

Associate editor:

Non-public comments to the Author:

in your response to reviewer #2 on the possible effect if nitrite you wrote: "we have not corrected our surface nitrate isotopic value for such nitrite effect, but have considered the impact of this when calculating nitrification". this differs significantly from your revised manuscript " we have not corrected our surface water nitrate isotopic values for a possible nitrite effect, as is the case in work presented by others (see e.g. DiFiore et al. 2009,rafter et al. 2013). It seems that you discuss this effect page 21 line 563-565. So add 6 line 160."but have considered the impact of this when calculating nitrification"

Reply

We have changed the text as suggested by the editor (Line158-161) "We have not corrected our surface water nitrate isotopic values for a possible nitrite effect, as is the case also in work presented by others (see e.g., DiFiore et al. 2009; Rafter et al., 2013), but have considered the impact of this when calculating nitrification (see section 4.5)."

Associate editor:

reviewer #2 : role of sediment:

In your reply you do not consider the possible advection of a signal coming from the shallow sediment located south of A3 (in the vicinity of heard.). I understand that you do not have any measurement of delta (15-18) in this region, but if the signal is of the same magnitude as at TEW1 how does this affect your conclusion? R-2 is located west of the plateau but it cannot be considered as an upstream station for A3. at least a short comment on this issue should be added in your section.

Reply:

We have changed the text (lines 452-472) taking into account the editor's comment:

"Nitrification could possibly occur at the shelf sediment water column interface, as reported for the low nitrate Bering Sea shelf, characterized by high NH_4^+ levels (Granger et al., 2011; 2013). For instance, at the shallow (< 100m) TEW1 shelf station (see Figure 6A) ammonium contents are enhanced (up to 1.1 μM) close to the seafloor. We note, however, that $\Delta(15-18)$ values are relatively large, averaging 2.3‰ (Figure 6A; Table A1), a condition that is not indicative of significant nitrification. Furthermore the shallow TEW1 station is located north of the Polar Front, and surface waters advected from this shallow shelf area flow north, north-east, staying north of the PF (see surface water flow lines in Figure 1), away from A3. Except for this station TEW1 we do not see evidence for nitrification at the site sediment water column boundary layer elsewhere above the Kerguelen Plateau, though we have no data for the shallow water column (<100m) close to Heard Island located further south on the Plateau, some 400 Km upstream of site A3 (Figure 1a). During KEOPS 1 (summer 2005)

NH_4^+ and NO_2^- concentrations at the C1 site close to Heard Island reached up to 0.7 and 0.4 μM , respectively and a single nitrate isotopic measurement for the C1 site gave a $\Delta(15-18)$ value of 2.13‰ (Trull et al., 2008) so conditions similar to those observed here for site TEW1. Especially the large $\Delta(15-18)$ values ($>2\text{‰}$) observed for these two shallow ($<100\text{m}$) plateau sites make it unlikely that sediment boundary layer nitrification is a source of nitrate to the mixed layer above the main Kerguelen Plateau area south of the Polar Front. In the next section we evaluate the strength of a possible nitrification in the surface layers.”

Associate editor:

Reference list update references of the special issue; e.g. Gille.

Reply:

Gille et al. and Lasbleiz et al. have been updated

Associate editor:

IMPORTANT

for consistency with all the ms published you must use correct labels for the stations. (refer to log book); for example The labels for stations on the panel a and b of figure 1 are not correct . (in panel b your station label of the transect EW are in roman character! : use the correct label (e.g TNS-1, TEW-2 E-1.....) modify, text, figures, tables accordingly.

Reply:

We have changed Figure 1b. It now shows the final and correct station numbers.
