometer): https://aviris.jpl.nasa.gov/data/get_aviris_data.html

UAVSAR (Uninhabited Aerial Vehicle Synthetic Aperture Radar): https://www.asf.alaska.edu/sar-data/uavsar/

G-LiHT (Goddard's LiDAR, Hyperspectral & Thermal Imager): https://gliht.gsfc.nasa.gov/
Please check the above mentioned websites to see if observational data are available for the time period and area of interest.

The proposals should include clear statements as to what the significance and impact of proposed work will be, scientifically and/or to a stakeholder community, and a plan on dissemination and

sharing of data, products, and tools where applicable. This research opportunity seeks to take advantage of the large quantities of data that NASA has already collected over the years in response to unforeseen or unpredictable Earth system events. Scientists cannot propose to collect new airborne or satellite observations; we may consider collection of limited and targeted field data on a case by case basis.

Examples of potential topics suitable for the EPSCOR Earth System response to natural disasters include:

1. Oil spills (e.g. improved mitigation strategies; further understanding of oil distribution through time; comparison between spills in similar settings)
2. Hurricanes (e.g. impacts on coastal communities/ecosystems and subsequent recovery; comparison of storm types and ecosystem damage)
3. Wildfires (linkages of various wildfires (type, extent) to climatic conditions; societal impacts; recurrence and ecosystem response)
4. Harmful algal blooms (e.g. impacts on air/water quality; comparison of climatic conditions for different blooms; comparison of blooms across regions)
5. Volcanic eruptions (e.g. atmospheric composition/distribution of plumes of same volcano through time)