Multi Station Frequency Response and Polarization of ELF/VLF Signals Generated via Ionospheric Modification

ASHANTHI MAXWORTH, MARK GOLKOWSKI, University of Colorado Denver, UNIVERSITY OF COLORADO DENVER TEAM — ELF/VLF wave generation via HF modulated ionospheric heating has been practiced for many years as a unique way to generate waves in the ELF/VLF band (3 Hz – 30 kHz). This paper presents experimental results and associated theoretical modeling from work performed at the High Frequency Active Auroral Research Program (HAARP) facility in Alaska, USA. An experiment was designed to investigate the modulation frequency dependence of the generated ELF/VLF signal amplitudes and polarization at multiple sites at distances of 37 km, 50 km and 99 km from the facility. While no difference is observed for X mode versus O mode modulation of the heating wave, it is found that ELF/VLF amplitude and polarization as a function of modulated ELF/VLF frequency is different for each site. An ionospheric heating code is used to determine the primary current sources leading to the observations.