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Regional trends and variability during the Holocene in Greenland and Antarctica

M. Debret (1), V. Masson-Delmotte (2), J-.R Petit (1)

(1) LGGE, BP 96, 38402 St Martin d'Heres Cedex France, (2) Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), CEA-CNRS-UVSQ, CE Saclay 91191, Gif sur Yvette, France.

If global change in hydrological cycle during glacial period could be related by major temperature fluctuation, this is less clear for the Holocene period. Indeed there is growing evidence of provincialism trends of climatic proxies during the Holocene (deVernal et al, 2006).

Here we use wavelets time series analyses to disentangle the problem of instationary processes in oxygene-18 signal. Applied on Greenland record (Grip and NGrip), wavelets highlight strong differences between the two signal. Indeed millennial scale oscillation indicates that the two sites undergo different forcing factor. The first factor that explains these differences in temporal and regional fluctuation signature comes from moisture origin confirmed by deuterium excess signal. GRIP and North GRIP, only located 320 km apart, undergo regional influences that modify the isotopic thermometer.

The same approach on 11 Antarctica ice cores do not allowed identifying a global pattern. Masson et al, 2000 distinguished hypothetical climatic fluctuation between eastern and western part of Antarctica. However wavelets analyses show a more enigmatic pattern because very close site (Vostok and Dome C for example) do not show correlation.

Wavelets performed on solar and oceanic activity proxies show millennial periodicity that can't explain the regional trends and variability during the Holocene as well as in Antarctica as in Greenland.

If the isotopic thermometer has a global signification at the glacial-interglacial time-

scale it remains to be shown for the last 10 000 years where a regional trend seems to prevail. Modellers need to take into account this regional pattern to improve the understanding of Holocene variability.