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Geomagnetically induced currents (GIC) recorded in the Czech oil pipeline network

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Buried pipelines are prone to corrosion. Even though the pipelines are provided with an insulating coating, there are always points where the insulation is defective. For this reason, the pipelines are equipped with a cathodic protection system which keeps the pipeline at a negative potential of about 1 to 2 volts in relation to the ground. The pipe to soil voltage in the Czech oil pipelines is recorded at about 80 cathodic protection stations with frequency from 2 to 12 samples per minute. As the pipelines represent long electric conductors they respond to electric fields induced by variations of the geomagnetic field. The pipe to soil voltage thus includes also information about the GIC.
Data from autumn 2005 to 2017 were used in this study. The data were cleaned from variations caused by local sources or by artificial effects. This was done by comparison with data from neighboring stations. The variation of the pipe to soil voltages was classified by several characteristics (e.g. range of the function, bounded variation) and compared with the characteristics of geomagnetic activity observed at the Budkov Observatory. The statistics as well as selected examples are presented.