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SOILS AND HYDROLOGY OF SEABEE HOOK, CAPE HALLETT, ANTARCTICA

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The soils and hydrology of Seabee Hook, Cape Hallett, Antarctica, were investigated during the 2003-04 and 2004-05 summers.

A soil map is presented of the Seabee Hook area. A soil association was identified between penguin mounds and intermound areas. The soils of the penguin mounds were enriched in many elements including nitrogen, organic carbon, phosphorus, cadmium, zinc, and copper, and had higher electrical conductivity than guano free soils. Radiocarbon dates from five penguin bones buried at the bottom of soil profiles indicate that Seabee Hook has been colonized by penguins for at least 1000 years.

Groundwater was perched above the ice cement as a shallow (<1 – 30 cm thickness of groundwater) unconfined aquifer through the summer months. Groundwater velocity through the permeable gravel and sand (porosity 23 – 33%) was up to 7.8 m day^{-1}, with hydraulic conductivities of 5×10^{-4} m s^{-1} to 5×10^{-9} m s^{-1}. The groundwater in the penguin colony was elevated in salt (1205 mgl^{-1} sodium, 332 mgl^{-1} potassium), and nutrients (193 mgl^{-1} nitrate, 833 mgl^{-1} ammonia, 10 mgl^{-1} phosphorus).