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RESOURCE

A tightly coupled GIS and distributed hydrologic modeling framework

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Description / Abstract

Distributed, physics-based hydrologic models require spatially explicit specification of parameters related to climate, geology, land-cover, soil, and topography. Extracting these parameters from national geodatabases requires intensive data processing. Furthermore, mapping these parameters to model mesh elements necessitates development of data access tools that can handle both spatial and temporal datasets. This paper presents an open-source, platform independent, tightly coupled GIS and distributed hydrologic modeling framework, PIHMgis, to improve model-data integration. Tight coupling is achieved through the development of an integrated user interface with an underlying shared geodata model, which improves data flow between the PIHMgis data processing components. The capability and effectiveness of the PIHMgis framework in providing functionalities for watershed delineation, domain decomposition, parameter assignment, simulation, visualization and analyses, is demonstrated through prototyping of a model simulation. The framework and the approach are applicable for watersheds of varied sizes, and offer a template for future GIS-Model integration efforts.

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