Spectral structures and IMF dependences of polar cap Pc 3 waves observed by the AGO network in Antarctica

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Using search coil magnetometer data obtained from six Automatic Geophysical Observatories locating at very high magnetic latitudes in Antarctica, we studied the spectral characteristics of Pc 3 magnetic pulsations in the cusp/cleft and polar cap region and the dependences of Pc 3 occurrences on the interplanetary magnetic field. It is found that the frequencies of narrow band Pc 3 pulsations coincide with the frequencies of upstream waves excited by the bow shock, suggesting that these pc 3 waves are extramagnetospheric origin. It is also found that upstream waves can penetrate into the magnetosphere across the flankside boundary region of the magnetotail.

Using ULF wave data measured by search coil magnetometers installed at six Automatic Geophysical Observatories (AGOs) locating from 70 to 87 magnetic latitude and South Pole station located at 74 magnetic latitude, the spectral characteristics of Pc 3 pulsations have been studied. Then, the dependences of the occurrences and frequencies of Pc 3 pulsations on the interplanetary magnetic field (IMF) have been investigated using the WIND satellite data..

It is found that Pc 3 waves with narrow-band spectral structures are ordinary events at these high latitudes, and that the frequencies of the spctral peaks coincide with the frequencies of upstream waves excited by upstream ions originated from the the bow shock, suggesting that the source of these Pc 3 waves is upstream waves. It is also found that Pc 3 pulsations occur both in small and large cone angle conditions of IMF. These facts suggest that upstream waves can penetrate into the magnetosphere not only across the subsolar magnetopause, but also across the flankside boundary layers of the magnetotail.