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Improved ionospheric observations of E-Region radar aurora through calibration of the ICEBEAR radar

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The high resolution ICEBEAR (Ionospheric Continuous-wave E-region Bistatic Experimental Auroral Radar) is a low-elevation radar designed primarily to observe E-region radar aurora and meteor trails. Having accurate altitude radar observations is critical for a better physical understanding of the height dependence of the plasma processes and irregularities associated with the radar aurora. ICEBEAR relies on interferometric processing to precisely locate echoes geographically within a wide field-of-view. This interferometry is performed using the phase of the received signal on 10 independent receiving antenna paths, meaning that phase calibration of the radar receiver antenna array is of utmost importance for confident and accurate measurements. In addition to observing radar aurora and meteor trails, ICEBEAR regularly receives echoes scattered from aircraft, the location of which are known with a high degree of confidence via independent means. In this talk, I will explain how I utilize the aircraft echoes to perform high-quality ICEBEAR receiver phase calibrations, ensuring the accuracy of ICEBEAR measurements for new and enhanced ionospheric understanding.

Keyword-1

Ionospheric Physics

Keyword-2

Radar

Keyword-3

Calibration

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