



Using satellite and geospatial information for disaster risk management knowledge, tools, and example

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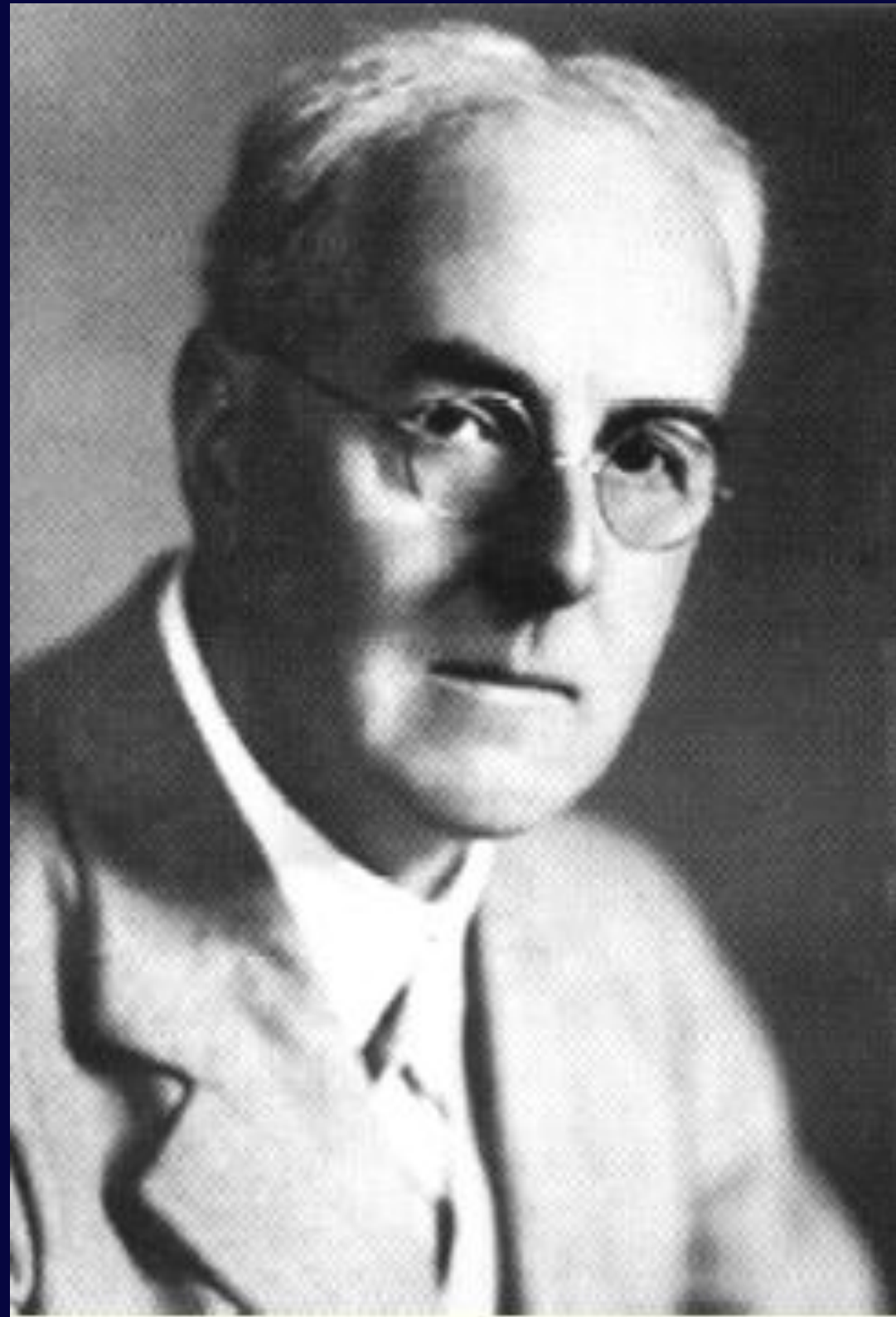


GFDRR
Global Facility for Disaster Reduction and Recovery



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The history of geospatial for DRM



“Perhaps someday in the dim future
**it will be possible to advance the
computations faster than the weather
advances** and at a cost less than the
saving to mankind due to the information
gained.”

– Fry Richardson, mathematician and meteorologist, 1922

The future of geospatial for DRM

EARTH OBSERVATION

- independence
- trust
- cost effective at scale

ARTIFICIAL INTELLIGENCE

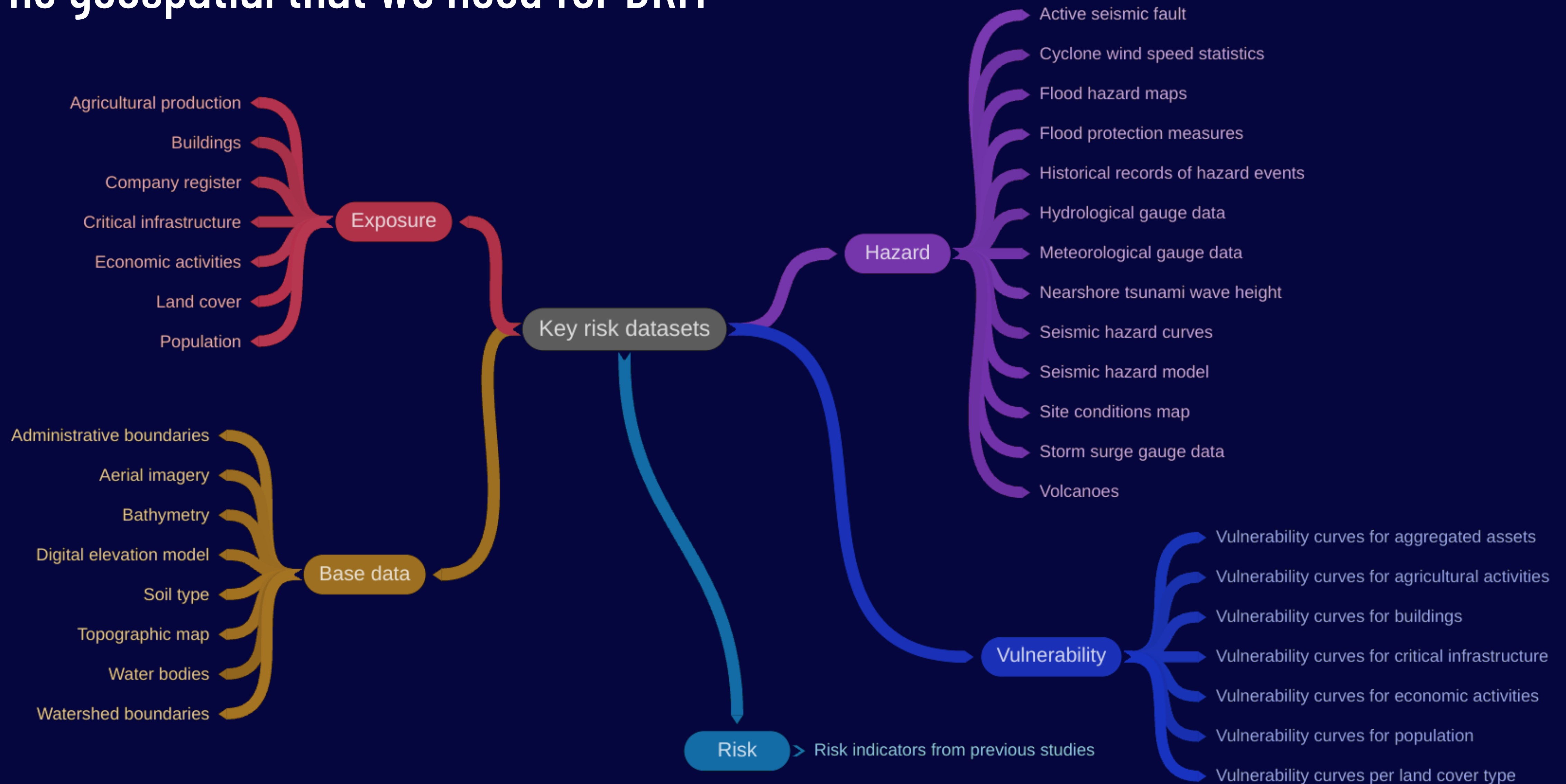
- customization
- cost reduction
- adaptability

LOCAL PARTICIPATION

- context
- calibration
- skills and jobs



The geospatial that we need for DRM



We can monitor settlement expansion in real time ...

ESA/DLR World Settlement Footprint

Cairo
EGYPT

1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

... and might soon be able to predict future urban growth

CITYNEXT is an advanced AI-powered solution aimed at predicting urban growth and related mobility patterns, along with their effects on urban climate and air quality.



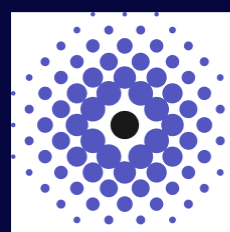
Johannesburg, South Africa



Warsaw, Poland



Medan, Indonesia



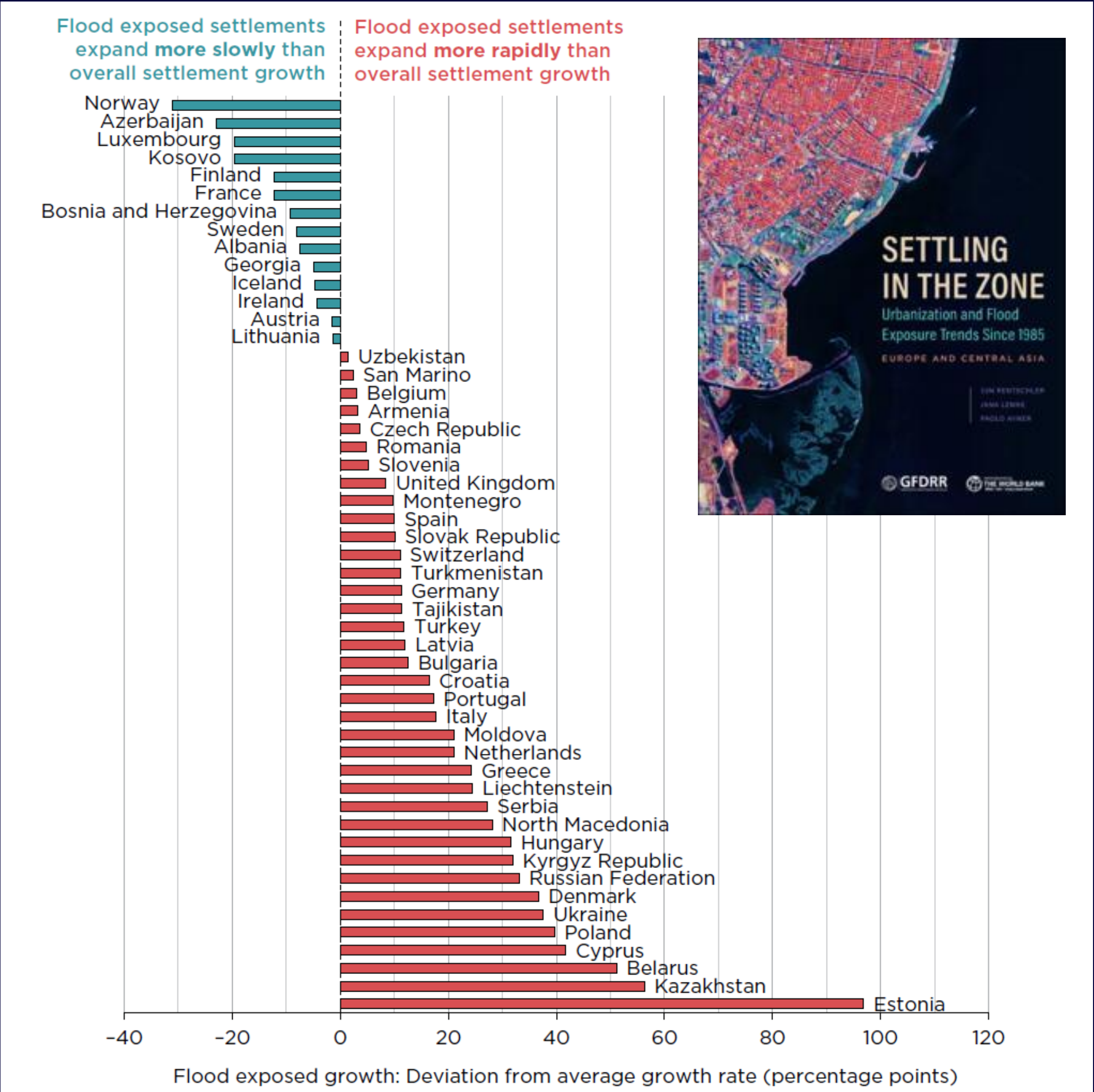
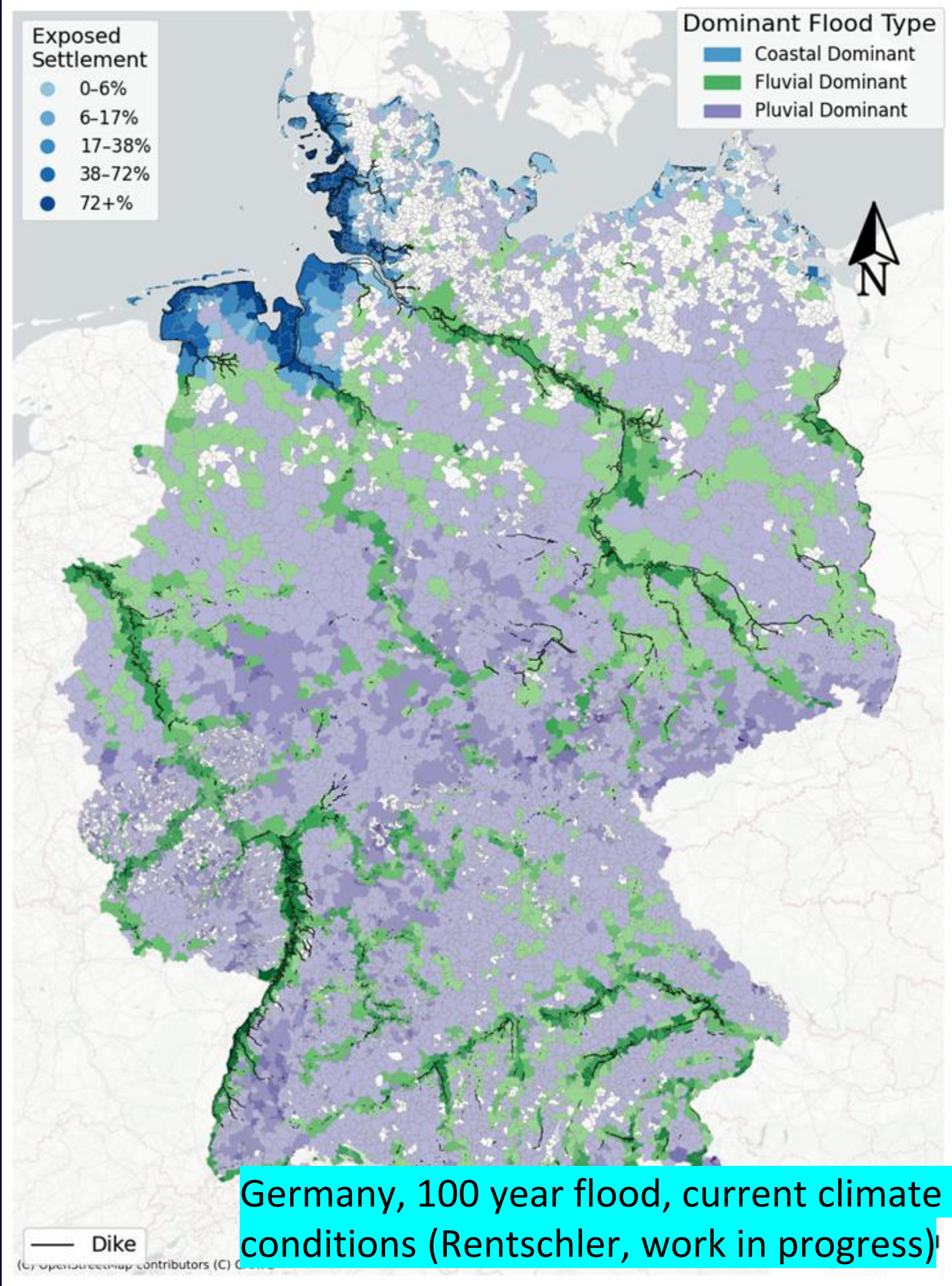
MindEarth

UNIVERSITY OF TWENTE.



The CITYNEXT project is funded under the ESA Express Procurement Plus (EXPRO+) program

We can understand the effect on flood risk ...



... and advise governments accordingly

Priorities for action differ by context – for instance:

- **When flood exposure is high already** – invest in disaster response, preparedness measures (e.g. insurance, early warning), retro-fitting, physical protection infrastructure, social safety nets and inclusive growth
- **When exposure is still growing** – prioritize land-use planning, risk-informed infrastructure development, nature-based solutions, and avoid settling in the riskiest zones

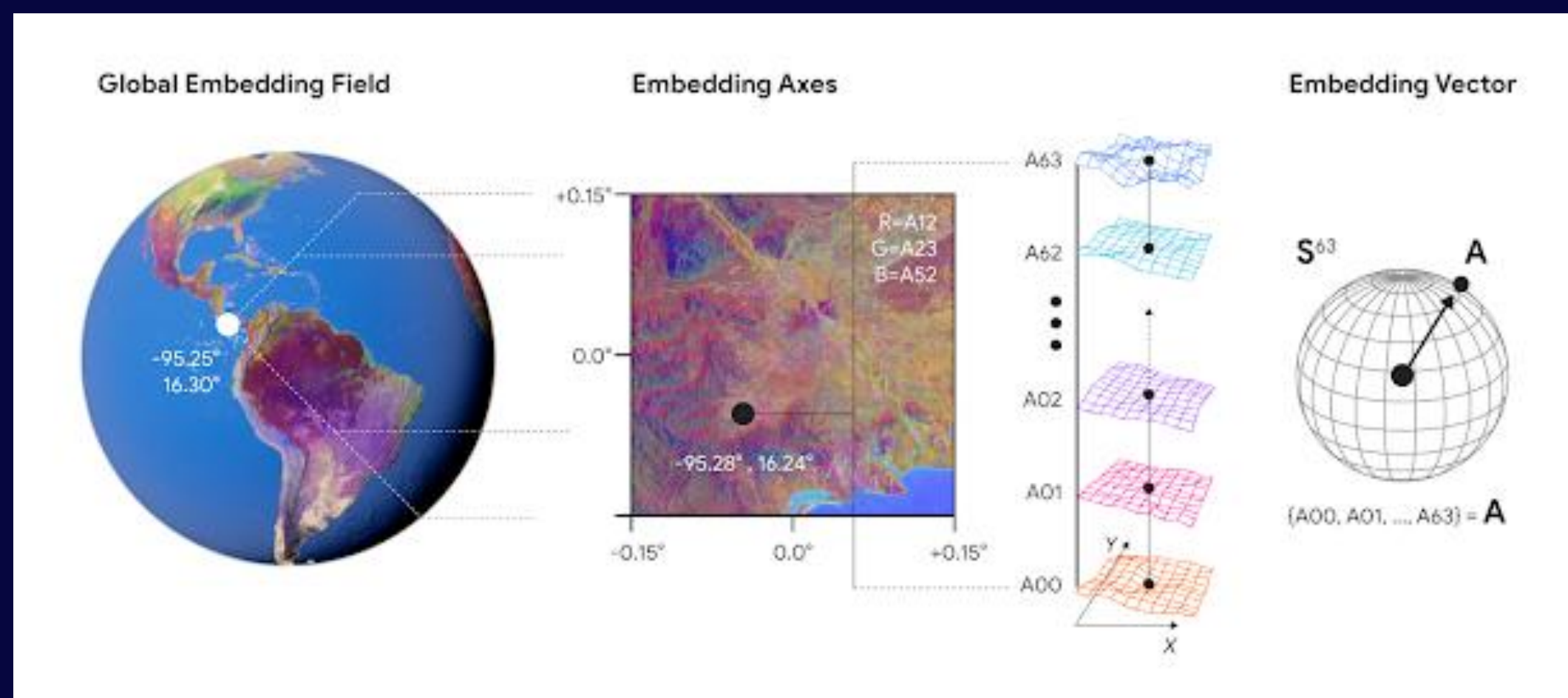


Geospatial technologies to watch

Geospatial Foundation Model (GeoFMs)

A Geospatial Foundation Model is a large AI model trained on diverse Earth observation and spatial datasets that generates reusable representations (embeddings).

Useful for analyzing and monitoring

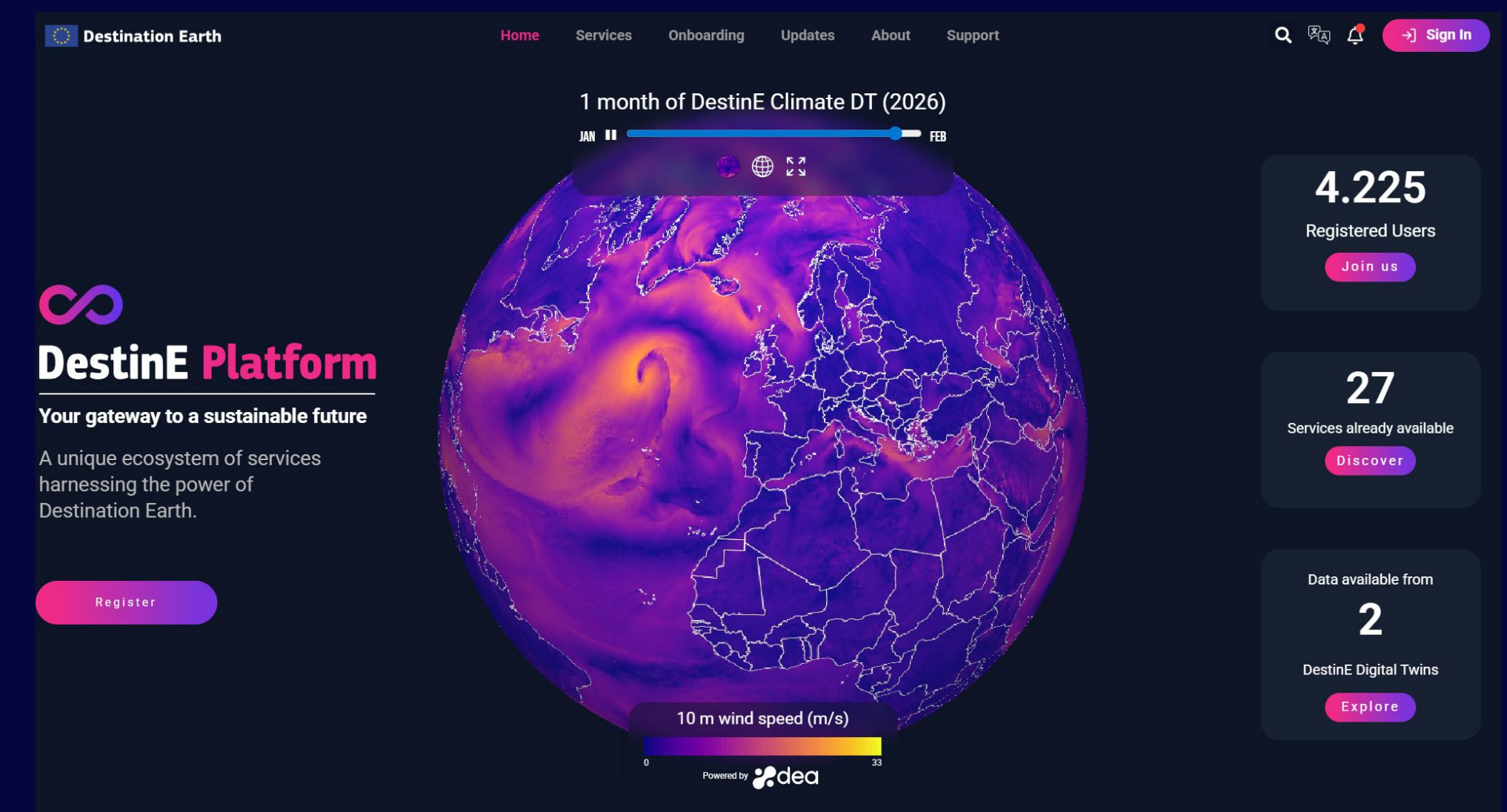


<https://deepmind.google/discover/blog/alphaeart-foundations-helps-map-our-planet-in-unprecedented-detail/>

Digital Twin – Destination Earth (DestinE)

Destination Earth is a European Union funded initiative launched in 2022, with the aim to build a digital replica of the Earth system by 2030.

Useful for predicting and experimenting



<https://destination-earth.eu/>

Invest in geospatial open data for DRM

The Risk Data Library Standard is an open data standard that provides a common description of the data used and produced in risk assessments.

GFDRR, World Bank

Risk Data Library Standard (RDLS)

The RDLS is an open data standard that provides a common description of the data used and produced in risk assessments, including hazard, exposure, vulnerability, as well as loss & damage data.

Get started

Risk Data Library
Standard

Search docs

Introduction

Metadata reference

Guidance

- How to publish RDLS metadata
- How to publish risk datasets**
 - How to format risk datasets
 - How to package risk datasets**
- How to format risk datasets
- Vulnerability data
- Loss data
- Taxonomy mappings

Glossary

About

RDLS Converter tool¹²

Hazard data

Format / data types

Hazard data typically include hazard maps representing one or more historical events, or simulated probabilistic scenarios (`event_footprints`). In some cases, hazard curves and stochastic event set tables are provided. Additional data could include intensity-duration-frequency curves, ground motion relationships, or hazard-defence measures.

Generally, hazard data (footprints) takes the form of raster (geospatial grid) data (`swath` / `cov`), less often as vector data (`lines`, `shp`). Supporting data (hazard curves, historical catalogue) could come as tables (`xlsx`, `xlsx`) or vector data (`gpkg`, `shp`).

Legend
Central city : STONGHOLM
Tropical Cyclones
IP (100 years)
Wind speed (m/s)
70
75
80
85
90
95
100
105
110
115
120

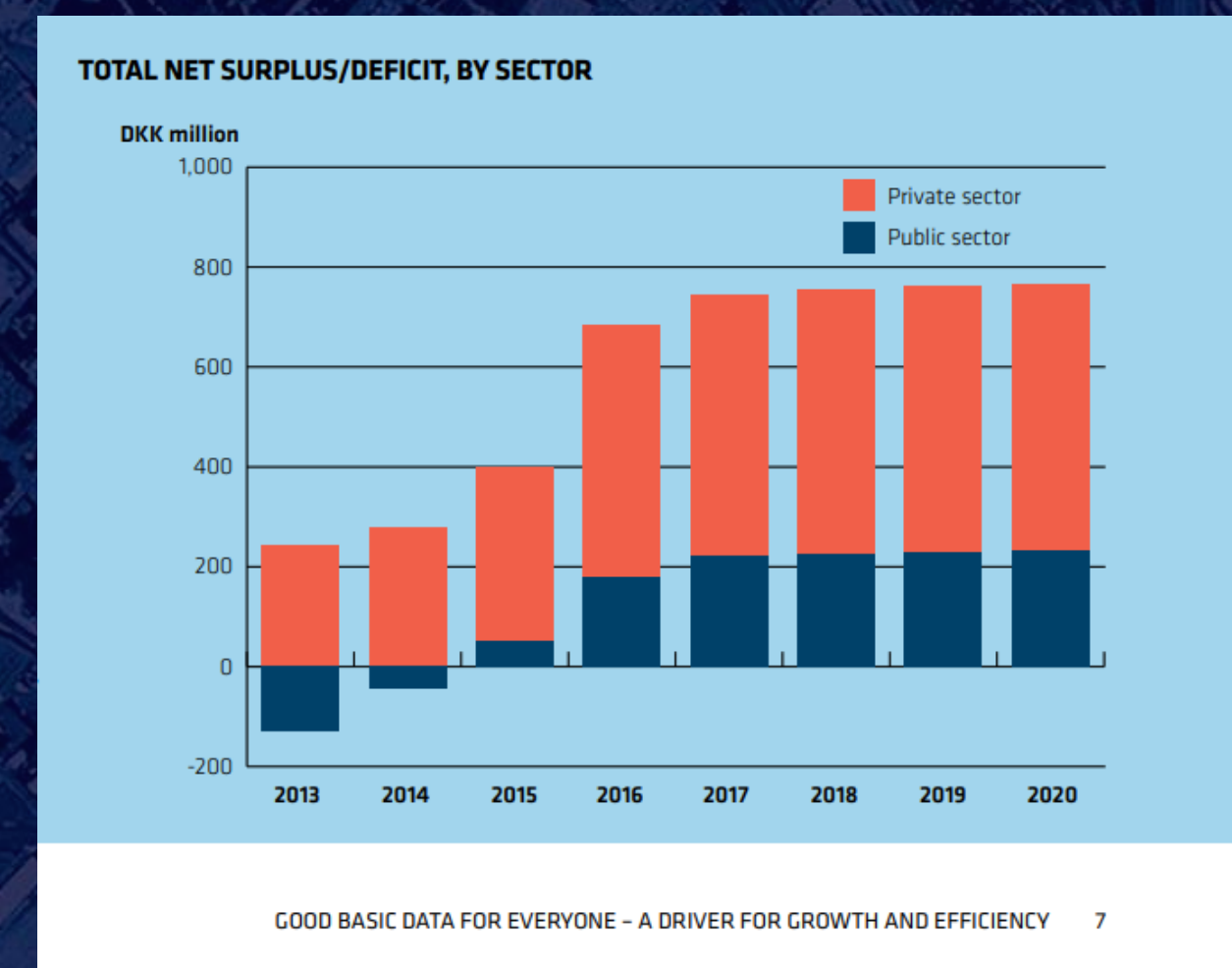
Legend
Central city : STONGHOLM
Wind speed (m/s)
70
75
80
85
90
95
100
105
110
115
120

<https://riskdatalibrary.org/>

High Value Datasets Regulation - (EU) 2023/138

HVDs are classified in six thematic categories: **1) geospatial; 2) earth observation and environment; 3) meteorological; 4) statistics; 5) companies and company ownership; and 6) mobility.**

As for their reuse conditions, HVDs should be made available for free, in a machine-readable format, via application programming interfaces (APIs) and bulk download.



Invest in practical geospatial DRM applications

The Rubber Boot Index (Denmark)

specifies forecasted water depth in 10 cm intervals, illustrated by six colour codes, making it possible to see very quickly where water levels are very deep and what are the routes of access.

It is used by emergency services to know whether to allocate pumps and barriers to affected areas and how to travel to affected areas.



Figure 2. Selected areas that will be struck by the storm surge in the course of the day.

Géorisques (France)

is an official public portal for information on natural and technological risks.

It allows citizens, professionals, and local authorities to check the hazards associated with a given location, access maps and historical data, and review legal requirements.



<https://www.georisques.gouv.fr/>

Invest in geospatial skills and jobs for DRM

Digital Public Work for Urban Resilience

Kenyan youth strengthen urban resilience through innovative public works pilot

VIVIEN DEPARDAY, SHEILA KAMUNYORI, MIRA LILIAN GUPTA, YVES BARTHÉLEMY & RAYMOND KIRWA | FEBRUARY 07, 2024

This page in: English



A worker walks through his settlement with a 360-degree terrestrial camera to capture Street View images. Photo: Spatial Collective

On a weekday morning in Nairobi's Embakasi Sokoni settlement, 30-year-old Lydia is viewing familiar images on her smartphone of businesses, churches and schools in her community, and answering questions about their physical characteristics. Lydia, a single mother of two, starts work

<https://blogs.worldbank.org/en/nasikiliza/kenyan-youth-strengthen-urban-resilience-through-innovative-public-works-pilot-afe-0224>

Risk Data Fellows 2022/23



Paolo R. Magnata
Philippines



Isabelle Tingzon
Caribbean



Hwaba Mambo
DRC



Zia Uddin Foisal
Bangladesh



Bradley Riley
South Africa



Ankita Sood
India



Mohammad Fadli
Indonesia

<https://www.youtube.com/watch?v=0yHDSia2ogM>

If the future of geospatial for DRM is already there,
why are we still suffering from disasters?