JRC PESETA III project

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JRC PESETA III

Projection of Economic impacts of climate change in sectors of the EU based on bottom-up analysis

Which are the most important climate impacts?

Is there a regional pattern in impacts?

How much climate impacts are avoided at 2ºC warming?

Policy context and Purpose

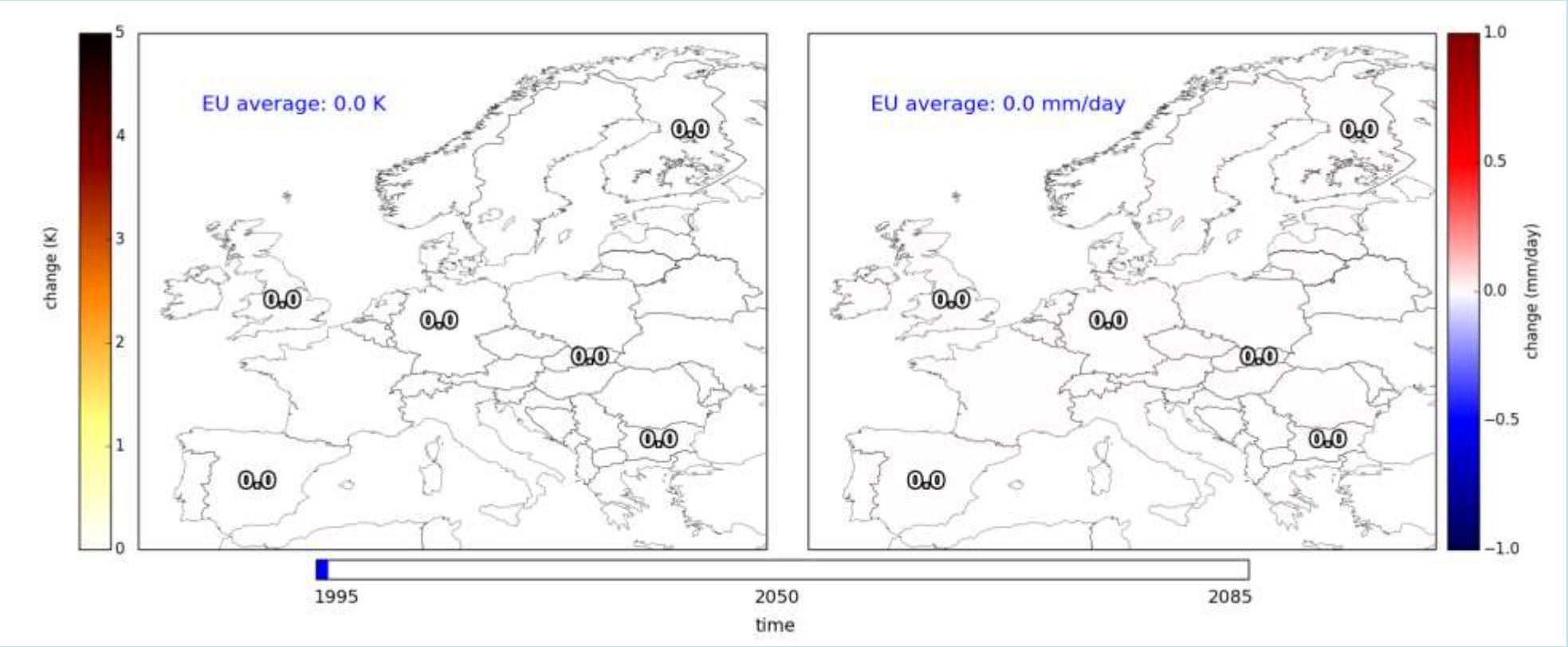
- 2015 Paris Agreement; 2015 Sendai Framework
- EU Adaptation Strategy; DG CLIMA's mid-century strategy
- Better understanding of possible consequences of climate change for Europe.

Strengths of PESETA approach

- Results based on bottom-up, process climate impact models
- Consistency (common climate scenarios)
- Coupling with sectoral economic model

Future climate heterogeneity in the EU

Temperature *Precipitation*



Derived from regional climate projections based on Reference Concentration Pathway RCP8.5

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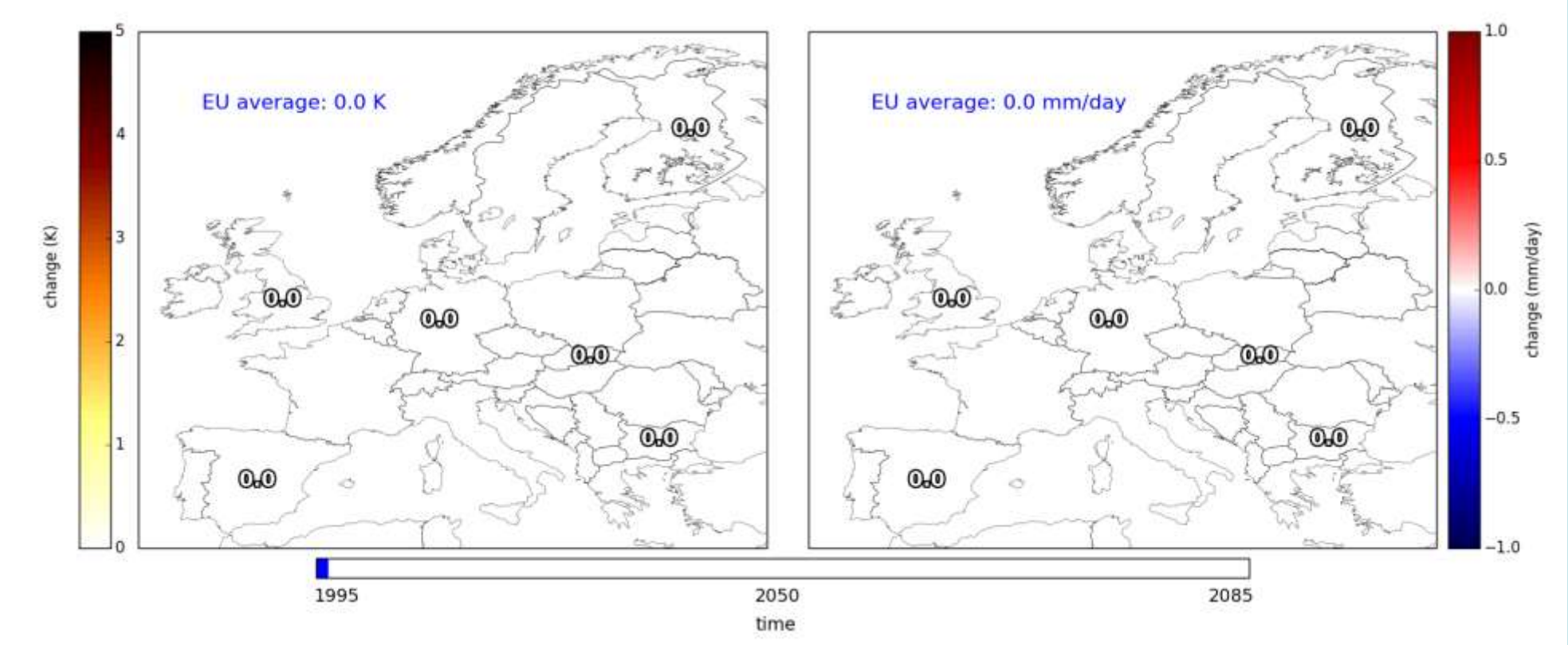
Future climate heterogeneity in the EU

Temperature *Precipitation*



Derived from regional climate projections based on Reference Concentration Pathway RCP8.5

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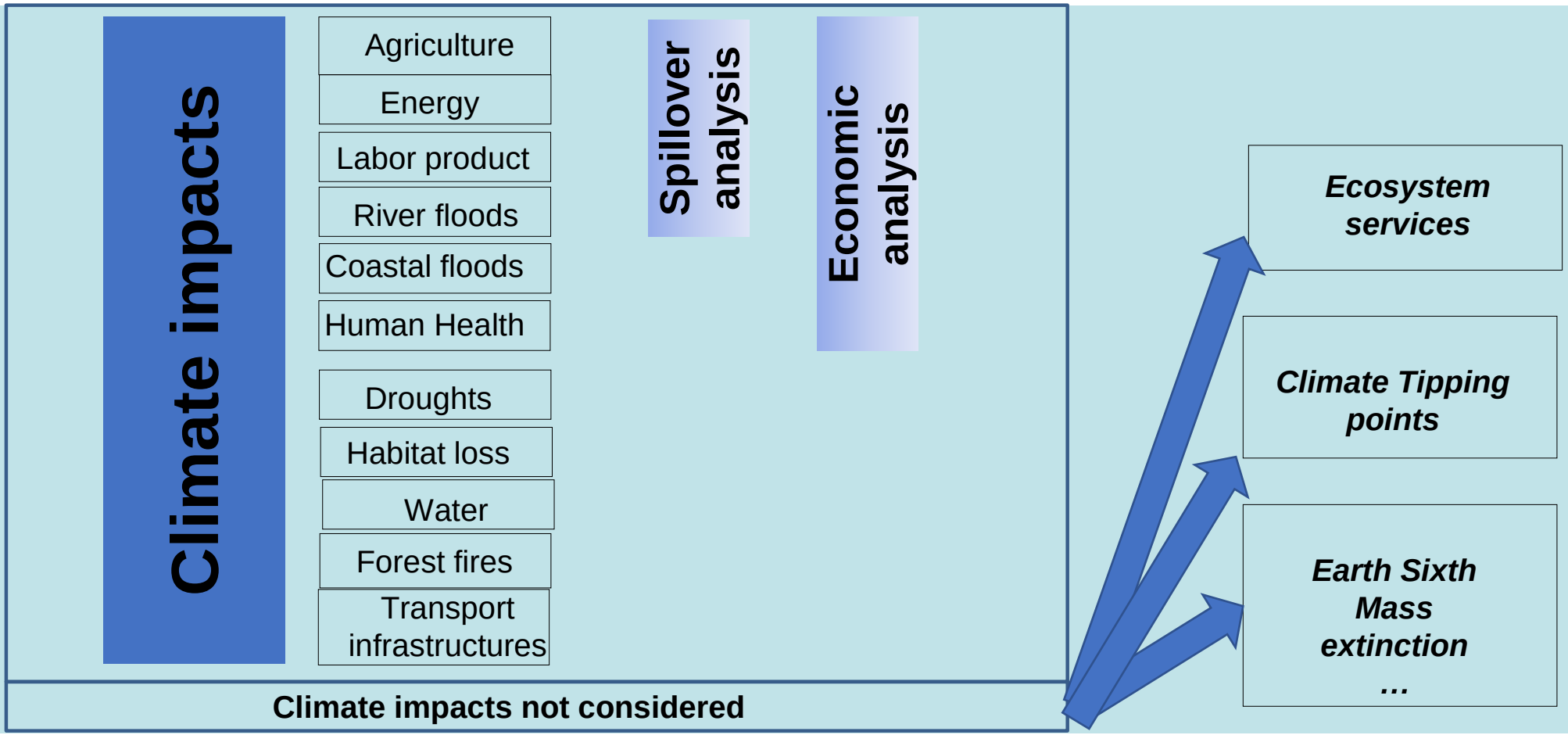
Climate scenarios

RCP8.5, EUROCORDEX climate runs (5 regional climate runs)

Two warming scenarios (relative to pre-industrial level)

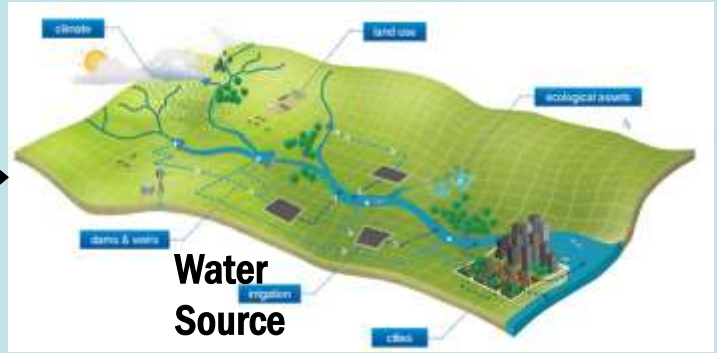
- **High warming scenario** (or reference scenario), end of the century
- **2ºC scenario**

Climate impact sectors



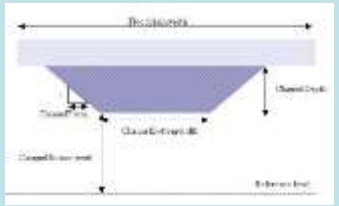
Impact modelling

high-resolution climate information



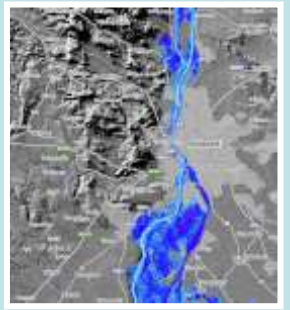
data on soils, land cover, river basins, ...

data on river dimensions, discharges, etc



Hazard analysis

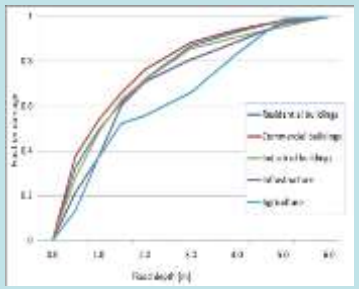
Hazard



Impact

Exposure

Vulnerability



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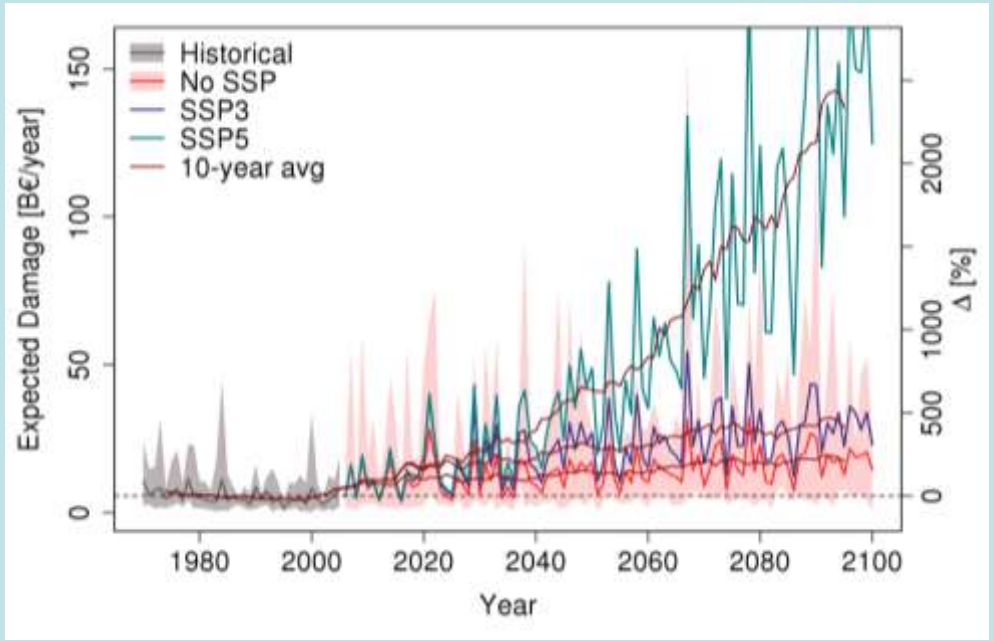
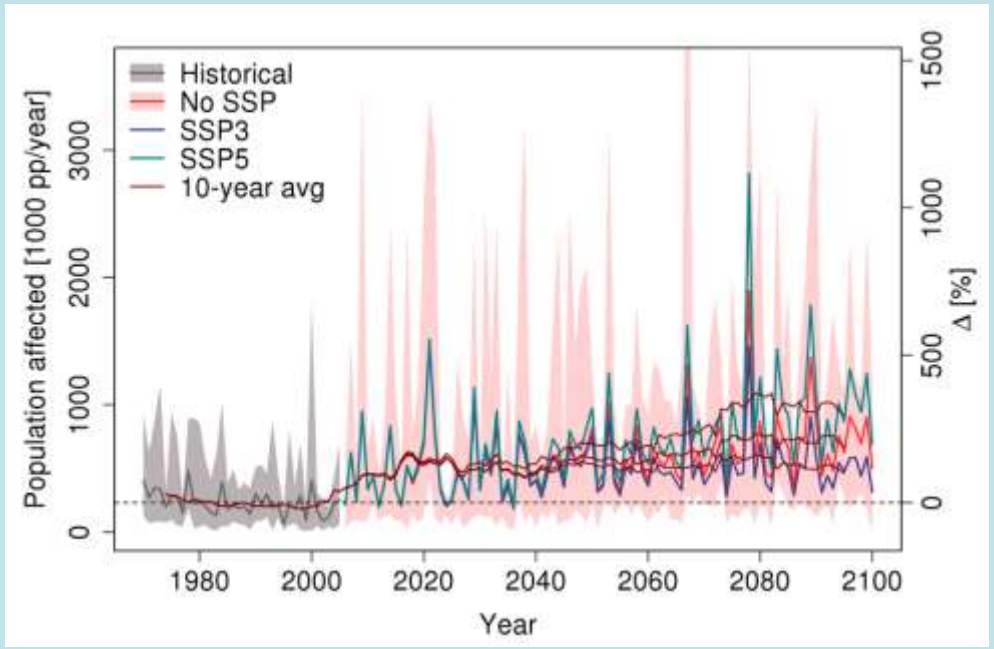
Impact modelling: river flooding



Expected annual damage from river flooding



Expected annual people exposed to river flooding

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Economic analysis (1/2)

Preliminary results (for the 6 impacts areas considered in the economic analysis)

- **The most important climate impacts**

  Heat-related mortality seems to be the largest single cause of welfare loss across the EU. The next largest welfare losses are due to coastal flooding, declines in labour productivity, agriculture and, lastly, river flooding

- **Damages avoided at 2°C warming**

  A large share of the welfare losses could be largely avoided under a 2°C scenario

Economic analysis (2/2)

- **Regional pattern of the project impact areas: the North-South divide**

  Clear North-South divide in the regional distribution of climate impacts across the EU, particularly, regarding heat-related human mortality, labour productivity, water resources, habitat loss, energy demand for cooling and forest fires

- **Spillover effects from the rest of the world**

  For 4 impact areas (residential energy demand, river flooding, labour productivity and agriculture), additional welfare impacts in the EU associated to changes in trade flows due to climate impacts occurring in third countries. The transboundary effect is estimated to increase the EU welfare loss by 20%

Next steps

- JRC PESETA IV
  - *Additional climate runs, with focus on 1.5ºC, 2ºC and 3ºC (4ºC) and 2050*
  - *Improvement regarding coverage of impacts (3 new areas: human health -heat and cold mortality-, forest ecosystems and windstorms);*
  - *For some sectors, cost-benefit analysis of adaptation*
  - Further integration across JRC models.

- Fundamental unknowns about impacts (e.g. ecosystem services, climate tipping points, human health impacts, etc)
- More research needed also for adaptation policy

Thank you!

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