Evidences for a persistent link between Greenland climate and northeastern Pacific Oxygen Minimum Zone on millennial timescales under interglacial conditions

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The intensity and/or extension of the northeastern Pacific Oxygen Minimum Zone (OMZ) varied in phase with the high northern latitude climate on millennial timescale during the last glacial period, indicating the presence of atmospheric and oceanic teleconnection under glacial conditions. While millennial-scale variability during the last interglacial is well known from Greenland and northern Atlantic records, a possible relationship with the NE Pacific OMZ has not been yet demonstrated. Here, we present a new geochemical dataset for core MD02-2508 (23°27.91′N, 111°35.74′W, 606 m water depth), retrieved from the northern limit of the modern OMZ, spanning the last 120 ka. High-resolution XRF scanning measurements deliver information on terrigenous fraction, marine organic matter, biogenic opal and carbonates, alongside with biological productivity and redox sensitive trace element content (Mo, Ni, Cd). The geochemical proxies (opal content based on Si/Ti, Cd/Al and Ni/Al) show that high productivity occurred during the last interglacial. Highly-resolved opal reconstruction shows strong millennial-scale variability matching all Dansgaard-Oeschger interstadials throughout the last interglacial, while Mo/Al indicates reduced oxygenation during these events. Extremely high opal content during warm interstadials corresponds to high diatom productivity. Despite the different climatic and oceanic settings between glacial and interglacial periods, NE Pacific OMZ rapid variability seems to be tightly coupled to high northern latitude climate, mainly via atmospheric processes.

Anorthosite deposits: Fragments of early Mars

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We here report the detection of near-infrared spectral signatures indicative of the presence of a new rock type on Mars of anorthosite composition. On Mars, there are several reasons to explain why such rocks would not have been formed during its primordial differentiation (wetter mantle, sequestration of aluminum at depth in dense majorite and garnet phases and shallower pressure of plagioclase stability) (Elkins-Tanton *et al*., JGR, 2005)

We will then discuss the setting properties of these intriguing deposits. The few occurrences of anorthosite in comparison to the large number of other minerals (including mafic and alterated ones) suggest that the formation process of anorthositic rocks was likely rare on Mars and mainly restricted to early Mars. Their detection at several locations on Mars provides new constraints into magmatic (plutonic) evolution during early Mars.

www.minersoc.org
DOI: 10.1180/minmag.2013.077.5.3