

Do essential trace elements influence the export production in oceans?

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Export production in open oceans is still scarcely studied and poorly understood. New production, assumed to be an excellent indicator for export production, was recently investigated in functionally contrasting ocean settings: K2 (47°N-161°E) during the 2005 VERTIGO Northwest Pacific cruise shows relatively high nitrate specific uptake rates (0.02-0.06 d⁻¹) but rather low new production rates (50-171 mg-C m⁻²d⁻¹) and is characteristic of HNLC (High Nutrient Low Chlorophyll) regions. Aloha (22°45N-158°W) during the 2004 VERTIGO Hawaii cruise has low nitrate specific uptake rates (0.002-0.006 d⁻¹), low new production (12-42 mg-C m⁻²d⁻¹) and behaves typically as an oligotrophic area. At both sites there is an agreement between the estimates of new production and the POC flux measured by neutrally buoyant traps at 150m depth: the ratio new production over POC buoyant trap flux is ranging from 1 (Aloha) to maximally 3 at K2.

In order to better understand the reasons why K2 is a HNLC area despite the availability in nutrients, total and labile concentrations of some essential elements like iron, copper, molybdenum, cobalt were also assessed using ultra-clean sampling and speciation techniques. Preliminary results indicate for example that 10% to 20% of dissolved iron and copper are labile compounds.

Key words climate change; ocean; nutrient; trace element; export production