

Geomagnetically induced currents: the latest science, engineering and policy actions in the US

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Geomagnetically induced currents (GIC) flowing in long manmade conductor systems have become one of the main space weather concerns. The potential for widespread problems in operating high-voltage power transmission systems during major geomagnetic storms has prompted increasing federal regulatory, science, industry and public interest in the problem. The impact caused by extreme storm events has been of special interest and consequently much of the recent GIC research has been focused on defining extreme GIC event scenarios and quantifying the corresponding transmission system response. In addition, there is an elevated need for developing next generation GIC prediction products for the power industry. In this presentation, I will discuss the latest science, engineering and policy actions around the topic especially in the US. Perhaps the most significant policy action are the standards work pushed by the US Federal Energy Regulatory Commission. GIC are centerpiece also in the newly released National Space Weather Strategy reflecting the strong interest in the topic at the highest levels of the US government. Much of the recent progress in understanding GIC and its impact on power grids has resulted from improved scientific community-power industry interactions. The common language and information exchange interfaces established between the two communities have led to significant progress in transitioning scientific knowledge into detailed impacts analyses. We also face a number of future challenges in specifying GIC, for example, in terms of more realistic modeling of the three-dimensional geomagnetic induction process. I will discuss briefly some of these future challenges.

Keywords: Space weather, Geomagnetically induced currents