Inundation prediction at global scale using JULES and CaMa-Flood: progress and future challenges

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Mississippi, Missouri & Illinois rivers, St Louis, USA (NASA)

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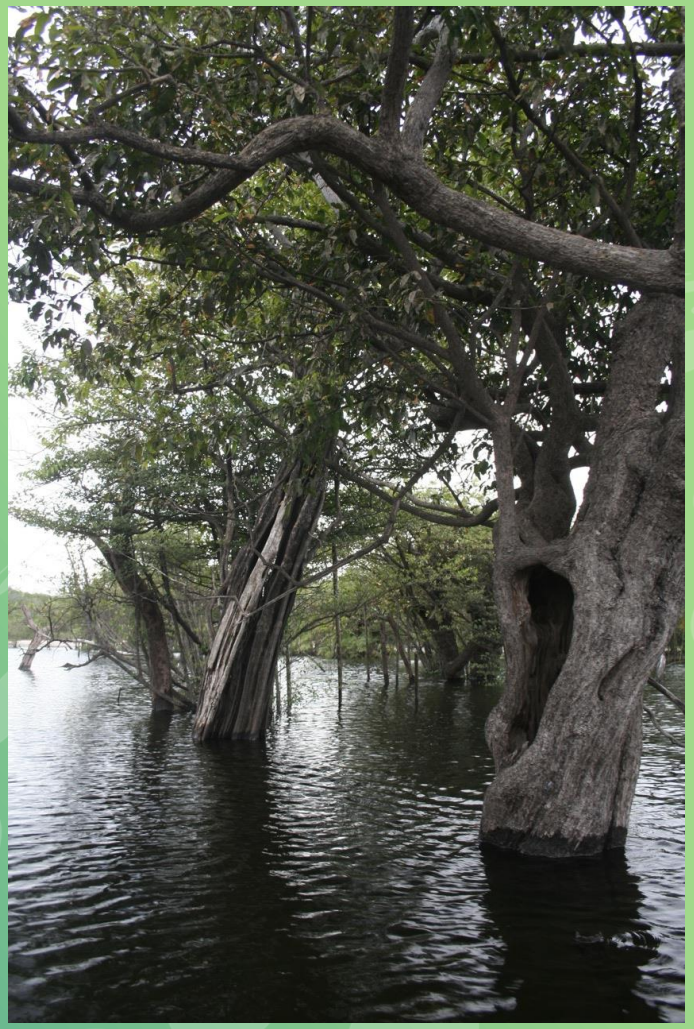
3. A request for help with flooded vegetation ...

ET from flooded vegetation

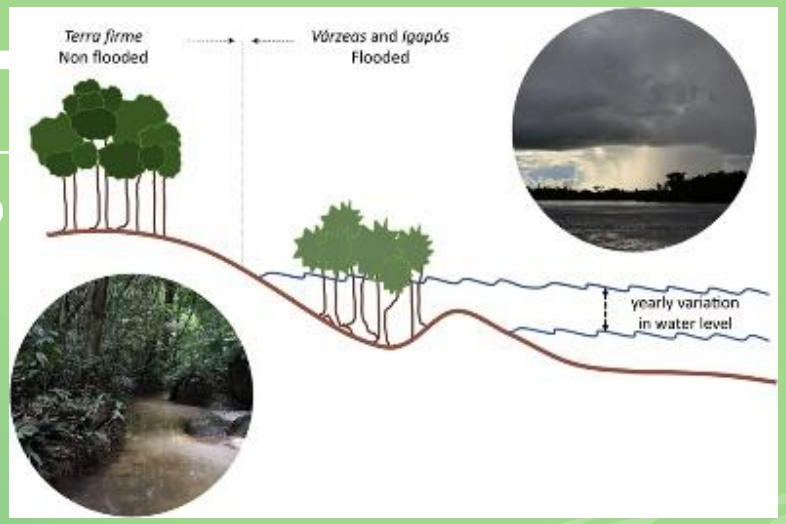
JULES can simulate overbank inundation (i.e. fluvial inundation), but this is not linked in to the separate evaporation calculations in the model. The inundated area is calculated, but no evaporation flux.

- **So why not use the existing routines in JULES that calculate open water evaporation? Because these inundated areas are not open water: they are flooded forest, flooded grassland, etc.**

- **I don't know how to calculate ET for flooded vegetation. For example, what would be a good estimate at the ET rate from this igapó forest (seasonally flooded forest) in Brazil right?**



ET from flooded vegetation



- **Is there any really simple equation / rule of thumb for the ET rate of flooded vegetation? My current 'model' for this is below, but I'll freely admit I don't like it (!). Can anyone do better?**

- **I'm not suggesting I lead a JPEG for this (!), but I'd be interested in having a Zoom about it. Email me on tobmar@ceh.ac.uk if interested!**

Land cover	Unflooded ET rate	Flooded ET rate
Lake	ETopwat	=ETopwat (i.e. the same as before if you follow the Penman equation, which does not depend on water depth so it doesn't matter if the lake level has risen a bit) ... or some evidence suggests the rate drops significantly for water depths >10 m (UKEA 2001)
Grassland or unstratified forest	ETveg	If flood depth > canopy height then =ETopwat, otherwise =(*k*/100)*ETveg (it seems reasonable to assume that the rate drops to *k*% of the unflooded rate while the vegetation is stressed because of anoxia). ... however I have not yet found any good estimates of *k*. Some papers loosely suggest that *k* should be <100%, but others suggest that adaptation ensures we can assume *k*=100%
Stratified forest	ETveg from a two-source model	What to do here? What happens if the subcanopy layer has been submerged but the canopy layer is still above the water? ... Currently I have found no data sources for this at all (cf. recent review Cuxart *et al*. 2019).

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Next generation land surface and hydrological prediction

This study is part of the five year NERC National Capability project *Hydro-JULES:*
https://hydro-jules.org/

For more about me and my research, see:
https://www.tobymarthews.com/

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