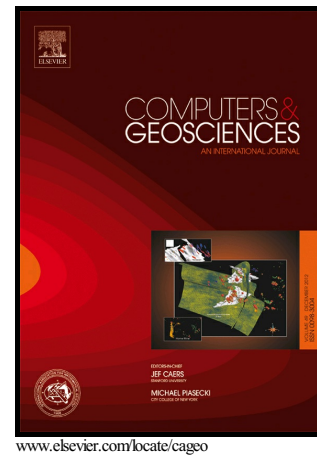


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Abstract

Large-scale, long-term and high spatial resolution simulation is a common issue in environmental modeling. A Gridded Hydrologic Response Unit (HRU)-based Soil and Water Assessment Tool (SWATG) that integrates grid modeling scheme with different spatial representations also presents such problems. The time-consuming problem affects applications of very high resolution large-scale watershed modeling. The OpenMP (Open Multi-Processing) parallel application interface is integrated with SWATG (called SWATGP) to accelerate grid modeling based on the HRU level. Such parallel implementation takes better advantage of the computational power of a shared memory computer system. We conducted two experiments at multiple temporal and spatial scales of hydrological modeling using SWATG and SWATGP on a high-end server. At 500-m resolution, SWATGP was found to be up to nine times faster than SWATG in modeling over a roughly 2,000 km² watershed with 1 CPU and a 15 thread

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