

## Daytime TIDs over Japan by simultaneous ground-satellite observations by the GPS-TEC network and the CHAMP satellite

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We report results of the daytime travelling ionospheric disturbances (TIDs) over Japan by simultaneous ground-satellite GEONET GPS receiver network and CHAMP satellite measurements. We used TEC (Total Electron Content) from GPS data and neutral and electron densities from the CHAMP satellite. For the years 2002 and 2008, we examined total of twenty events. From the events, fifteen of them have clear southward moving structures while the remaining five have clear northward moving structures in the GPS-TEC measurements are found. On 2002, simultaneous events are only observed in January (1 event) and February (4 events). All events from 2002 are southward moving events. On 2008, fifteen events are observed (January (3 events), February (5), March (1), May (1), June (1) September (1), October (2) and November (1)). CHAMP satellite measurements show quasi-periodic fluctuations for all events in the neutral and electron density data. We selected events with the criteria of CHAMP satellite crosses at least one clear TID phase front. To determine the both measurements are observing the same wave and to calculate the phase differences of those measurements, we fitted a sinusoidal function to the data and calculated frequencies and phase. In this presentation, we report of those TID structures seen in the simultaneous ground-satellite observations by GPS-TEC and CHAMP and identify the source of the daytime TIDs at middle latitudes.