

Interactive comment on “Numerical simulations of tsunami generated by underwater volcanic explosions at Karymskoye lake (Kamchatka, Russia) and Kolumbo volcano (Aegean Sea, Greece)” by M. Ulvrová et al.

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I have read the manuscript by Ulvrova et al. and I would like to focus my comment on the case of the tsunami simulation for Kolumbo submarine volcano. I would also like to say that my main criticism has to do with the volcanological details that are important for their modeling and not with the tsunami simulations/methodology which are outside my expertise and I cannot comment on these.

The authors have used for their simulations, as origin of the submarine explosion,
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the location of the Kolumbo crater. This implicitly assumes that the site of the future eruption lies in the main crater or very close to it, which volcanologically means that this is a central vent eruption. Such an eruption is likely when there is an edifice on top of the magma chamber, causing loading stresses to focus on the rocks that cover the top of the chamber leading eventually to their failure (see for example Pinel and Jaupart, 2003). Once the rocks fail, magma can flow through the newly created crack and erupt on the seafloor also mixing with the cold seawater and generating a submarine explosion.

However, this does not seem to be the case for the Kolumbo submarine volcano as there is no large edifice causing this stress focusing. This has implications for the style of eruptive activity, where instead of a central eruption a flank eruption (from the sides of the magma chamber) is more likely. Analogue stress modeling conducted by Konstantinou and Yeh (2012) support the scenario of flank eruption with a dike propagating away from the magma chamber beneath Kolumbo. I attach a PDF copy of this article in case the authors are not aware of it.

I would strongly recommend that the authors consider other locations at the flanks of the Kolumbo crater and especially at locations closer to Thera island. I would expect that the tsunami simulation results (and thus the conclusions of the manuscript) shown in Figures 7-10 will change considerably.

There is also one additional point which the authors have not taken into account in their study. Dominey-Howes et al. (2000) (a paper which is cited in the manuscript), conducted a sedimentological survey at Kamari and Perissa beach in order to find evidence for the 1650 eruption tsunami. Their results show that there was no evidence of sediments deposited inland after a tsunami at these sites. However, based on the results shown in the manuscript both of these sites should be significantly affected by a tsunami originating at Kolumbo crater. It may be possible that changing the explosion location closer to Thera might also resolve this point of controversy between simulations and observations.

Please also note the supplement to this comment:
<http://www.nat-hazards-earth-syst-sci-discuss.net/1/C1890/2013/nhessd-1-C1890-2013-supplement.pdf>

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