



Two types of substorm expansion phase onsets in the Earth's two hemispheres

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On the base of magnetogram inversion technique, with one – min time resolution we determine 3 Iijima-Potemra zones (regions) of field-aligned currents (FACs), and inside each region -mesoscale cells. Such cells are usually not seen because of different averaging procedures used. We study relationship between FAC intensities in the pre- and postmidnight sectors of each zone using the global electric scheme of the system magnetosphere- ionospheres of the two hemispheres. From data of 15 investigated substorms two main types of M-I feedback instability have been found: 1) summer (type 1), and 2) winter (type 2). In equinox both types were observed. Each type of instability creates two simultaneous local expansion phase onsets, EOs: Type 1 - non-linear amplification of the downward FAC in one hemisphere and Type 2 - non-linear amplification of the upward FAC in the other hemisphere. Work is partially supported by RFBR research grant N 18-05-00437.