

## MMS Meeting 29 January 2018

### 1. Introductions

Guard, Chip - Warning Coord. Met. WFO, Guam, Barriguda, GU;  
Lutu-McMoore, Elinor - Acting MIC WSO Pago Pago, Pago Pago, AS;  
Stroker, Kelly - Nat'l Ctrs for Env. Info, Boulder, CO;  
Wu, Chin - Professor Univ. of WI-Madison, Madison, WI  
Wilson, Rick - California Geological Survey, Sacramento, CA  
Walsh, Tim - Asst. State Geologist, WA Dept. of Nat'l Resources, Olympia, WA  
Eungard, Daniel - Geologist/GIS Specialist, Washington Geological Survey, Olympia, WA  
Forson, Corina - Chief Hazards Geologist, Washington Geological Survey, Olympia, WA  
Arcas, Diego - Director, Ctr. for Tsunami Research, Pacific Marine Env't. Lab., Seattle, WA  
Insua, Tania Lado - Ocean Analytics Pgm. Mgr., Ocean Networks Canada, Victoria, BC  
Huerfano, Victor - Puerto Rico Seismic Network, Mayaguez, PR  
Cheung, Kwok Fai - Professor, Univ. of Hawaii, Honolulu, HI  
Grilli, Stephan - Professor, Univ. of Rhode Island, Kingston, RI  
Ross, Stephanie - U.S. Geological Survey, Menlo Park, CA  
Chu, Philip - Researcher, NOAA Great Lakes Lab., Ann Arbor, MI  
Eble, Marie - Oceanographer, Pacific Marine Env't. Lab., Seattle, WA  
Nicolosky, Dmitry - Asst. Professor, University of Alaska, Fairbanks, AK  
Kirby, Jim - Professor, University of Delaware, Newark, DE  
Horrillo, Juan - Professor, Texas A&M at Galveston, Galveston, TX  
Lopes, Rocky - NTHMP Administrator, Silver Spring, MD (partial attendance)

### **09:00 – 09:30 Landslide Modeling Benchmark Workshop (speaker: Jim Kirby)**

Jim introduced workshop web page <http://www.udel.edu/kirby/landslide/index2.html> and continued with:

The web-site and report concentrate on three benchmarks (BMs): flying saucer, BM4 (glass beads submarine LS), field case Valdez 1964 from Dmitry. Individual modeler write-ups are linked at the web-site and are provided as individual documents. Additionally, there are links to invited talks:

- Geology: Dave Tappan, Jason Chaytor, Homa Lee. Never got Jason's report.
- Lab studies: Hermann Fritz (also never gave a report)
- Pat Lynett: Traan Fjord LS

Jim discussed common naming convention and format for all submitted model results for all BMs. Some statistical analyses using RMS errors, etc. have been completed. Matlab files are available (bottom of the page).

The Workshop Proceedings Report has been compiled as a LaTeX file. Anyone wishing to provide edits should contact Jim for access to the document.. The BM information is same as what is on the website. An additional chapter talks about methodologies for evaluating the models.

In the document,

1. models are subdivided according to categories: hydrostatic, Boussinesq models, dispersive/non-hydrostatic models, Navier-Stokes models.
2. Landslides are represented by solid slides, viscous depth integrated, granular and 3-D models with continuous representation of density field.

3. Presentation of comparison of model results has not changed since previously shown during summer meeting.
4. Results: Dispersive models do a magnitude better than non-dispersive models. Boussinesq model accuracy deteriorates rapidly with time. Individual model results are available. Wave tank for BM 4 was too short. Wave train contaminated by reflection.

Questions:

Dmitry: need to prepare a short document about the criteria for models.

Stephan: looking at models, if you look at propagation from slide onshore vs. away – some people suggested using dispersive distance. Such a big difference between dispersive and nondispersive model – need to decide when to use each.

Jim: need to address in paper when using non-dispersive model would be bad.

Stephan: onshore does not show any dispersive effects. Offshore, you see 60-80% difference between dispersive and non-dispersive modeling.

Marie: a topic for further discussion.

Stephan: can meet as a smaller committee.

### **09:30 – 10:00 DEM plans & prioritization (speaker: Kelly Stroker)**

Kelly was unable to connect her laptop to the projector so instead of showing the Power Point she prepared, highlighted its content.

1. Finished everything for calendar and FY years 2016,
2. Almost done with FY17, one more on PR for calendar year 17. Working with Aurelio and others to make sure focusing on right area.
3. Working on 4 postage stamp DEMS.
4. FY17 completed for Marquesas, French Polynesia; Society Islands, French Polynesia; Rarotonga, Cook Islands; Easter Island
5. NTHMP CY17: Atka & Adak, AK; Bristol Bay, AK; Bellingham Bay, WA; SW Florida; Puerto Rico (developing 4 to 6 smaller high resolution, 1 meter DEMs on north shore, *in progress*)
6. Special DEM: Grenada
7. No NOAA DEMs in FY18 due to NWS decreased funding.

Kelly requests list of priorities for NTHMP DEMs. NCEI needs the list now for planning.

National Tsunami DEM Priority List, i.e. a spreadsheet on Kelly's computer.

Montauk (talk at summer meeting; was it going to be covered by USGS), Charlston, NC.

Stephan: Montauk is one of the most exposed areas, focusing for tsunamis. Jim: also Martha's vineyard.

Corina: WA – is there an age limit. Some of WA DEMs are 10 years old; do they need to be redone?

Tim: another issue was that two areas have a step between them.

Kelly: want to bring in the new surveys as they come on line. Those would be good areas to work on. NCEI needs shape file or bounding box at a minimum.

Dmitry: Port Alexander, Wrangell.

Victor: what NTHMP does with changes in geomorphology like we have in Caribbean?

Kelly: we need to get new data is the biggest issue; know that new data is being collected throughout Caribbean. NCEI is focused on small areas for current work we're doing. You could think about adding another PR location for next year. NOS is doing data collection; they have a planning website with a map. There's been a lot of adjustment due to the storms. Kelly will connect Victor with the right people.

Dmitry: we need a wish list.

Diego: we sometimes run into an issue with sea level/mean high water. PMEL will contact you about some locations.

Corina: so we should email Kelly?

Tim: same thing likely to happen with Strait of Juan de Fuca. ... tile map. So that triggers are needed to redo the DEM for Strait of Juan de Fuca.

### **10:00 – 11:30 Development of the MMS Annual Work Plan and 5-yr Vision Plan (MMS discussion lead by Rick Wilson)**

Rick: Here is an example of an activity in the MMS Annual Work Plan: **development of the 2018 Tsunami source database for the Powell Center activity**; Need to define how we source/classify our databases; first complete deterministic databases; year 4 and 5 develop probabilistic databases; both seismic and landslide.

Chip: would existing inundation models count as a probabilistic source?

Rick: probably considered deterministic

Rocky: procedure/logistic updates. We expect MMS to say what the workplan is at combined meeting tomorrow. I prefer that you focus on calendar year 2018. Whatever you agree on as MMS activities for 2018, you'll check on those during your conference calls. That's what's reported to the CC as MMS' workplan/productive. You just need the annual plan.

Dmitry: how do we know what's too little or too much? Rocky: it is up to you. If you see slippage during conference calls, you'll learn to adjust. All of your work plan activities are contributed to by your volunteering to do this, so be realistic. Think of me asking you at the end of 2018 to write your report page. The other thing I'm expecting delivered as a result of this meeting today – MMS can endorse activities for grantees.

Fai: Is the Powell Center activity coming up with a new database?

Rick: that's the first step – collecting sources people use now. Discussions will follow at regional workshops – do these seem reasonable, is a higher deterministic source better?

Rocky: let me know when get to the Powell Center conversation in this meeting today.

Tim: any need to work with ASCE7?

Rick: deterministic first. Then work with them. Their next update is ....

Diego: centralized depository?

Rick: maybe with links to files. Work with PMEL on that.

Juan: I send you my source?

*\*\*Rick: Stephanie will send out email after this meeting after we have discussions figuring out what we need from the states and territories.*

Corina: Powell Center PIs should be involved in that part of the work plan.

Tania: for source database, please keep in touch with the Canadian counterparts. Canada is looking into including tsunami in the building code; would be good to connect on that, too.

Dmitry: tsunami source database development is a good example; we can heavily leverage the USGS Powell Center work. For other activities, how do we want to do that? Asks state by state to propose activities.

Rick: if there's a state that would like to take charge of this but not break the bank.

Marie: have to be careful that it can be completed this year.

Corina: I'll start. For **the HAZUS guidance**, we applied to FEMA to do a workshop to beta test the tsunami module. In 2018 we will have a short paper that discusses the workshop; a paper the next year with guidance.

Chip: we do not have the Tsunami HAZUS module yet.

Corina: we don't know for sure if we get the funding for the workshop, it's dependent on that.

Dmitry: AK, CA, OR and HI developed tsunami current maps, now have more guidance for best practices. Another MMS activity is to finalize a short document summarizing **criteria for models to satisfy in order to be used for the tsunami current modeling**. The goal is to make a 2-page summary.

Rick: California would like \$20K **to complete Maritime Guidance Document**; needs more work on mitigation and recovery.

Rick: Is there a tiger team working on model criteria? Separate from maritime guidance doc?

Marie: volunteer effort with no sponsorship or funding or does it have deliverables and need funding?

Dmitry: Juan, Jim, Rick, Dmitry ... on team.

Rick: the output of the tiger team fits into our guidance.

Corina/Rick: updating information that's on the web. Not a tough project but we need to gather what we know. Marie: and have Rocky and Christa R make the change.

Chip: like the harbor studies that Fai is doing for Guam?

Corina: Another MMS activity: **a geographic gap analysis of tsunami maps and products**.

Rick: is that state-by-state or larger?

Marie: put it together as one.

Corina: require input from every state.

Diego: each state compiling where there are gaps.

Corina: with one overall lead pulling together

Marie: does a state want to take that on and ask for funding for that? Those take priority over other funding. Want to make sure you can get it done.

Rick: can we get gap analysis done in one year?

Marie: nice to have GIS so everyone can see holes.

Corina: ideally a widget map with direct links to those maps, but that would take a lot.

Marie: a state could take it on, provide the background and feed it to Rocky and Christa, with a link to the state that's hosting.

Marie: this year focus on developing the gap. Future years do a visual presentation of it.

Corina: that's why NTHMP web site needs ability to host it and update it.

Daniel: you can have a list of sources in your viewing area in the widget map.

Chip: so not evacuation maps?

Chip: could vertical evacuation be considered part of the gap? The answer was yes

Rick: eventually we'd get there.

Marie/Rick: leave it to the states? It could be sources, it could be ..

Rick: first year, list areas not covered by inundation and evacuation maps.

Rick: like American Samoa's evacuation map.

Elinor: I'm still trying to get them to update based on inundation maps.

Rick: first year: list areas not covered by inundation and evacuation maps.

Have everyone bring information to the summer meeting?

Tim: we have evacuation brochures for a lot of places that don't have modeling.

Rick: Another potential activity is the **Sediment transport**. What does EC (east coast) think?

Stephan: worry about thousands people camping beyond dunes on Assateague Island, also flooding possibilities at Norfolk Naval Base. Take Atlantic City, NJ; also Ocean City, MD. Could do a little test, say Ocean City example.

Marie: Would it be a finite completable effort?

Stephan: yes.

Jim: only if can hire a student.

Rick: some of these are MMS-wide, some are more local.

Rick: if supported workshop or groups that work on sediment transport towards the workshop

Marie: grant review panel might be concerned about number of workshops.

Rick: maybe a small task, a pilot project.

Juan: workshop will be the first step to advancing. Jim: choosing the BMs will be challenging.

Dmitry: worry about when need to write report; we need a champion by each activity. Sediment transport is great, but need a champion.

Fai: question is whether it should be a state activity or MMS. Overall sediment transport is good for MMS. Case study in NJ is a state thing.

Corina: as part of TsuInfo, having large catalog of tsunami material.

Rick: WA will support a pilot project on Sediment transport through TsuInfo. Brief catalog of studies and pilot projects. Workshops down the road.

Dmitry: called for a small break with the idea that more work would be done and vote would be later.

Rick: **guidance document for Landslide-triggered** tsunami modeling based on the previous Landslide workshop.

Stephan: requires some additional modeling, thoughts, work. Perhaps \$20k for the support. PIs will volunteer their time.

Marie: does MMS want to support that as a group?

Chip: where does the money come from?

Rick: idea is that there's an NTHMP pot of money. These will have higher priority than other, but these amounts are also small.

Voting on the proposed activities:

1. Tsunami source database. California will take the lead, about \$10k.
2. Updating Maritime Guidance: Work with MES. California will take the lead, about \$20k.
3. Complete gap analysis for inundation and evacuation for each state/territory. Work with MES.
4. Complete Current mapping and modeling activity/guidance.
5. Sediment transport:
6. HAZUS guidance: Washington has submitted for a grant
7. Landslide-triggered tsunami model guidance.

All activities are approved.

Dmitry: come back here at 12:45 to talk about GNSS.

## **\*\*LUNCH BREAK**

### **What is the GNSS and how it could be useful? (speaker: Paul Huang)**

Paul H. presented a Power Point on Quick and Accurate Magnitude Determination

Can get GPS displacements; Tohoku earthquake inversion: Fastest seismic calculation about 9 minutes. With GPS? can do it in theory in about 157 seconds. Project been going on for 2 ½ years. Problem is that the data is scattered, and that the data is not complete.

In a small EQ, 7.5-8, your reference station might not have moved. In M9, the reference station will have moved.

Clock problem. I tried to solve clock problem. NASA atomic clock data only goes to DoD (for accurate launch information from various locations) and NASA. We have 15 minute propagation time from the earthquake to the coast. The problem with tsunami modeling is that you need to know the location and it takes 45 minutes to do the wave field inversion.

Questions:

Stephan: if you have a non-seismic component to your source, and did normal inversion, you do not get the wave generation to the north (with Tohoku). Assuming the deformation is co-seismic, what if it's not seismic?

Dmitry: if EQ happens on outer rise, signal to noise ....

Paul: we have GPS in the ocean. Not automated yet, would like it to eventually be.

Juan: a landslide component?

Paul: that is another story. We do not know where to add the landslide component in.

Diego: we are changing SIFT model to run it from any arbitrary source.

Dmitry: if EQ is on the megathrust and there is a splay fault, can untangle it in real time?

Paul: not sure we can do it in real time.

Tania: may be interesting to touch bases on Vancouver Island.

Paul: we have communicated with Canadians.

Tim: interacting with EEW people? They also want to use GPS.

Paul: no.

Stephan: Boston coast could be good to work on with the landslide sources.

Paul: yes.

Victor: PR switched to PTWC. (ITIC/UNESCO? Has Over 60 instruments in Caribbean. Does PTWC use that?)

Paul: PTWC uses local structure, it's a different way of solving.

Tonya: for newest Cascadia scenarios (Kelin Wang).

Paul: I didn't work on those. For Shumagin Gap, it generates all the way to Los Angeles but Cascadia won't.

## **7. Powell Center Working Group (speaker: Stephanie Ross)**

Stephanie R. provided an overview of the Powell Center workshop and updated participants on planning.

1. 2016 Workshop with USGS and MMS was held to look at how to improve the USGS-NTHMP collaboration. The workshop came up with a few things that would be helpful: a tsunami Source database, regional workshops, general workshops every few years. The USGS has no official Tsunami Program - they do individual work but no coordinated effort. As a result, Stephanie wrote a proposal for Powell Center. Provide meeting space, logistical support, etc, and Powell Center Fellow: Kenny Ryan

### 2. Workshop plan:

1st workshop in April 9-13, 2018 – The process workshop to decide what is needed for a suite of sources. Come up with processes and protocols

2nd - Alaska Sources in Fall 2018

3rd - Caribbean, Spring 2019

4th - Pacific, Fall 2019

Powell Center Discussion Questions:

Fai: what additional information will the Powell center provide? I use GEM for Magnitude.

Dmitry: heterogeneity of sources.

Corina: will it include crustal faults? e.g. the Seattle crustal fault

Nate: PMEL did inundation modeling for Tacoma fault; 40k people would be affected.  
Rick: use sensitivity analysis to help focus on important sources.  
Diego: if PC comes up with different sources, do we go back?  
Dmitry: it's a question for different states.  
Diego: even without PC, we'll be updating sources.

Corina: Is there a deadline for the Power Center paper to be written.  
Stephanie: No. The Powell Center likes a paper to be written by the Powell Center Fellow  
Nate: Is Cascadia wrapped into workshop 1?  
Stephanie: No, it is in Workshop 4.

Expected attendees list was presented. Powell Center only wants 15 but max is 20.

Stephanie: MMS representatives please provide what you use for your state/territory for source list  
Timeline need this ASAP

Rocky: In the lists of people in workshop 1, several people are from our NTHMP partner states. No funding available from the FY17 (current) NOAA/NWS tsunami grants.  
Stephanie: They are funded by Powell Center, self-funded, or by other USGS funds  
Rocky: confirm will him which NTHMP partners should add travel for the upcoming grants deadline of 2/23. We want to make sure that people are asking for it in their grants if needed  
Corina: is there guidance about what should be asked for as far as amounts are concerned?  
Rocky: we will figure out the standard cost. Likely about \$1500.

Chip: go back to the schedule. Is AK included?  
Dmitry: Dmitry and Rick need to be added to the 2nd and 3rd meeting lists.  
Corina: When will we have a finalized schedule? When is the meeting for Fall?  
Once they list of attendees is final, they will work on the dates with that group  
Rocky: Asks the MMS to add travel support on grants and into the Annual Workplan.  
Corina: Workshop 1. One or more MES members invited in Workshop 1. For other workshops will there be MES members?  
Stephanie: Need to discuss  
Chip: what is the date of end of Feb? What is needed for that?  
Stephanie: The raw databases to assemble the tsunami source. Chip would get this from Fai and PMEL

#### **14:00 –14:15 Sharing of products and links to products (general MMS discussion)**

Dmitry: it would be a good idea to add grant accomplishments to the NTHMP page  
Nate: some states charge when put it out to public.  
Rocky: when a project is funding by NOAA NWS, it's required to be publicly available. May not be sold or restricted.  
Nate: what about the GIS behind it?  
Tim: data are now available.

**Rocky: issue about endorsement by MMS for part of your grant request. (change of topic).**

Rocky asks Juan what he wants to do for a meteotsunami. Propose to Juan to describe his work and MMS endorse it or not to include in his grant pre-application.

Juan: meteotsunami 1911 Gulf of Mexico. The main idea is to do a characterization and conduct a pilot study at specific locations.

Philip: interesting approach to do the GOM. We had a NOAA meeting of meteostunami approach. How does your approach differ? All the record is there.

Juan: yes, one of the steps is to see what we have.

Marie: is the purpose for forecasting or to assist with mitigation and preparedness?

Juan: it's a pilot for specific, but would need to do it for all of GOM.

Philip: how do you determine the one location?

Chin: trying to look at a probabilistic view. Our experience is that looking at whole broader view took a grad student 2 years to look at 15 years of water level data. After that exercise, we know.

Marie: from MMS perspective, you need to convince people that your project will have an impact on their work.

Stephan: how will you model the tsunami?

Juan: non-hydrostatic model.

Stephan: these are the sort of things we've been asked to do, would it make sense to re-use that approach/model?

Dmitry: we have heard the project. I do not see clear links how this project would impact AK, and MMS in general.

Chin: This was a very tedious process, am happy to share it with you. I think it would work for many places. We worked with scientists in Croatia, Spain, etc. Key component is how you develop the sources. Meteotsunami work started with Europeans, not US, but now we're more equal. East Coast has done great work.

Corina: it seems like an oversight in grants allowable that this can only be done by MMS approval instead of by the state.

Marie: maybe, the proposed task can be reworded to work with Chin and Philip. The way proposal is submitted it is GOM-centric and it is so hard to have endorsed by MMS. Could change it to proof of concept, or as an example.

Corina: how much funding do you request?

Juan: The project cost would be \$15k. Outcome would be report with characterization of GOM.

Marie: can you modify it to include work already done in Great Lakes?

Rick: and talk about how it could be applied beyond GOM.

Philip: need to start with an amount more like \$50k than \$15k. How does GOM relate to U.S. or the globe? Apply what we've learned in great lakes to GOM. Nothing is available for GOM in terms of meteotsunamis. There is still a denial that meteotsunamis happen in the GOM.

Marie: in order for MMS to endorse it, it needs applicability to the rest of MMS. We do not disagree that it's useful work.

Rick: we talk about vision planning; those often talk about pilot projects. This could be a starting point for a multi-year project.

Dmitry: could you send us updated text of your project?

Juan: it's a test.

Dmitry: no consensus yet.

Marie: what's the feeling for what could be endorsed?  
Chin: I am willing to share our knowledge in any way.  
Rocky: we need a recorded vote by 2/23.

**14:30 – 14:45 Wrap-up and Election of NOAA Co-chair.**

Rick: is Marie interested in staying? Who's regularly been involved?

Answer: Eligible: Kelly, Chip, Diego, Marie, Kara, Elinor

Kelly: rather not do it so soon after joining MMS.

Rocky: could elect someone for a 2-year term. If someone chooses to retire, then MMS would be asked to consider a replacement.

Chip: group deserves someone who can focus more on it than I can.

Elinor: I also just started a new job.

*MMS elected Marie.*

**NEW BUSINESS:**

**Corina: assembly areas discussion.** When doing pedestrian evacuation maps, some communities decided not to have assembly areas because they had different ideas as of what is meant by the term itself. Please think about your definition of an assembly area and be ready to discuss tomorrow and into the future.