SEDIMENTOLOGY AND PETROLOGY OF DVDP 15, WESTERN McMURDO SOUND, ANTARCTICA

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Abstract: The first drilling into the floor of McMurdo Sound (DVDP 15) took place in November 1975, 16 km east of Marble Point through 122 m of water. The purpose was to core the Cenozoic glaciogenic sequence estimated to be 300 m thick. The 2 m thick annual ice was used as a drilling platform until 21 November when the appearance of cracks caused the hole to be terminated. The drill penetrated 65 m below the sea floor, recovering a total of 34 m of core. Over 270 kg of wash samples were also collected.

The core is mainly sand made up chiefly of glassy and crystalline basaltic grains, with persistent quartz, feldspar and granitic fragments. The sources were the late Cenozoic McMurdo Volcanics to the south, and the basement complex, Beacon and Ferrar rocks in the adjacent Transantarctic Mountains. The top 12 m of core (Unit 1) has pebbles scattered throughout and has been much disturbed by drilling. The texture of the sediment suggests dumping of superglacial debris, like that on the McMurdo Ice Shelf, from melting berg ice. Unit 2, from 12 to 65 m, consists largely of basaltic sand, like Unit 1, but differs in its lack of pebbles, common mudstone beds and the widespread well-developed stratification. The stratification and texture suggest that Unit 2 accumulated in a quiet sedimentary environment from sediment transported by wind and was only slightly modified by bottom currents. The basaltic character of the sand, and the slight lithification, suggest a Plio-Pleistocene age. Increase in deformation of the stratification towards the top of the unit is attributed to movement of grounded ice.

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