RELATIONS OF PIPE TO SOIL POTENTIAL VARIATIONS TO THE LOCAL GEOMAGNETIC AND TELLURIC ACTIVITY ON TIERRA DEL FUEGO

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Abstract:

Magnetic disturbances cause electric currents in long pipelines, which can contribute to corrosion of the pipeline. To protect the pipeline a cathodic protection system is used to maintain the pipe at a constant negative potential with respect to surrounding soil that inhibits the corrosion reactions. However induced currents in the pipeline create variations in the pipe to soil potentials taking knowing where and how often these potential variations occur is necessary for assessing the corrosion risk for a pipeline.

Large pipe to soil potential variations have been observed on a pipeline of Gas del Sur Survey, General San Martín line, on Tierra del Fuego, Argentine. We present observations and analysis of pipe to soil potential variations made in the period from 2013 to 2018 to investigate why this area experienced such large fluctuations. Geomagnetic field recorded from the nearby Port Stanley Geomagnetic Observatory were used to calculate the electric field at the Earth surface. Comparison between the pipe to soil potential variation and the electric field variations gave correlation coefficients up to 90 %.

We examine the factors in the pipe structure and in the earth conductivity structure that could be the cause of these localized effects on the pipe.

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Poster