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A comparative study of solifluction processes in Dovrefjell, Norway and Endalen, Svalbard.

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Here we describe on-going field monitoring of periglacial solifluction processes on a non-permafrost solifluction slope in Dovrefjell, Norway, and a continuous permafrost solifluction slope at Endalen, Svalbard. The monitoring equipment is designed to provide continuous data on soil thermal status, hydraulic condition, phase change, soil volume strain and soil shear strain. At each site supporting frames provide a stable mounting for two LVDT displacement transducers. These allow continuous monitoring of frost heave, thaw settlement and down slope surface displacements. In addition, thermistors and Druck PDCR 81 miniature pore pressure transducers are installed to a depth of 0.8 m in Dovrefjell and 1.2 m (approximately 20 cm below permafrost table) in Svalbard. Thermistors are also mounted above ground to 2 m to measure air temperature. All instrumentation is logged at one hour intervals using a Campbell CR23X logger and multiplexer. In Svalbard an automatic digital camera recording one image per day allows monitoring of snow depth. Data are presented from both sites illustrating the contrasting thermal regimes, ice segregation processes, and timing of frost heave and thaw settlement. Resulting contrasts in soil displacement profiles are demonstrated by reference to excavated Rudberg columns (Dovrefjell) and reconstruction of shear strain distribution from soil temperatures and surface vectors (Svalbard). Finally, field data are compared with results from full-scale laboratory simulation experiments of solifluction associated with one-sided and two-sided freezing.