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Megatsunami Deposits on Bermuda at Stage-11 Interglacial: Implications for Giant Submarine Landslides in the Atlantic

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Deposits of coral-bearing, marine shell conglomerate found at elevations up to 21 m above sea level (asl) in coastal Bermuda caves have previously been interpreted as evidence of a towering sea level high stand during marine isotope stage 11. Hearty et al. (1999) U-series dated this deposit at 420 +/- 30 ka and correlated it with carbonate sand deposits at up to 21 m asl in the Bahamas; they attributed this putative sea level high stand to a 20% decrease in Antarctic ice volume and suggested direct geologic evidence for ice sheet instability. Although stage 11 was an extended interglacial period similar to the Holocene, few marine isotope sea level curves support a high stand greater than that of stage 5e over the past million years, and those that do suggest a maximum height of no more than about 9 m asl. The sea level evidence is primarily from Bermuda, where no subsidence has been identified, and Oahu, Hawaii, where the rate of uplift is generally known and the Kaena high stand, containing corals U-series dated at 400 to 550 ka , is exposed at up to 30 m asl. On Oahu, the uplift for the island is recorded by a nearly linear (r = 0.999; n = 7) emergence rate of 0.069 +/- 0.003 mm/kyr, using isotopically-dated, uplifted marine terraces back to nearly 500 ka BP. This uplift rate is supported by identical stage 7 comparisons with Bermuda, Papua New Guinea and Barbados (Jones, 1993). When this rate is applied to the "best" U-series age for stage 11 (430 ka) at the maximum elevation of 30 m asl, we arrive at a maximum sea level height for stage 11 that is no greater than the present sea level. This evidence, together with: (1) the 21-m cave deposit's reported field relations to similar massive, graded eolianite boulder-bearing deposits in caves at 18 m asl (ob-

served by us) and at 28 m asl (reported but now destroyed) in Bermuda; (2) the lack of any reef build-up and presence of transported lagoon and back-reef species; and (3) the occurrence of stage 11 deposits at only 5 +/- 3 m asl elsewhere on Bermuda (Hearty et al., 1992), suggest an alternative deposition mechanism for this deposit. We hypothesize that this conglomerate was rapidly deposited by a “megatsunami” during stage 11, an interpretation that is consistent with the climate correlation of McMurtry et al. (2004). Likely causes for such a megatsunami are a flank collapse of an Atlantic oceanic island volcano, such as the synchronous Orotava giant submarine landslide off Tenerife in the Canary Islands, or a giant submarine landslide on the Atlantic continental margin.