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Building a GIC forecasting tool based on geomagnetic and solar wind data: challenges and future avenues

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Measurements of geomagnetically induced currents (GICs) in the Austrian power transmission grid have been carried out since 2014 at multiple locations. Following an analysis of the scales of GICs across the grid, we now look into forecasting the GICs from incoming solar wind data. Using nearby geomagnetic field measurements stretching back 26 years, we can estimate the local geoelectric field and consequently the GICs over longer time periods. We apply a machine learning method based on recurrent neural networks to this dataset combined with solar wind data as input. In this talk, we present the final method to forecast both the local geoelectric field E and the GICs in substations in the Austrian power grid, with our model results being compared to GIC measurements from recent years. We will discuss the current status of the model, outline limitations, and consider future applications.