
Holocene changes in North-East Atlantic sea surface hydrology derived from cold-water corals

Mélanie Douarin^{*1}, Quentin Dubois-Dauphin², Mary Elliot¹, Edwige Pons-Branchu³,
Christophe Colin², Dominique Blamart⁴, and David Long⁵

¹Laboratoire de Planétologie et Géodynamique de Nantes (LPGN) – CNRS : UMR6112, INSU,
Université de Nantes – 2 Rue de la Houssinière - BP 92208 44322 NANTES CEDEX 3, France

²Géosciences Paris-Sud (GEOPS) – Université Paris Sud - Paris XI, CNRS : UMR8148 – Laboratoire
Géosciences Paris-Sud (GEOPS), UMR 8148, CNRS-Université de Paris-Sud, Bâtiment 504, 91405
Orsay Cedex, France., France

³Laboratoire des Sciences du Climat et de l'Environnement [Gif-sur-Yvette] (LSCE - UMR 8212) –
Université de Versailles Saint-Quentin-en-Yvelines (UVSQ), CEA, CNRS : UMR8212 –
LSCE-CEA-Orme des Merisiers (point courrier 129) F-91191 GIF-SUR-YVETTE CEDEX LSCE-Vallée
Bât. 12, avenue de la Terrasse, F-91198 GIF-SUR-YVETTE CEDEX, France

⁴Laboratoire des Sciences du Climat et de l'Environnement [Gif-sur-Yvette] (LSCE) – Université de
Versailles Saint-Quentin-en-Yvelines (UVSQ), CEA, CNRS : UMR8212 – LSCE-CEA-Orme des
Merisiers (point courrier 129) F-91191 GIF-SUR-YVETTE CEDEX LSCE-Vallée Bât. 12, avenue de la
Terrasse, F-91198 GIF-SUR-YVETTE CEDEX, France

⁵British Geological Survey (BGS) – Murchison House, West Mains Road, Edinburgh EH9 3LA,
Royaume-Uni

Résumé

Changes in Holocene sea surface hydrology have been derived from a coral rich sediment core collected in the northeast Atlantic (BGS core 59-07/293, 59°43N; 06°29W, 282 m water depth). The downcore *L. pertusa* U-series chronology, which covers most of the Holocene period with a centennial temporal resolution, have been coupled with neodymium isotope measurements to document sea surface hydrology changes and more specifically the relative influence of subpolar and subtropical gyre (SPG and STG) waters to the study site. Large variations on the neodymium isotopic composition (eNd), with values ranging from -16.6 to -10.2 were documented, with a major transition between 5 ka and 6 ka. eNd values centred at -14.5 for the period from 8.2 ka to 6 ka suggest an enhanced east-west SPG elongation and strong outgrowth of Labrador Sea waters into the eastern Atlantic. In contrast, eNd values are centred at -12.5 during the period comprised between 2.1 ka and 5 ka suggesting a weaker influenced of SPG waters. Superimposed on this major feature, large shifts in eNd values are also reported highlighting potential abrupt hydrological changes that could be associated with Holocene climatic anomalies. Finally, at 2.1 ka there is a major shift with less negative eNd values, which appears correlated with the apparent demise of coral on that site.

*Intervenant