Climate of the Past Discussions

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Comment on cp-2021-50

John Barron (Referee)

Referee comment on "North Atlantic marine biogenic silica accumulation through the early to middle Paleogene: implications for ocean circulation and silicate weathering feedback" by Jakub Witkowski et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-50-RC1, 2021

This paper builds on earlier studies, in particular Witkowski et al. (2020, Palaeo3) and presents detailed data for comparing North Atlantic biosilica deposition on the Blake Nose during the Paleocene and Eocene with silicate weathering and Pacific biosilica accumulation data. As mentioned in the text detailed silica flux records are sorely lacking from the world's oceans. Therefore, this publication should be of major interest to readers of Climate of the Past.

As mentioned in the text, 49 Ma corresponds with the possible onset of Northern Component Water. The 49-47 Ma gap in BN silica deposition is intriguing. Witkowski et al. (2020, Fig 5) show a 47 Ma end of widespread chert deposition in the deep North Atlantic. Why would biosilica deposition shift from the shelf to the deep sea? This is discussed more thoroughly in Witkowski et al. (2020), but I believe a review of this discussion is warranted.

Figure 4 –Biosilca and CaCO3 flux is pulsed in the equatorial Pacific, as would be expected due to changing climate driven productivity gradients. Narrow vs. broad band of equatorial flux.

Line 407 –high diatom to radiolarian ratios in BN sediments. What about diatom to sponge spicule ratios? Were these done? Could sponge spicules contributed to biosilica percent.

Line 449 –diminished BN silica fluxes at 42-38 Ma –imply diminished nutrient supply? How about increased productivity gradients? Explained beginning of line 470

Line 78 –flat continental relief –Does this imply reduced rates of terrestrial runoff?