GROUP ON EARTH OBSERVATIONS

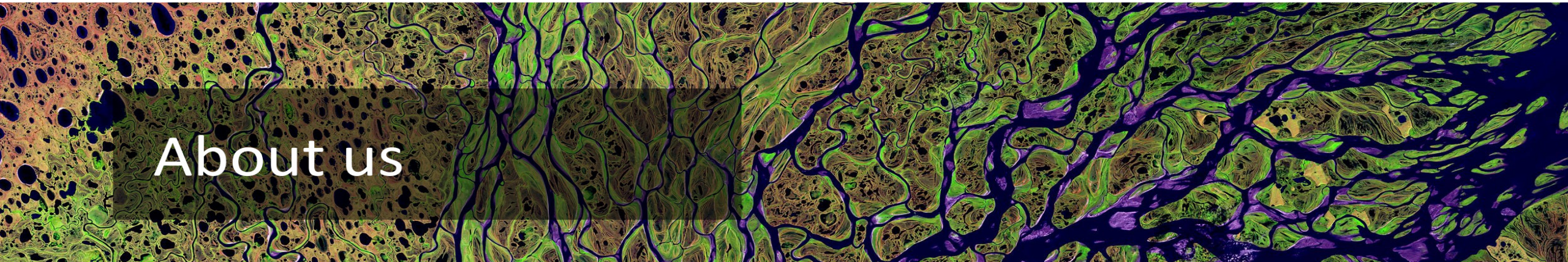
GEO Disaster Risk Reduction WG

CEOS WGDisasters-17

David Borges
GEO DRR WG Co-Chair
Associate Program Manager
NASA Applied Sciences Disasters Program

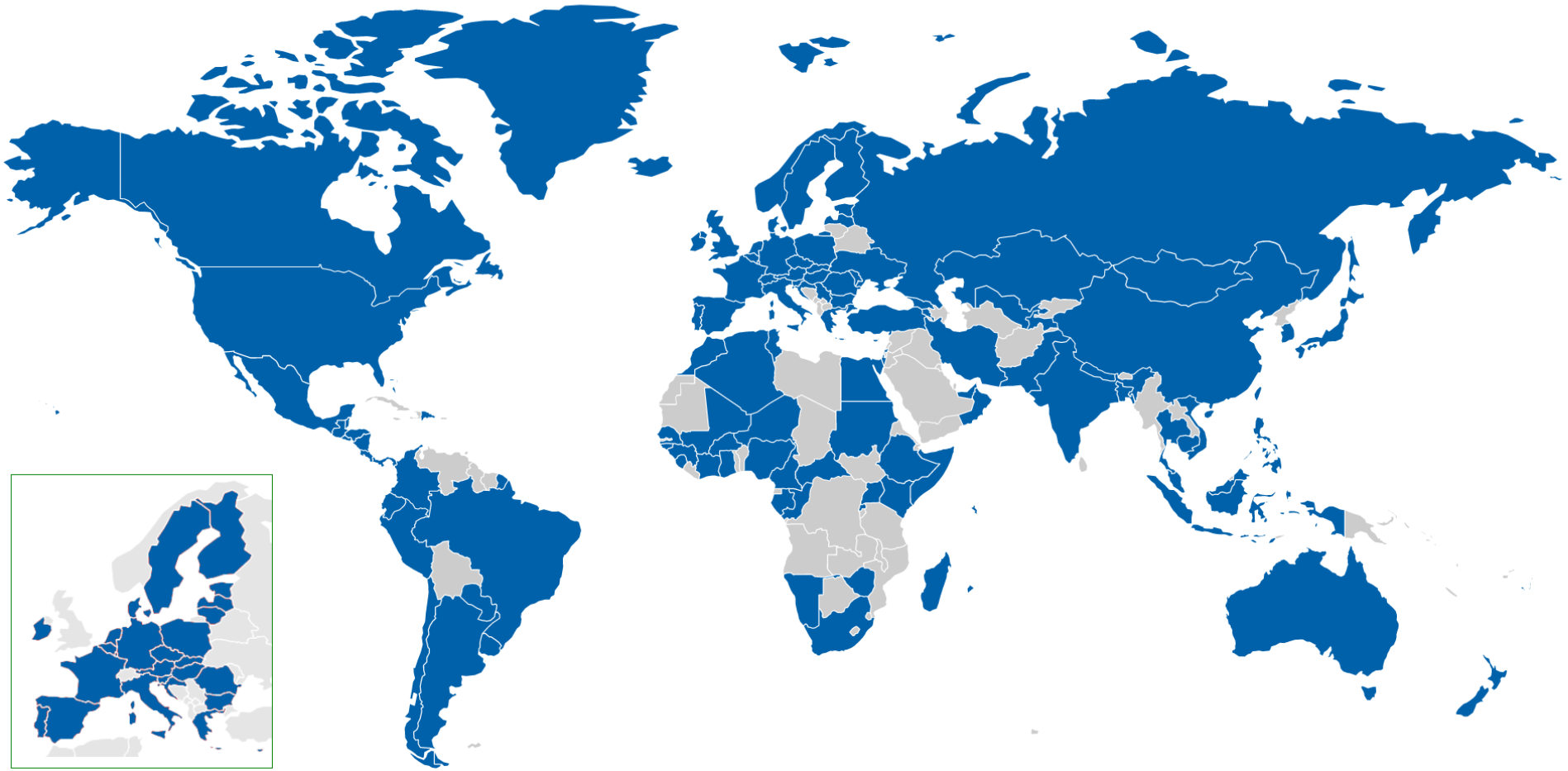
Group on Earth Observations (GEO)

GEO is an international partnership of more than 100 national governments, 100 Participating Organizations and multiple Associate members working towards a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.



GEO Member Map for the year 2021

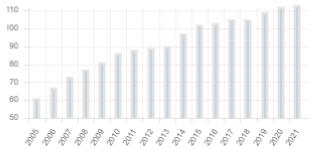
(Use slider under the map to change the year)



Number of Members (2021)

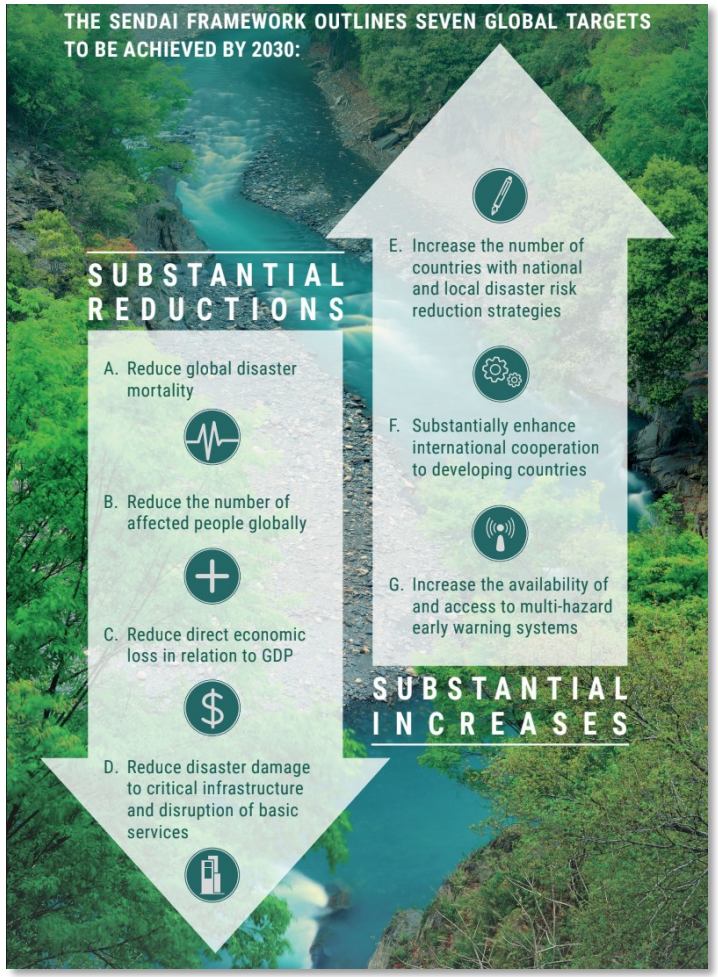
Africa:	30
Americas:	20
Asia/Oceania:	22
C.I.S.:	6
Europe:	35
Total:	113

Number of Members by year

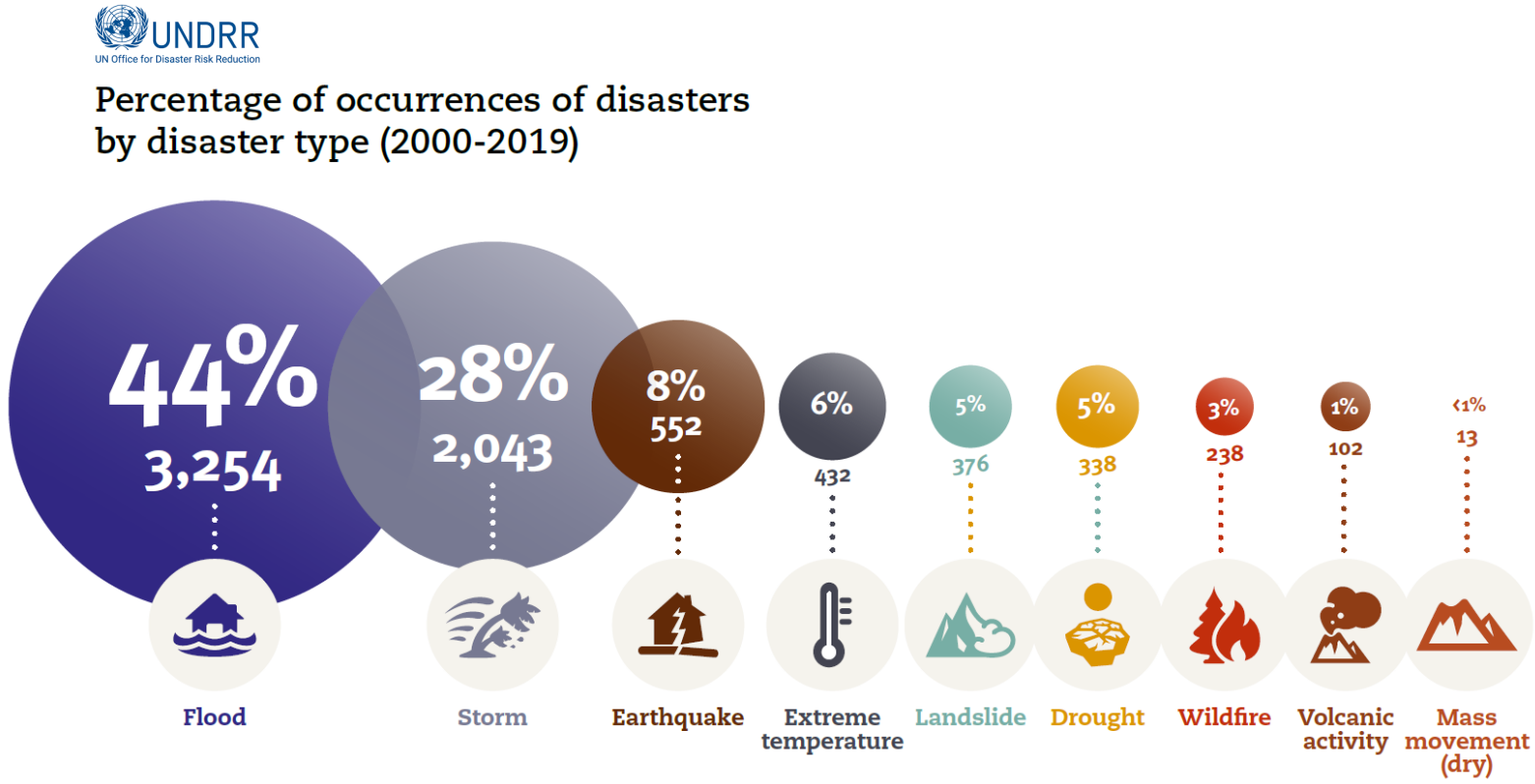


GEO GROUP ON EARTH OBSERVATIONS

UNDRR Sendai Framework for Disaster Risk Reduction 2015-2030



Promote and increase use of Earth observations to address disaster risk reduction efforts and achieve Global Targets.



Credit: Human Cost of Disasters, UNDRR

2020 – 2022 GEO Work Programme

GEO Flagships

GEO Biodiversity Observation Network GEO BON	GEO Global Agricultural Monitoring GEOGLAM	Global Forest Observation Initiative GFOI	Global Observation System for Mercury GOS4M

GEO Initiatives

AquaWatch AQUAWATCH	Data Access for Risk Management GEO-DARMA	Data Integration and Analysis System DIAS	Earth Observations for Ecosystem Accounting EO4EA	Earth Observations for Health EO4HEALTH	Earth Observations for the Sustainable Development Goals EO4SDG
GEO Capacity Building in North Africa, Middle East, Balkans and Black Sea Region GEO-CRADLE	GEO Global Water Sustainability GEOGLOWS	GEO Human Planet HUMAN-PLANET	GEO Land Degradation Neutrality GEO-LDN	GEO Vision for Energy GEO-VENER	GEO Wetlands GEO-WETLANDS
Geohazard Supersites and Natural Laboratories GSNL	Global Drought Information System GDIS	Global Network for Observations and Information in Mountain Environments GEO-MOUNTAINS	Global Observation System for Persistent Organic Pollutants GOS4POPS	Global Urban Observation and Information GUOI	Global Wildfire Information System GWIS
Oceans and Society: Blue Planet BLUE-PLANET					

GEO Community Activities

Advancing Communication Infrastructure and Services ACIS	Arctic GEOSS ARCTIC-GEOSS	Chinese High-resolution Satellite Data Resources CSDR	Climate Observation, Simulation and Impacts CLIMATE-OBS	Copernicus Atmosphere Monitoring Service CAMS	Copernicus Climate Change Service C3S
Digital Earth Africa DE-AFRICA	Earth Observation and Copernicus in support of Sendai Monitoring EO4SENDAI-MONITORING	Earth Observation Industrial Innovation Platform for Sustainable Development EO-IIP	Earth Observations for Disaster Risk Management EO4DRM	Earth Observations for Managing Mineral and Non-Renewable Energy Resources EO4MIN	Earth Observations for the Atlantic Region ATLANTIC-EO
Earth Observations for the Water-Energy-Food Nexus EO4WEF	Enhancing Food Security in African Agricultural Systems with the Support of Remote Sensing AFRICULTURES	GEO Citizen Science GEO-CITSCI	GEO Essential Variables GEO-EV	GEO Global Ecosystems GEO-ECO	Geodesy for the Sendai Framework GEODESY4SENDAI
Global Agricultural Drought Monitoring AGRI-DROUGHT	Global Crop Pest and Disease Habitat Monitoring and Risk Forecasting CROP-PEST-MONITORING	Global Ecosystems and Environment Observation Analysis Research Cooperation GEOARC	Global Flood Awareness System GLOFAS	Global Flood Risk Monitoring GFRM	Global Land Cover LAND-COVER
Global Observation of Deltas and Estuaries DELTA-ESTUARY	In-Situ Observations and Applications for Ecosystem Status of China and Central Asia IN-SITU-ESC	Multi-source Synergized Quantitative Remote Sensing Products and Services MUSYQ	Next Generation Earth Observation Services NEXT-EOS	Night-Time Light Remote Sensing for Sustainable Development Goals NIGHT-LIGHT	Open Earth Alliance OEA
Space and Security SPACE-SECURITY	Space Climate Observatory SCO	The International Grand Global Ensemble TIGGE	Understanding the Impacts and Value of Earth Observations GEO-VALUE		

Regional GEOs

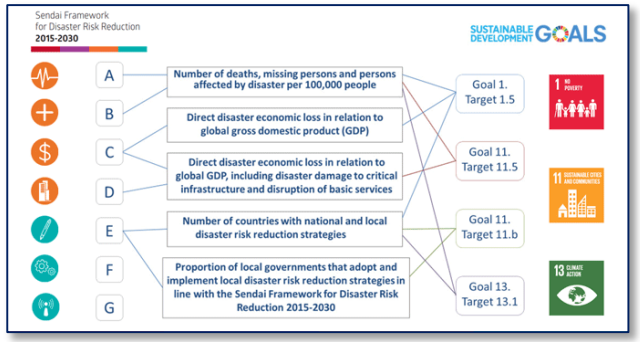
African Group on Earth Observations AFRIGEO	Americas Group on Earth Observations AMERIGEO	Asia-Oceania Group on Earth Observations AOGEO	European Group on Earth Observations EUROGEO

Foundational Tasks

GEO Engagement Priorities Coordination	GEOSS Data, Information and Knowledge Resources	GEOSS Infrastructure Development	GEO Work Programme Support	GEO Secretariat Operations

GEO Disaster Risk Reduction WG

- Purpose
  - Develop and implement a coherent and crosscutting approach within GEO to advance the use of Earth observations in support of countries' disaster risk reduction and resilience efforts.
- Serve as primary GEO liaison to UNDRR
  - Promote the dissemination and use of Earth observations to strengthen capabilities to reduce disaster risk according to the needs of countries as identified by UNDRR
- Determine links and actionable opportunities between disaster risk reduction, climate change, SDGs and urban activities
- Promote awareness of relevant global policy frameworks across the WP, such as ***UN-GGIM WG-Disasters Strategic Framework on Geospatial Information and Services for Disasters***



GEO DRR WG Governance

GEO SEC: Rui Kotani, GEO SEC DRR Coordinator
Delali Kemeh, DRR Consultant

Subgroup 1: Coordination across the GEO Work Programme

Co-Chair: David Borges (NASA, United States)

Deputy Chairs: Godstime James (Africa), Fernando Belda (Spain), Tatiya Chuentragun (Thailand)

Subgroup 2: UNDRR Coordination (Sendai Framework Monitoring & Global Assessments)

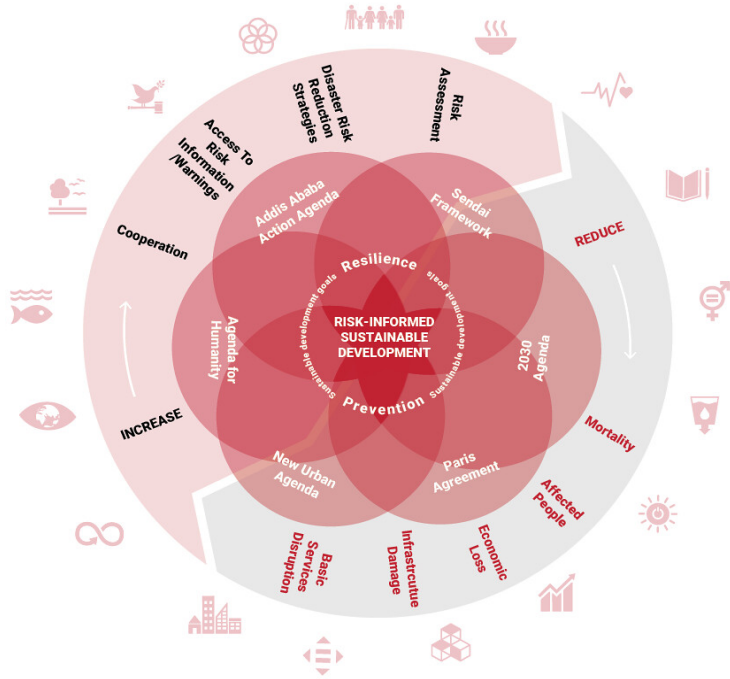
Co-Chair: Nathaniel Newlands (Agriculture/Statistics Canada)

Deputy Chairs: John LaBrecque (United States), Aliyu Abdullahi (Africa)

Subgroup 3: Climate Change, SDG, Urban Activities Coordination

Co-Chair: Kene Onukwube (DEAR Africa, Nigeria)

Deputy Chairs: Cheila Cullen (United States), Ramesh Singh (United States), Chulam Rhasul (Nepal)



GEO GROUP ON EARTH OBSERVATIONS

DRR WG Subgroup 1 Work Plan Highlights

- Purpose
  - Develop and implement a coherent and crosscutting approach within GEO to advance the use of Earth observations in support of countries' disaster risk reduction and resilience efforts.
- Highlight aspects of the Work Programme that are DRR related, and describe key elements and locations of each activity.
- Promote, including through good practices and impact, sharing of data and knowledge to improve DRR.
- Work with SG2 and SG3 to understand real requirements at national levels and communicate these requirements to relevant activities within GEO WP.
- Promote awareness of relevant global policy frameworks across the WP, such as *UN-GGIM WG-Disasters Strategic Framework on Geospatial Information and Services*.

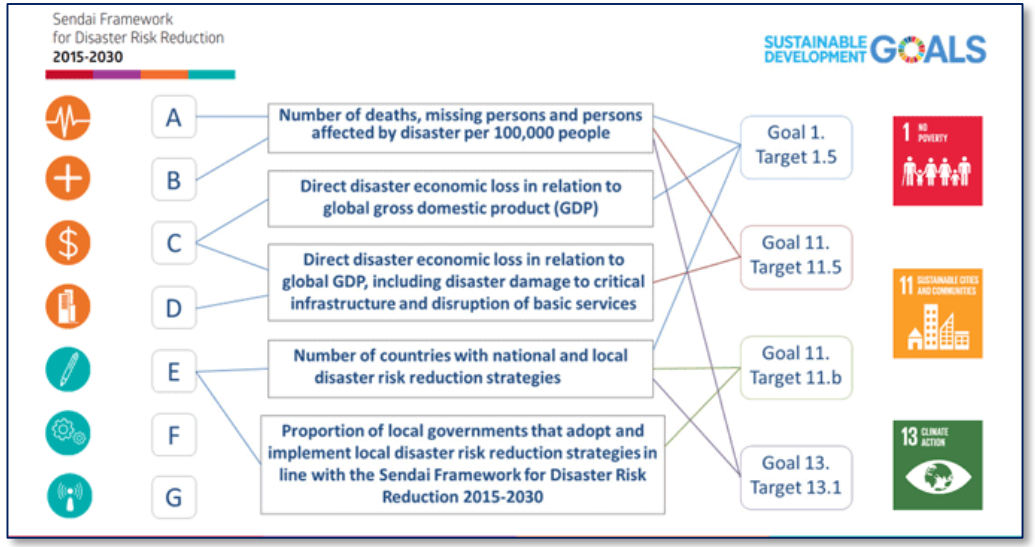
DRR WG Subgroup 2 Work Plan Highlights

- Purpose
  - Leverage SG1 efforts and use combined resources of SG2 to promote the dissemination and use of Earth observations to strengthen capabilities to reduce disaster risk according to the needs of countries as identified by UNDRR.
- Serve as primary GEO liaison to UNDRR
- Increase the use of Earth observation data for achieving the Sendai Framework's Global Target E, that is to substantially increase number of countries with national and local disaster risk reduction strategies.
- Showcase how Earth observation data can complement data governments already have to assess risk and risk trends over time.
- Showcase how Earth observations can be used to describe and visualize vulnerability and exposure.

UNDRR
UN Office for Disaster Risk Reduction

DRR WG Subgroup 3 Work Plan Highlights

- Purpose
  - Leverage SG1 efforts to provide an overview of links, and actionable opportunities, between disaster risk reduction, climate change, SDGs and urban activities.
- Serve as primary link to Climate WG, SDG and Urban related activities.
- Document an end-to-end approach of the impacts and linkages of climate change on disaster risk reduction and the SDGs.



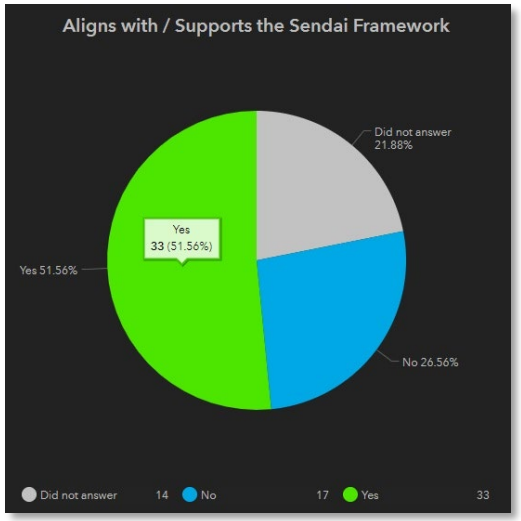
Activities Underway

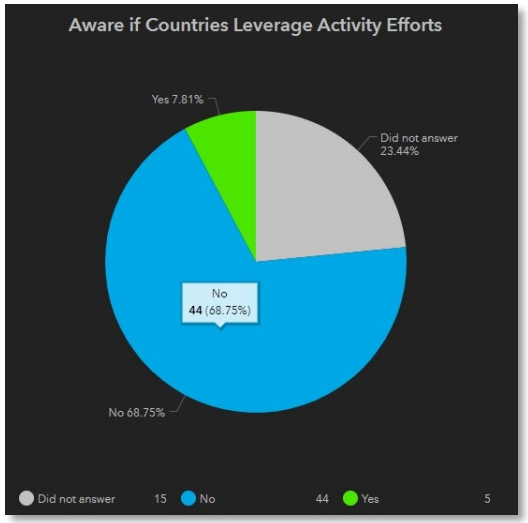
Review of current Earth observation data usage in DRR strategies by national level GEO members, in coordination with UNDRR. Develop assessment incorporating findings with status of GEO members actively working towards Sendai Target E to inform how GEO should promote and support increasing usage of Earth observations in national DRR strategies

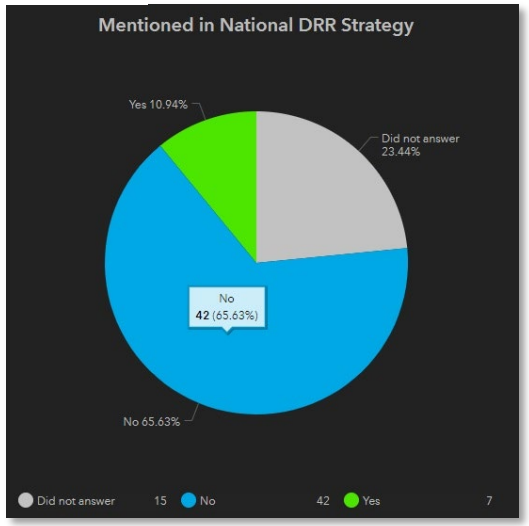
- UN Global Assessment Report on Disaster Risk Reduction (GAR) 2022 Contributing Paper
  - *Earth Observations into Action: Systemic Integration of Earth Observation Applications into National Risk Reduction Decision Structures*

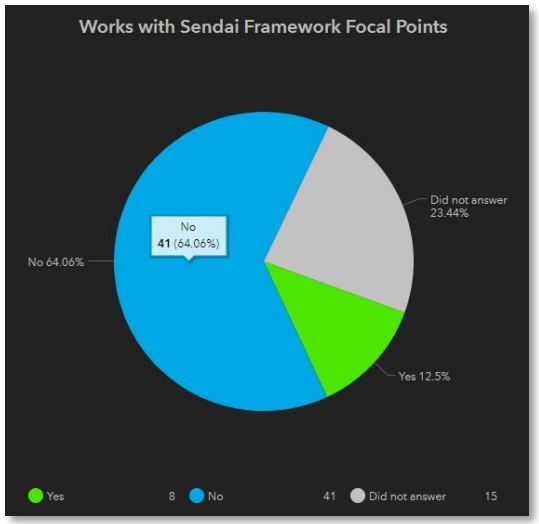
Our Engagement Priorities

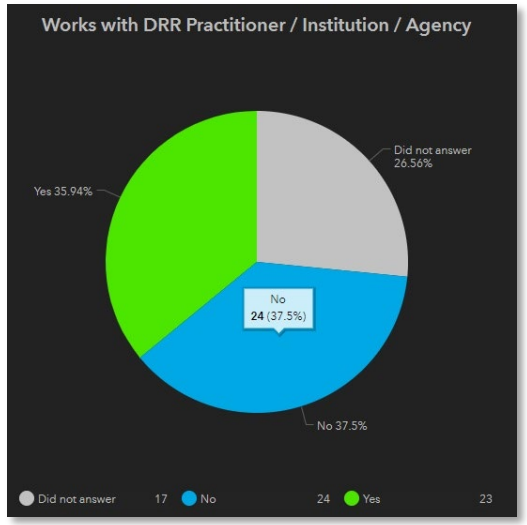
GEO's global priorities include the Sustainable Development Goals, Climate Action, and Disaster Risk Reduction.

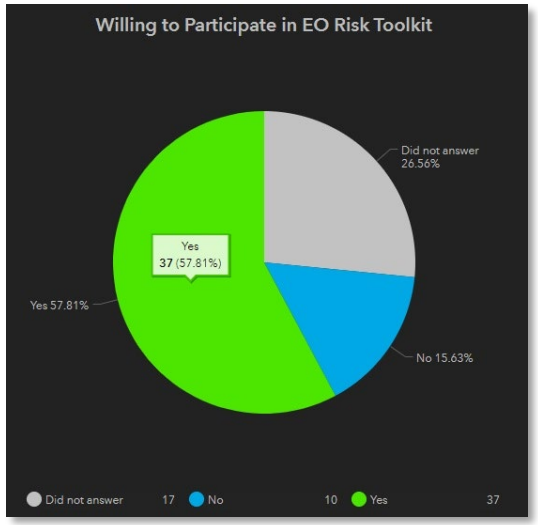












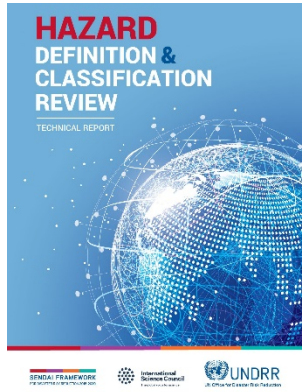
Activities Underway

- Earth Observation (EO) Risk Toolkit
  - In development with GEO DRR WG, Esri, UNDRR
  - Earth observation-informed insights are needed to support evidence-based decision making
  - Toolkit will bring together relevant use cases and tools with the goal of accelerating the uptake of EO capabilities by countries and other global disaster risk reduction organizations

- Data Sources / Requirements
- Thematic Risk Addressed (Flood, Seismic, etc.)
- Geographic Focus Area
- Workflow / Methodology
- Sendai Framework Target / Indicator Addressed
- Sendai National Focal Point Input
- Technology Solution(s) Leveraged
- End User / Needs Addressed
- Lessons Learned (Scalability / Replication Potential)

UNDRR
UN Office for Disaster Risk Reduction

National Risk Information Portal



GRAF National Risk Information Portal (NRIP)

- **Country Name**
  - **Country Profile**
    - Country Overview
    - Global Risk Ranking
  - **Hazard and Exposure**
    - Hydrological Hazards
    - Geological/Geo-physical hazards
    - Environmental hazards
    - Biological hazards
    - Technological hazards
  - **Vulnerability**
    - Social
    - Economic
    - Environmental
  - **Climate change**
    - Regional Climate
    - Past Climate
    - Climate projections
    - Performance indicators
  - **Disaster profile**
    - Past disasters
    - Annual losses
    - Disaster trends
    - Migration & Displacement

SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

UNDRR United Nations Office for Disaster Risk Reduction

EN

EARTH OBSERVATION RISK TOOLKIT

USE CASES TOOLS POLICY BRIEFS GRAF ABOUT CONTRIBUTE

Leveraging Earth observation insights to support evidence-based decision making.

Hazards | Vulnerability | Exposure

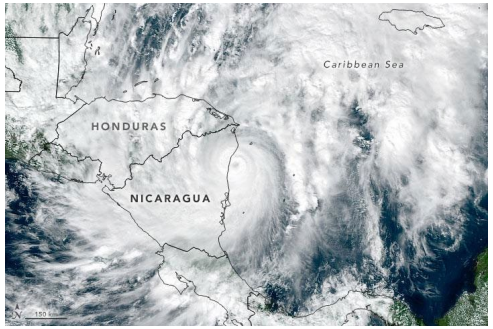
KEY CONTENT

- Use Cases
- Tools
- Policy Briefs
- EO Data

HIGHLIGHTS

Use Case: GEOGloWS ECMWF Streamflow Forecast Service helped Honduras' state-owned company with reservoir management between two major hurricanes.

Read More >>



ORGANIZERS

GROUP ON EARTH OBSERVATIONS | UNDRR UN Office for Disaster Risk Reduction | esri

Use Case Example: GEOGloWS Initiative

Summary

In 2020, the National Electric Energy Company (Empresa Nacional de Energía Eléctrica: ENEE) of Honduras used a precipitation/flood forecasting EO tool to reduce loss and damage in the Sulla Valley by making controlled water discharges from a reservoir between two major hurricanes, which occurred within 2 weeks: Hurricane Eta, category 4 on 2 November 2020, and Hurricane Iota, Category 5 on 16 November 2020. The EO-based analysis was also shared with the country's National DRR agencies, who made their decisions on community evacuations.

Stakeholder Impact

The damage to Sula Valley was considerably reduced by the decisions made by ENEE based on its EO enhanced analysis. The valley is Honduras' most vulnerable area because it receives water discharges from 4 rivers with draining areas of over 22,000 square kilometers; meanwhile, it is home to approximately 2 million people and produces about 65% of the national GDP. Compared to the estimated economic losses caused by Hurricane Mitch (Category 5) in 1998 (US $3,793.6 million), combined losses of Hurricanes Eta and Iota (US $2,171 million) were reduced by 40%.

San Pedro de Sula Airport after Hurricane IOTA.
(Photo by Orlando SIERRA / AFP)

Methodology

The EO tool used in Honduras is called the Global Water Sustainability (GEOGloWS) European Centre for Medium-range Weather Forecasts (ECMWF) Streamflow Forecast service. It is a worldwide application to forecast:

1. the overland water runoff -- water that flows over land as surface water instead of being absorbed into groundwater or evaporating; and
2. river discharge -- the volume of water flowing through a river channel; measured at any given point in cubic metres per second).

The GEOGloWS ECMWF Stream Forecast service provides an ensemble of 15-day forecasts together with 40-year historical simulations on an open website.

GEOGloWS ECMWF Streamflow Service.

Read More >>

For more information, visit the GEOGloWS ECMWF Streamflow Forecast Service website (mwf.int/)

Contact

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www.earthobservations.org
https://appliedsciences.nasa.gov/what-we-do/disasters

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UNITED NATIONS INITIATIVE ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT
CEOS
The Committee on Earth Observation Satellites

Credit: UNDRR