

Properties of large amplitude geomagnetic sudden commencement (SC)

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Araki [2014; EPS] confirmed that SC occurred on March 24, 1940 was largest since 1868. The amplitude is 310nT at Alibag and more than 273nT at Kakioka. Using the experimental relationship between SC amplitude dH and dynamic pressure P_d associated with interplanetary shock (IPS) [Siscoe et al. ; 1968], $dH = A * d(P_d^{0.5})$, the corresponding P_d increase was estimated as 400-500nPa.

When the magnetosphere is compressed by IPS, field aligned currents (FACs) and ionospheric currents (ICs) are induced in addition to the primary magnetopause current (MPC). The LT variations of SC amplitude is produced by them which should be taken into account in estimation of P_d using Siscoes relationship.

When P_d is larger than about 30nPa, the magnetopause enters into the inside of the geosynchronous orbit. At that time the configuration of the MPC, FAC and IC might be different and contribute differently to the LT variation of SC amplitude. Thus it is important to examine the LT variation of large SCs and reflect the result in estimation of P_d associated with IPS.

Here we study properties of large amplitude SC including its LT variation. .

Keywords: geomagnetic sudden commencement(SC), interplanetary shock, LT variation, large amplitude