



Presentation of ESM2025

EU-H2020 funded project



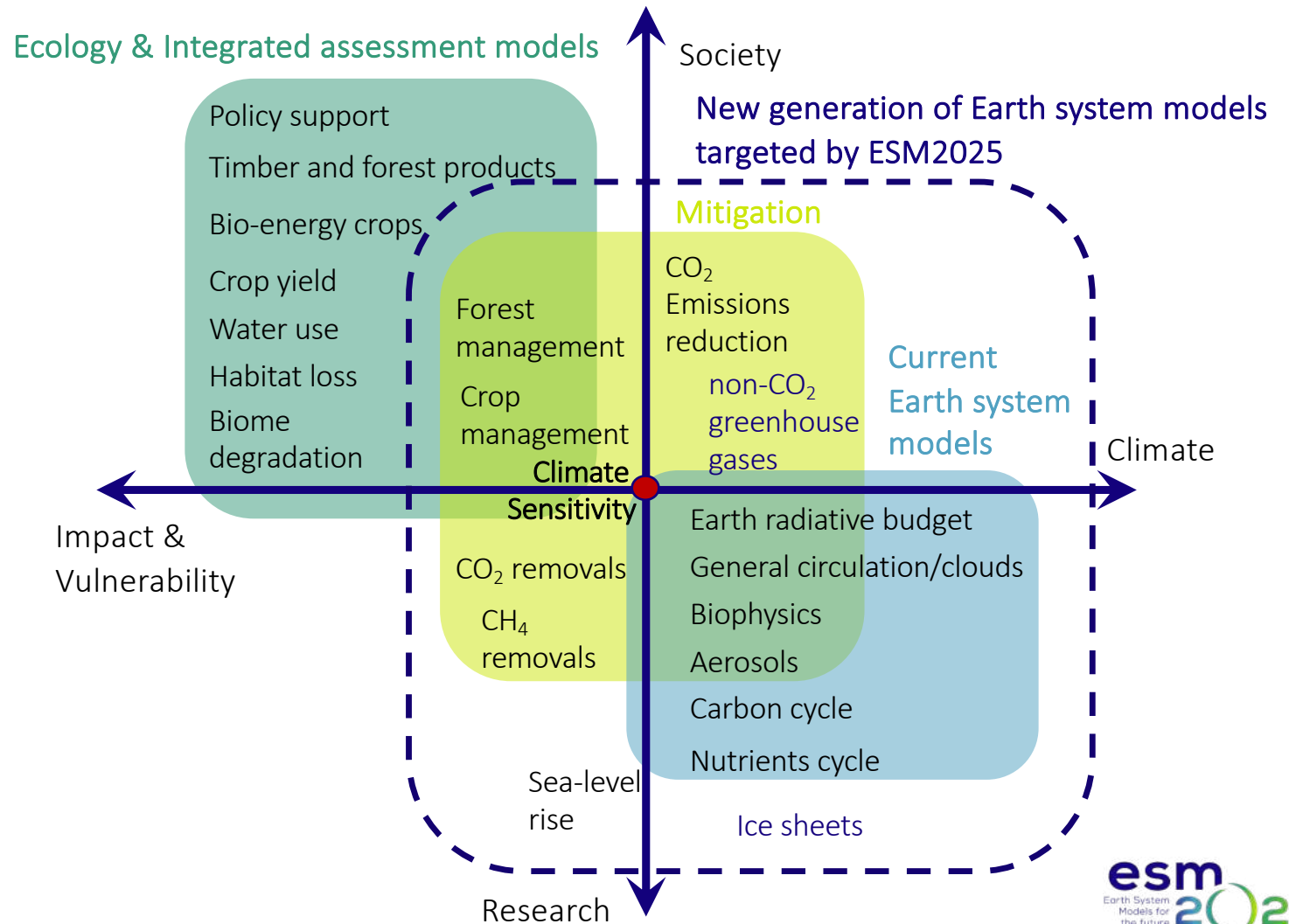
This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement n° 101003536



Main goals

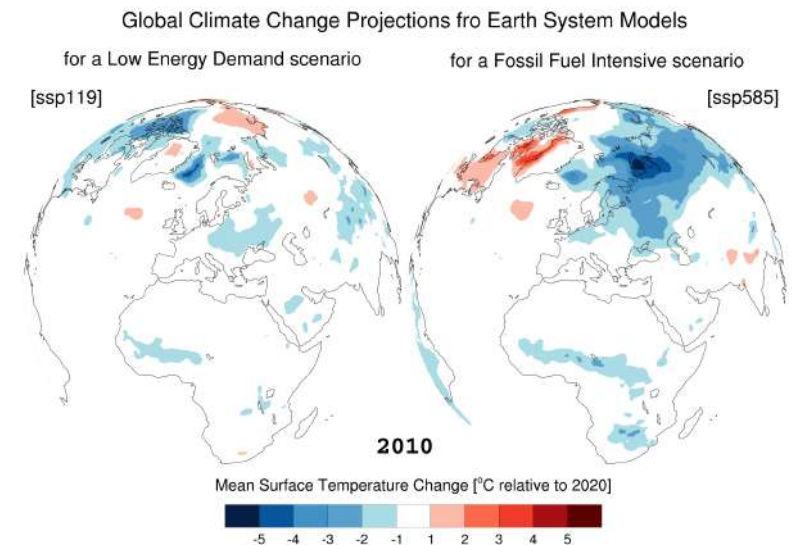
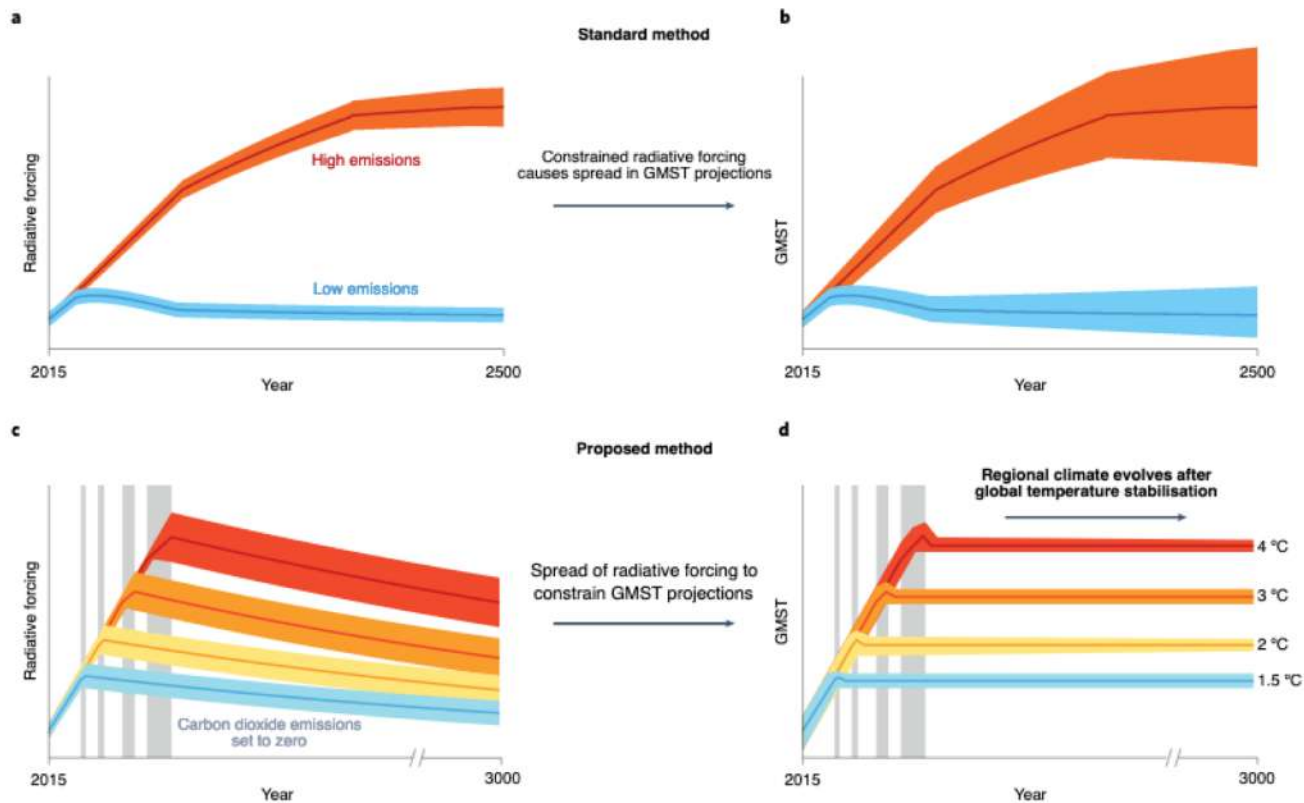
ESM2025 ultimate goal

- ▶ to develop a novel generation of Earth system models tailored to deliver underpinning scientific support on mitigation actions targeting a successful realisation of the Paris Agreement.



Long-term implication of the Paris Agreement

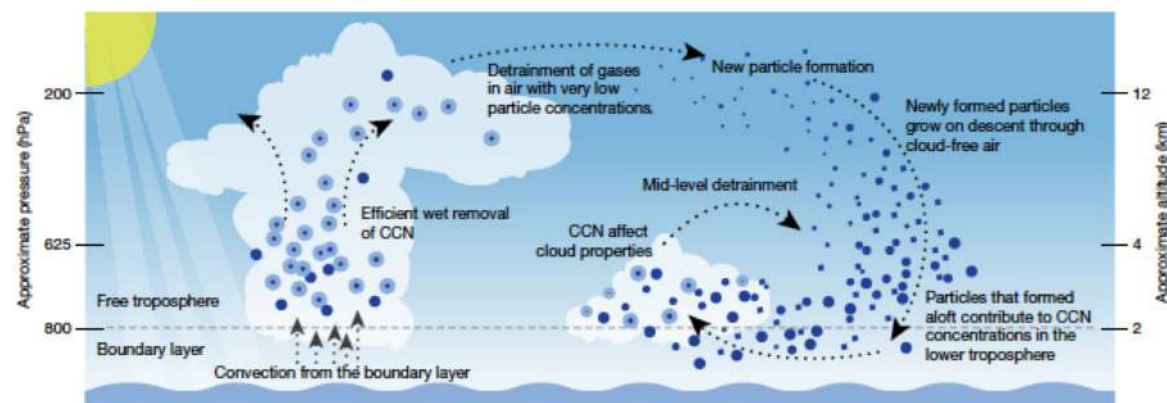
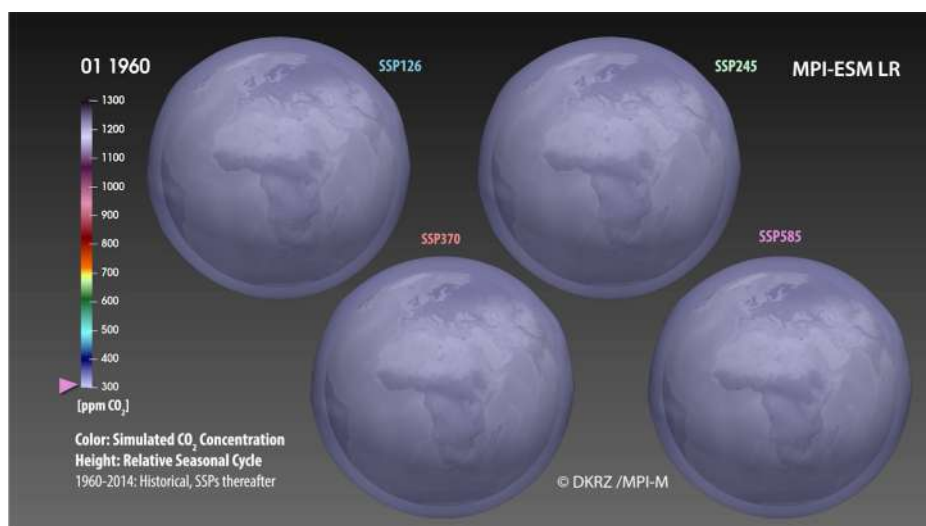
- Move towards emission-driven modelling (ZEC, LongRunMIPs, etc)



⇒ A new framework of model experiments is needed to increase our understanding of climate stabilization and its impacts.

Improve the representation of Earth's system feedbacks

- Develop the coupling between realms AND not only the realm themselves



Williamson et al., 2019 Nature

⇒ Uncertainties from biogeochemical feedbacks are poorly integrated/represented in the current generation of ESMs

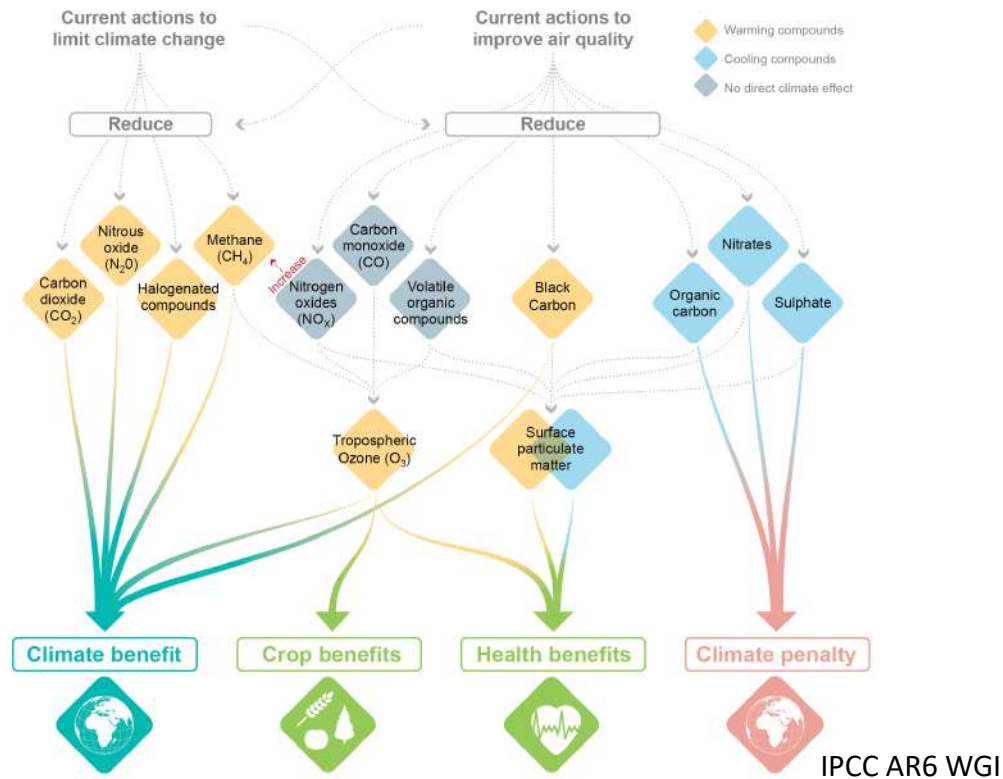
⇒ The chain of processes from emissions to clouds and/or radiative feedbacks is not represented in the current generation of models

Bridge the gap between modelling platforms

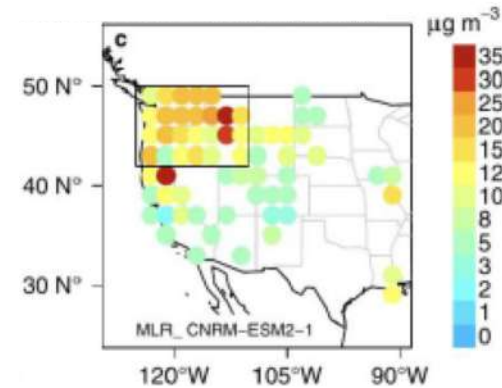
- Improve linkages between climate change (ESMs) and air quality (CTMs)

FAQ 6.2: Limiting climate change and improving air quality?

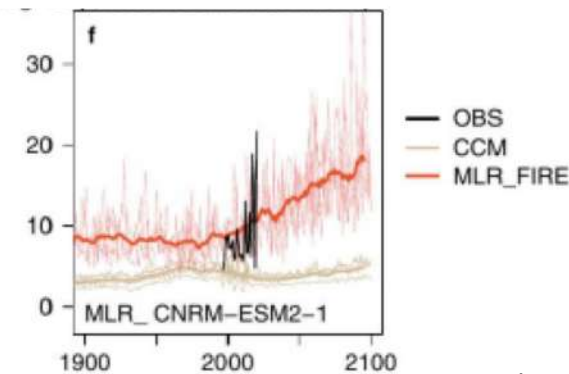
Climate change and air quality are so intimately linked that addressing one issue can affect the other one.



PM2.5 projection in ssp585



⇒ The level of integration between climate change & air quality is rather poor in the current generation of ESMs



⇒ Science-based information guiding air quality policy may support ambitious climate policies (short-term benefits on health)

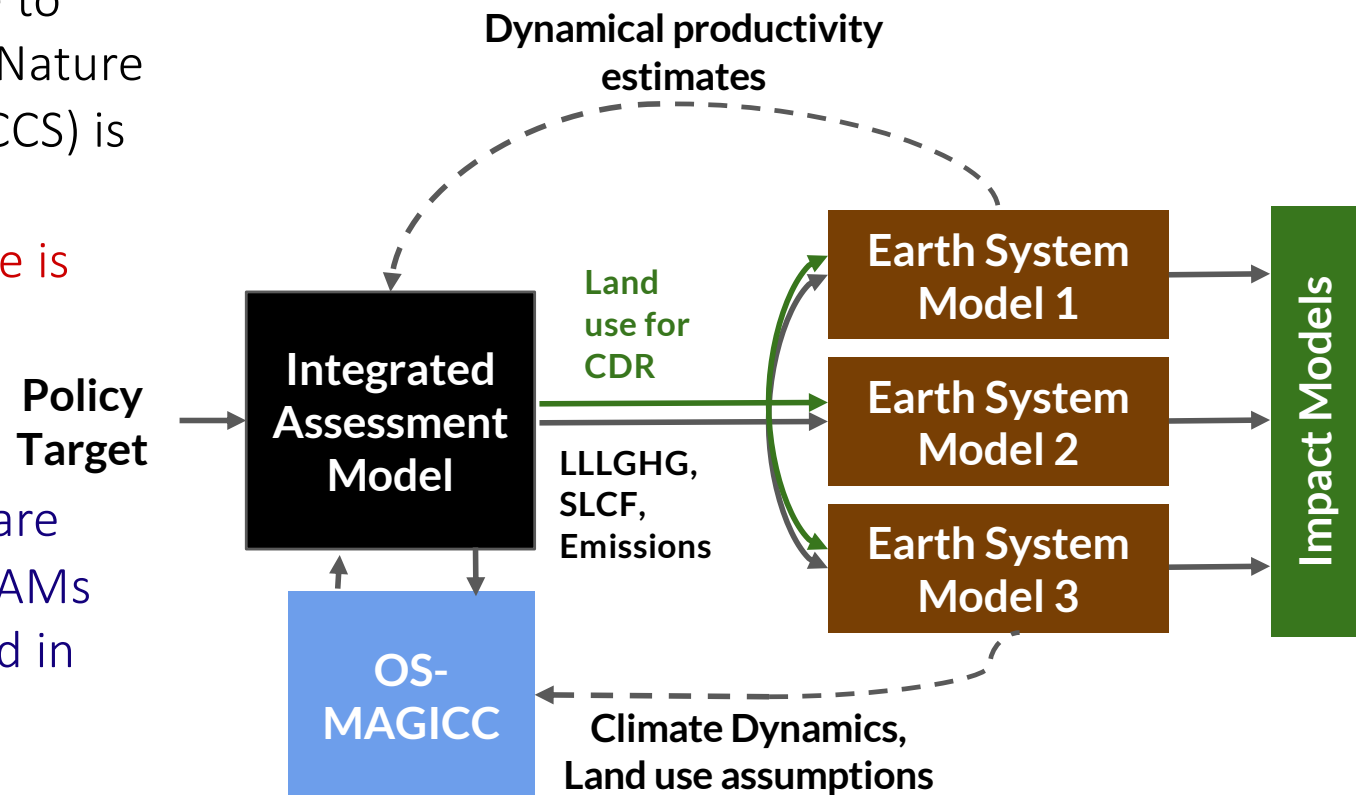
Xie et al., in revision PNAS

Bridge the gap between modelling platforms

- Improve the geophysical representation of the land between ESMs and IAMs

The capacity and the resilience to climate change of Land-based Nature based solutions (afforestation/BECCS) is one of the largest mitigation uncertainty **BUT our confidence is currently NOT informed by comprehensive models**

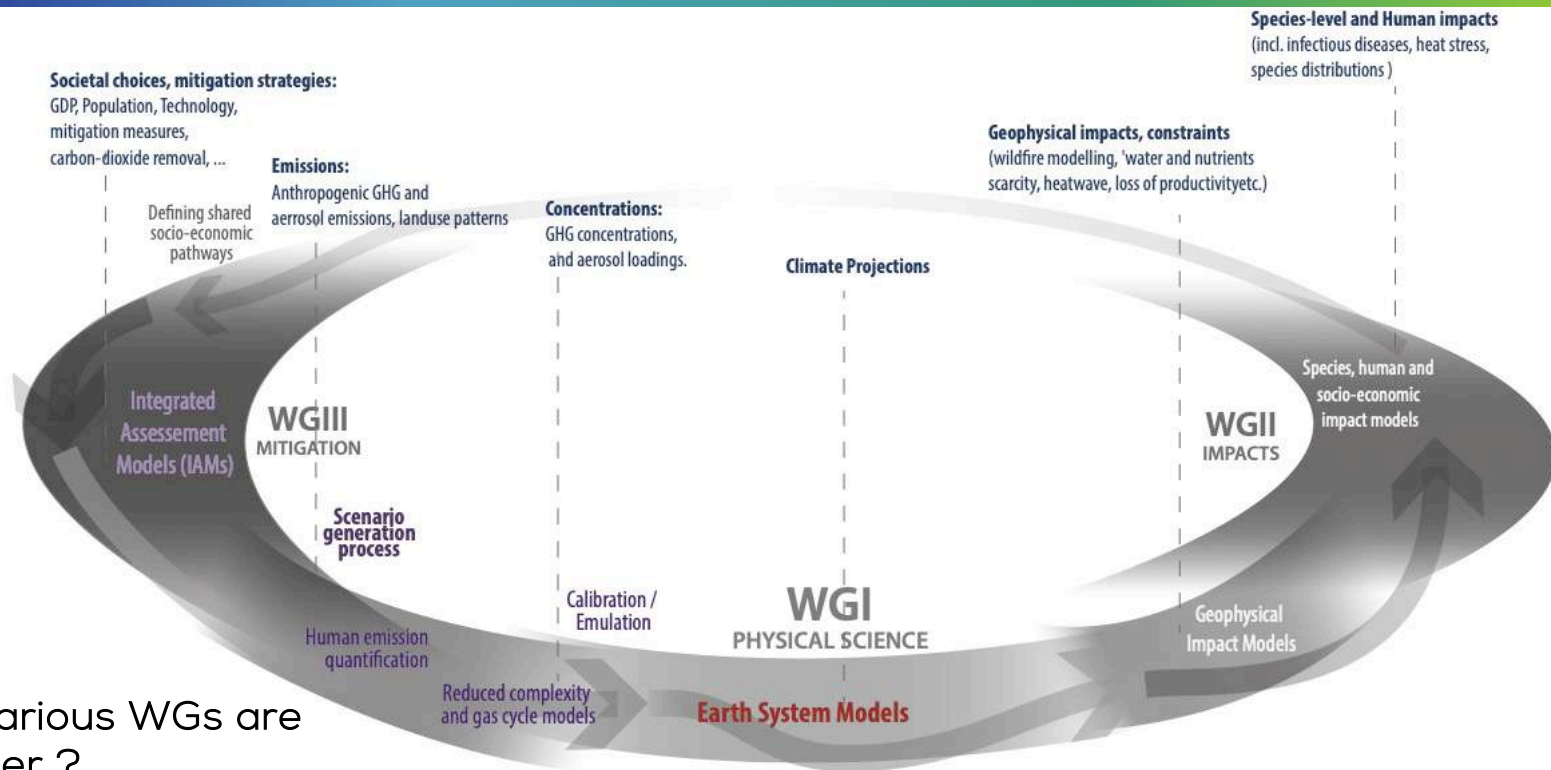
- ⇒ The geophysical properties are NOT taken into account by IAMs
- ⇒ The NBS are not represented in ESMs



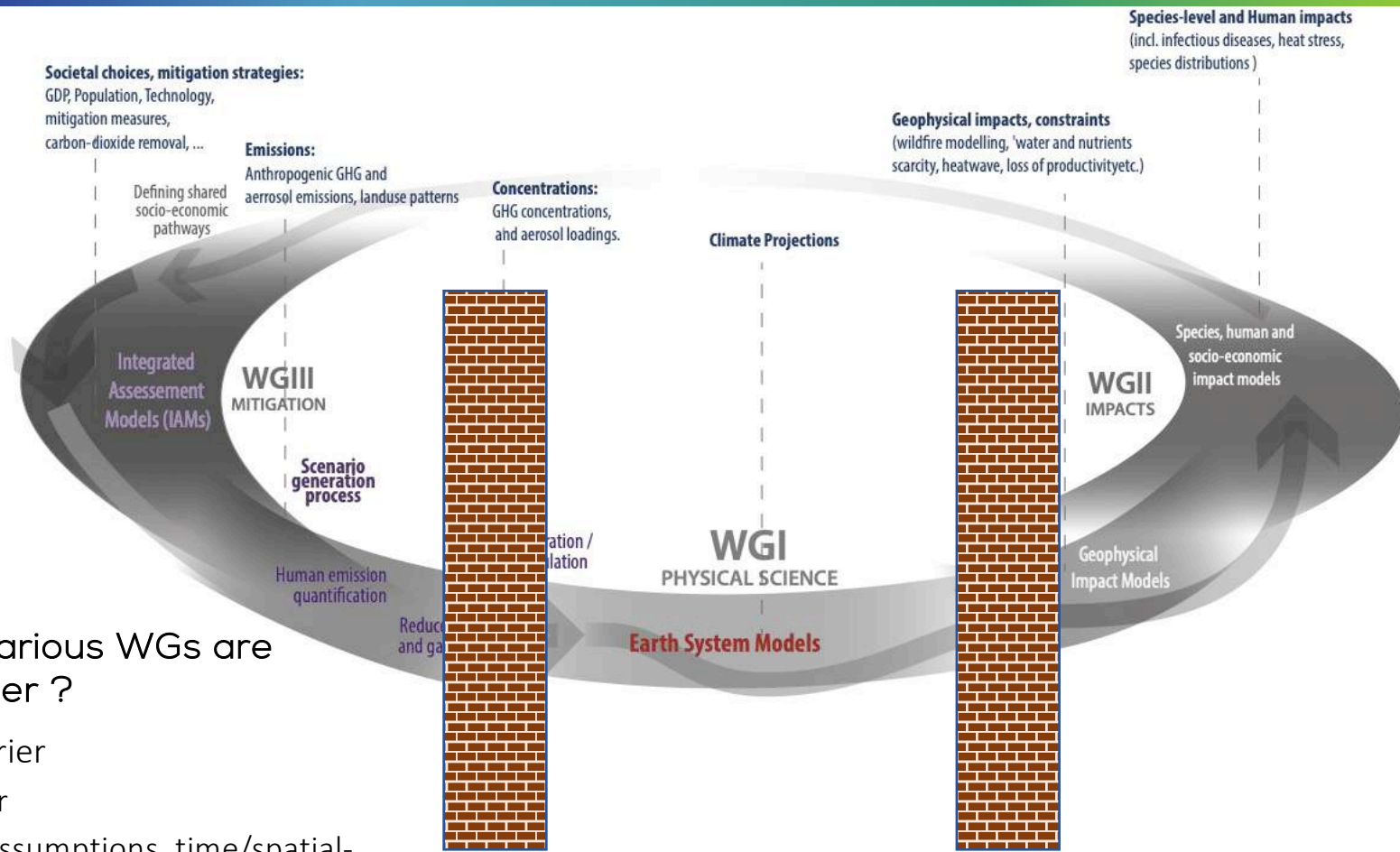


ESM2025 & international initiatives

IPCC and WCRP lighthouse activities
Our proposal to move forward



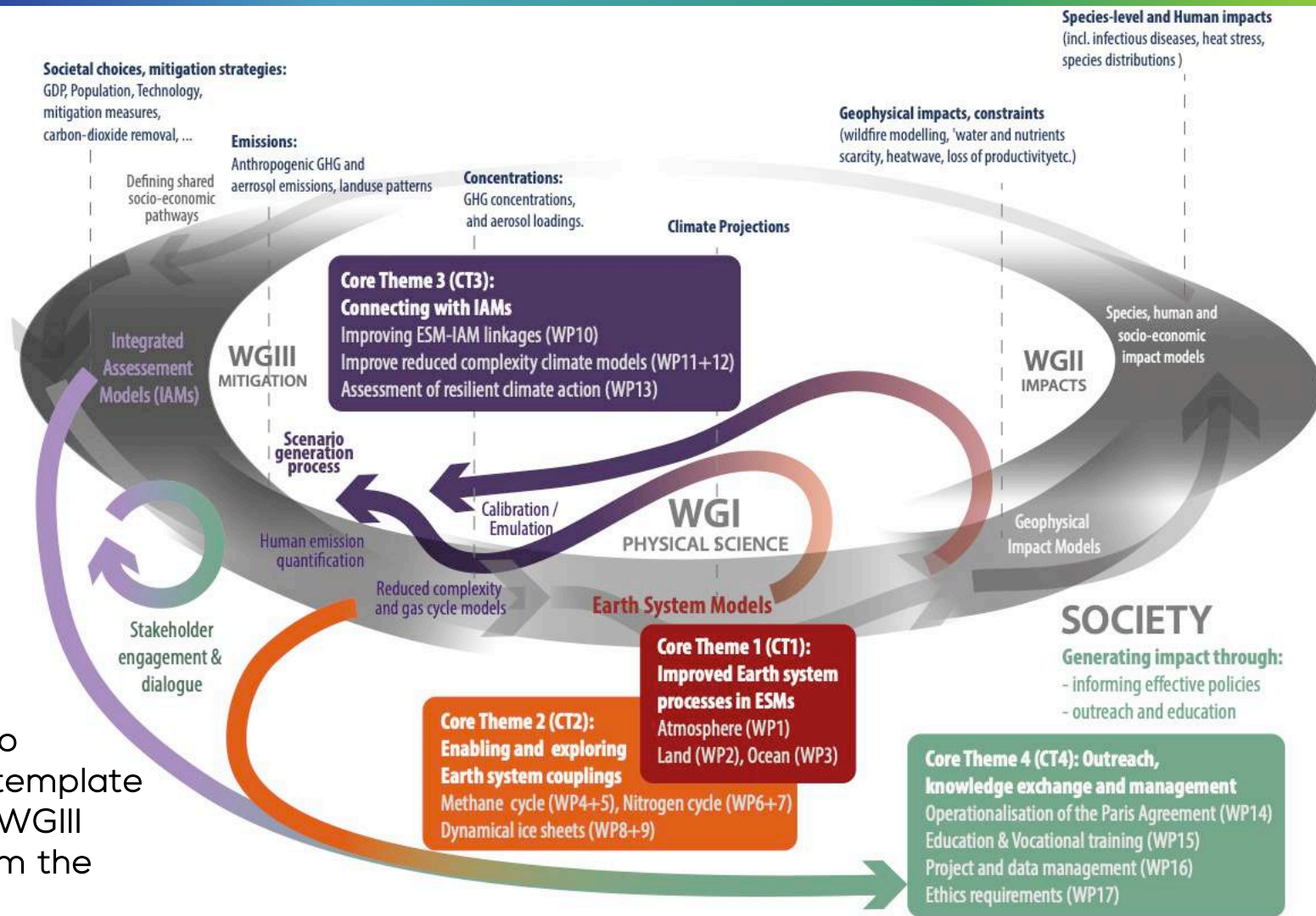
How well the various WGs are working together ?

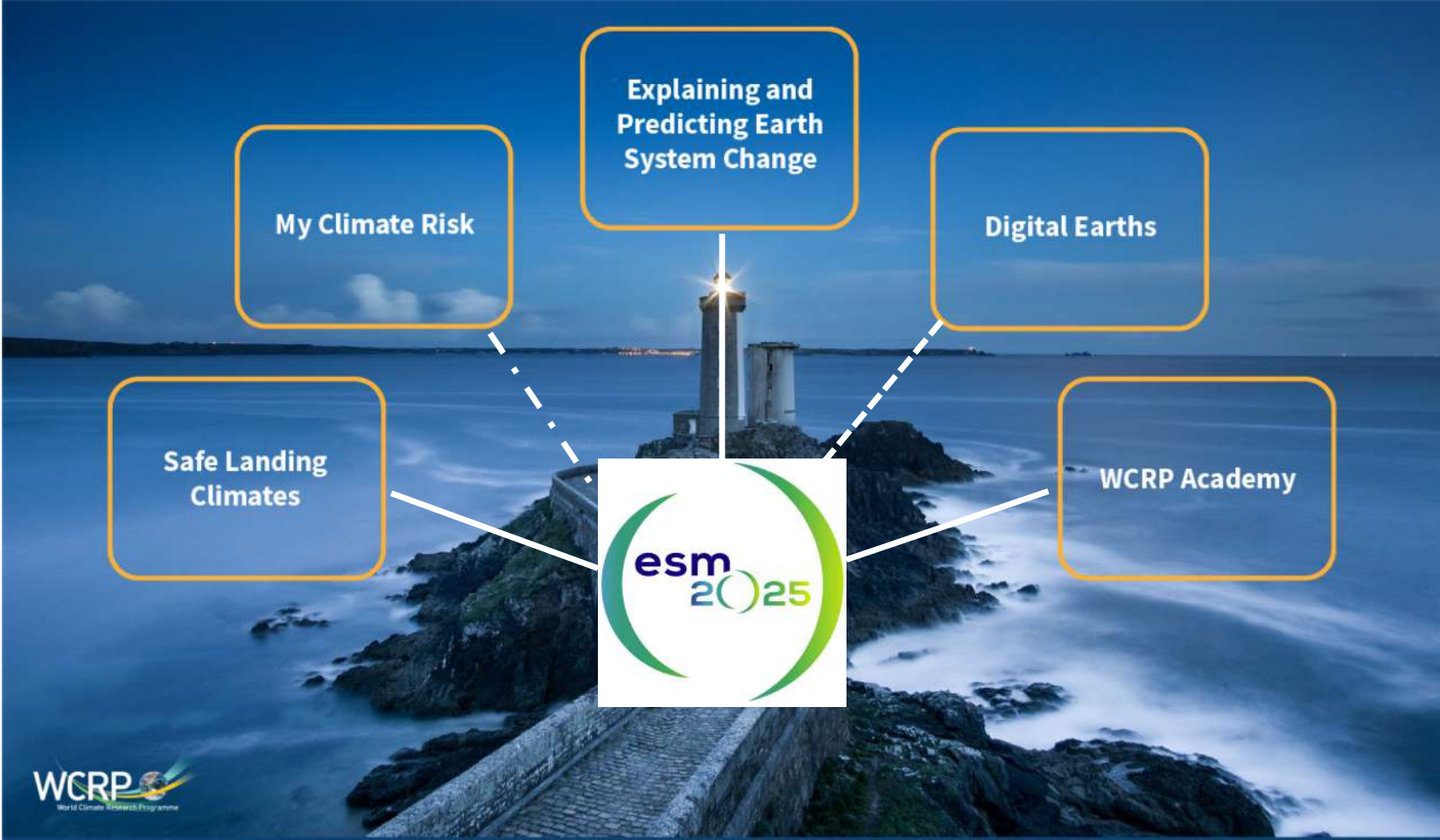


How well the various WGs are working together ?

- ▶ Community Barrier
- ▶ Modelling Barrier
- ▶ Several lock-in (assumptions, time/spatial-scales, etc.)

ESM2025 aims to develop a novel template integrating WGI-WGIII collaboration from the very basis





DRAFT WCRP Lighthouse Activities

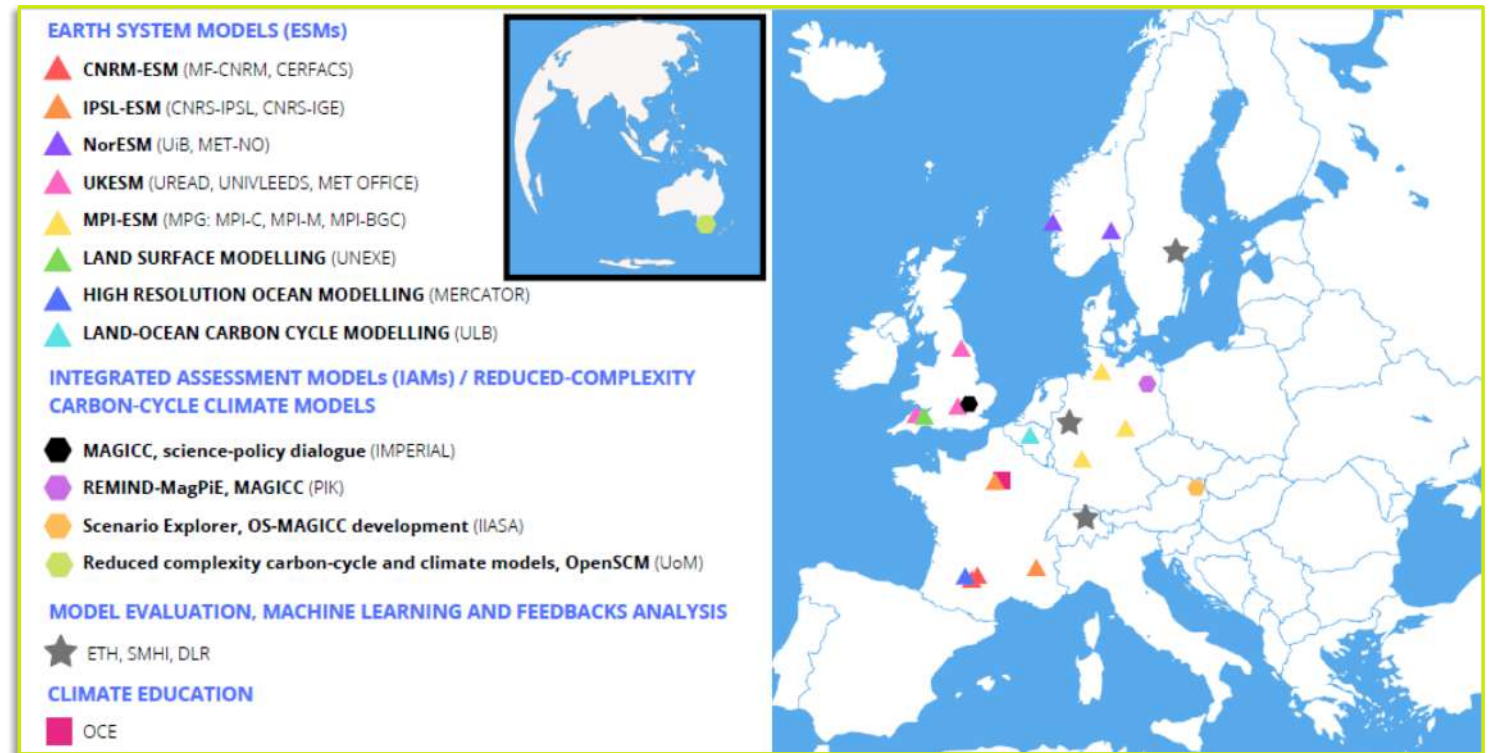


ESM2025 in brief

Main information & goals

ID Card

- ▶ The team : 20 partners
- ▶ Duration : 4 years
- ▶ Project start: June 1st 2021
- ▶ Project end : May 31th 2025
- ▶ EU budget : 11,333 M€



Coordinating the project...

In colleagues' minds



Reality check



Merci! 😊



Project ▾ Research Science-policy Education News

🔒 Stakeholder Area

🔒 Intranet

Climate research in support of the Paris Agreement

ESM2025 - **Earth system models for the future** is an ambitious European research project on Earth System modelling that will build a novel generation of Earth system models fitted **to support the development of mitigation and adaptation strategies in line with the commitments of the Paris Agreement.**

+ MORE ABOUT THE PROJECT

Let's have a look on the ESM2025's website : <https://www.esm2025.eu>