

The article presents an analytical assessment of the undrained response impact on the state of stress change during reservoir impoundment and associated reservoir triggered seismicity. Authors present laboratory measured permeability and porosity to support the assumption of undrained response. The assessment is based on assumption of oedometer conditions and using analytical expression based on poroelastic relationships. However, a significant deficiency is that Equation 1 has only the relation between horizontal stress and pore pressure. Even if the pore pressure is not changing (drained condition) the horizontal stress would change due to the change of vertical stress. This effect is expected to be the same order of magnitude or stronger than the effect of pore pressure change and therefore cannot be neglected. It is recommended that the calculations must be updated or it should be explicitly shown that the term can be neglected (more details are available in specific comments in attached file).

Specific comments:

12: Either “Specifically” or “in particular”

22: Is the accuracy of porosimetry sufficient to report it to third decimal places?

69: The delayed response is dominant in case of the Koyna, however the local maximum of seismic activity is also observed during the maximum water level (<http://dx.doi.org/10.1134/S1069351322030077>). It might be worthy to mention that both mechanisms are present, but the dominant one is delayed.

122-123: It would be great to mention the depth of earthquakes here.

127: The number of events cannot be negative, so it would be better to start the vertical axis from 0 and not -1.

134: Since only three stations were utilized for the location, it seems to be impossible to determine 4 parameters of earthquake hypocenter (x,y,z,t) without certain assumptions. It would be great to mention if assumptions were made and what is average accuracy of location.

184-186: It would be great to mention the lower instrumental limit for the permeability and the accuracy of measurements. It also seems to be inconsistent with the information in supplementary material, which says that 0.01 mD is the lower limit. In general, supplementary material contains important information but never referred in the main manuscript which make it difficult to find.

192 MAJOR: The equation consider only relationship between change in horizontal stress and change in pore pressure. However, the change in vertical stress would also cause change in the horizontal stress, which is neglected. The equation should be

$$\Delta\sigma_h = \frac{\nu}{1-\nu} \Delta\sigma_v + \alpha \frac{(1-2\nu)}{1-\nu} \Delta p$$

197: What is the sign agreement here? If the pore pressure is positive and compressive stresses are also positive, it should be no minus sign.

198: “*mean* stress change”

201: Equation seems to assume that there is no minus sign in Equation 2. **MAJOR:** The equation have to be modified due to the change in Equation 1. Or it should be explicitly shown why term proportional to change of vertical stress in neglected.

224: Is the porosimetry is accurate to report it to three decimal places? It is suggested that “<0.002” is reported instead of “0.002” for permeability.

226: Since the measurement are close to instrumental limit, it would be great to show this limit on the plot as well as the accuracy of calculated permeability.

242: It is mentioned further in the text, but it would be great place to say that absence of fractures is assumed.

259-261: The permeability measured in the lab is usually 1-2 orders of magnitude lower than the in-situ one even without visible fractures. At least in the laboratory experiments, the presence of open fractures is capable of enhancing the permeability by 5 orders of magnitude (e.g., <https://doi.org/10.1038/s41598-022-19775-4> or <https://doi.org/10.22541/essoar.171629597.77744897/v1>). It is acceptable to assume that 5 orders of magnitude enhancement is unlikely, but slightly extended discussion would be worthy here.

334-335: It is not fully clear what is meant by “carefully manipulating reservoir loading”. If the change of impoundment rate is meant, it seems unlikely that the impact of undrained response will be different by the end of impoundment. If the limiting the maximum water level is meant, it is not fully clear what is suggested as a limit and rewording might be necessary.