Isotopic constraints on oxygen sink partitioning in the Lower St. Lawrence Estuary

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Bottom waters in the upstream portion of the Laurentian Channel are severely hypoxic. The relative role of the benthic versus deep pelagic environment as sites of oxygen (DO) respiration remains uncertain. Here, we report on concentration and stable isotope measurements of DO in the water column of the Estuary and Gulf of St. Lawrence. The apparent O-isotope effect of 10.8‰ reveals that community O-isotope fractionation is significantly smaller than anticipated if respiration occurred solely in the water column. Our observation can be explained by the contribution of benthic DO consumption occurring with a strongly reduced O-isotope effect at the scale of sediment-water exchange (~ 7‰). Based on the observed community O-isotope fractionation, we calculated that approximately two thirds of the ecosystem respiration occur within the sediment, in reasonable agreement with results of direct respiration measurements.

80 My high resolution Nd isotopes record in Western Pacific (ODP 807)

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We present a record of the Nd isotopes signature (εNd) of the Pacific seawater for the past 80 My extract from ODP Site 807 sediments and based on a hundred analyses.

For the last 80 My, the paleogeographic situation of Site 807, located on the Ontong Java Plateau, have been rebuilt. It indicates migration of the site from the South Pacific (30°S, 160°W) towards its present location in the Western equatorial Pacific (3°36N, 156°3E, 2800 meter water depth). At present, ODP 807 sits near the Solomon trench active subduction zone and the indonesian arc active volcanoes.

Sediments from Site 807 are mainly composed of foraminifera and nanoplankton oozes (carbonate content above 80%). The high sedimentation rate and the precise biostratigraphic dating allow us to propose a high-resolution record.

The pattern of Nd isotopic seawater curve agrees with the general trend obtained in previous Nd isotopic studies from Fe-Mn crusts in the Pacific (Ling *et al*. 1997, 2005). However, our data show large and rapid variations that have not been reported before.

The first order signal is characterized by an increase of εNd from –6 (80 My ago) to –1.5 (3 My ago) in response to the progressive closure of the Pacific Ocean. Since 30 My, higher frequency fluctuations of up to 2 εNd units over a period shorter than 3 My are superimposed to the long-term signal. The amplitude of these high frequency variations increases as the site moves toward the Indonesian volcanic arc and the Papua New Guinea block. Therefore, we suggest that they reflect regional events such as volcanic crisis or continental inputs linked to climate changes. The Nd isotopic study of the silicate part of the sediment gives us complementary information to identify the source of dissolved Nd inputs.