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Origin and propagation of the terrigenous flux associated with the Meltwater Spike during the deglaciation in the northwestern Gulf of Mexico

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During the last termination, rapid changes of the Laurentide Ice Sheet triggered major meltwater flows, which were evidenced in the Gulf of Mexico through their imprints on hydrological proxies. However the Laurentide ice-sheet contribution to the global 20 meters sea-level rise associated with the Meltwater Pulse 1A is still under debate (Peltier, 2005, Carlson, 2009). How important is the freshwater flow through the southern outlet, i.e. into the Gulf of Mexico? How to explain the little -if any- imprint of this major Laurentide ice-sheet freshwater discharge on the Atlantic Meridional Overturning Circulation (McManus et al., 2004)? How freshwater discharges into the Gulf of Mexico can be sneaked into deep ocean (Roche et al., 2007)? Is the hypothesis of hyperpcynal dense flows transferring the freshwater signal toward the deep ocean consistent with sedimentary evidences (Aharon, 2006)?
We try to bring some new insights on this question using the mineralogical and geochemical characteristics of the terrigenous sediments deposited in the northwestern Gulf of Mexico during the major deglacial meltwater spike (Sionneau et al., 2008 ; Montero-Serrano et al., 2009 ; Sionneau et al., 2010). Our results allowed us to constrain the origin and propagation of the detrital supply associated with the most prominent freshwater discharge using sediment records from a series of intraslope basins along a northwestern Gulf of Mexico transect. We also attempt to compare previously published estimations of the freshwater discharge with our own estimation of the freshwater discharges based on the observed accumulation rates, the intrinsic characteristics of hyperpycnal flows and the reconstructed extension of the terrigenous plume into the northwestern Gulf of Mexico.

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