

## オーロラ帯 Pi2: 電離層電流系と振動モード

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### Pi2s in auroral zone: mode of field line oscillations and ionospheric current system

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Field line motions excited in the outer boundary of the inner magnetosphere are transmitted toward the Earth. On the ground, they are observed as Pi2 pulsations. In the auroral zone, we compared the Pi2 signals in the magnetosphere and at the satellite footprints. We obtained following results regarding mode of the field line oscillations and ionospheric current system in the auroral zone.

- (1) Pi2 polarizations (CW/CCW) in the magnetosphere reversed at the satellite footprint in auroral zone.
- (2) The polarization reversal was not caused in the transverse planes (toroidal components) but by the polarity changes of the field line motions in the meridian planes (poloidal components).
- (3) The polarity changes in the meridian planes could be explained by the third harmonic of poloidal components excited by the diamagnetic currents in the equatorial plane.
- (4) Field lines in higher latitudes were expanded poleward by the excitation of the diamagnetic current and compressed equatorward in lower latitudes.
- (5) The field line motions associated with the diamagnetic currents invoked the Hall currents in the ionosphere. On the ground, propagating Hall currents closed in the ionosphere generated Pi2s.

磁気圏外部境界に励起された磁力線運動は磁気圏を横切り地上で Pi2 脈動として観測される。地上オーロラ帯と磁気圏赤道面で同時に Pi2 を調べた結果、Pi2 の電離層電流系と振動モードについて以下の結論を得た。

- ( 1 ) オーロラ帯では赤道面と地上共役点との間に Pi2 脈動の偏波に逆転が現れた。
- ( 2 ) 逆転の原因は Toroidal 成分ではなく子午面内の Poloidal 成分が地上と赤道面で反転したためである。
- ( 3 ) 子午面内反転は赤道面内の反磁性電流による 3 次高調波励起と考えられる。
- ( 4 ) 反磁性電流は高緯度で磁力線を極側へ拡張させ、低緯度では逆に赤道側へ収斂させる。
- ( 5 ) この磁力線運動は電離層に Hall 電流を生み、閉じた Hall 電流の東西伝播が地上 Pi2 として現れる。