

Interactive comment on “Silicon stable isotope distribution traces Southern Ocean export of Si to the eastern South Pacific thermocline” by G. F. de Souza et al.

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We thank the reviewer for her/his positive and concise review.

Abstract line 7 to 9: ...What do you mean by 'annual winter convection' – is it the maximum convection depth in winter?

This is indeed what is meant. We have rephrased the sentence.

Section 5.1.1: I have problems following the logic here...the problem with the mixed layer model is that it requires a source of lower $d^{30}\text{Si}$ that compensates in the annual mean for the 'enrichment' for incorporating high $d^{30}\text{Si}$ – otherwise the mixed layer

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$d^{30}\text{Si}$ would increase asymptotically towards the high $d^{30}\text{Si}$ values.

Yes, indeed – without supply from depth, an annual mixed layer system with export across the winter mixed layer base would not only asymptote to high $d^{30}\text{Si}$, but also to zero mixed layer [Si]. The reviewer is referring to a relatively fundamental biogeochemical concept – i.e. that continued export requires nutrient replenishment from depth. The manuscript makes numerous references to the fact that Si supply occurs from the deeper water column (e.g. P6419, L3-7 of the original manuscript; also Fig. 6), and even refers to the dominance (75-80%) of this source in L6 of P6419. The changes made to Section 5.1 in response to Reviewer 1's comments (adding the Supplementary Material B to the main text) results in this connection being more clearly accentuated, and we thus see no need to make any further changes.

P6418, L3: 'isopycnal control' – the isopycnals do not control the distribution but the physical processes that act preferentially along the isopycnals such as lateral transport of advection along isopycnals.

Agreed. However, in our opinion it is quite apparent that the formulation 'isopycnal control' does indeed mean 'control by isopycnally-acting processes' and we have not changed this in the revised manuscript.

Table 1: Longitudinal range is wrong, it should be 103W.

This had completely escaped our attention; thank you for the correction.

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