How strong is the link between CO_2 carbon flux and benthic communities in the Southern Ocean?

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Climate change has brought considered attention in the media nowadays. One of the ways it can be measured is by rapid increases in CO2 concentration over the past four climate cycles (Abelmann *et al*., 2006), which in turns influences surface primary productivity and carbon export to the seabed (Lutz *et al*., 2002). The fate of organic matter below the photic zone has an important role in determining CO2 sequestration and its remineralisation by benthic organisms (Middelburg et al., 1997). The Antarctic Circumpolar current, delimited by the Polar Front, is considered to play an important role in regulatory mechanisms of CO2 and its export as particulate organic carbon to the seabed (Abelmann *et al*., 2006). Four stations were sampled along the Polar Front (Southern Ocean) on board of the RV Polarstern and we investigated to what extent differences in quality and quantity of surface primary productivity and benthic environmental parameters, and fatty acids, mirrored benthic standing stocks (i.e. densities and biomass) and community composition, here represented by nematodes, the most abundant and omnipresent meiofaunal group in the Southern Ocean (Lins *et al*., 2014). Higher surface primary productivity was responsible for up to 10 fold increase in nematode standing stocks. Additionally, fatty acid analyses revealed a planktonic-based diet, dominated by diatoms, whenever enough labile organic matter was available, and otherwise by refractory organic matter where flux to the seafloor was low. Uncommonly found in typical deep-sea environments, opportunistic genera normally observed in productive environments (e.g. *Desmodora*) dominated samples under highly productive regimes, confirming the strong benthic-pelagic coupling even at great depths. This study suggests that shifts in nematode standing stocks, community composition and fatty acids, together with selective feeding by specific genera, can be positively associated and shaped by differences in surface primary productivity.

References

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