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Title: Mitigation of transboundary river flood effect by riparian country reservoirs joint operation

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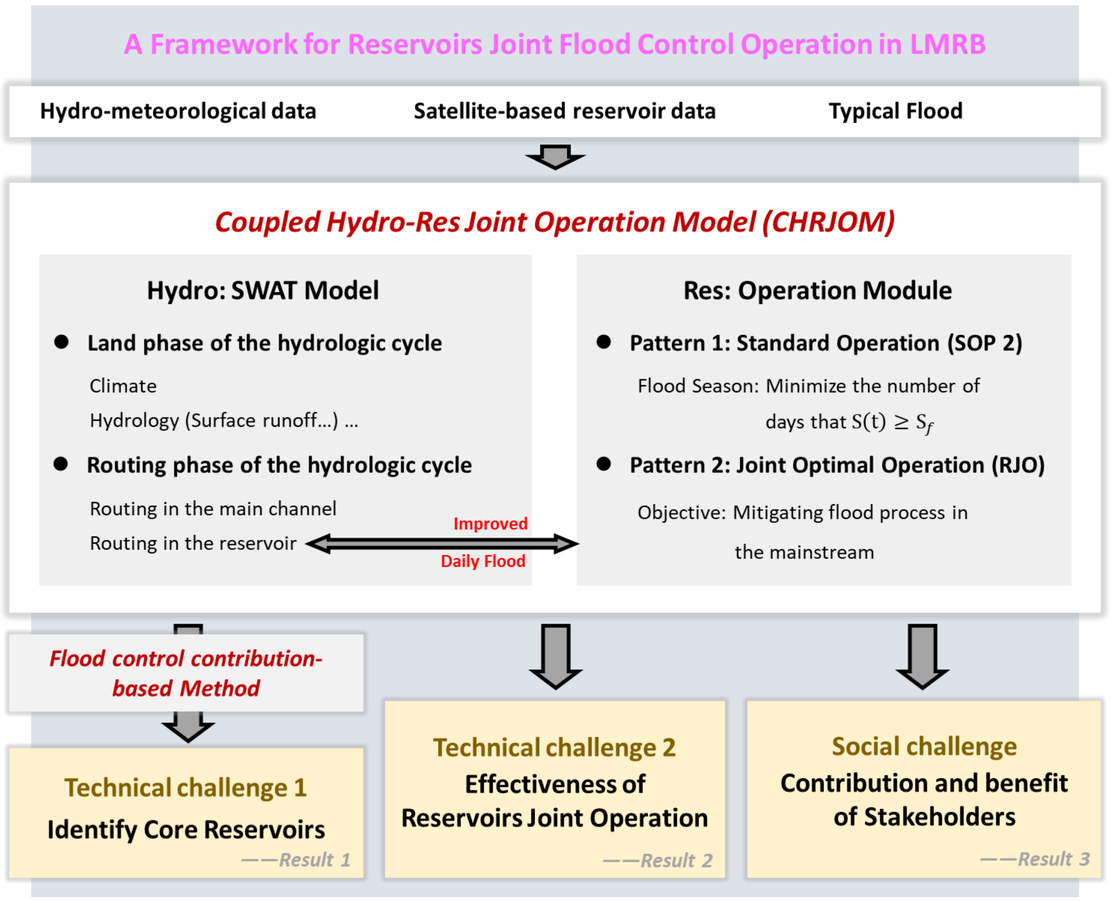
Introduction

The Lancang-Mekong River Basin (LMRB) has been threatened by flooding for millennia. However, joint actions for basin-wide reservoirs flood control is still lacking due to complex flood processes and multi-involved stakeholders, facing both technical and social challenges: identifying the core **reservoirs** incorporated into joint action, investigating the **effectiveness** of joint action, and furthermore exploring the **contribution** of the riparian countries.

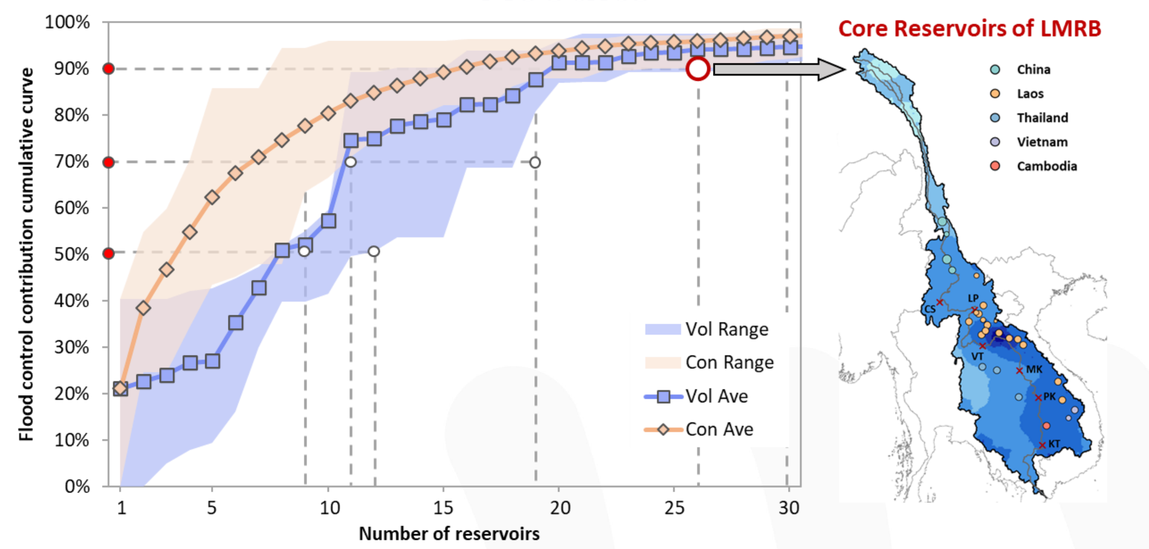
Methods



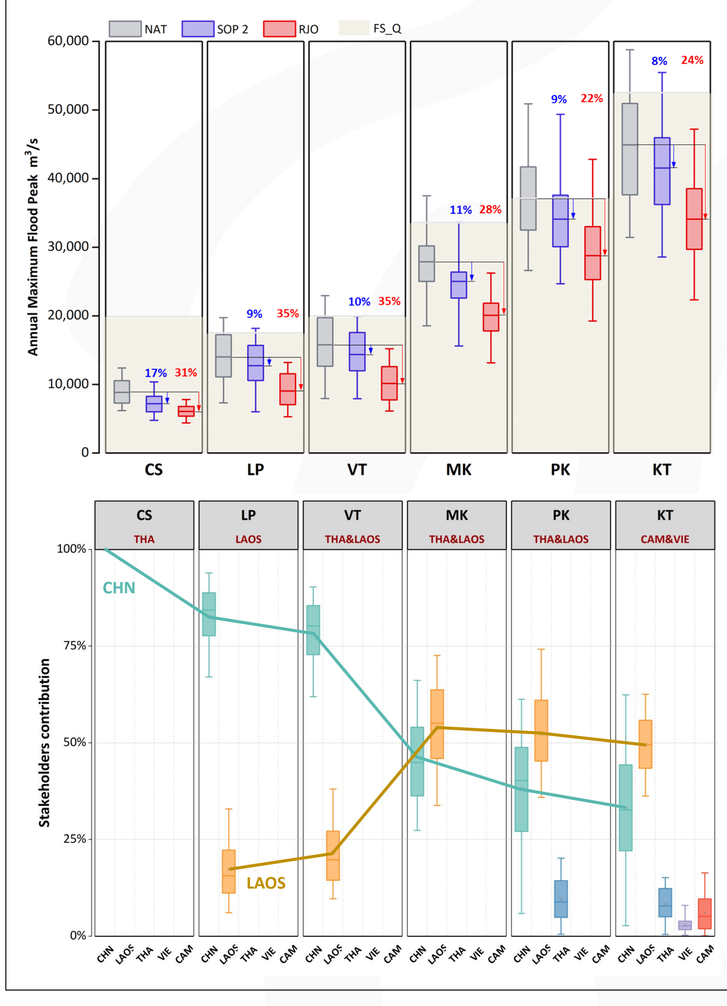
The framework offers a feasible pathway for transboundary reservoirs joint action in the LMRB, with the overall goal of mitigating flood pressures in the Mekong River mainstream.

- ***Coupled Hydro-Res Joint Operation Model:***
  The CHRJOM is composed of hydrological model and reservoir operation to obtain flood processes under the complex natural-reservoir dynamics, which are coupled through the routing phase.
- ***Flood control contribution-based method:***
  The flood control contribution (***Con***) of each reservoir is quantified as a percentage of peaks reduction effect. The core reservoirs are identified through larger ***Con***.

Results



- *Con-based* method performs **better** than *Vol-based*.
- Few core reservoirs make major role, whereas the **9 res** (total 92) play 50% of the basin-wide effect.
- With the threshold of 90%, 26 res are identified.



- Flood peak reductions are increased to **22%~35%** for joint action.
- **CHN** and **LAOS** have made many contributions to flood control along the Mekong River.

Conclusions

Our study addresses the gap in exploring basin-wide flood control capacity and provides reference for joint action, with the support of the **CHRJOM**.

- ***Con-based*** method is proposed and proven as efficient tool in identifying the core reservoirs.
- **Twenty-six** core reservoirs are identified for joint operation, which could basically control the frequent floods **within the levee's safety standard**.
- **China** and **Laos** emerge as predominant contributors.