

Excitation of Pc2 waves near noon at high latitudes preceding the preliminary impulse of a geomagnetic sudden commencement

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We report the characteristics of the Pc2 waves observed near noon on the ground at high latitudes during periods of high solar wind dynamic pressure, focusing on their temporal relationship to the preliminary impulse of a geomagnetic sudden commencement (SC). Examination of the magnetic perturbation data from a newly installed induction magnetometer at Longyearbyen, Svalbard, together with the magnetic field data from the IMAGE magnetometer chain, has shown that the Pc2 waves can be excited about 30 s before the start of the preliminary impulse of SC. Pc1 waves are also excited, but their onset is almost simultaneous with the start of the preliminary impulse, i.e., about 30 s later than the onset of the Pc2 waves. The Pc2 waves last for about 90 s, while the Pc1 waves are observed for longer periods during the high solar wind dynamic pressure. Previous research has often attempted to explain the Pc1 and Pc2 waves near the cusp by a single mechanism, but our result indicates that a mechanism is at work that excites only the Pc2 band for a relatively short period, starting before the preliminary impulse and lasting until the middle of the preliminary impulse. We will discuss the generation mechanism.

Keywords: Magnetic pulsations, geomagnetic sudden commencement, cusp, dayside polar cap