Earth Syst. Sci. Data Discuss.,
https://doi.org/10.5194/essd-2020-222-AC1, 2020

Earth System Science Data Discussions

Interactive comment on "Database of global glendonite and ikaite records throughout the Phanerozoic" *by* Mikhail Rogov et al.

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Received and published: 29 November 2020

We are grateful for the helpful review and suggestions by Dr. Madeleine Vickers.

20: ":mainly due to their (possible) utility for palaeoenvironmental (especially palaeoclimatic) reconstructions:::" I think the word "possible" should be added as this is still debated among the palaeoclimate community.

- done

70: discussion on transformation from ikaite to water and vaterite, calcite, aragonite: : :.could cite Tang et al. 2009 (J. Applied Crystallography) who also show ikaite transforming to vaterite before the calcite.

- we cited this article, as well as additional (previously omitted) paper providing evidence of ikaite transformation to amorphous calcium carbonate

75: "Purgstaller et al. (2017) showed that the formation of anhydrous calcium carbonates is controlled mainly by the prevailing physicochemical conditions, such as the Mg/Ca ratio of the aqueous medium and water availability." - Stockmann et al., 2018 (Applied Geochemistry) also show this, and should probably be cited here.

- done

90 – 95: "The size of natural modern ikaite clusters: : :." Are all of these from personal observation or are there published studies you used to determine this? (in which case, cite them).

- proper references were added

100 – 105: Petrography and Cathodoluminescene: You cite studies that have used these techniques: we have just published CL, SEM element maps, and thin section work on the Danish Fur Formation glendonites (Vickers et al., 2020, Nature Communications) that you might want to include here.

- done

120: "Besides multiple carbonate generations, some detrital material is typically also found in glendonites" - They also tend to have a high OM content - enough that can be measured for stable isotopes by dissolving the carbonate (we did this with subsamples of the Danish Eocene glendonites, see Vickers et al., 2020 for the data).

- we cited Vickers et al., 2020 here

165: "Interestingly, most glendonite occurrences have been reported from the northern Hemisphere, which is challenging to explain." - Could it be partially due to there being fewer high latitude southern hemisphere outcrop studies? Could it be that since many of the Mesozoic and early Cenozoic S. hemisphere studies are based on cores, they

may not have sampled rare glendonites in the successions?

- glendonites are so remarkable and easily distinguished from other types of concretions common in sedimentary rocks, that as follow from the both authors' experience and analysis of publications, we rather suggesting that rarity of the Southern Hemisphere occurrences are reflect the real situation, which will be analyzed in detail elsewhere. Although the described database could be partially biased towards the datapoints located in Russia due to availability of diverse data sources, including reports and explanatory notes, online search in different languages indicates rarity of glendonites in the Southern Hemishere except the Australian and Tasmanian occurrences.

180: "It should be noted that the giant glendonites from Denmark are mainly embedded in post- PETM rocks, but clumped isotope data from the glendonites are indicative of near-freezing temperatures" – we also present new clumped and stable isotope data for the Danish Eocene mega-glendonites in Vickers et al. (2020).

- added

180-185: "only a single occurrence has been reported from the Barremian." – Who reported this?

- we found this specimen from the Barents sea shelf in core storage, it will be studied soon. Age of this core was determined by means of dinocysts (Shurekova and Gogin, 2018 – reference added to the database)

225: However, experiments carried out during the last few years have revealed at least short-term ikaite stability at much higher temperatures, up to 30-35o C" – also Stockmann et al. (2018) could/should be cited here.

- added

Figures: Overall very nice figures. Figure 4, however, the dots showing glendonite/ikaite locations are very small. I think you should make the dots bigger as it's hard to distinguish some of them at this scale (particularly the purple ones)

- figure was corrected by changing of grey to light-grey background of landmasses; point sizes were enlarged nearly in two times

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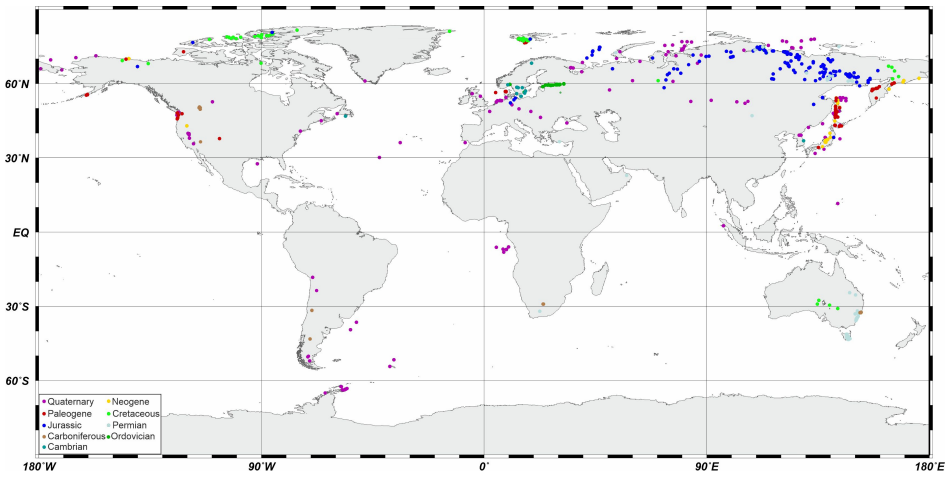

Fig. 1. corrected fig. 4