

Ampere force exerted by geomagnetic Sq currents and thermospheric pressure difference

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Relationship between Ampere force exerted by geomagnetic Sq currents and neutral pressure was examined. It was shown that the Ampere force around the Sq current vortex center is almost equal to the pressure difference between its maximum and minimum, and this balance is kept through the solar cycle. The lowest height of the pressure integration for best fit is 120km, which is reasonable considering the height profile. There was a seasonal variation that the pressure difference is smaller and larger in local summer and winter, respectively. This is consistent with the effects of magnetic field by inter-hemispheric field-aligned currents on geomagnetic Sq field.

Keywords: geomagnetic daily variation, total current, Ampere force, thermospheric pressure difference, solar activity