

Subantarctic Pacific iron fertilization during the last ice age

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Paleoceanographic records from the Subantarctic Atlantic show that peak glacial times and millennial cold events were nearly universally associated with increases in dust flux, export production, and nutrient consumption (the last indicated by higher foraminifera-bound $\delta^{15}\text{N}$). This combination of changes is uniquely consistent with ice age iron fertilization of the Subantarctic Atlantic. However, the impact of iron fertilization in other sectors of the Southern Ocean characterized by lower glacial dust fluxes than the Atlantic remains unclear. A series of recently published records from the Subantarctic Pacific indicate that dust deposition and marine export production were three times higher during glacial periods than during interglacials, consistent with enhanced iron fertilization. However, glacial dust and productivity fluxes remained significantly lower than in the Subantarctic Atlantic. Therefore, the potential impact of the observed dust and productivity changes on major nutrient consumption and carbon sequestration remains unclear. Here, we present new measurements of foraminifera-bound nitrogen isotopes in a sediment core located in the Subantarctic Pacific (PS75/56-1), which provide the first insights on the impact of iron fertilization in the largest Southern Ocean sector.