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Poster
Geomagnetic disturbances (GMDs) related to multi-scale phenomena in near-Earth space induce geoelectric fields in the Earth and in conductors at the Earth's surface, which drive electric currents known as geomagnetically induced currents (GIC) that flow through power grids, power feed equipment for submarine cables, and other electrically conducting systems. The production of these currents is a complex interplay between geospace system dynamics, the conducting Earth, the properties of the conducting system of interest, and the spatial and temporal scales involved. In this presentation, we use publicly available GIC measurements from the North American Electric Reliability Corporation (NERC) GMD dataset to identify the largest amplitude GIC during recent geomagnetic storms. Working backwards from the measured GIC, we identify the drivers and key factors controlling the generation of these GIC using a combination of satellite and ground-based measurements. We perform a similar analysis for submarine communications cables using published voltage measurements during two historic storms. We discuss the implications of both analyses for the generation of large amplitude GIC/voltages during future storms.
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