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Correspondence between the dynamics of the outer radiation belt, auroral oval, and ULF power

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We compare the spatial location of the outer radiation belt with an instant position of the auroral oval and the latitudinal distribution of ULF wave power during two strong magnetic storms in November 2001. Before storm onset, the polar cap is filled with solar electrons (0.6-1.5 MeV), and the electron penetration boundary approximately coincides with the position of the equatorward border of the nightside auroral oval. At the recovery phase the new radiation belt is formed predominantly with lower energies, 0.3-0.6 MeV. The origin of recovering radiation belt is located deeper inside the magnetosphere than the auroral oval, and near the inner edge of nighttime ULF power in the band 1.5–7.0 mHz. We suggest that the acceleration of electrons by ULF disturbances occurs not in a regime of “geoserfotron” with Pc5 waves (match of azimuthal velocities of waves and particles), but rather in regime of “geosynchrotron” with Pi3 pulsations ($T \sim T_d$).