2010 Fall Meeting
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Cite abstracts as **Author(s) (2010), Title, Abstract xxxxx-xxxx presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.**

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HR: 0800h
AN: **SA31B-1734** ***Poster***
TI: Satellite and ground based observations of a large-scale electron precipitation event
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AB: In order to describe how geomagnetic storms couple to the upper atmosphere, and hence to atmospheric chemistry and dynamics, measurements are required of energetic electron precipitation into the atmosphere. However, satellite observations are currently poorly suited to providing measurements of energetic and relativistic electron precipitation. The AARDDVARK network (Antarctic-Arctic Radiation-belt (Dynamic) Deposition - VLF Atmospheric Research Konsortium) provides continuous long-range observations of ionisation levels from ~30-85 km altitude, with the goal of increasing the understanding of energy coupling between the Earth's atmosphere, Sun, and Space. In this study we combine AARDDVARK subionospheric VLF measurements with DEMETER electron spectra using modelling techniques to study >100

keV energetic and relativistic electron precipitation into the atmosphere for the 24-hour period beginning 0600UT 19 January during the 17-21 January 2005 geomagnetic storms. The study augments large-scale regional observations using VLF measurements of multiple subionospheric paths to our receiver at Sodankylä, Finland (67.4°N, 26.6°E, L=5.31), combined with detailed in situ measurements from the DEMETER satellite to allow the spatial extent, flux, and energy distribution of the precipitation to be determined. In contrast to other satellites, DEMETER's electron spectrometer has excellent energy resolution. The DEMETER-measured precipitation spectrum is used to infer an altered electron density profile, modelled using a simple ionospheric electron model. This altered electron profile is then used in a subionospheric VLF model and compared with AARDDVARK VLF results. Matching model results with subionospheric VLF measurements allows calculation of both the intensity and geographic extent (in L) of the precipitation region required to produce such an effect. We find that a flux of 7000 elec.cm^{-2}s^{-1} >100 keV electrons precipitates into the atmosphere over an L range of 3.5-4.0. An error analysis is also included. By providing a better picture of both the intensity and size of the precipitation region, we obtain a more complete picture of the net impact that such a precipitation event has on the upper atmosphere. The results of this analysis will become primary inputs to chemical modelling of the impact that this precipitation has on the neutral atmosphere.
DE: [2423] IONOSPHERE / Ionization processes
DE: [2431] IONOSPHERE / Ionosphere/magnetosphere interactions
DE: [2455] IONOSPHERE / Particle precipitation
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