Nd AND Pb ISOTOPE SIGNATURES OF THE CLAY-SIZE FRACTION OF LABRADOR SEA SEDIMENTS DURING THE HOLOCENE: IMPLICATIONS FOR THE INCEPTION OF MODERN DEEP CIRCULATION PATTERN

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Nd and Pb isotopes were measured on the fine fraction of one sediment core drilled off southern Greenland (MD99-2227). This work aims to reconstruct the evolution of deep circulation patterns in the North Atlantic during the Holocene on the basis of sediment supply variations. For the last 12 kyr, three sources are involved in the sediment mixture: the North American Shield, the Panafrican and Variscan crusts, the Mid-Atlantic Ridge. Clay isotopic signatures indicate two mixtures of sediment sources for the last 12 kyr. The first mixture (12.2-6.5 kyr) is composed of material derived from the North American shield and from a 'young' crustal source. From 6.5 kyr onward, the mixture is defined by a 'young' crustal component and by a mantellic component characteristic of the Mid-Atlantic Ridge. Since the significant decrease of proximal deglacial supplies, the evolution of the relative contributions of the sediment sources implies major changes in the relative contributions of the Western Boundary Undercurrent components for the last 8.4 kyr. The progressive intensification of the Western Boundary Undercurrent is associated with the transport of the North East Atlantic Deep Water until 6.5 kyr then, by the Denmark Strait Overflow Water mass. The setting up of the modern circulation pattern at 3 kyr suggests a decrease of the control by the Denmark Strait Overflow Water mass. This change is synchronous with inception of the Labrador Sea Water mass. Our isotopic dataset emphasizes several changes in the relative contribution of the North Atlantic Deep Water components through the Holocene.