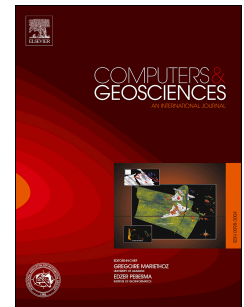


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HydroSedFoam: A new parallelized two-dimensional hydrodynamic, sediment transport, and bed morphology model

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Abstract

Depth-averaged two-dimensional (2D) models are useful tools for understanding river morphodynamics through the computation of hydrodynamics, sediment transport, and an evolving river bed morphology. This paper presents a new parallelized 2D hydrodynamic, sediment transport, and bed morphology model, HydroSedFoam. The model uses the Message Passing Interface for code parallelization and adopts a depth-averaged $k - \varepsilon$ turbulence model. Three different case studies, including a laboratory experiment, an analytical solution, and a field-scale river reach, show good agreement with HydroSed-

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**Zhenduo Zhu develops HydroSedFoam. Jessica LeRoy performs meandering channel laboratory experiments and analyzes data. Bruce Rhoads and Marcelo García make substantial contributions to the development of ideas, data analysis, and interpretation of results. All authors participate in drafting and critically revisiting the manuscript.

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