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# Internal waves and modern and ancient hiatuses in pelagic caps of Pacific guyots and seamounts

Neil Mitchell (1), Harper Simmons (2), and Carrie Lear (3)

(1) University of Manchester, School of Earth, Atmospheric and Environmental Sciences, Williamson Building, M13 9PL, Manchester, United Kingdom (neil.mitchell@manchester.ac.uk), (2) School of Fisheries and Ocean Sciences, University of Alaska-Fairbanks, 905 N. Koyukuk Drive, 129 O'Neill Building, Fairbanks, AK 99775, USA, (3) School of Earth, Ocean and Planetary Sciences, Cardiff University, Main Building, Park Place, Cardiff CF10 3YE, UK

Locations of recent non-deposition and ancient hiatuses in the pelagic caps of guyots and seamounts are compared with paleotemperature and physiographic information to speculate on the character of internal tidal waves in the upper Pacific Ocean through the Cenozoic. Internal tidal waves are generated where the ocean barotropic tide passes over the Hawaiian and other major ridges in the Pacific basin.

Drill core and geophysical evidence for sediment accumulation, non-deposition or erosion are used to classify broadly sites as either accumulating or eroding/non-depositing in the recent geological past. When these classified sites are compared against results of a numerical model of the internal tide field (Simmons, Ocean Mod. 2008), the sites accumulating particles over the past few million years are all found to lie away from beams of the modeled internal tide, while those that have not been accumulating are in areas of high internal wave energy. Given the correspondence to modern internal wave conditions, we examine whether internal tides can explain ancient hiatuses at the drill sites. For example, Late Cenozoic pelagic caps on guyots among the Marshall Islands contain two hiatuses of broadly similar age, but the dates of the first pelagic sediments deposited following each hiatus do not correlate between guyots, suggesting that they originate not from universal factors (e.g., water chemistry) but local, probably physical factors, such as internal tides. We investigate how changing boundary conditions such as ocean temperature and basin physiography may have affected the geometry and vigour of internal tides through the Cenozoic. Changes in the geometry of ridges underlying the Solomon, Bonin and Marianas Island chains caused by plate tectonics and subsidence may be responsible for sediment hiatuses at these far-field guyot sites.