Meridional advection of Southern Ocean intermediate waters during the last deglaciation from Nd Isotopes in foraminifera

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The Southern Hemisphere plays a key role in the global ocean thermohaline circulation and the climate system, particularly during the glacial-interglacial transitions [1,2]. In particular, the advection of Southern Ocean intermediate waters like Antarctic Intermediate Water (AAIW) and Sub-Antarctic Mode Water (SAMW) towards the tropics is a means for rapid transfer of climatic signals from high-to-low latitudes, channelling heat, freshwater, salt, and chemical species, including dissolved CO_2, through a so-called '*oceanic tunnelling mechanism*' [3]. We will present new results for Nd isotopes ($^{143}Nd/^{144}Nd$) in foraminifera shells (*N. dutertrei*) at ODP Site 1240 (0° 01.31'N, 86° 27.76'W, 2921 mbsl) in the Eastern Equatorial Pacific. *N. dutertrei* preferentially dwells in the lower thermocline, at the core of the Equatorial Undercurrent (EUC). Therefore, changes in the Nd isotope ratio of cleaned samples will reflect the isotopic composition of the EUC, which in turn reflects changes in the composition of the Southern Ocean end-member and in the advection of SAMW-AAIW.

The Nd isotope ratios indicate the following LGM-to-Holocean history for the EUC. The LGM shows lower ε_{Nd} values than the late Holocene, consistent with more intense glacial advection of SAMW-AAIW from the Southern Ocean to the EUC. These values increase with the onset of deglaciation, reaching the highest ε_{Nd} (-1) at ~15 kyr, coinciding with the Antarctic Cold Reversal (ACR), and implying weaker SAMW-AAIW advection to the tropical thermocline. Following the ACR, the advection initially strengthens, reflected by lower ε_{Nd}, but then transitions to the weaker Holocene mode as reflected by higher ε_{Nd} values.

[1] Anderson, R.F. *et al.* (2009), *Science*, **323**, 1443-1448. [2] Barker, S. *et al.* (2009), *Nature*, **457**, 1097-1102. [3] Liu, Z. and Herbert, T.D. (2004), *Nature*, **427**, 720-723.

Research on geological features and characteristics of inclusions of Zhongqu Gold Deposit in Maqu, Gansu, China

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Zhongqu Gold Deposit in Maqu, Gansu which was found in west Qinling mountain area was a type of gold deposits with extremely unique mineralization characteristic.The tectonic location of the deposit belonged to Qin-Qi-Kun orogenic belt, south of west Qinling orogenic belt.Gold mineralization was strongly related to the silicification and hematitization. The ore was red, brown and very poor in sulfides.Currently the study level on this type of gold deposit was low; researching the geological and fluid inclusions characteristics would bring significant meaning on discussing ore-forming fluid sources and forming mechanism of this type of gold deposit.

In this article freezing method, homogeneous and Laser-Raman and so on were used to measure various geochemical characteristics of fluid inclusions and discuss the source of ore-forming fluid and deposit genesis. The results showed that the ore-forming fluid was low temperature, low salinity and low - density system. The gas phase in the inclusions contained a certain amount of organic ingredients that were supposed to be involved in the mineralization.The inclusions of Zhongqu gold deposit might suffer the later thermal power effects during the ore-forming process. The depth of mineralization in this area was shallow, belonging to the hypabyssal-shallow causes.