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Radial evolution of thin current sheets in the Earth's magnetotail

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The model of thin current sheet in the Earth's magnetotail taking into account the radial inhomogeneity of magnetic field is constructed and investigated. It is shown that charge particle dynamics which is different in earthward and tailward regions of current sheet is determined by large-scale changes of the normal component of the magnetic field. At the same time as transient ions support practically 1D structure of current sheet, contributions of electrons and quasi-trapped ions differ dependently on the radial distance from the Earth. Thus quasi-trapped ions should dominate in earthward region of current sheet, in contrast to electrons supporting a narrow strong peak of current density in tailward edge of current sheet. Generally, it is shown that thin current sheets in the Earth's magnetotail might be described as 2D multiscale embedded structure.