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C 会場 ：11/5　PM1 （13:45-15:30）
13:45〜14:00

#海老原　祐輔 [1)], 田中　高史 [2)]
([1 京大生存圏,([2 九大

Region 1 field-aligned current and energy transfer from solar wind to polar ionosphere

#Yusuke Ebihara[1)], Takashi Tanaka[2)]
([1RISH, Kyoto Univ.,([2REPPU code Institute

The ultimate source of the electromagnetic energy consumed in the ionosphere is the solar wind and interplanetary magnetic field (IMF), but the pathway of the energy transfer is not well known. According to global magnetohydrodynamics (MHD) simulation, the integral curve of the Poynting flux (S-curve) in the magnetosphere shows a spiral with its center moving toward the Earth (Ebihara and Tanaka, 2017). The spiral shape probably implies that the magnetic energy is transferred to the perpendicular direction, which may be an alternative view of the magnetospheric convection. The earthward shift of the center probably implies the transport of the magnetic energy toward the Earth along the magnetic field lines. The shape of the S-curve is reasonably understood to be the presence of the large-scale field-aligned currents, known as the Region 1 current, which twist Earth's magnetic field lines. In that sense, the magnetospheric convection and the Region 1 field-aligned current (FAC) are tied to each other. By tracing "packets" that are supposed to carry perturbations associated with FACs backward in time from the ionosphere in a reference frame of the plasma bulk flow, we identified the generation region of the Region 1 current to be the flank (low-latitude) magnetopause, in which the solar wind-originated plasma pulls Earth's magnetic field lines to excite the Alfven waves (Ebihara and Tanaka, 2022). We overview the relationship between the Region 1 FACs and the global energy transfer, and possible pathway of the energy from interplanetary space to the ionosphere as well as energy conversion processes taking place during the substorms and interplanetary shocks.