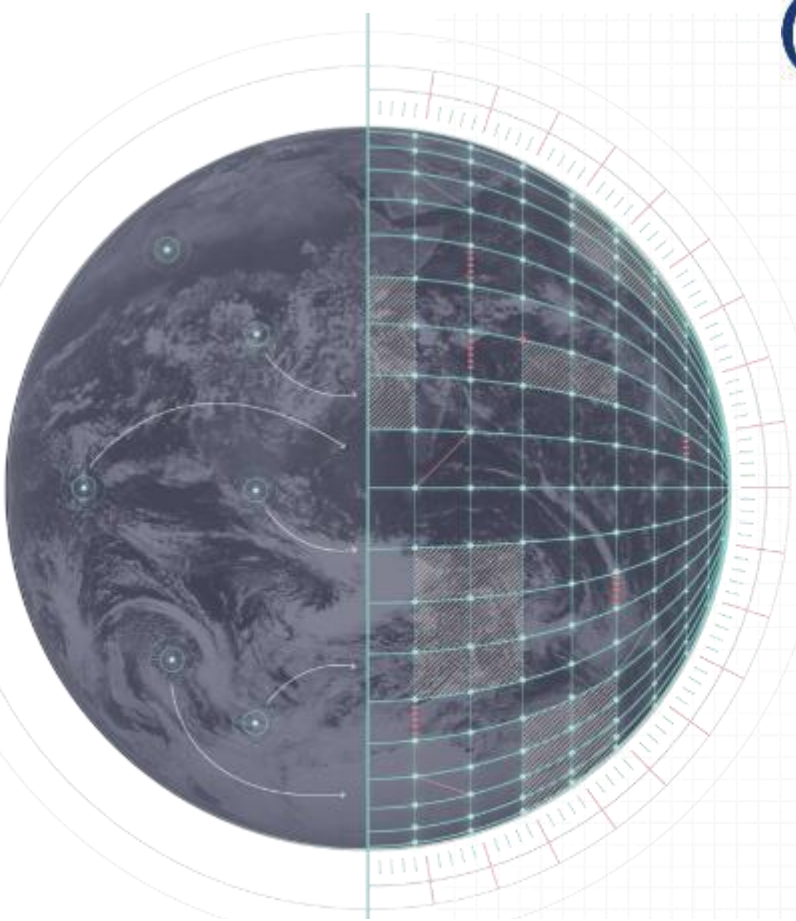

DESTINATION EARTH

Second User eXchange Workshop

Challenges and opportunities for the Climate Adaptation Digital Twin

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Funded by the European Union

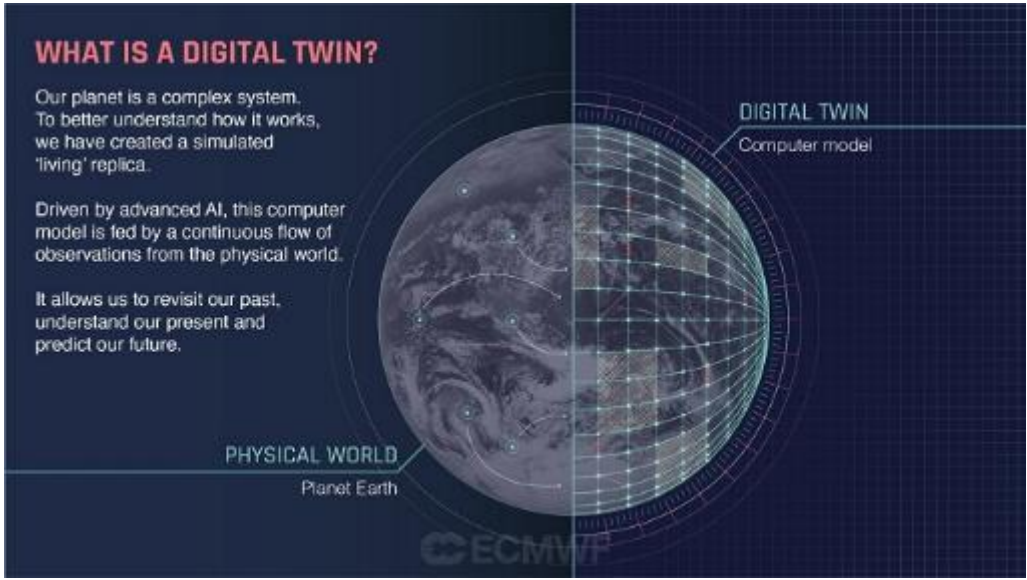
Destination Earth implemented by ECMWF esa EUMETSAT

DIGITAL TWINS FOR CLIMATE ADAPTATION

A digital twin for climate adaptation is a system that supports decision-making in adaptation to climate change using the best models available in an environment that allows an interactive relation with the user.

The digital twin requires (this is a non-exhaustive list):

- a strategy to collect user requirements
- a well-validated set of interoperable models
- an environment for operations (software and hardware)
- a work and dataflow strategy
- a suitable interface



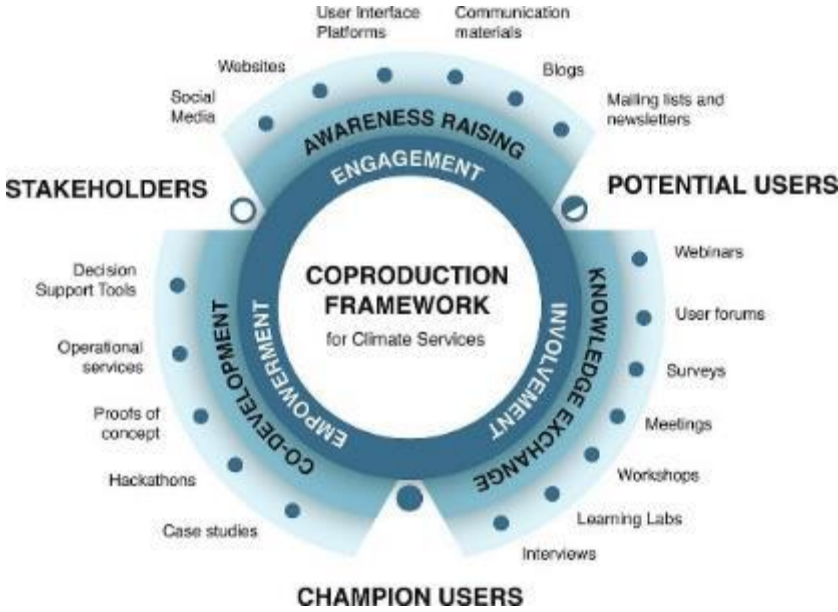
USERS AND THE CONTEXT OF THE DIGITAL TWIN

Challenge: The digital twin emerges in a busy context, with many requirements for climate information, a cacophony of sources, a growing market, increasing needs, no defined standards, and some well-positioned actors. Are the needs taken care of? Are timing, quality, adequacy, and authority addressed?

Opportunity: Social sciences and humanities play an increasingly important role in the services that provide climate information. New and varied approaches are leading to more efficient and successful links to both public administrations and the private sector.

Collaboration with existing actors (C3S, private sector, climate services) familiar with user requirements is already taking place and should be enhanced.

Bojovic et al. (2021, GEC)



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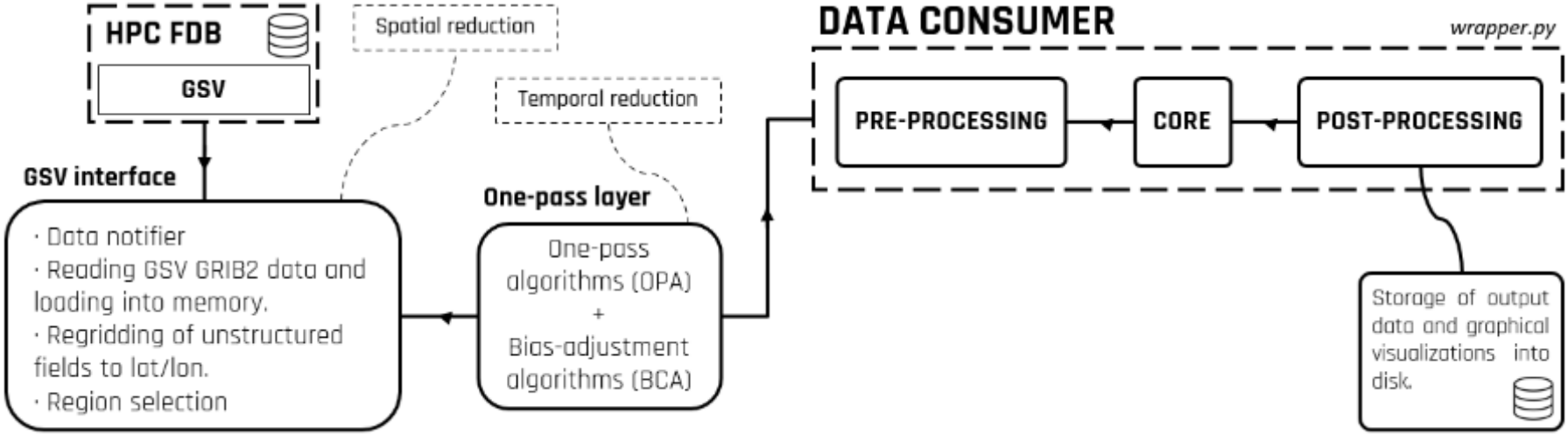
FIT-FOR-PURPOSE DATA ACCESSIBILITY

Challenge: As little relevance as climate drivers might have in the complex climate adaptation arena, climate simulations are still not fit for purpose.

Opportunity: The streaming and operationalisation concepts are central in the digital twin because it gives data consumers access to the full, salient state vector. Machine learning-based emulators of the climate trajectory to allow streaming at will.

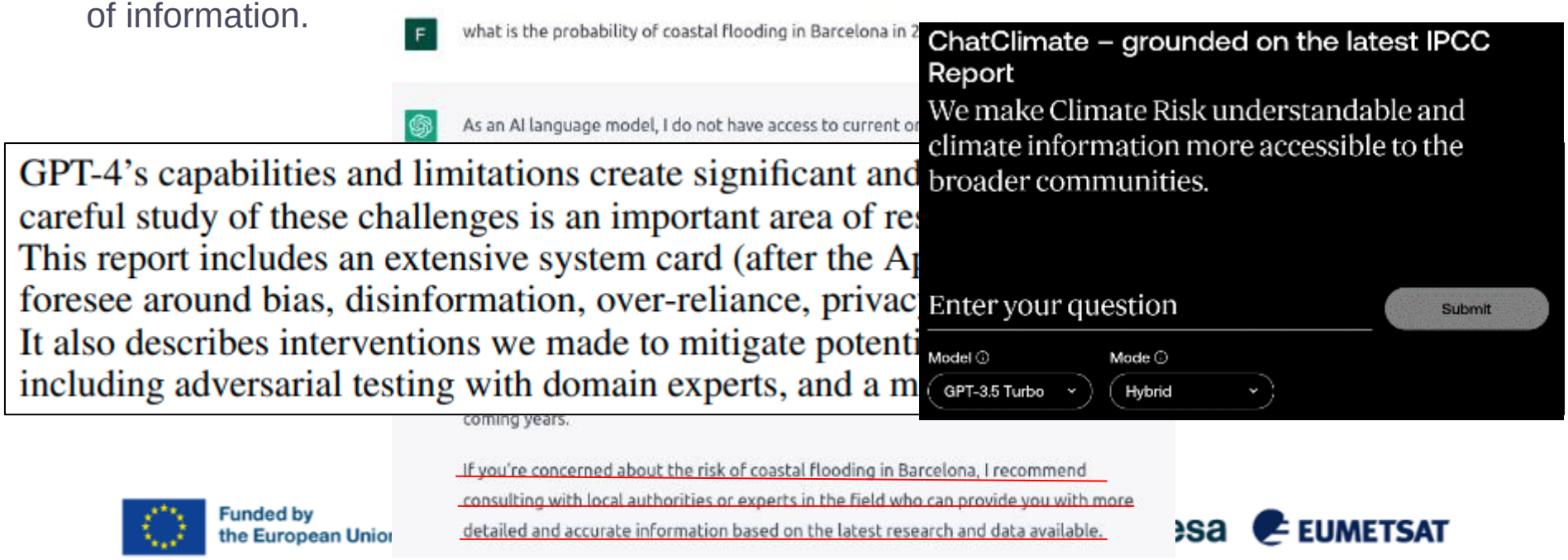


GSV-DATA CONSUMER WORKFLOW

A SCALABLE INTERFACE FOR HUMANS

Challenge: Access to climate information for adaptation does not scale. For instance, human expertise is scarce and often oriented to research.

Opportunity: Large-language models, fine tuned to the climate adaptation problem using a relevant corpus for training, could offer support to humans to better scale the provision of information.



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