

## Precision of GPS Point Positioning -part9 -Refraction of L1 wave by geomagnetism and turbulence by atmospheric components

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<http://home.att.ne.jp/iota/bluedoor2001/index33.html>

The previous studies of GPS (Global Positioning System) point positioning in Odawara-city, Kanagawa Prefecture, from December 2002 to September 2005 have suggested that GPS data have 1 day cycle, 1 month cycle and seasonal variation, which caused atmospheric refraction. Another factor for the variation is assumed the effect of geomagnetism.

Within geomagnetic variation, a magnetic storm due to solar flare is a short-term noise of high amplitude, which influences L1 wave by disturbing ionosphere. On the other hand, a static variation of low amplitude in yearly time-scale is due to static solar activities and the geomagnetic variation in terrestrial interior, which includes secular variation, and influences L1 wave, too.

Geomagnetic data in this study was hourly data measured at Kanou-zan, Chiba Prefecture, downloaded from the homepage of GSJ (Kokudo-chiri-in), and analyzed on correlation with GPS point positioning data (receiver: Garmin).

The result is that the correlation between geomagnetic and GPS data changes seasonally dependent on air pollution concentrations (ref: NIES, Soramame-kun), particularly on SPM (Suspended Particulate Matter), which suggests the relation between geomagnetic data and SPM concentration, and perhaps that, within SPM, any charged particles or soil particles including magnetic components as iron influence the refraction of L1 wave by geomagnetism.