



## **D-Region Electron Densities obtained by differential Absorption and Phase Measurements with a 3-MHz Doppler Radar**

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A Doppler radar at 3.17 MHz has been installed close to the Andøya Rocket Range as part of the ALOMAR observatory at Andenes, Norway in summer 2002 to improve the ground based capabilities for measurements of small scale features and electron number densities in the mesosphere. The main feature of the new radar is the transmitting/receiving antenna which is arranged as a Mills Cross of 29 crossed half-wave dipoles with a minimum beam width of about 7°. Each dipole is fed by its own transceiver, and the individual phase control of the 58 transceiver modules on transmission and reception provides high flexibility in beam forming and pointing as well as switching of the transmission between ordinary and extraordinary mode polarisation. Interleaved transmission of the ordinary and extraordinary polarisation with a change of the polarisation from data point to data point provides differential absorption (DAE) and differential phase (DPE) measurements resulting in estimates of the electron number density in a height range between about 60 and 85 km. The electron number density profiles derived with the DAE as well as DPE method are in remarkable good agreement.

We discuss the diurnal and seasonal variability of electron densities (60...85 km) obtained at Andenes (69°N) in 2004/2005, the response of D-region electron densities to geomagnetic disturbances and solar proton events. The results are compared with rocket measurements from Andenes and the International Reference Ionosphere.