



Pc5 wave observed simultaneously by EKB radar in the Ionosphere and by Van Allen Probes in the Magnetosphere

Olga Mager, Maksim Chelpanov, Pavel Mager, Dmitri Klimushkin, and Oleg Bergardt
The Institute of Solar-Terrestrial Physics, SB RAS, Irkutsk, Russian Federation (o.mager@iszf.irk.ru)

The work presents an analysis of a Pc5 wave registered on November 22, 2014 simultaneously by Ekaterinburg decameter coherent radar (EKB radar) in the night ionosphere and by Van Allen Probes in the conjugate region of the magnetosphere near the geomagnetic equator between 5.5 and 5.8 L-shells. The wave had frequency about 1.8 mHz and was observed after an increase in geomagnetic activity, in the recovery phase of a substorm. Probably, the observed wave is a drift-compressional mode: its frequency was much lower than the estimated lowest Alfvén frequency; the wave had a predominant longitudinal magnetic component in antiphase to the observed plasma pressure oscillations, and was accompanied by an increase in the flux of energetic protons. Besides, the direction of wave propagation coincided with the direction of the magnetic drift of the energetic protons: the azimuthal wave number m calculated on the basis of radar and satellite data was about -10. And indeed, a modulation of proton fluxes with energies 81.6 and 99.4 keV at the wave frequency was found. The magnetic drift velocity of protons with these energies is close to the phase velocity of the wave. Therefore, it is possible that the wave was generated due to the resonant wave-particle interaction (drift instability).

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