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Robust regression analysis of energy spectrum evolution in time for relativistic electron bursts in the Earth's magnetosphere

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Various local geophysical phenomena, like thunderstorms and earthquakes can be the cause for particle precipitation from Earth radiation belt. Longitudinal particle drift period is known to be dependent from its energy, due to this fact: using particles energy spectrum data change in time, it is possible to determine distances between locations of precipitation and registration on board of satellite. Using results of numerical model calculations of longitudinal particle drift, the energy spectrum dynamics of particle burst electrons detected in satellite experiments ARINA (on board the Russian satellite Resurs-DK1) and VSPLESK (on board the International Space Station) have been analyzed. The robust regression method is proposed to be used for detection of burst electrons in data with high levels of background albedo electron fluxes. The research has shown that this method provides the way to increase signal to noise ratio in experimental data and achieve more precise burst precipitation area detection in compare to linear regression analysis.

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