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Towards a digital twin for flood risk management

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Equitable flood risk management is contingent upon understanding the evolution of floods and their impacts on different groups in society. While rapid, open-source, physics-based flood and impact models offer valuable insights, their complexity often limits accessibility for decision-makers lacking technical expertise. Digital twins for flood risk management can address this issue by automating model pre-processing, execution, and post-processing, enabling end users to evaluate meaningful "what-if"scenarios, such as specific events, future conditions, or protective measures, regardless of their technical expertise. These digital twins employ automated workflows and model builders to configure and execute state-of-the-art flood and impact models across various contexts efficiently. However, orchestrating multiple models across disciplines poses challenges, including standardised data management and reproducibility. Our work focuses on developing a digital twin for flood risk management, building on the FloodAdapt desktop application. FloodAdapt integrates compound flood modeling and detailed impact assessment, providing an accessible platform for defining, simulating, and visualizing flood scenarios and their consequences. Users can explore diverse scenarios, including historical events, future projections, and adaptation strategies like green infrastructure, floodwalls, or elevating buildings. In our presentation, we will highlight the capabilities of the flood risk management digital twin that are under development. We'll describe how we leveraged Destination Earth and the interTwin Digital Twin Engine in the implementation of FloodAdapt as a digital twin web application, highlighting the benefits this presents to end-users.

Topic

Needs and solutions in scientific computing: Digital Twins

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