

High-Performance Interactive Flood Simulations

Christoph Ertl¹, Florian Mintgen², Nevena Perovic³, Hao Zeng⁴, Michael Manhart⁵ and Ralf-Peter Mundani^{6,*}

¹ Computation in Engineering, TUM, Arcisstr. 21, 80333 Munich, Germany, christoph.ertl@tum.de

² Chair for Hydromechanics, TUM, Arcisstr. 21, 80333 Munich, Germany, f.mintgen@tum.de

³ Computation in Engineering, TUM, Arcisstr. 21, 80333 Munich, Germany, nevena.perovic@tum.de

⁴ Chair for Hydromechanics, TUM, Arcisstr. 21, 80333 Munich, Germany, hao.zeng@tum.de

⁵ Chair for Hydromechanics, TUM, Arcisstr. 21, 80333 Munich, Germany, michael.manhart@tum.de

⁶ Computation in Engineering, TUM, Arcisstr. 21, 80333 Munich, Germany, mundani@tum.de

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“[Computational] Steering enhances productivity by greatly reducing the time between changes to model parameters and the viewing of the results [1].”

Risk assessment and prediction of floods in complex environmental settings, like urban environments, is a challenging task, especially when done in real time. While often (simplified) hydrological models coupled with meteorological models for precipitation input are sufficient, they are no longer valid when three-dimensional effects take place in the flow and considerably impact the flow dynamics. In such situations, a full three-dimensional solution is indispensable to obtain a sufficiently correct prediction of flow variables.

Within our researches, floods and impact of floods on infrastructure should be predicted, reaching from the river down to the scale of the built infrastructure, such as railway, subway, tunnels, waste water channels, buildings, and building infrastructure. A real-time simulation based on an efficient and transparent 2D–3D coupling for an integrated prediction of local flows together with large scale flow dynamics should therefore support experts for a better protection against extreme flood events, allowing him or her to interactively explore and evaluate various scenarios and, thus, enabling decision makers to decide on a new level of information detail and accuracy.

REFERENCES

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