

## An empirical model of the quiet daily geomagnetic field variation derived from CPMN 210 MM data from 1996 to 2007

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When solar-terrestrial disturbances are absent, the daily record of the geomagnetic field smoothly changes with primarily 24-, 12-, 8- and 6-hour spectral components. These regular daily variations of the geomagnetic field are defined as SR [Mayaud, 1965]. Meanwhile, mean SR variations over the five quietest days per month are defined as Sq [Chapman and Bartels, 1940]. In the present paper, we have constructed an empirical model of the SR variation using geomagnetic data obtained from 21 stations along the 210 Magnetic Meridian of the Circum-pan Pacific Magnetometer Network; Magadan (MGD), Popov Island (PPI), Rikubetsu (RIK), Onagawa (ONW), Kagoshima (KAG), Okinawa (OKN), Lumping (LNP), Muntinlupa (MUT), Guam (GAM), Cebu (CEB), Davao (DAV), Biak (BIK), Wewak, (WEW) Weipa (WEP), Dawin (DAW), Learmonth (LMT), Birdsville (BSV), Dalby (DAL), Canberra (CAN), Adelaide (ADL) and Katanning (KAT). SR variations at each station from 1996 to 2007 ( $K_p < 3$ ) were described as functions of (1) solar activity SA, (2) day of year DOY, (3) lunar age LA and (4) local time LT. The obtained model includes a mean error of less than 15% of the daily variation range. After latitudinal distribution is estimated using linear interpolation, the model can describe solar cycle and seasonal variations of both S (solar) and L (lunar) fields. We performed the spherical harmonic analysis (SHA) on these S and L fields and examined the external portion of the equivalent current systems. SHA results showed good agreement with the results that had been shown by previous researchers. Moreover, some new findings will be presented.