Geophysical Research Abstracts, Vol. 7, 00141, 2005
SRef-ID: 1607-7962/gra/EGU05-A-00141

Ground surface enthalpy balance during freeze and thaw seasons in Livingston Island, Antarctic

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Livingston Island is located in the South Shetlands archipelago near the northern tip of the Antarctic Peninsula at 62ž39'S, 60ž21'W. Climate at sea level is cold oceanic with frequent summer rainfall in the low areas and moderate annual temperature range, reflecting the strong influence of the circum-Antarctic low-pressure system. Mean annual air temperature is ca. -2žC at sea level and mean-monthly values above 0žC occur from December to March. One borehole for continuous monitoring of the temperatures of the active layer was established in Hurd Peninsula. It is located in quartzite bedrock at Incinerador Point (35 m a.s.l) and is 2.4 m deep. The study of Incinerador Point borehole temperatures from 2000 to 2004 allowed calculating the energy fluxes (enthalpy) between the ground surface and the air, as well as the rates of ground cooling and heating. The calculations using thermodynamic arguments are possible because the ground is bedrock with insignificant water content. The procedure allows assessing the effects of air climate and snow cover in the ground and to evaluate the main thermal parameters related with aggradation or degradation of permafrost in that locality.