

Sr, Pb, Cu and Zn isotope variations in deep-sea sediments from Southern Okinawa Trough over the last 35ka

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This study aims to generate a preliminary record of Sr-Pb and Cu-Zn isotopic ratios for the ODP leg 195 site 1202, hole D, located at the southernmost part of the Okinawa Trough. The results suggest the possible use of these isotopic tools as tracers of sources and as paleoceanographic proxy, respectively.

The Sr-Pb data obtained in the silicate fraction of ODP 1202D marine core samples allow us to discuss the temporal variations of sedimentary inputs in the Okinawa Basin since 35ka. The influence of Chinese Loess contribution is strongly marked during the last deglaciation, in particular during the Younger Dryas type-event: the isotopic compositions can be explained by an input of about 10-30% of Taiwan, 60-90% of Chinese Loess and 0-10% of Yangtze River whereas during the glacial period an input of about 10-20% of Yangtze River, 40-60% of Chinese Loess and 30-50% of Taiwan contributions can explain the analysed data. These results suggest an intensification of the winter Asian monsoon during the last deglaciation. This increase of Chinese Loess contribution was accompanied by a reduction of riverine input from China, probably due to a rapid sea-level rise of about 40m toward 10.5ka B.P. No variation can be observed in the Sr and Pb isotopic compositions of the Okinawa marine samples since 7ka. A contribution of about 50% of Taiwan and 50% of Chinese Loess can explain the analysed values.

The Cu and Zn isotope compositions of the bulk carbonate fraction of the marine cores show non negligible variations since the last glaciation: the Younger Dryas period seems to be recorded in the carbonates, with weaker Cu and Zn isotopic fractionation than during the glacial period. We suggest that the increase of winter monsoon during the Younger Dryas event allows the replenishment of surface waters by isotopically homogeneous deep waters, and consequently, the Cu and Zn isotopic fractionation recorded in the carbonate fraction is weak. Since 7ka, the important Cu and Zn fractionation could reflect the re-entered of Kuroshio in the Okinawa area which allow the development of deep and nearly permanent thermocline.