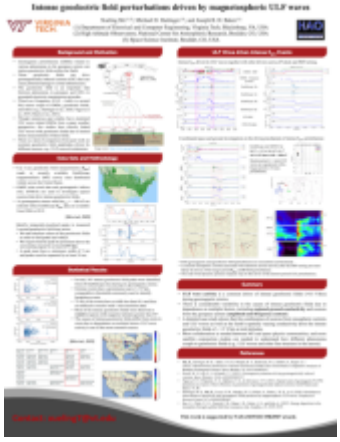
Xueling
Shi
Virginia Tech
Michael Hartinger, Space Science Institute, Boulder, CO, USA
Joseph Baker, Virginia Tech, Blacksburg, VA, USA
Poster
Geomagnetic perturbations related to various phenomena in the near-Earth space environment can induce geoelectric fields within the electrically conducting Earth. In turn these geoelectric fields drive geomagnetically induced currents (GIC) that can cause potential damage to technological infrastructure. Ultra-low frequency (ULF: 1 mHz - several Hz) waves have recently been reported to be a common driver of intense geoelectric fields during geomagnetic storms. Though numerous past studies have examined ULF wave related geomagnetic fields from a space weather perspective, few studies have linked ULF waves with geoelectric fields due to limited direct measurements of these fields. Using 1-second cadence geoelectric field measurements made at recently available magnetotelluric survey sites distributed widely across the United States, we explore the relationship between ULF waves and intense geoelectric field perturbations. Detailed case studies demonstrate that the ULF wave driven geoelectric fields have significant spatial variation in contrast to relatively uniform geomagnetic field perturbations, consistent with spatially varying Earth conductivity. We further show that geoelectric fields driven by magnetospheric ULF waves during geomagnetic storms have comparable amplitudes to once-per-century geoelectric hazard maps. Our results highlight the need for more research characterizing geoelectric fields driven by ULF waves.



Poster PDF
Shi-Xueling.pdf

Poster category:

Poster category
Geospace/Magnetosphere Research and Applications
Meeting homepage
Space Weather Workshop 2023
Download to PDF