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Due in part to their large amplitudes and long event durations, magnetospheric Ultra Low Frequency (ULF) waves have been linked to several space weather phenomena, including geomagnetic/geoelectric field variations and ionospheric heating. Past studies show they can lead to significant space weather impacts, for example driving geomagnetically induced currents that are among the largest ever reported at some mid-latitude locations. However, because of the spatial and temporal dependence of these waves, they are often attenuated, eliminated, and/or not accounted for in space weather models and statistical analyses. We highlight lessons learned from several recent studies and related recommendations for properly accounting for ULF waves in space weather models and statistical (or hazard) analyses: (1) use of uniform 10-s or 1-s samples at mid- and low-latitude locations to capture expected wave frequencies, (2) using power spectra rather than time series when conducting superposed epoch analysis to avoid averaging out wave activity with arbitrary frequency/phases, (3) using geoelectric field dynamic power spectra rather than geomagnetic field time series to avoid obscuring contributions from ULF variations to geomagnetically induced currents, (4) use of sufficient grid resolution (~<1/8 Re cells) upstream of the Earth's magnetosphere when simulating ULF waves in space weather models. More work is needed to quantify the contribution of ULF waves to, for example, overall ionospheric heating rates and overall geomagnetic/geoelectric hazard analyses. However, general conclusions concerning the contributions of ULF waves to these phenomena should be avoided if the above recommendations aren't followed.

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9
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