

Can the onset arc be an interchange filament?

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Different researchers identify the onset auroral arc (OA) with the different mechanisms: near-Earth neutral line, current sheet disruptions, etc. (for review see e.g. [Kan et al., 1997]). Based on the morphological features of the OA we hypothesize that the OA has exactly the same genesis as any other discrete arc, i.e. striation of the pressure gradient-driven field-aligned current by the interchange process in the magnetosphere [Volkov and Maltsev, 1986; Ivanov and Pokhotelov, 1987; Golovchanskaya and Maltsev, 2002]. The distinct behavior of this particular arc is presumably caused by the highly variable dynamics of the cross-tail and field-aligned currents at the substorm growth phase in the region of the OA formation ($x = -6 \div -8 R_E$). Thus the well-known OA distortion having the form of the westward travelling surge (WTS) can be explained under assumption of non-uniform cross-tail current distribution along the OA extent. The numerical simulation of the WTS-like development is performed.