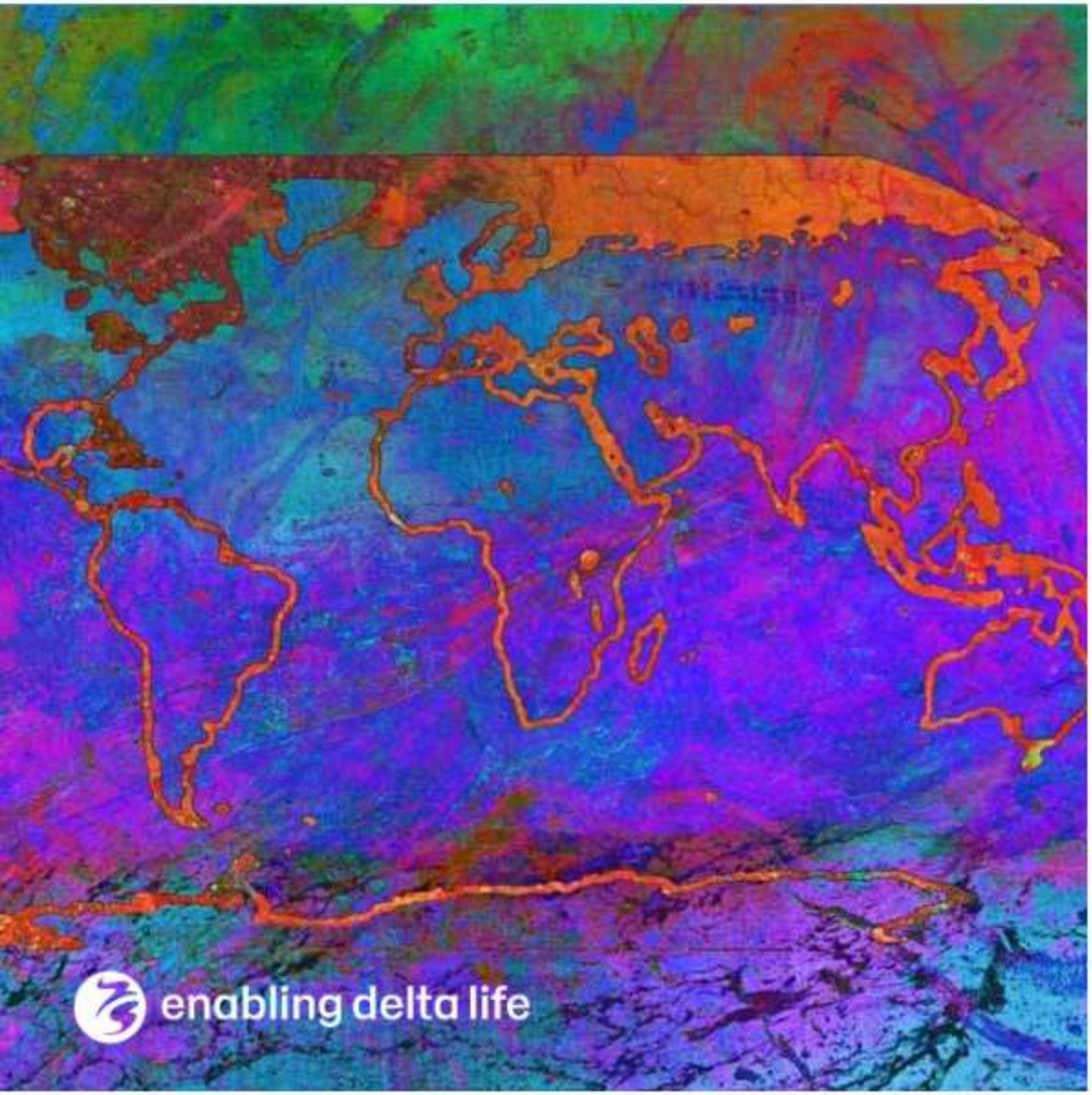

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CLIMAAX climate ready regions

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CLIMate risk And vulnerability Assessment framework and toolboX

Preparing for regional Climate Risk assessments

Frederiek Sperna Weiland
Bart van den Hurk

Regional Climate Risk Assessments are very diverse

Many challenges

Multiple
data sources

Our motto:
standardized flexibility

Many regions

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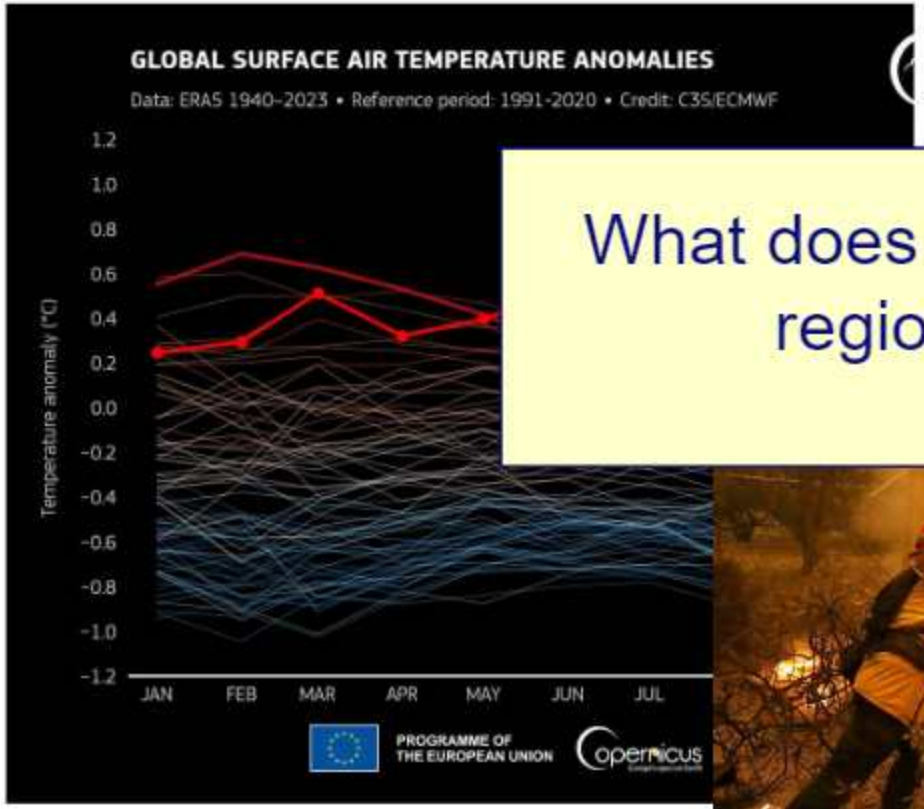
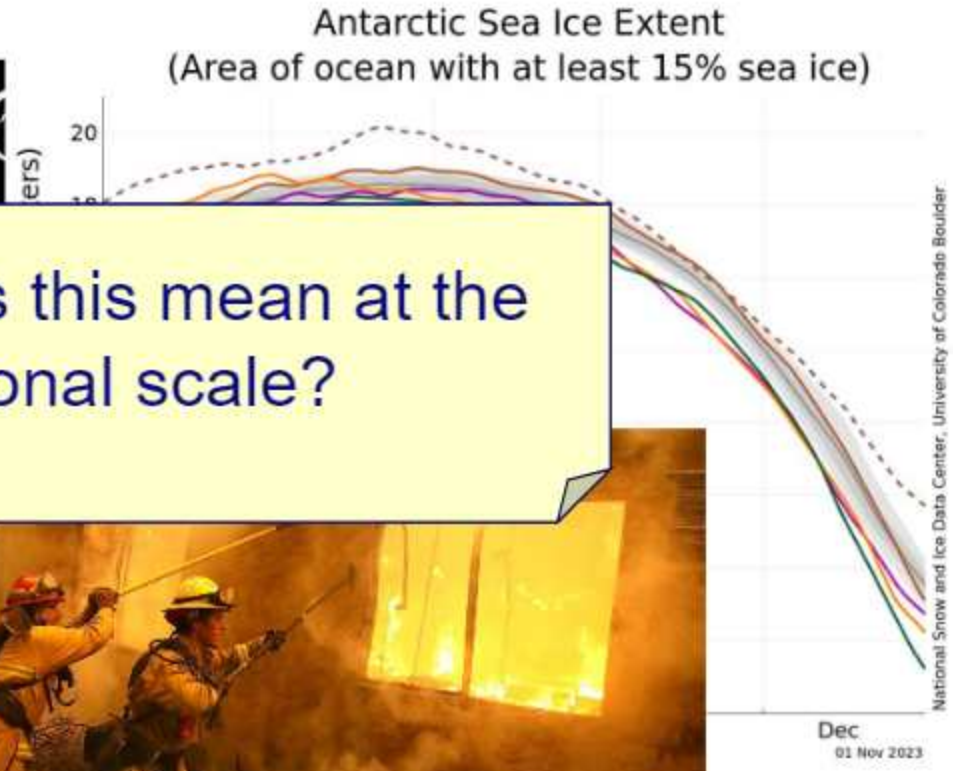
Part of the
EU Mission on
Adaptation

The year 2023





What does this mean at the regional scale?

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The pillars of CLIMAAX

Framework for regional CRA
→ supporting civil protection and climate adaptation

Toolbox and pilots
→ testing data needs and diversity of requests

Cascading fund
→ Financial support for >50 regions

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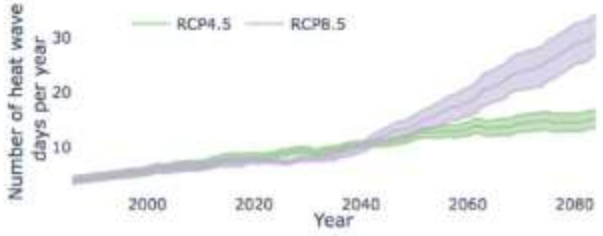
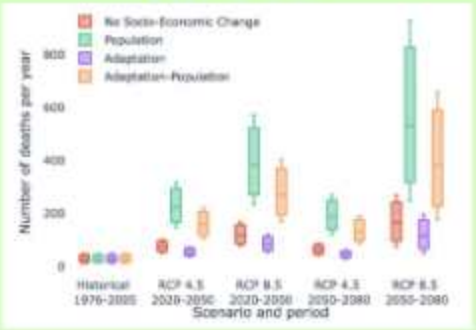
PRESENT RISKS

INCREASE OF IMPACTS DUE TO CLIMATE CHANGE



FUTURE RISKS



METHODOLOGICAL APPROACH for REGIONAL/LOCAL SCALE

ADAPTATION strategies to increase regional Resilience and Improve local Risk Management Plans

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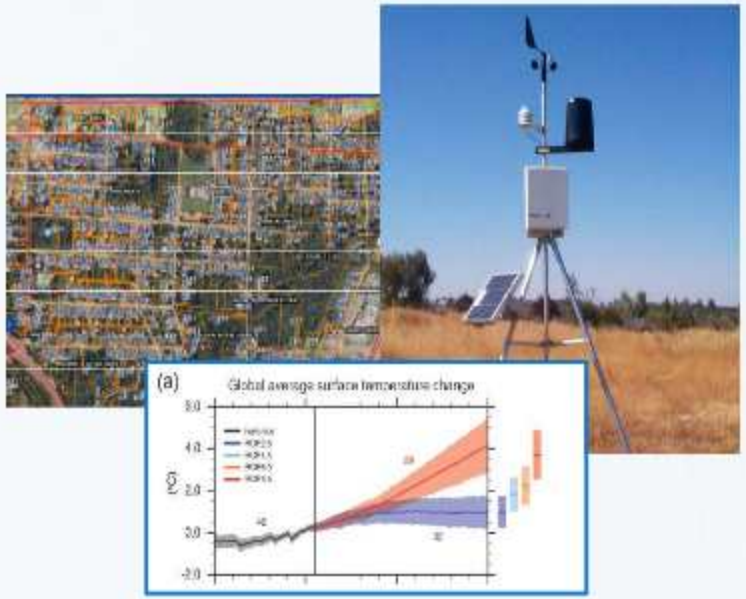
Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.

Requirements for a regional CRA

- Represent local characteristics (at high resolution)
- Represent local climate variability
  - *Regional climate trends*
  - *Local weather characteristics*
- Forward looking for hazard, exposure and vulnerability
- → Regional expertise is required



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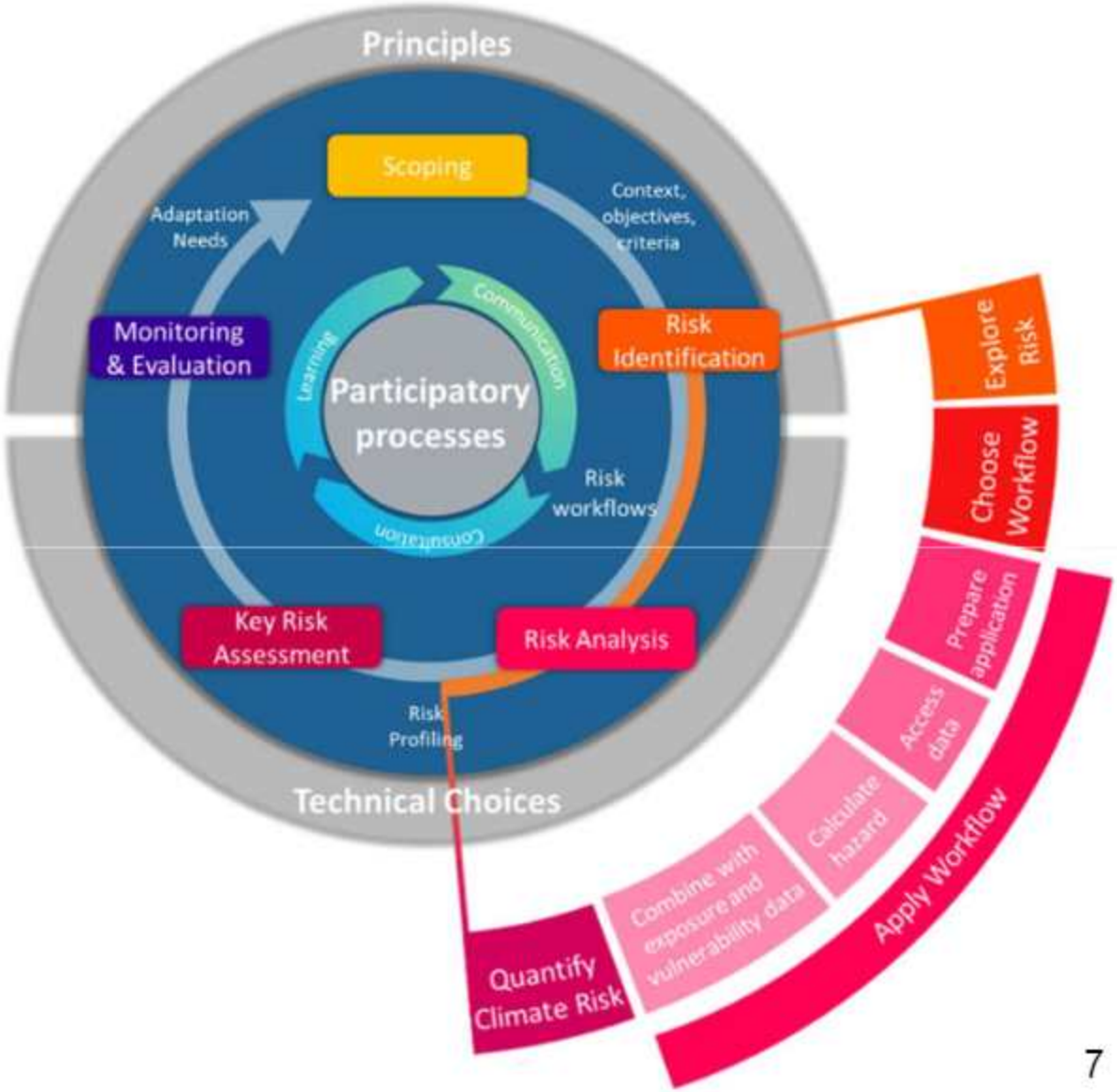
CRA Framework

- Setting the context
- Selection of hazards
- Use of available data
- Selection of indicators
- Assessment of risks



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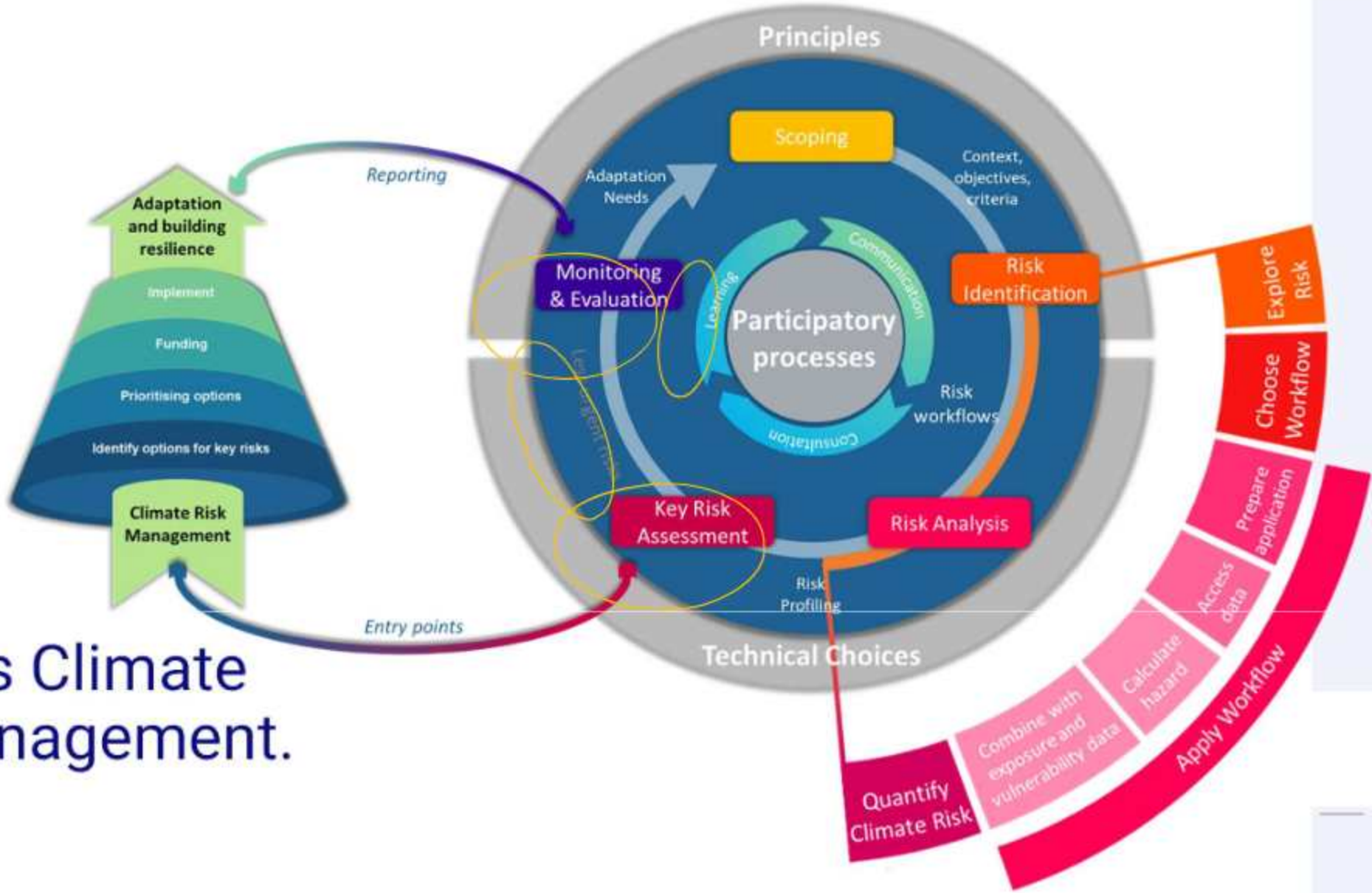
Towards Climate Risk Management.



The pillars of CLIMAAX

Toolbox and pilots
→ testing data needs and diversity of requests

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The CRA toolbox principles

- Accomodate risk analysis at high spatial resolution
- Standardised flexibility
  - Global and local data
- Forward looking for hazard, exposure and vulnerability
- Co-production

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Hazards included

- Coastal and riverine flooding
- Wildfire
- Heatwaves
- Heavy precipitation
- Droughts
- Snow storms

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First design: The recipes

Exploring data by Hazard, Exposure and Vulnerability → Risk

Connecting to a.o.:

- Copernicus DataStore
- JRC RiskDataHub
- EEA ClimateAdapt

handbook.climaax.eu

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Hazard data

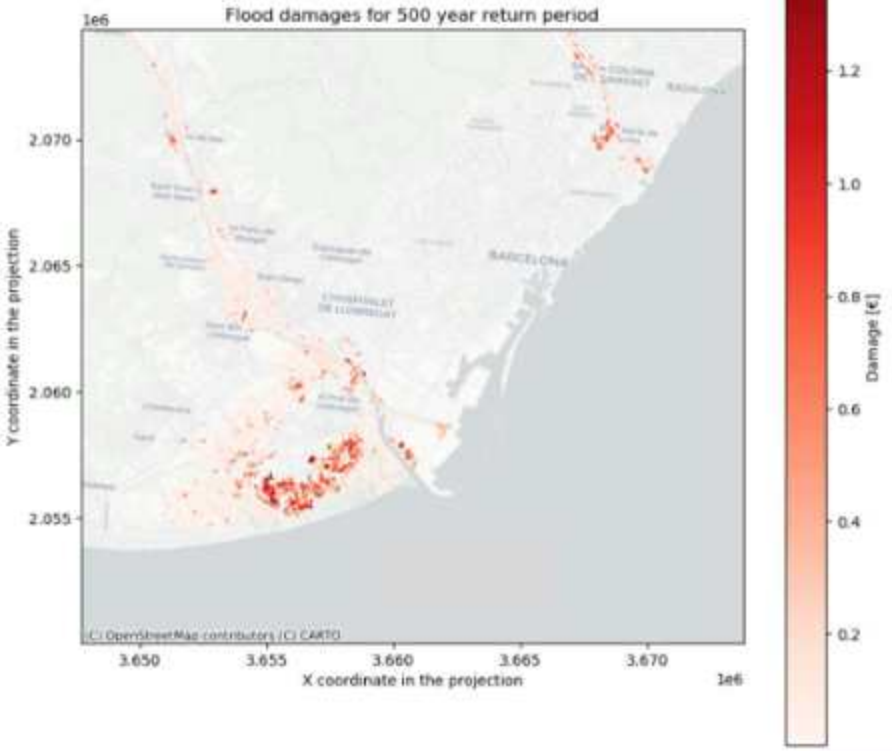
The dowloaded storm footprints can be visualised to get an overview of what it in the dataset. First, we need to open the storm footprint from the downloaded zipfile. Then we change the dimension from latitude and longitude to y and x so we can work with and manipulate the data later. Then, we need to set the CRS of the dataset since that has not be predefined by the Copernicus Climate Data Store. Before plotting we need to select the right variable to plot ('FX') and specify the band of interst, in this case there is only one so that is easy (z=1)

```
with ZipFile(f"{data_dir}/storm.zip") as zf:

    # Let's get the filename first
    file = zf.namelist()[0]

    # And now we can open and select the file within Python
    with zf.open(file) as f:
        windstorm_europe = xr.open_dataset(f)

windstorm_europe = windstorm_europe.rename({'Latitude': 'y','Longitude': 'x'})
windstorm_europe = windstorm_europe.rio.set_spatial_dims(x_dim="x",y_dim="y", inplace=True)

windstorm_europe.rio.write_crs(4326, inplace=True)

windstorm_europe = windstorm_europe['FX']['z'==1]

#plot
windstorm_europe.plot()
plt.title('Windstorm across Europe')
```

```
Text(0.5, 1.0, 'Windstorm across Europe')
```

First design: The recipes

- Calculate risk
- Exploring CRA outcomes



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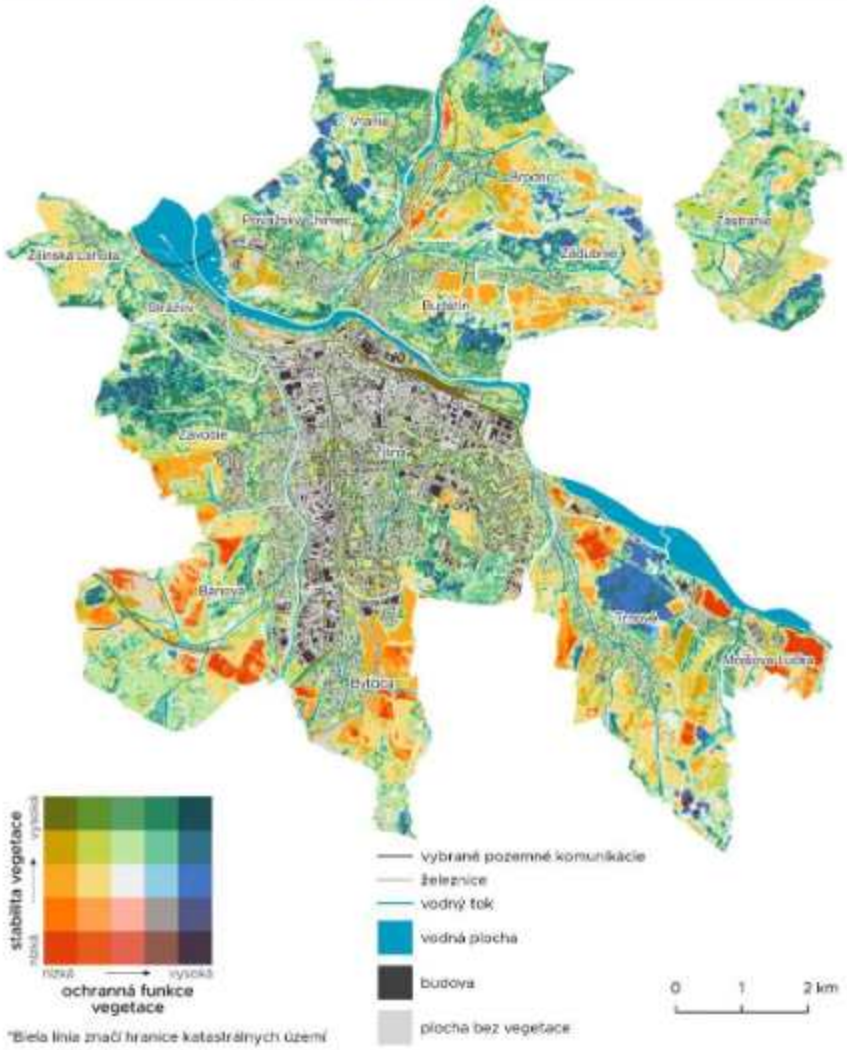
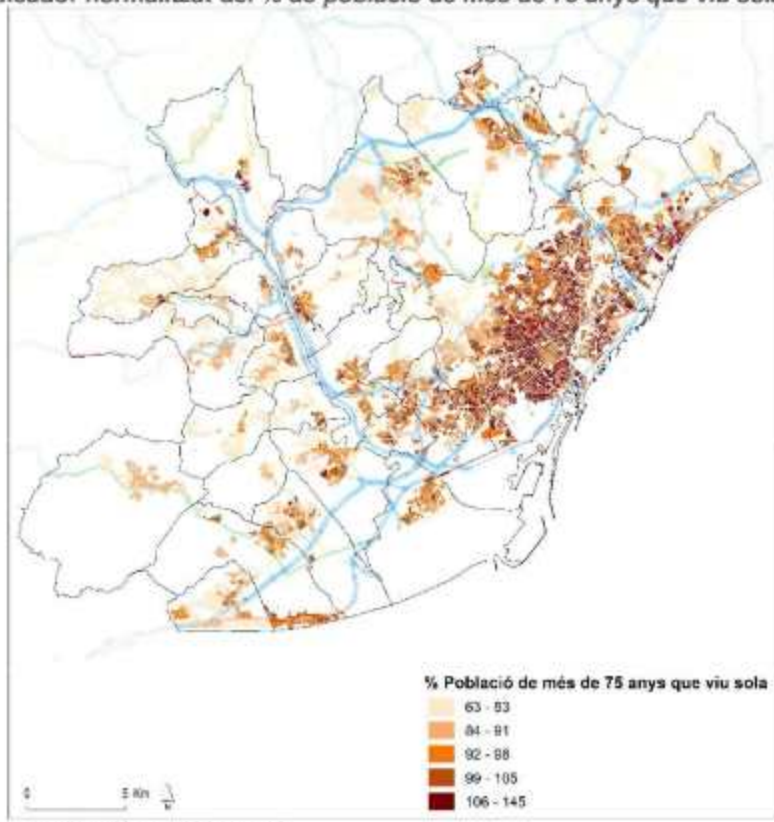
Žilina city vegetation



*Biela línia značí hranice katastrálnych území

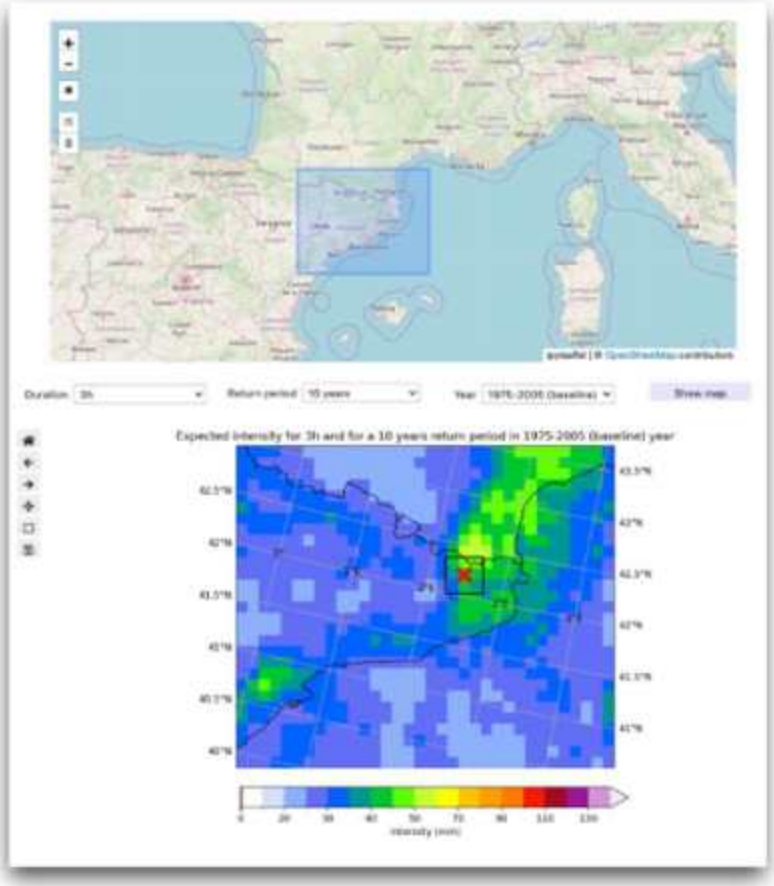
% of Population over 75 years that lives alone in Barcelona Metropolitan Area (2018): IERMB from IDESCAT

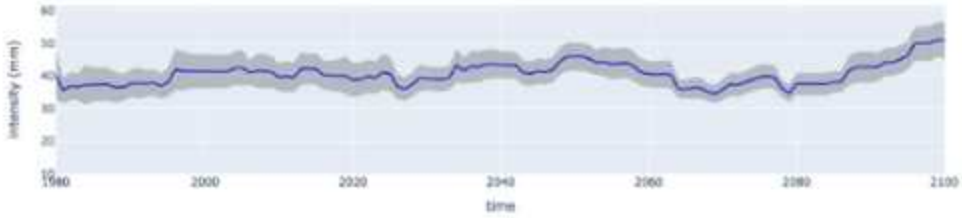
Mapa 3.10. Indicador normalitzat del % de *població de més de 75 anys que viu sola*. 2018.



Nota: Mètode de normalització: μ = 100 i σ=10.
Font: IERMB a partir de Padró municipal d'habitants, IDESCAT.

High intensity rainfall workflow - visualisation





Rainfall intensity (mm) for 3h

Frequency	2005	2050	2099
2	23.64	28.21	35.09
5	33.81	38.84	42.09
10	42.47	45.97	51
25	56.22	64.76	63.1
50	68.95	61.35	72.73
100	84.2	67.9	82.89
200	102.52	74.42	93.64
500	132.59	83.02	108.83

Access and support

- Access to CRA framework
- Access to toolbox:
  - Viewer
  - Online iPython Notebooks
  - Download and modification of notebooks
- Helpdesk for technical support

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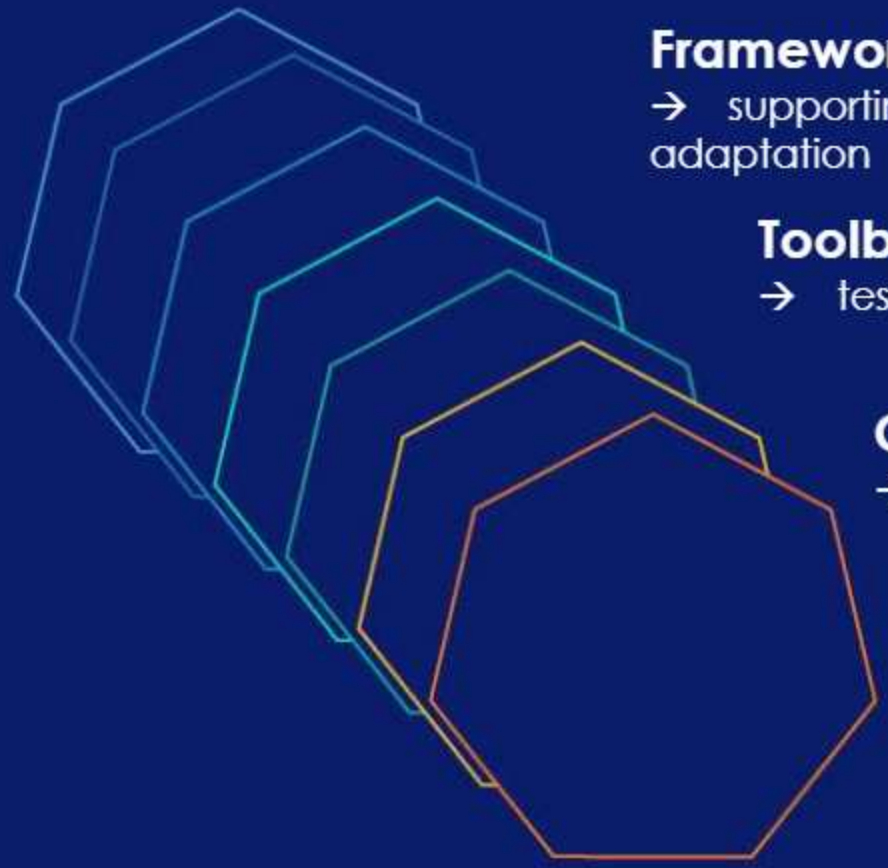
What do we want to learn from this?



Framework for regional CRA

→ supporting civil protection and climate adaptation

Toolbox and pilots

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Cascading fund

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Synthesis of regional CRAs

Lessons to be learned

- Finetuning the regional support service
- Exploit the market potential
- CRA standardization and connection to European policies

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