



VLF · ELF Remote Sensing of Ionospheres and Magnetospheres

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## **Determining Size of a Precipitation Event with AARDDVARK system of VLF radio wave receivers**

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We analyze subionosphere propagating very low frequency (VLF) radio waves observed by several receivers to determine an approximate area of the pulsating aurora precipitation event during the LAMP rocket launch. With the size of the event and the in situ rocket results we can better understand the total energy input during the event. We use amplitude and phase measurements from the Antarctic-Arctic Radiation-belt Dynamic Deposition VLF Atmospheric Research Consortia (AARDDVARK) set of radio wave receivers and transmitters whose propagation paths are in the northern hemisphere. These paths are defined as the propagation of the VLF radio waves between a transmitter and receiver, and we use receivers in Fairbanks, Alaska and Edmonton, Canada with transmitters located in North Dakota, Seattle, Maine and Iceland. We subtract the background noise of each phase and amplitude measurements by using a set of the respective averaged measurements for days with little geomagnetic activity and are temporally close to the event of interest. Since this pulsating aurora event has an energetic electron flux content ( $>30$  keV), by observing the perturbations in resulting amplitude and phase measurements from each path we can estimate when the pulsating aurora event crossed the path's lines of sight and approximate the area of the pulsating aurora event.