



Climate stress testing

Data issues

Lucia Alessi

Team leader – Financial research

European Commission – Joint Research Centre

Data needs for physical risk assessment

Financial data

- Securities holdings:
 - Bonds
 - Equities
 - Fund shares
- Loans

Firm-level data

- Location of:
 - Headquarters
 - Production plants
 - Warehouses
- Associated weight
- Vulnerability info

Residential buildings

- Geolocation
- Vulnerability info

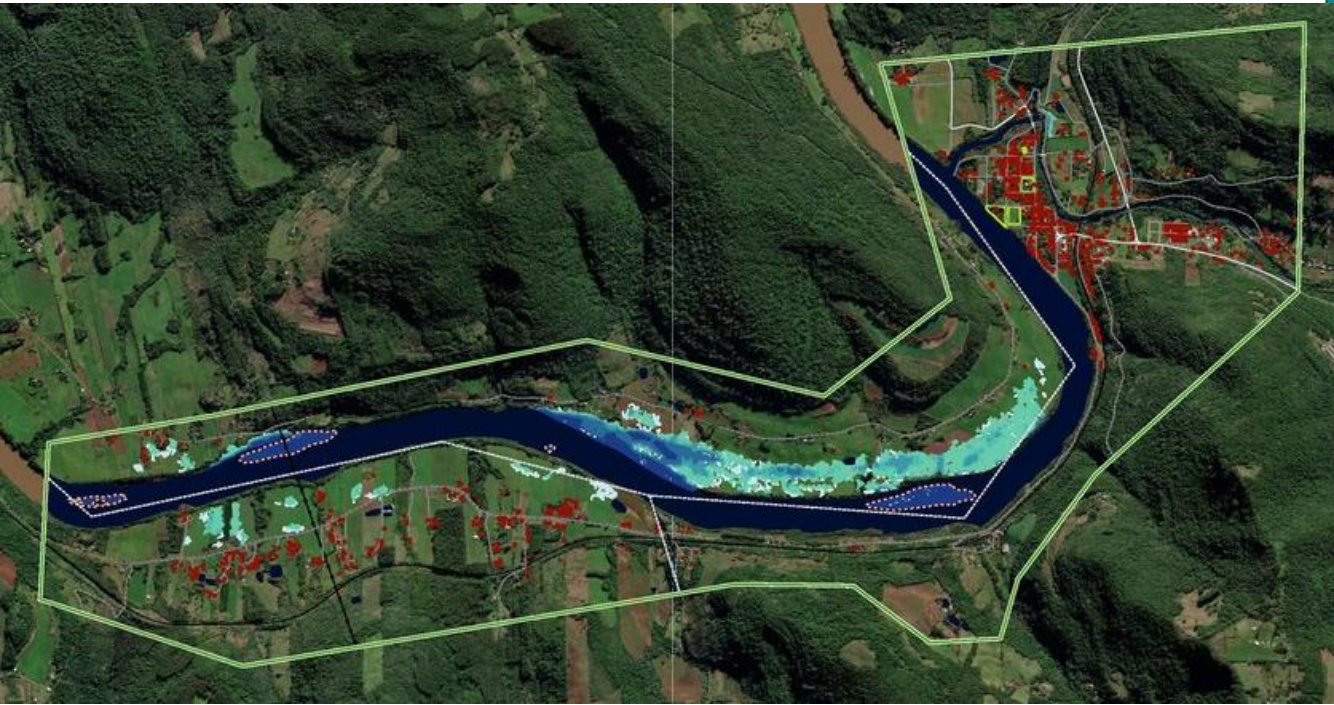
Granular insurance data

Risk maps

- Exposure maps per hazard
- Vulnerability layer
- EU-wide harmonized data vs more granular maps (national sources)

Data quality

- Commercial data providers sell firm-level physical risk data...
- ...but if it's averages, better be transparent
- ...and underlying scenarios/assumptions not always clear



Alessi and Bizzarri (forth.)

- Data on **population** of Italian firms from official source (CERVED)
- Address of **headquarters, plants and warehouses, employees per local unit, buildings owned, estimates of reconstruction costs per building**
- Hazard maps from [Copernicus - Emergency Management Service - Mapping](#)
- Analysis based on losses from past hazard events
- **Extremely precise identification** of flooded firms
- Impact on assets, turnover, RoA... and **projections**



PROGRAMME OF THE
EUROPEAN UNION



The JRC Risk Data Hub

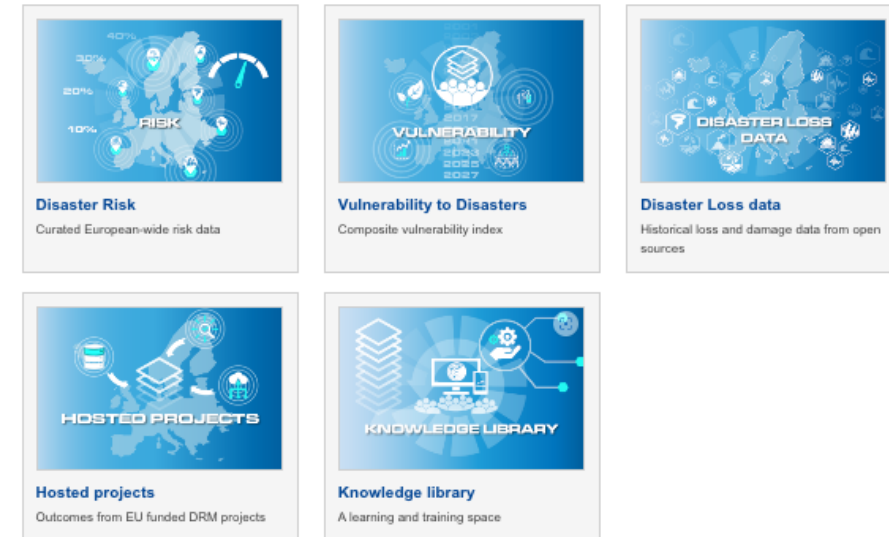
multi-hazard geo-portal

- ATLAS drmkc.jrc.ec.europa.eu/risk-data-hub/
- Disaster Risk
- Exposure
- Vulnerability
- Disaster loss data
- Hosted projects
- Knowledge library
- Data
 - API
 - Geospatial Web Services

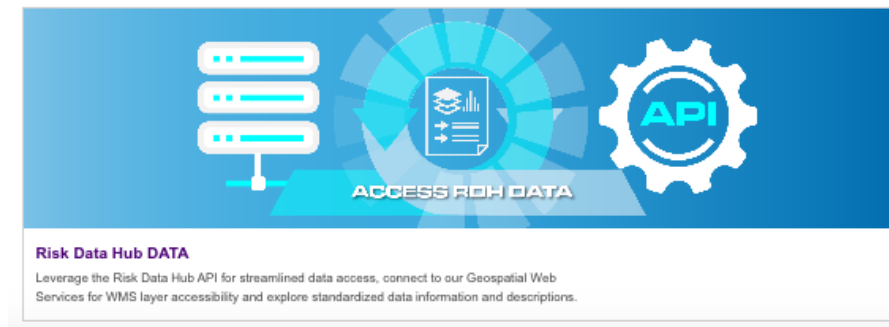
Our ATLAS



Modules



Our DATA



Hazard



Exposure



Vulnerability



Disaster Risk

Disaster Losses

Risk Data Hub - ATLAS

Map Layers

- H3 - Geospatial indexing system
- Administrative Divisions
- Vulnerability
- Exposure
- Hazard
- Risk (under validation)
- Losses
- National/Member States Data

Legend

Hazard

River Flood

100-year return period

Flood depth 0.1 - ≥ 10 (m)

Metadata

Disclaimer

Hazard



Exposure

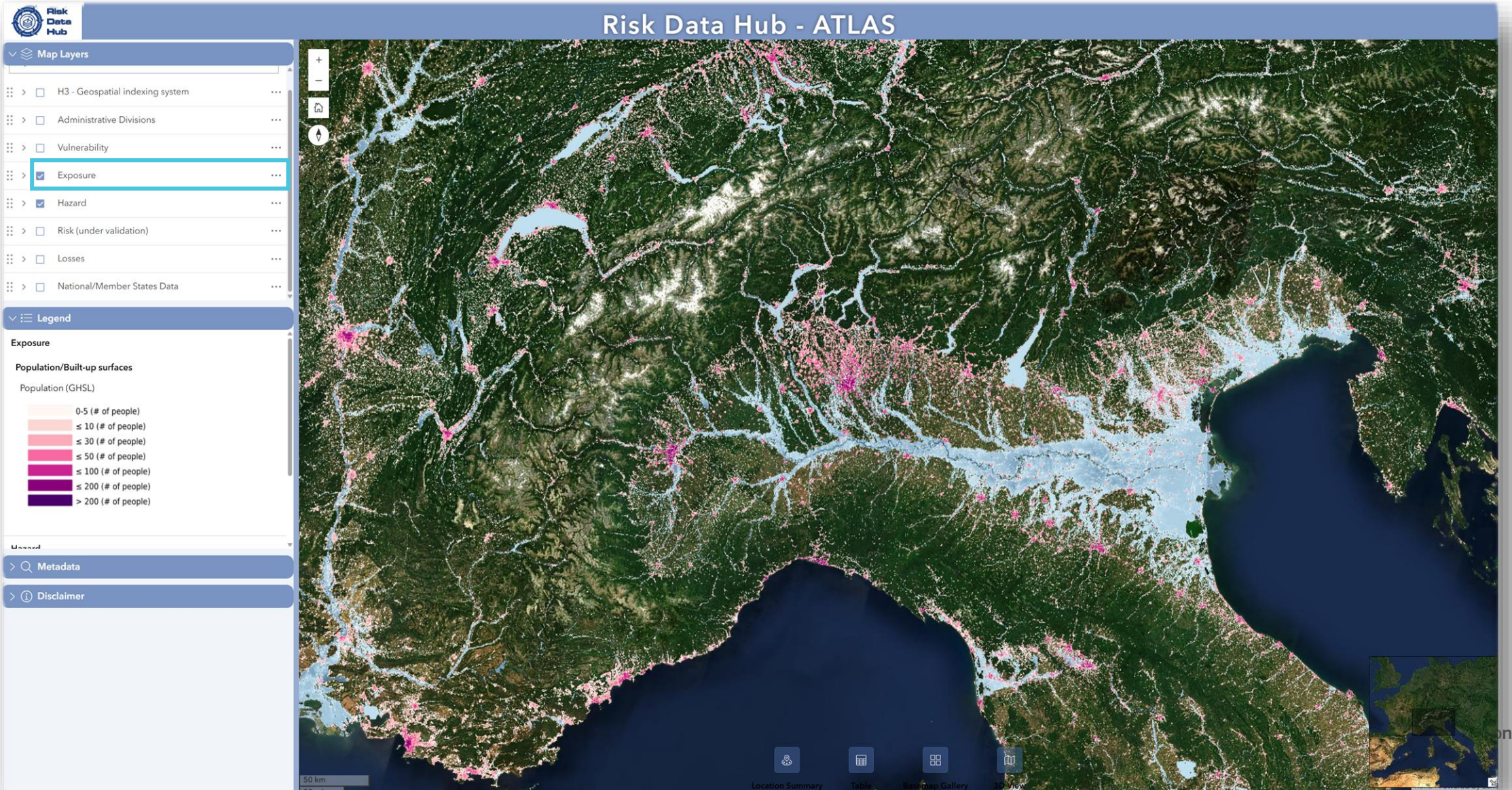


Vulnerability



Disaster Risk

Disaster Losses



Hazard



Exposure

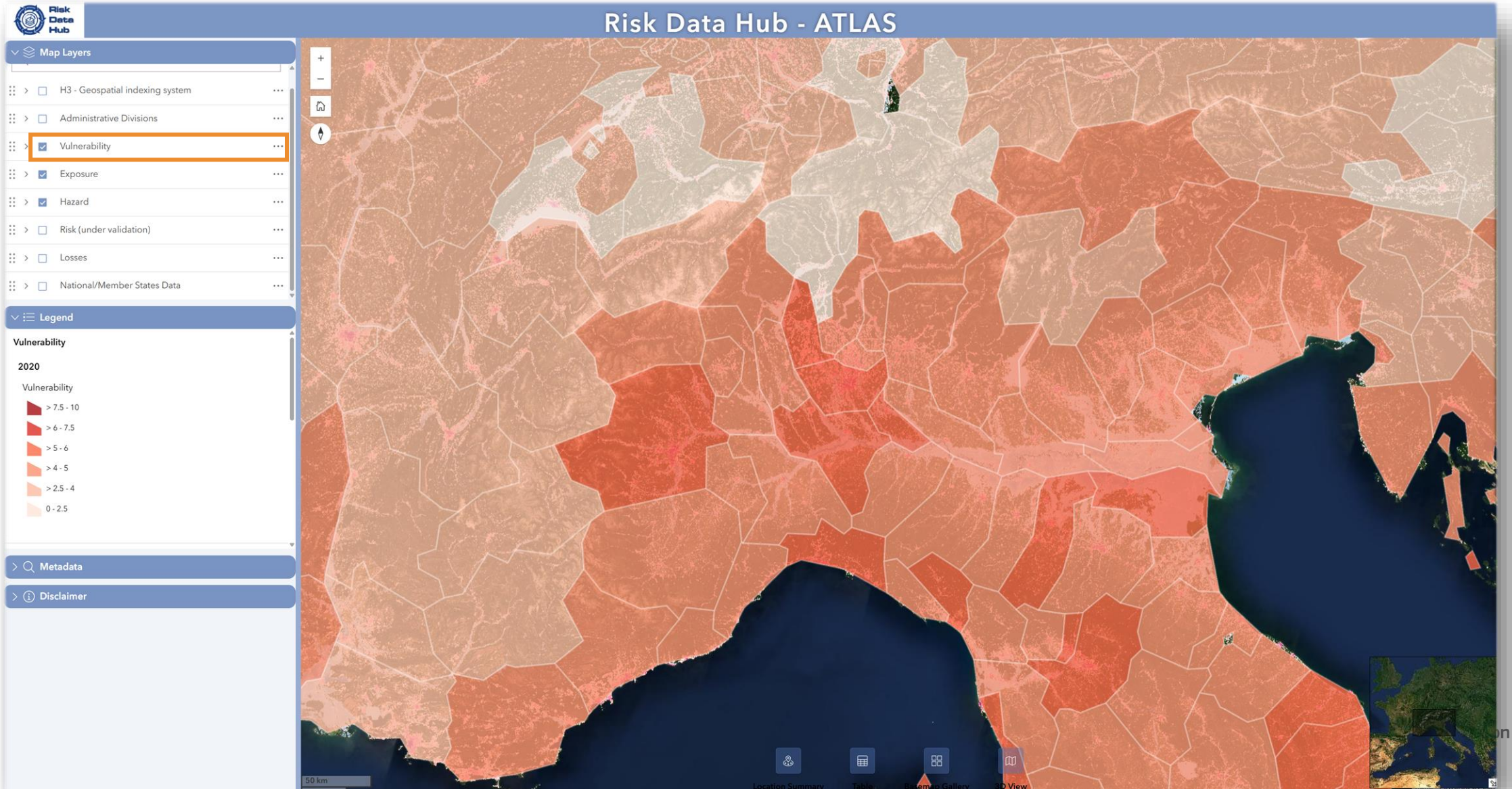


Vulnerability



Disaster Risk

Disaster Losses



Hazard



Exposure



Vulnerability



Disaster Risk

Disaster Losses

Risk Data Hub - ATLAS

Map Layers

- H3 - Geospatial indexing system
- Administrative Divisions
- Vulnerability
- Exposure
- Hazard
- Risk (under validation)
- Losses
- National/Member States Data

Legend

Risk (under validation)

River Flood - Population

Risk

- 8 - 10
- 6 - 8
- 4 - 6
- 2 - 4
- 0 - 2

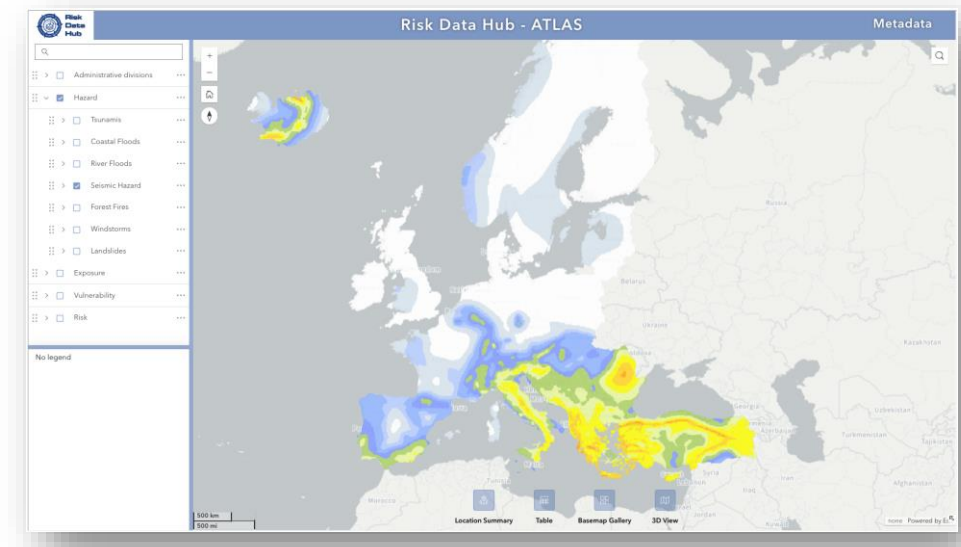
Metadata

Disclaimer

50 km
20 mi

Location Summary
Table
Basemap Gallery
3D View

ATLAS – Available Data



-  Landslide
-  Earthquake
-  Wildfire
-  Windstorm
-  Coastal Flood
-  River Flood
-  Tsunami
-  Extreme Heat

HAZARD

-  Cultural Heritage
-  Residential Buildings
-  Commercial Buildings
-  Population
-  Land use/cover
-  Critical Infrastructure

EXPOSURE



Composite Vulnerability Index

VULNERABILITY

RISK

Metadata



River Floods

Earthquakes

Tsunamis

Coastal Floods

Windstorms

Wildfires

Extreme Heat

Landslides

Vulnerability

ATLAS

River Floods

• **UNDRR Hazard Category:** Meteorological and hydrological

• **EM-DAT Classification Key:** nat-hyd-flo-riv

• **How to cite:** Baugh, Calum; Colonese, Juan; D'Angelo, Claudia; Dottori, Francesco; Neal, Jeffrey; Prudhomme, Christel; Salamon, Peter (2024): River flood hazard maps for Europe and the Mediterranean Basin region. European Commission, Joint Research Centre (JRC) [Dataset] doi: <https://doi.org/10.2905/1D128B6C-A4EE-4858-9E34-6210707F3C81>

• **Original dataset:** <https://data.jrc.ec.europa.eu/dataset/1d128b6c-a4ee-4858-9e34-6210707f3c81>

• **Publisher Name:** European Commission (EC), Joint Research Centre (JRC)

• **Publishing Year:** 2024

- Harmonized EU-wide data: 90 mt
- For 6 countries: up to 2 mt

↪ Risk Data Library Standard (RDLS) Metadata Datasets

Additional details	River flood hazard maps for Europe and the Mediterranean Basin region is a gridded data set representing inundation along the river network, for nine different flood return periods (from 1-in-10-years to 1-in-500-years). The input river flow data for the new maps are produced by means of the open-source hydrological model LISFLOOD, while inundation simulations are performed with the hydrodynamic model LISFLOOD-FP. The extent comprises most of the geographical Europe and all the river basins entering the Mediterranean and Black Seas in the Caucasus, Middle East and Northern Africa countries. Flood hazard maps are generated for river basins > 150km ² . Cell values indicate water depth (in m). The maps can be used to assess the exposure of population and economic assets to river floods, and to perform flood risk assessments. The dataset is created as part of the Copernicus Emergency Management Service. NOTE: this dataset is not an official flood hazard map (for details and limitations please refer to related publications).
Contact point: Email address	peter.salamon@ec.europa.eu
Contact point: Name	Peter Salamon
Dataset identifier	View
Dataset version	1
Description	Probabilistic modelling of river flood hazard
License	CC-BY-4.0
Publisher:Name	European Commission (EC), Joint Research Centre (JRC)
Publisher:URL	View
Risk Data Type	hazard

Resources

Coordinate reference system	EPSG:4326
Dataset identifier	View

EBA proposed amendments to EC Implementing Regulation on Pillar 3 disclosures under the CRR3

- The EBA proposes a proportionate ESG disclosure framework aligned with the EC initiative to simplify sustainability reporting
- Consultation launched on May 22, runs until August 22
- Template 5: Banking book –Climate change physical risk: Exposures subject to physical risk

• Examples of public data sources to identify geographical areas subject to climate change related include:

- a. The Risk Data Hub (RDH) of the Disaster Risk Management Knowledge Centre (DRMKC). Currently: windstorms, coastal & river flooding, wildfire, landslides, subsidence, earthquakes, tsunamis.*

Data needs for transition risk assessment

Financial data:

- Securities holdings (bonds, equities & fund shares)
- Loans

Firms:

- Specific sector classification and size of business segments
- Production process / greenhouse gas emissions (Scope 1/2/3)
- Transition plans

Real estate:

- Energy certificates of buildings

Sector-level data not ideal

- Approximations are needed
- In the case of climate risks, working at the sectoral (NACE) level can be misleading
 - High risk related to communicating the wrong message (that sectors might be at risk), which would be also a very strong assumption
 - Not credible that policymakers will allow entire sectors to default
 - In the EU taxonomy, a steel producer can be fully green
 - No sector fully at risk, taking approximations of entire sectors risky route
 - Not even very polluting companies fully at risk, when they have credible transition plans
 - Working at sector level might hide risk concentration
- Estimation methodologies soften these problems

A methodology to estimate Taxonomy-alignment and transition risk exposure of portfolios

Alessi and Battiston (IRFA 2022, WP 2023)



- First Top-down approach to estimate taxonomy-alignment and transition risk exposure of portfolios
- Makes use of standardized coefficients (TACs and TECs) by NACE sector of the obligor/investee company
- Can be applied to any portfolio, incl. SME lending, and whenever more granular info is not available

Taxonomy-alignment and transition risk:
a country-level approach

Alessi, L.
Battiston, S.

JRC Working Papers in Economics and Finance, 2023/12

First version of TAC elaborated in Alessi, Battiston, Melo and Roncoroni (JRC report 2019). <https://publications.jrc.ec.europa.eu/repository/handle/JRC118663>

Alessi and Battiston 2022, *Two sides of the same coin: Green Taxonomy alignment versus transition risk in financial portfolios*, *Int'l Review of Financial Analysis* with Excel tool available at <https://doi.org/10.1016/j.irfa.2022.102319>

Alessi and Battiston 2023, *Taxonomy alignment and transition risk: a country-level approach*, *JRC WP* with Excel tool available at <https://publications.jrc.ec.europa.eu/repository/handle/JRC135889>



Two sides of the same coin: Green Taxonomy alignment versus transition risk in financial portfolios[☆]

Lucia Alessi^{a,b,*}, Stefano Battiston^{c,d}

^a European Commission Joint Research Centre, Italy

^b CeBIS - Center for European Studies (Università degli Studi di Milano-Bicocca), Italy

^c University of Zurich, Switzerland

^d Ca' Foscari University of Venice, Italy

ARTICLE INFO

JEL classification:

G2

G3

G54

Keywords:

Greenness

Climate transition risk

Climate-related financial disclosures

EU Taxonomy

Green financial flows

ABSTRACT

We develop the first top-down method to estimate the greenness of financial portfolios, in terms of alignment to the EU Taxonomy for sustainable activities. We also develop a method to estimate, at the same time, the portfolio exposure to climate transition risk. We provide sector-level, standardized and transparent coefficients for both estimates, based on definitions of greenness and transition risk that are applicable across countries. We analyse the portfolios of Euro Area investors in 2022, based on the confidential Securities Holdings Statistics of the European Central Bank. We find that, overall, the greenness of Euro Area investors' portfolios is lower than their exposure to transition risk (2.8% vs. 11.7%).

Across financial institutions, we estimate greenness and exposure to transition risk, respectively, at 3.2% and 12% for investment funds, at 0.8% and 5% for banks and at 4.8% and 15.1% for insurers. Our analysis also shows that investors with large amounts invested in green activities can have at the same time large exposures to transition risk.

Thank you



© European Union 2026

Unless otherwise noted the reuse of this presentation is authorised under the [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/) license. For any use or reproduction of elements that are not owned by the EU, permission may need to be sought directly from the respective right holders.

