



Surface characteristics of polygonal tundra and their influence on energy balance at Samoylov Island, Lena River Delta, Siberia

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Soil surface characteristics, such as albedo, moisture content and porosity are important factors of the energy balance and therefore critical to the ground thermal condition of permafrost regions. These surface characteristics alternate over distances of a few meters within the polygonal tundra, where water saturated peat soils are surrounded by elevated dry rims.

The presented results are based upon data collected during the July and August 2007 expedition on Samoylov Island in the Lena River Delta. This study focuses upon spatial variations of the energy balance components occurring within low centre polygons which are the most dominant surface features of the investigation site. Energy balance components were recorded over a wide range of scale to gather general information about the magnitude of energy flux variations between surface units such as polygon rims and centres. Those measurements include calculations of ground heat fluxes from a dense network of continual temperature and moisture measurements immediately below the surface; variations of surface temperatures measured with a 10 m long infrared scanner system; and spectrometer measurements used to gain information about the reflectance characteristics of the different surface elements. Sensible and latent heat fluxes were detected on a larger scale of several hundreds of meters by Eddy covariance method and standard climate tower. The energy flux measurements in combination with soil thermal models give us a more detailed view of the small scale energy balance variations. First results indicate that energy balance components such as ground heat flux or long wave emission can vary by a factor of two over a

distance of only 5 - 10 m. These small scale variations of the energy balance should be taken into account when considering permafrost processes at regional scales.