磁場なし太陽風下での磁気圏電離圏対流の生成

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The magnetosphere-ionosphere convection under the non-magnetized solar wind

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The solar wind sometimes has no or quite-small magnetic field. In such cases, the magnetosphere-ionosphere convection has been regarded to be driven by the viscous interaction [Axford and Hines, 1961] instead of the reconnection [Dungey, 1962]. The convection under the magnetized solar wind has been studied by using a global MHD simulation [e.g., Tanaka, 1995, 1999]. Tanaka [1995] revealed that the cusp plays a crucial role of driving the convection system because two-step process (enhanced pressure in the cusp due to release of the magnetic tension caused by magnetic merging in the dayside magnetosphere as well as conversion of the thermal energy to the electromagnetic energy in the high-latitude side of the cusp). The R1 FAC is thus generated in the high-latitude side of the cusp (the mantle region). On the other hand, as the solar-wind magnetosphere interaction for the non-magnetized solar wind has not been studied in detail by using a global MHD simulation, we perform the simulation. We will report that the convection system is generated again in the cusp region even when the magnetic reconnection does not work. The viscous interaction drives to enhance the pressure in the cusp and the R1 FAC is also generated in the mantle region in the same mechanism as that in the magnetized solar wind as shown in Fig. 1. In addition, we find that the convection system is similar to the convection system for the southward IMF condition.

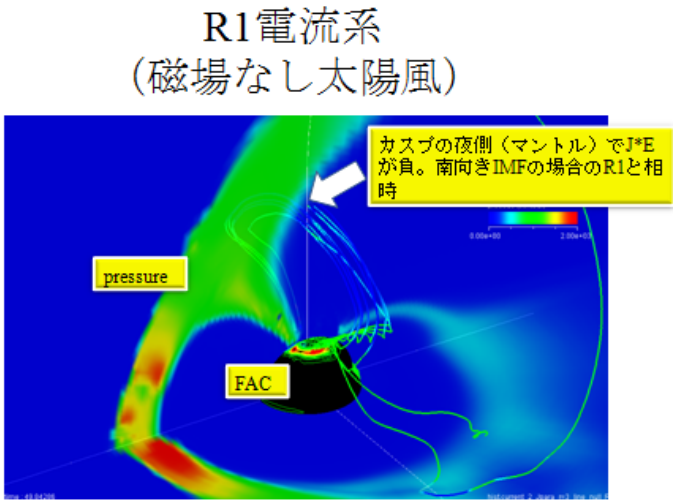

Figure 1. R1 FAC generator in the mantle region

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