

INITIAL RESULTS OF THE HAWAII SCIENTIFIC DRILLING PROJECT

¹Thomas, D.M., ²DePaolo, D.J., and Stolper, E.M. ¹ UH, Honolulu; UC, Berkeley; Cal. Inst. Technology, Pasadena, USA.

The Hawaii Scientific Drilling Project has completed its first phase of deep drilling recovering core to a depth of 3109 m. This is the longest sequence of core that has been collected for from an ocean island volcano and will provide new insights into the growth and evolution of Hawaiian volcanoes as well as the dynamics of the Hawaiian mantle plume. The subaerial section of the borehole consisted of Mauna Loa lavas to 257 m depth that were underlain by 834 m of Mauna Kea flows. The first 1000 m of submarine section consisted of hyaloclastites interspersed with massive basalts; sulfur contents of these rocks show that all originated as subaerial flows. The shallow hyaloclastites were poorly consolidated but, as depth increased, secondary minerals (e.g. gypsum, zeolites, clays) became more common and the hyaloclastites showed more induration. At a depth of 2 km the first units having classic pillow lava features (e.g. glassy margins, lobate forms) were encountered. These units were interspersed with hyaloclastites but, as depth increased, the frequency and thickness of these units declined. From 2000 m to 3000 m pillow lavas predominated but units tentatively identified as intrusive lavas were encountered even though the site is well removed from any recognized rift system. Chemical and magnetic analyses of the recovered rocks is currently underway to determine the age progression of the Mauna Kea basalts as well as the evolution of the lavas as Mauna Kea passed over the Hawaiian mantle plume.