Moving towards a Global Flood Model Validation Framework

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The WHY

Global Flood Models (GFMs) are powerful tools to detect flood risk hotspots, provide early warning, and inform policy.

Yet, there are several major shortcomings:

1. Each GFM follows its own approach (Fig. 1);
2. GFMs employ different numerical schemes, data;
3. Validation is done for different basins using varying data and metrics (Tab. 1)

As a result, models can differ locally (Fig. 2)

The WHAT

By establishing a GFM validation and benchmarking framework (Fig. 3) it becomes possible to disentangle the underlying drivers of the deviations through:

→ ***providing standard forcing data***
→ ***validating & benchmarking model results***
→ ***storing & indexing reference output***

The HOW

We need to test several elements of GFMs. To do so, we also foresee several challenges to be met.

Testing elements:

- Inundation extent & depth
- Discharge hydrograph
- Input forcing/data
- Regionality

Testing challenges:

- Test location
- Common forcing data
- Observed discharge, extent, and depth

And THEN?

- Make it cloud-based and open
- Evolve into plug-and-play tool for model component coupling (Fig. 4)
- Open up model code and make it accessible

We must **understand** better **why** Global **Flood Models** can **differ locally**.

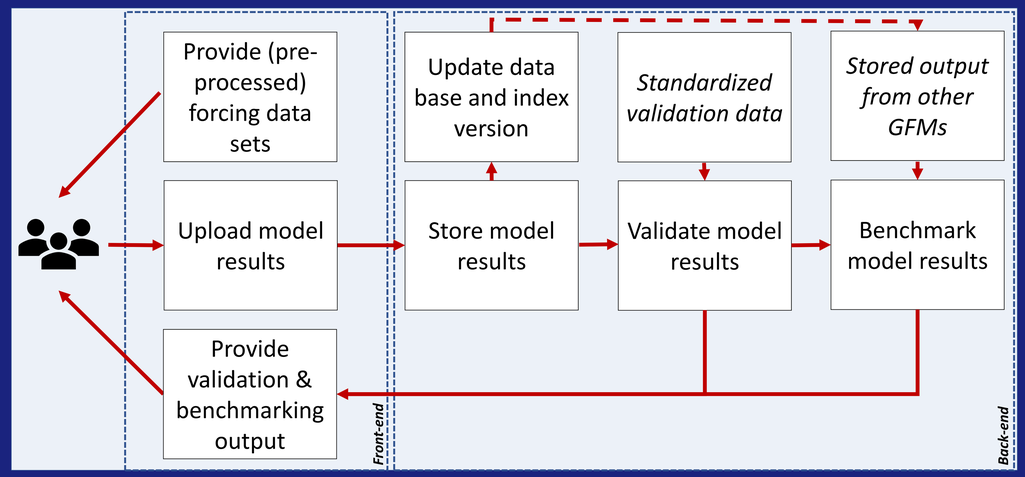

Fig 3: *Conceptual design of the proposed GFM validation & benchmarking Framework*

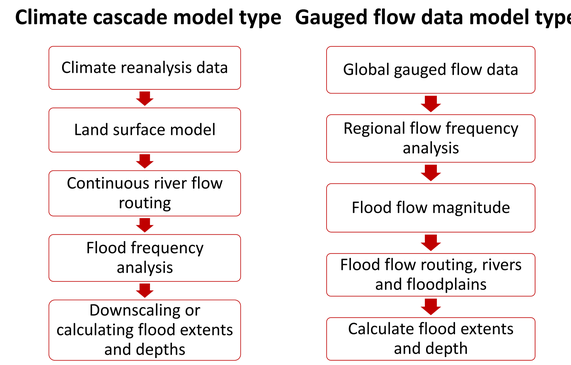

Fig. 1: *Overview of different GFM modelling approaches and their modelling steps*

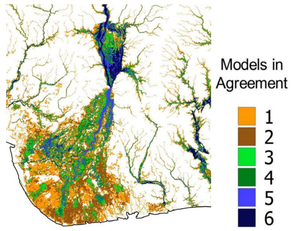

Fig. 2: *Agreement between GFMs of 1/100 years flood extent for the lower Niger*

Basins	Periods	Data sets
> 25	> 5	16

Tab. 1: *Summary of meta-study analysing the different river basins, time periods, and data sets used for GFM validation*

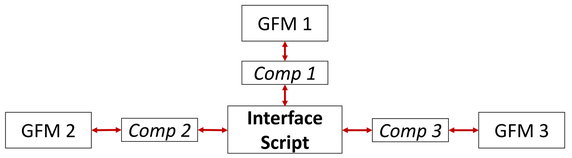

Fig. 4: *Conceptualization of a GFM plug-and-play tool combining components ("Comp") from different GFMs*

Take a picture to **download the full paper**

References:

Hoch, J. M., and Trigg, M. A.: *Advancing global flood hazard simulations by improving comparability, benchmarking, and integration of global flood models*, Environ. Res. Lett., 2019.

Trigg, M. A. et al: *The credibility challenge for global fluvial flood risk analysis*, Environ. Res. Lett., 2016.

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