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Title: *Internal structure of patterned ground as revealed by detailed electrical resistivity tomography (SW Spitsbergen)*

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Origin and growth of patterned ground are dependent on many factors, including both soil substrate characteristics and external factors. Therefore, formation mechanisms are explained in many ways. Until now, studies of patterned ground have been mainly based on terrain observations, simple field experiments, laboratory tests and computer simulations. Any excavations in existing forms, rarely performed in practice, inevitably led to destruction of these structures and hence, were uncommon.

In this investigation, an internal structure of patterned ground was recognized using electrical resistivity tomography (ERT). In contrast to other geomorphological applications with ERT, the distance between measuring electrodes was reduced to minimum (0.3–0.8 m) and all measurements were carried out in two electrodes arrays: (a) in Schlumberger array, regarded as a universal and (b) in Dipole-Dipole array, to obtain a more detailed picture.

The measurements was carried out in an environment suitable for patterned ground development, i.e. in the periglacial zone of SW Spitsbergen. Three types of fully-developed patterned ground were selected, usually in moist locations: (1) sorted circles at the lake shoreline in the Bratteggdalen valley, built of fine-grained sediment with an ability to thixotropy, (2) nonsorted stone stripes and mounds, (3) large nonsorted polygons on an uplifted marine terrace (classification after Washburn 1979). These sites were also observed more than 40 years ago, and described by Jahn (1975).

The results of investigations and obtained resistivity models resemble, in graphical form, conceptual schemes based on excavations. In the case of sorted circles (case 1) a phenomenon of ‘floating’ stone borders and differentiation of soil by grain size and humidity were recorded. In the case of nonsorted ground (cases 2, 3), models point out differences in moisture content within the profiles. However, all models shows clearly the presence of permafrost table (several thousand of Ω/m and more) and its shape. In two profiles (1,2) the internal structure of patterned ground mimics the wavy topography of permafrost table.

Jahn A. 1975: Patterned Ground. In: Problems of the Periglacial Zone. Polish Scientific Publishers, Warszawa: 127–140.
Washburn A.L. 1979: Patterned ground. In: Geocryology. A survey of periglacial

processes and environments. Edward Arnold: 119–170.