



The Thermal State of Permafrost: A Contribution to the International Polar Year

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Permafrost is defined as earth material that remains at or below 00C for at least two consecutive years. Its thickness on the Earth's surface varies greatly for less than one metre to many hundreds of metres in thickness. Geographically the regions underlain by permafrost extend from the extensive northern continental and offshore regions, to mid- and lower-latitude mountains and plateaus, and to the Antarctic. Permafrost temperatures at the depth of zero amplitude range from essentially 00C to lower than -150C. These temperatures respond to changes in ground surface temperature over relatively short time periods, associated with climate change or alterations of surface conditions due to natural or human causes. Permafrost temperature observations have been made throughout the last century and continue to the present. However, many locations with excellent past records have been abandoned and some regions are under represented. New boreholes have been drilled recently and others are being planned. Lacking is a standardized set of permafrost temperature measurements obtained over a limited time span for the entire Planet. Once available, this new data set will be used to assess recent changes in permafrost temperatures by comparing them with the available historical records in similar boreholes, and it will serve as a baseline for assessing 21st Century responses to changing climates. A coordinated field campaign to obtain this "snapshot" of temperatures is planned under the auspices of the International Polar Year (IPY) with measurements to be obtained over a limited time period in 2007 and 2008. We anticipate concurrent measurements to be made in about 500 boreholes, that are distributed across representative regions. Lack of present-day geographic coverage based on available borehole data is discussed. Time series of borehole temperatures are

presented to demonstrate recent decadal changes from diverse geographical location. Recent observations indicate that permafrost temperatures over the past three decades have warmed or remain relatively unchanged. This programme on the Thermal State of Permafrost (TSP) is planned and coordinated by the International Permafrost Association and is a field component of the Global Terrestrial Network on Permafrost (GTN-P). The data will be archived and be publicly available. Many of the borehole sites will become part of a network for future measurements.