The NTHMP Tsunami Inundation Model Benchmarking and Acceptance Process

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According to the 2006 Tsunami Warning and Education Act, all inundation models used in NTHMP projects must meet benchmarking standards and be accepted for use by the NTHMP Mapping and Modeling Subcommittee (MMS). To this end, a workshop was held in 2011 by the MMS, and participating models whose results passed the benchmarking criteria were accepted for use in tsunami inundation modeling for NTHMP projects. These models and their results are documented in the "Proceedings and results of the 2011 NTHMP Model Benchmarking Workshop".

Since then, other models have been subjected to the benchmark problems used in the workshop, and their use subsequently requested for NTHMP projects. **This document details how acceptance from MMS for use in NTHMP modelling can be achieved.**

Steps for achieving MMS acceptance for tsunami inundation models

1. Preliminary requirements
    a. All models being used by U.S. federal, state, territory, and commonwealth governments should be provided to the public as "open source."
    b. Through professional papers and/or other accessible publications (university, government, etc.), there should be adequate documentation for others who are qualified to test and/or use the model.
2. Using the Benchmark Methods for Tsunami Model Validation and Verification provided by NOAA's National Center for Tsunami Research, complete the following Benchmark Problems:
    - BP1 - Solitary wave on a simple beach (nonbreaking – analytic)
    - BP4 – Solitary wave on a simple beach (breaking – lab)
    - BP6 – Solitary wave on a conical island (lab)
    - BP7 - Runup on Monai Valley Beach (lab)
    - BP9 – Okushiri Island tsunami (field), if intended to model not from local source

    A Summary of NTHMP Tsunami Inundation Benchmark Problems, including objectives and helpful checklists, is provided as well.
3. Document the experiments and results
    a. The following Matlab program should be used for standardized analysis of benchmark problem results and to facilitate ease of comparison with other benchmarked models
        i. Zipped file of MATLAB scripts for benchmark problems including a README document (provided by Juan Horrillo) [1]
    b. A paper documenting the benchmarking problems and results should be written and submitted to the MMS co-chairs for review.

[1] Hosted by the University of Washington as part of the benchmarking process for GeoClaw in 2011

c. The MMS co-chairs will post the submitted manuscript on the NTHMP web-site and solicit comments via announcement on the Tsunami Bulletin Board (TBB) for a 30 day period
    i. All comments and feedback from the TBB will be delivered to the modeler and also made available for review to MMS members prior to the presentation of results to MMS.
        1. Based on feedback at the end of the 30-day review period, the presentation to MMS may be delayed while adjustments and revisions are made.

4. Present results to the MMS
    a. The MMS co-chairs will arrange for a presentation to the group – presentations can be done in person at the NTHMP/MMS semi-annual meetings[2] or scheduled separately and done via webinar to the group
    b. After the presentation and discussion with MMS, the modelers can decide if they would like the MMS members to vote on acceptance, or request a delay to make corrections or revisions.
5. MMS votes on acceptance.
    a. Models which successfully meet the NTHMP/MMS tsunami inundation benchmarking criteria will be accepted by MMS for use in NTHMP tsunami inundation modelling following the general recommendations for use, as defined in Guidelines and Best Practices for Tsunami Inundation Modeling for Evacuation Planning
    a. The model name along with a brief summary description of the physics incorporated will be added to the "NTHMP Benchmarked tsunami models" document posted on the MMS website
        i. No significant modifications to the tsunami runup algorithm may be introduced, following the benchmarking process. If a significant model update is made, the MMS co-chairs should be notified and The NTHMP Tsunami Inundation Model Approval Process must be repeated.
    b. The model results and paper will be added to the "Addendum to the 2011 NTHMP Model Benchmarking Workshop Proceedings" document, accessible through the MMS website.

[2] Next in-person MMS Meeting will be in Jan/Feb 2017