



Monitoring of the active layer, at Kapp Linné, Svalbard 1972-2018

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The active layer has been monitored in the vicinity of Kapp Linné (78° 03'42" 13° 37' 07"), Svalbard during the period 1972-2018. The sites differ in elevation, distance from the sea, vegetation cover, substrate and active periglacial processes. From 1994, the International Permafrost Association "CALM" standard grids, with measurement within 100x100m squares, has been applied. Microclimate and soil temperatures have been monitored by data logger covering levels from 2 m above to 7 m below the ground at one of the sites. The macroclimate is covered by complete data series from the nearby weather station at Kapp Linné, covering the period 1912 to 2018. A number of periglacial processes, especially slope processes, are monitored parallel with the active layer. The mean active layer for the sites varies between 1.13 m and 0.43 m. The deepest active layer is found in the exposed, well drained raised beach ridges and the shallowest in the bogs. The interannual variability during the observation period do not correlate well with the MAAT but better with the summer climate, June-August mean or DDT. The data clearly illustrate colder summers during the period 1972 to 1983 and after 1983 steadily increasing summer temperatures. The active layer follows the same general pattern with good correlations. There are several surface indications as a response to the deepening active layer especially in the bogs. Thermokarst scars appear frequently and a majority of the palsa like mounds and pounus have disappeared. A drastic change in the vegetation on the bogs has also occurred, from dry heath to wet Carex-vegetation. In summary the observations from Kapp Linné 1972-2018 are; A clear trend towards milder and longer summers, A clear trend of a deeper active layer, All sites show a similar pattern, The bogs are getting strikingly wetter, the Palsa-like mounds in the bog sites are disappearing, The slow slope processes are getting accelerated, Thermokarst depressions and scars are appearing in a small scale at all sites, Soil temperatures are increasing at all levels down to 7 m.