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Deglacial Melt Water Pulse 1A revisited from the new IODP Tahiti record

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So far, the most complete and accurate sea-level record that encompassed the period between the Last Glacial Maximum and the present day is based on cores drilled offshore the Barbados coral reef [1,2]. That record suggests a non-monotonous sea level rise punctuated by two dramatic accelerations, the MWP1-A and MWP1-B events, centred at ∼14,000 and ∼11,300 cal. yr BP respectively [3]. However, the occurrence, the hemispheric origin as well as the exact relationship between those events and the global climatic evolution remains enigmatic and controversial.

The recent IODP leg 310 "Tahiti Sea Level" offers a unique opportunity to extend the existing Tahiti sea-level curve that document the deglacial sea level rise for the last 13.8 ka [4]. Located at a considerable distance from the major former ice sheets and characterized by slow and regular subsidence rates, the coral reefs of Tahiti provide an ideal setting to constrain MWP events that are thought to have punctuated the last deglaciation. The offshore coring operations carried out during Leg 310 recovered

more than 400 m of post-glacial reef material, ranging from 122 to 40 m below modern sea level [5].

Post-glacial coral materials were selected using strict screening criteria in order to preclude any post-mortem diagenetic alteration of the skeleton. We checked the absence of secondary calcite content in aragonite skeleton by using X-ray diffraction precisely calibrated by using gravimetric standards. All measured $\delta^{234}U_{initial}$ are highly consistent within 0.2-0.3% of the seawater value. Finally, more than 60 U-Th ages were obtained on various types of corals (shallow and deeper living ones). We also use a numerical model to simulate the reef growth, in order to better understand the relationship between each coral sample and the rising sea-level. Together with previous on-shore data, this new data set extend the previous Tahiti record to the last 16 ka and allow to document the sea-level rise during the key period of the MWP-1A as previously defined by [4]. Our results confirm the occurrence of an acceleration of the sea-level during these period. However, the timing and duration of this event are not completely similar to those of the MWP-1A as defined in Barbados [3]. These new results allow us to revisit the relationship between the MWP-1A and the climate history of the last deglaciation. We will discuss also their implications in terms of the potential sources of the ice that generated the MWP-1A.

[1] Fairbanks, 1989, *Nature* **342**, 637.

[2] Bard et al., 1990, *Nature* **346**, 456.

[3] Peltier and Fairbanks, 2006, *Quaternary Science Reviews* **25**, 3322.

[4] Bard et al. 1996, *Nature* **382**, 241.

[5] Camoin et al., 2007, Proc. IODP, 310