



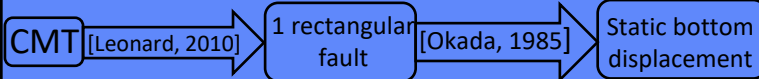
Comparative study of the 3D tsunami simulations performed with the use of different approaches to the reconstruction of the bottom movement



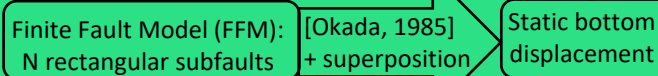
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Approaches to the bottom movement reconstruction

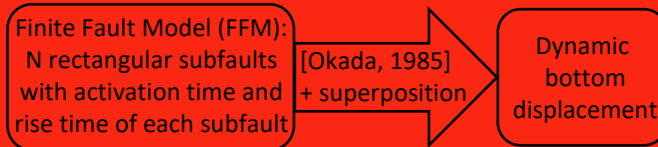
1. Based on the CMT solution



2. Based on the Finite Fault Model without rise time and activation time of each subfault ("FFM static")



3. Based on the FFM with rise time and activation time of each subfault



Aim of the study:

- To perform 3D tsunami simulations for the different above mentioned approaches to the bottom movement reconstruction
- To compare the simulation results with each other as well as with nearest DART station records

List of events

- | | |
|---------------------------|-------|
| 1. 2007-08-15 Peru | Mw8.0 |
| 2. 2009-09-29 Samoa Is. | Mw8.1 |
| 3. 2011-03-11 Tohoku | Mw9.1 |
| 4. 2012-04-11 Sumatra | Mw8.6 |
| 5. 2013-02-06 Solomon Is. | Mw8.0 |
| 6. 2014-04-01 Iquique | Mw8.2 |
| 7. 2015-09-16 Illapel | Mw8.3 |
| 8. 2017-09-08 Tres Picos | Mw8.2 |

Criteria

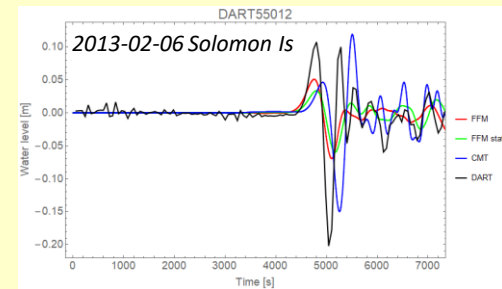
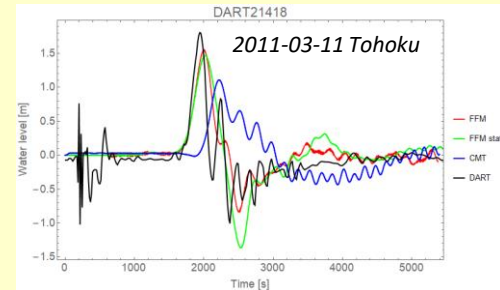
- 2003-2021, Mw8+
- FFM on the USGS web-site
- The nearest DART station is located at the distance < 1500 km from the epicenter

All 3D tsunami simulations were performed with the use of the Combined Potential Tsunami Model (CPTM)



[Nosov, Kolesov, 2019; Sementsov et al., 2019]

Results



Conclusions:

- Tsunami waves calculated for the FFM and FFM-static bottom displacement are quite close to each other
- Tsunami waves for the CMT bottom displacement can differ significantly (from the FFM and DART) and in both directions