

Relationship between the Region-2 current intensity and the solar-wind dynamic pressure

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The relationship between the Region-2 field-aligned currents and the solar-wind dynamic pressure is investigated using magnetic-field data from Defense Meteorological Satellite Program-F13 (DMSP-F13). The intensity of the Region-2 currents is determined by the vector product between the magnetic-pressure gradient in the magnetosphere and the thermal-pressure gradient. It has been suggested that the magnetic-pressure gradients in the magnetosphere on the dawnside and the duskside depend on the solar-wind dynamic pressure. Therefore, we can expect that the Region-2 currents would also depend on the solar-wind dynamic pressure. This study compares the Region-2 field-aligned current intensity at the altitude of the ionosphere, as derived using magnetic-field data from DMSP-F13, with the solar-wind dynamic pressure derived from OMNI2 hourly data. It was confirmed that the Region-2 current intensity depends on the solar-wind dynamic pressure during magnetic storms. During non-storm times, however, a correlation between the Region-2 currents and the solar-wind dynamic pressure is weak. This finding indicates that the ion pressure in the ring-current region could also be essential for the generation of Region-2 currents.