

Interactive comment on “Tree-based mesh-refinement GPU accelerated tsunami simulator for real time operation” by Marlon Arce Acuña and Takayuki Aoki

Anonymous Referee #1

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Overview

In the current high-performance computing (HPC) context, where accelerated computing is revolutionizing not only the computation capacity but also the computation time required to perform the numerical simulation of large problems, it's very important the development of new numerical models able to change the game rules in the context of natural hazard early warning. In this framework these authors develop a new tsunami model (TRITON-G) coded in GPU architecture. The model is based on Spherical non-linear shallow water equations (SSWE) in the far-field area while the near-field and inundation areas the cartesian coordinate version of SWE is used. The developed nu-

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merical model in the far-field is based on the method of characteristics with a cubic polynomial approximation on the grid. In the near-field area, when inundation is calculated, they use a finite volume model. Authors use a quad-tree refinement method to build the grid for the computational domain. Later, it's explained in detail the GPU and multi-GPU implementation and finally they present some numerical experiments based on analytical solutions and a simulation of the Indian ocean 2004 tsunami. The article closes with final conclusions and a list of 67 references.

Overall Recommendation

My recommendation is: major revision.

Assessment and Further comments

Included in the PDF file attached.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-379/nhess-2017-379-RC1-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2017-379>, 2017.

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