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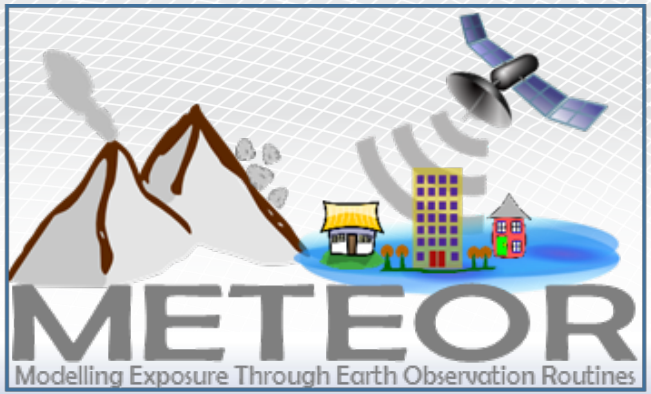
Gateway to the Earth

METEOR: 'Modelling Exposure Through Earth Observation Routines' to Aid Sustainable Development



https://meteor-project.org/

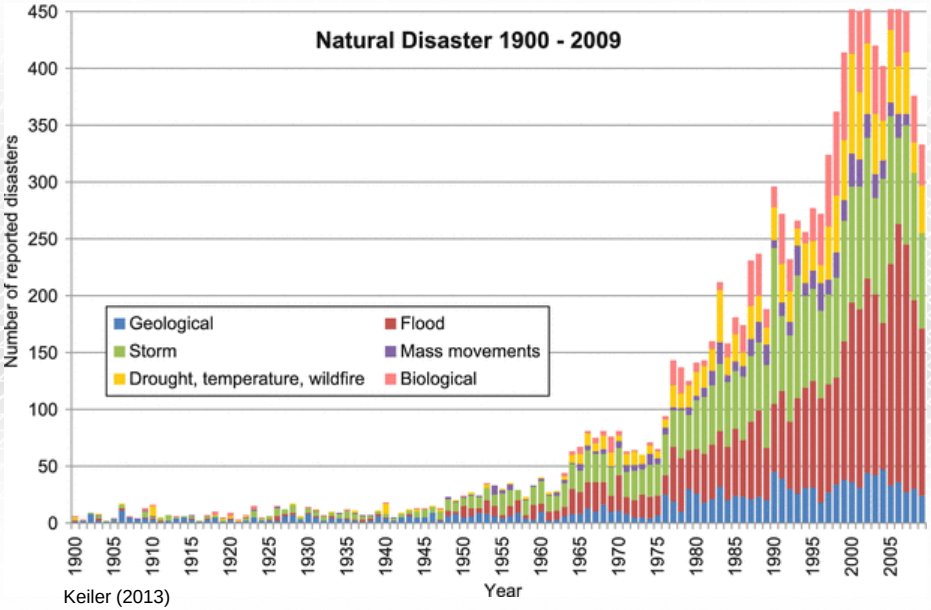
Dr Colm Jordan (cjj@bgs.ac.uk)
British Geological Survey

Photography encouraged

EGU General Assembly 2019
Vienna | Austria | 7–12 April 2019

Earth Observations for Sustainable Development Session
https://meetingorganizer.copernicus.org/EGU2019/session/33108

Global Context

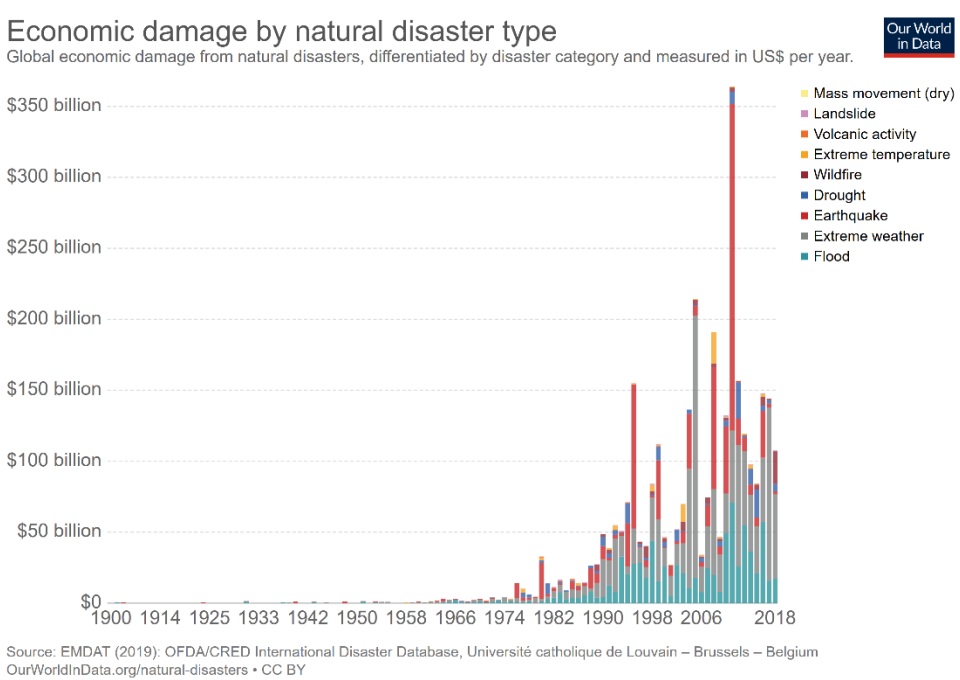


Keiler (2013)

Increasing number of natural disasters reported

Landslides
Floods
Earthquakes
Volcanoes

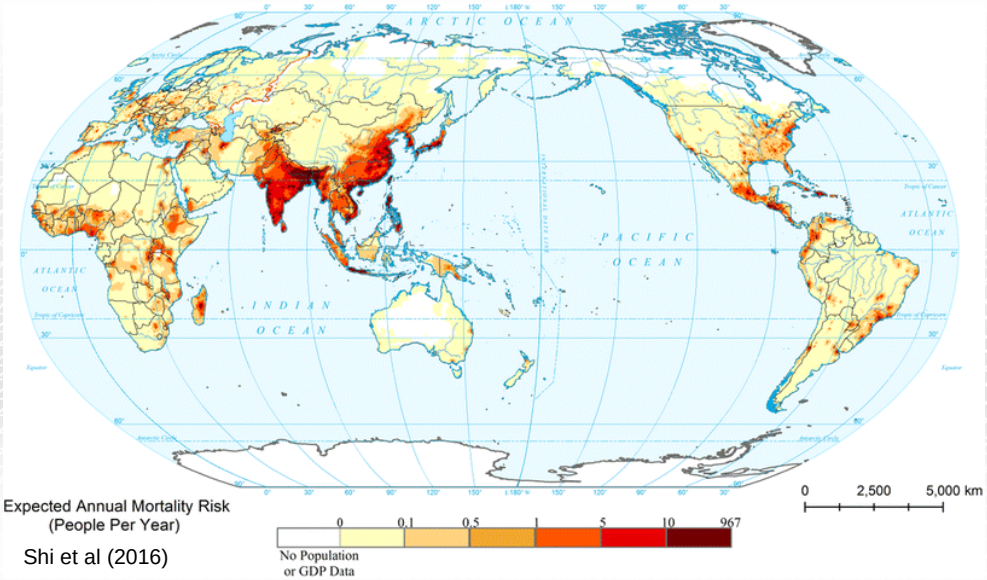
Global Context



EMDAT (2019)

Increasing economic impact of natural disasters

Global Context



Shi et al (2016)

Expected distribution of mortality risk for multiple natural hazards (2020-2030)

Bias towards ODA countries
Often ‘data-poor’
> EO an ideal data source

Global Context

Plan International: *“Women and children 14 times more likely to die from disasters”*

World Health Organisation: “*Women and children are particularly affected by disasters, accounting for >75% of displaced persons”*

Impact of disasters: Gender and age bias

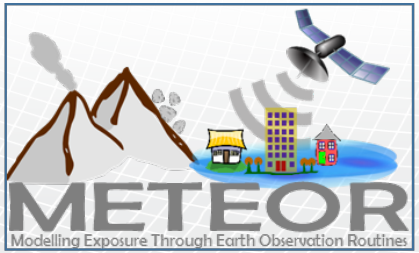
Care International: *“When disaster strikes, women and girls often suffer most”*

METOR Sustainable Development

Fully aligned with UN SDGs

Progress towards Sendai Framework DRR outcomes & priorities

- Increasing knowledge of exposure, multi-hazards and their impacts
- Co-producing baseline data to help stakeholders make informed decisions
- Steps to help inform practice and policy
- Improving lives and livelihoods
- Legacy and sustainability



SUSTAINABLE DEVELOPMENT GOALS

Target: To significantly reduce the number of deaths and the number of people affected…by disasters

Sendai Framework for Disaster Risk Reduction 2015 - 2030

1 OUTCOME

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

1 GOAL

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

Target: to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters

METEOR: Modelling Exposure Through Earth Observation Routines

An ambitious collaborative project to help strengthen resilience to disasters

(February 2018 – January 2021)

Project Lead:

British Geological Survey
Expert | Impartial | Innovative

Landslide & volcanic hazards
Multi-hazard modelling & impacts

Disaster Management Dept
Prime Minister's Office
United Republic of Tanzania

National Society for Earthquake Technology, Nepal

Flood hazard

Seismic hazard
Vulnerability / Uncertainty
Knowledge sharing

Crowdsourcing

Exposure development
Sustainability

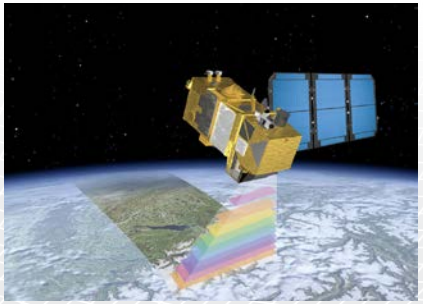
Monitoring & Evaluation

Unfunded partners include:
ICIMOD (Nepal)
Uni Tribhuvan (Nepal)
Uni of Dar es Salaam (Tanzania)
Geological Survey of Tanzania

Funded by International Partnerships:

METEOR: Modelling Exposure Through Earth Observation Routines

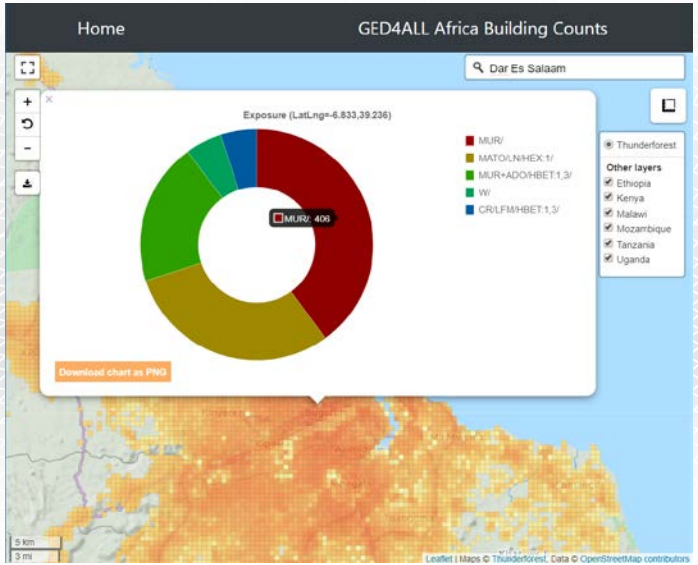
Utilising Earth Observation to co-design and co-deliver:

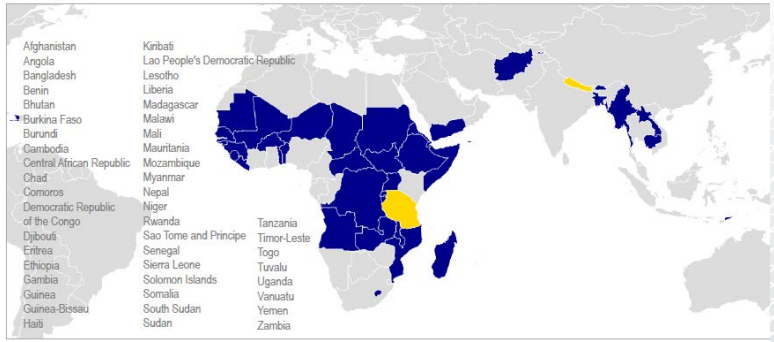


- Exposure data
  - Aggregated and segmented: 47 ODA countries
  - Validated: Nepal and Tanzania
- National Hazard Footprints
  - Nepal: Seismic, Landslide, Flooding
  - Tanzania: Flooding, Volcanic, Seismic (Landslides additional requirement)
- Models
  - Multi-hazards with exposure and vulnerability
- Protocols (incl.)
  - Mapping of robust exposure & hazard data with uncertainty guidance
  - Crowd-souring regional exposure data
  - Training materials

EO for a step-change by co-developing and co-delivering rigorous, robust and open routines (protocols) and standards for exposure

National coverage (Nepal, Tanzania etc.)
Spatially consistent
Robust
Standardised
Updated taxonomy
Quantified uncertainty
Protocols
Openly available
Capacity-building





METEOR will deliver:
Country-wide Level-1 exposure data for 47 countries
Level 2/3 exposure for Nepal and Tanzania

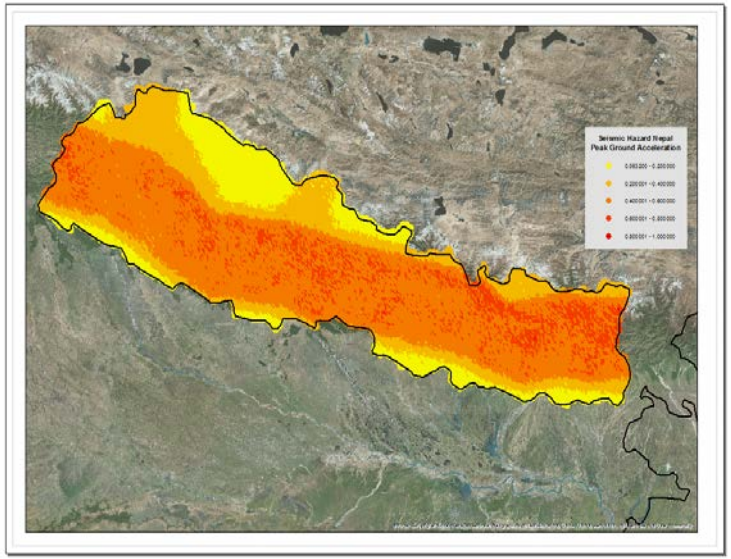
EO data utilised include:
Optical (e.g. Sentinel-2, drone flights)
Radar (e.g. Sentinel-1)
Night-time light (e.g. Suomi)

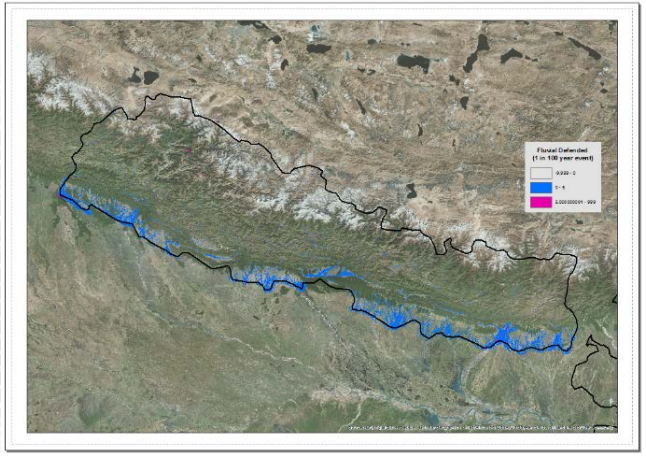
EO for a step-change by co-developing and co-delivering rigorous, robust and open routines (protocols) and standards for multi-hazards

National hazard footprints (susceptibility):

- Nepal (Landslides, earthquakes, floods)
- Tanzania (Earthquake, floods, volcanic and landslides)

Openly-available
Capacity-building





EO data used for:
Elevation development & modelling
Hazard detection and characterisation
Landcover analysis
Validation & calibration
Disaster response

Summary

METEOR results co-developed and openly / freely disseminated:

- Exposure taxonomy and data models
- Robust country-wide exposure data for 47 countries
- Multi-hazard information for Nepal and Tanzania

} Derived from EO data

- Training materials, tutorials & protocols
- Better-informed DRM decisions that meet the demands of
  - in-country stakeholders
  - international drivers (e.g. UN Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction)

Acknowledgements

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[1]British Geological Survey (BGS) UK; [2]Global Earthquake Model Foundation (GEM) Italy; [3]Humanitarian OpenStreetMap Team (HOT) USA; [4]ImageCat Inc. USA; [5]Oxford Policy Management Limited (OPM) UK, Nepal and Tanzania; [6]Disaster Management Department of the Prime Minister's Office (DMD) Tanzania; [7]National Society for Earthquake Technology (NSET) Nepal; [8]Fathom UK.
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