SEMINAIRES Talence - UMR EPOC

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MEGATIDES AND DEGLACIATION IN THE GLACIAL NORTH ATLANTIC

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A number of independent numerical open ocean global palaeotidal model simulations identify that the Last Glacial Maximum North Atlantic was close to resonance with the M2 tide. This resulted in extremely high tidal amplitudes in some ice-marginal locations, notably the Hudson Strait. Northwest European shelf sea palaeotidal models, parameterised with shelf break open ocean boundaries forced by these global tidal models and with dynamic palaeotopographies from glacial isostatic adjustment (GIA) models, predict megatides (mean spring tidal range in excess of 10 m) in some key locations along the north-west European margin, including the British-Irish Ice Sheet (BIIS) margin. I will present relative sea level and palaeotidal amplitude reconstructions for the NW European margin and for major ice streams draining the BIIS based on two independent simulations. The simulations are consistent in indicating large variation in palaeotidal amplitudes between different ice streams during deglaciation with some, notably the Minch Ice Stream, characterised by megatidal amplitudes. I propose that the rapid rates of BIIS deglaciation in some ice stream sectors suggested by geological observations were the product of 1. rapid atmospheric and oceanic warming linked to meridional migration of the North Atlantic Polar Front, 2. relative sea-level change, compounded by 3. megatidal calving margins which forced high iceberg fluxes and consequent ice sheet drawdown. The deglaciation and inundation of Hudson Strait in the early Holocene reduced the resonance of the North Atlantic generating the damped interglacial ocean tide characteristic of the Holocene.