

**Large-scale parallel realistic tsunami analysis with floating objects on
Ishinomaki city using hierarchical domain decomposition explicit MPS method**

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In this research, a new distributed memory parallel algorithm of the explicit MPS (Moving Particle Simulation) method is presented. An analysis region is divided for a distributed memory parallel computation using ParMETIS. As a result, we have been able to run the MPS analysis of 20 billion particles using 4,800 nodes by the Fujitsu PRIMEHPC FX10 System (Oakleaf-FX) of the University of Tokyo. In the performance, we have achieved 7.25% of the peak performance by 4,800 nodes and 79.48 speed-up from 60 nodes to 4,800 nodes. A large-scale three-dimensional simulation of the tsunami run-up with floating objects that occurred during the Great East Japan Earthquake was carried out on FX10 of the University of Tokyo and CX400 of Kyushu University.

Keywords: MPS method, Large scale parallel computing, Floating object, Tsunami