# Application of the LISFLOOD-FP Hydrodynamic Model for Impact-Based Forecasting over the Eastern Africa Region





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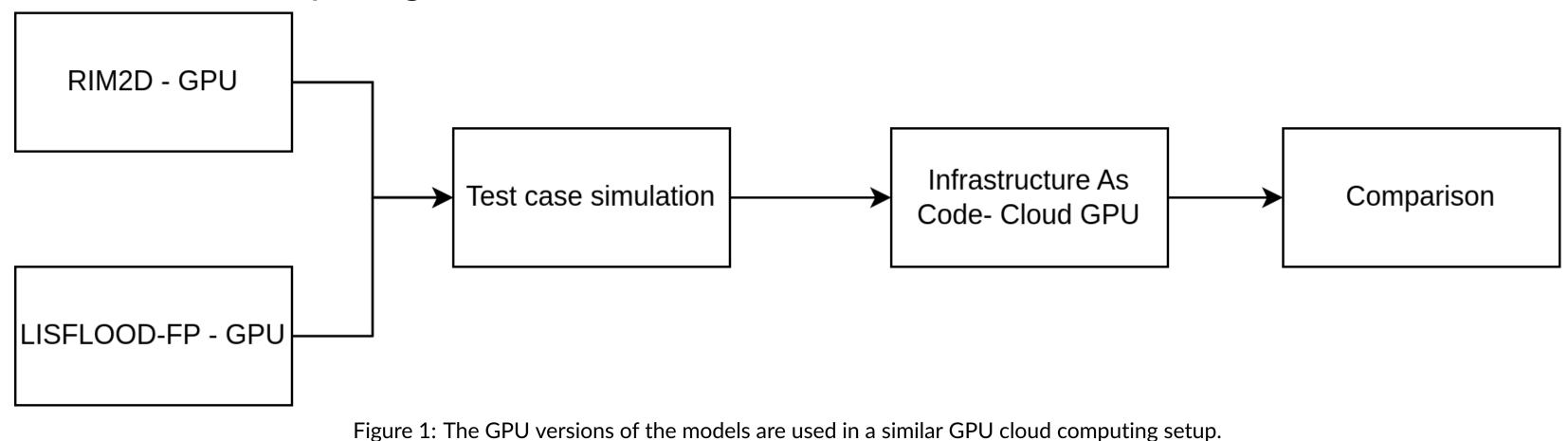
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# Introduction

- Impact-based forecasting (IBF) supports risk-oriented decisions in disaster risk management by emphasizing anticipatory actions that minimize damage and loss.
- Inundation forecasting is essential for IBF hazard modeling and use with impact functions, linking flood water depth to displacement risks and damage to infrastructure.
- Currently, IBF uses hydrological forecasts combined with historical maps for inundation data from stream flow forecasts, but it struggles to capture urban and riverine rainfallinduced floods. Although hydrodynamic modeling is precise, it is too computationally intensive for routine IBF.
- A parsimonious modeling framework that balances the complexity and simplicity of hydrodynamic processes might be a promising approach for generating inundation data.
- Current study evaluated the hydrodynamic model LISFLOOD-FP [1] for its potential in impact-based forecasting. We also assessed the operational IBF suitability of the parsimonious, simplified model RIM2D [2].

## Methods

The Figure shows the method used to compare LISFLOOD-FP and RIM2D for operational use in cloud computing.



- Test case simulations indicate that RIM2D is more efficient for operational IBF due to its parsimonious hydrological modeling approach, making it suitable for IBF risk measures.
- The validation of RIM2D's hydrodynamic modeling in East Africa is ongoing; the supporting materials detail the Python programs and cloud setup for the model.

### References

Results

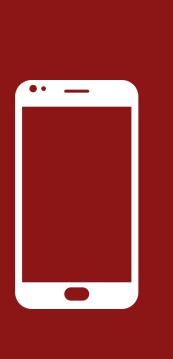
[1] Mohammad Kazem Sharifian, Georges Kesserwani, Alovya Ahmed Chowdhury, Jeffrey Neal, and Paul Bates. LISFLOOD-FP 8.1: new GPU-accelerated solvers for faster fluvial/pluvial flood simulations. Geoscientific Model Development, 16(9):2391-2413, 2023.

[2] Heiko Apel, Sergiy Vorogushyn, and Bruno Merz. Brief communication: Impact forecasting could substantially improve the emergency management of deadly floods: case study july 2021 floods in germany. Natural Hazards and Earth System Sciences, 22(9):3005-3014, 2022.

RIM2D, a streamlined, parsimonious version of LISFLOOD-FP model, might be the ideal choice for impact-based forecasting. After all, why

putting on a space suit to water the garden?





Scan the QR Code for supporting materials @ GitHub Repository: icpac-igad/rim2d-ibf For comments and questions icpac-igad/rim2d-ibf/issues