About distribution of energy, transported in the magnetosphere during superstorm on Nov 20, 2003, between the ionosphere and ring current.

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The values of the power consumed in the ionosphere (Q_i) and DR-current (Q_{DR}), also the ratio α=(Q_{DR}/ Q_i) during different regimes of the superstorm on Nov 20, 2003, were calculated by using the new method without applying of the known DPS equation. The values of the Perreault-Akasofu's Poynting flux ε=$10^{-7}V_{sw}B^2\sin^4(\theta/2)L_0^2$ have been used in calculations of $Q_{DR,}$ and the parameter of the same sense $\varepsilon\prime = \Psi_1^2 V_{sw}/\mu_0 S$, where Ψ_1 – the open tail magnetic flux, S – the area of the tail cross-section, pierced by Ψ_1. Having the values of ε, $\varepsilon\prime$, respectively, the underestimated and overestimated values of the total power Q of the superstorm on Nov 20, 2003 were found. They were used to calculate Q_{DR}=0.5(Q-Q_i), and α.

The values α were changed during the superstorm from $\alpha << 1$ to $\alpha \sim$(3 - 10), as distinct from the results that are known from the literature. Two maximums of α coincided with the substorm onsets at 0314 and 0351 UT. Some other maximums were found for the interval (1112-1210) UT of the driven regime of the disturbance, when a saturation of the ionospheric electric field was observed. We interpreted this saturation as the result of the observed fragmentation of the cross-tail current in the substorm current wedge, SCW.

Thus all the above-mentioned maximums of α , likely, are linked with an amplification of the ring current due to injection of the particles from the SCW. On the other hand, the tendency of an increasing of α from $\alpha << 1$ to $\alpha > 1$ was observed when the polar cap potential drop was growing from $<$100 kV to $>$150 kV.