Supporting Information for "Modelling temporal changes in the gravity field in the Nankai Trough Subduction Zone, Japan"

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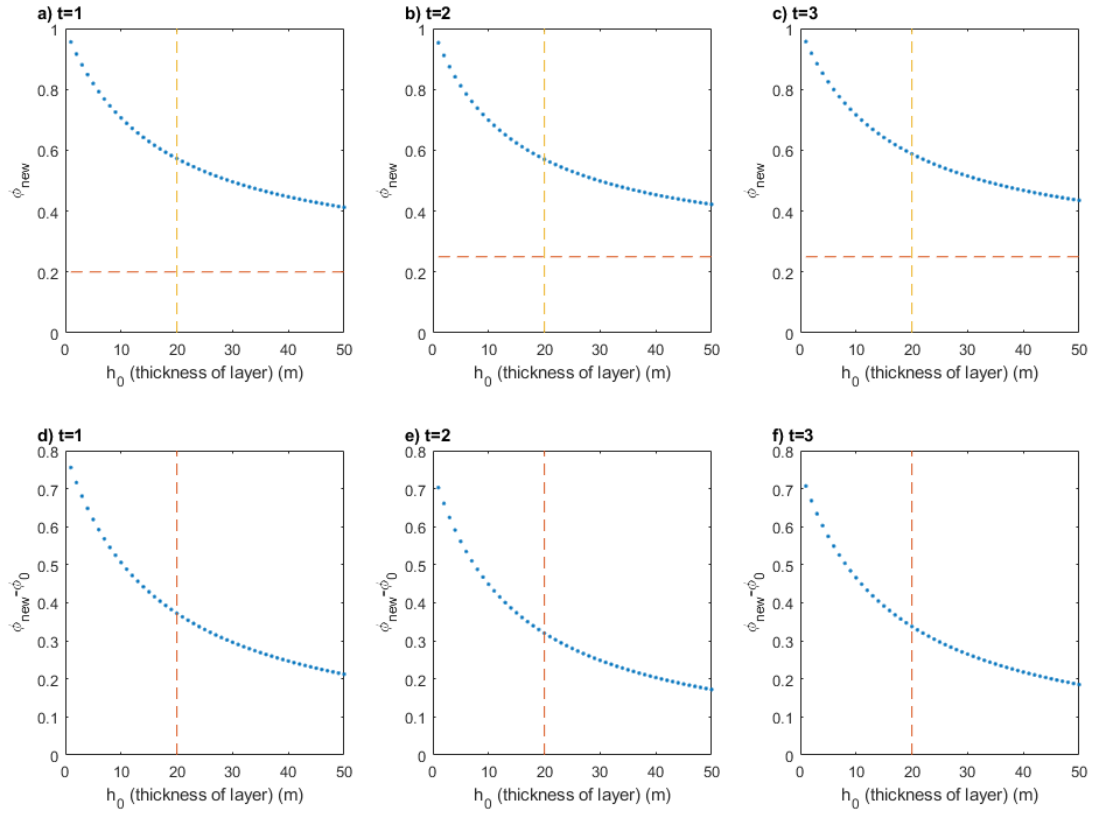
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Introduction The figures provided here give an overview of the porosity increase of fault rocks involved in Scenario 2. These results can be used to estimate porosity increase relating to the increased fluid volumes, given varying thickness of the fault damage zone.
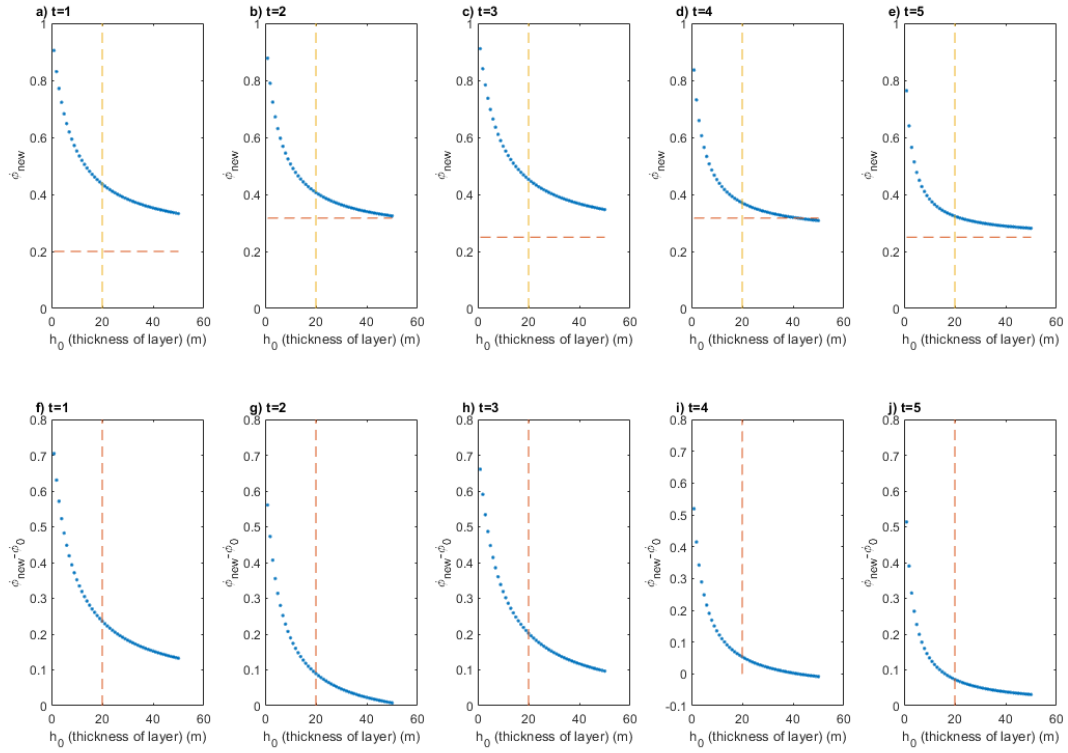
Text S1. The volume of the fault rock is compared to the volume of the fluid added to the affected areas. Since the area A remains constant, the volume of the fault rock and the volume of the fluid are dependant of the thickness h_0 of the sections in relation to the thickness of water added to each section, dh. The thickness of the damage zone, h_0 is varied between 1 - 50 metres. As several fault sections, and therefore several rock types, are involved in the analysis, the initial porosity ϕ_0 used for the analysis of each cluster

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is an average value of the rock types. For each thickness h_0, the new porosity phi_{new} is computed for each fault section, using the initial porosity of the fault section. Then, the average value of the increased porosity for all rock section involved is shown in figs. S1 and S2.

Figure S1. Relation between damage zone thickness and estimated porosity increase of fault sections involved in the 2015 VLFE episode. The porosity increase from pore space expansion is computed for each cluster, t_1 - t_3, separately. Plots a)-c) show the total porosity after pore space expansion. Plots d)-e) show the difference between the original average porosity and the porosity after pore space expansion.

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Figure S2. Relation between damage zone thickness and estimated porosity increase of fault sections involved in the 2016 VLFE episode. The porosity increase from pore space expansion is computed for each cluster, t_1 - t_5, separately. Plots a)-e) show the total porosity after pore space expansion. Plots f)-j) show the difference between the original average porosity and the porosity after pore space expansion.