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Interactive comment on “A new approach for modeling the Cenozoic oceanic lithium isotope paleo-variations: the key role of climate” by N. Vigier and Y. Godderis

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The authors discuss a different mathematical approach to interpret a recent data set of Li isotopes from deep sea sediments. The data they deal with (Misra and Froelich, 2012) bear on paleoclimate studies, and so the correct interpretation of such data is an important topic. The major finding of the new modeling is that the lithium isotopic composition of river inputs to the oceans are not the major driver of marine Li isotopes. This instead is determined to be the riverine flux, which the authors tie primarily to soil formation. Through their mathematics, which appear to have reasonable input parameters (although Li in soils is admittedly rather underdetermined), the authors

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indicate that the general increase in the marine Li isotopic composition is most plausibly driven by a net decrease in Li flux caused by a slowdown of soil formation over the last 60 Ma. Hence, Li in the oceans is moderated mainly by climate (e.g., tied explicitly to the carbon cycle). The authors suggest that the absence of Li isotopic variation in the oceans over the last ~ 5 Ma may be a reflection of inadequate estimation of the marine residence time of Li. Although there are a few typos here and there, the authors make their case in a clear and terse fashion, the logic is easy to follow, and the mathematics appear robust.

Interactive comment on Clim. Past Discuss., 10, 3027, 2014.

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