Abstract: Near surface ground ice conditions in University Valley, McMurdo Dry Valleys of Antarctica

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15 ice-bearing permafrost cores were collected from nine sand-wedge polygons in University Valley, McMurdo Dry Valleys of Antarctica, in order to describe their cryostructures and quantify their ground ice content through the combination of laboratory measurements and computed tomodensitometric scanning (CT scans). The analysis of the CT scans revealed three types of cryostructures present in the cores: structureless, suspended and crustal. The results of the grain size analyses revealed that the soils in University Valley were predominantly medium-sand. In the 15 cores, excess ice content ranged from 0 to 93%, gravimetric water content ranged from 13 to 1881% and volumetric ice content varied from 28 to 93%. Ground ice was preferentially stored in the centre of the sand-wedge polygon in the perennially cryotic ground surface zone; conversely, higher ground ice contents were found in the shoulder of the polygon where the ground surface was seasonally non-cryotic. Median excess ice content and gravimetric water content significantly increased in the polygon shoulders with increasing distance from University Glacier as a result of differences in ground surface temperature zones and relative humidity values. Variations in ground ice content with depth for each permafrost core were suggested to result from differences in ground surface temperature zone, relative humidity and the age of sediments.