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# Dependency of the equatorial ionospheric current system on solar flux and geomagnetic main field, results from Huancayo geomagnetic observatory data from 1935 to 1985

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We have analysed 51 years (1935 to 1985) of geomagnetic observatory data from Huancayo, Peru, to determine the sensitivity of the equatorial ionospheric current system (i.e. the solar quiet current system and the equatorial electrojet, EEJ) to solar cycle variations and to the secular variation of the geomagnetic main field. Firstly, we digitised some 19 years of previously unavailable hourly mean values of the horizontal component (H) for the 1960ies, 1970ies and 1980ies, since the period 1935 to 1985 is ideal to analyse the influence of the main field strength on the amplitude of the quiet daily variation. This is because the main field decreases significantly from 1935 to 1985, while the distance of the magnetic equator to the observatory remains stable. The latter is important, because the amplitude of the magnetic field signature of the EEJ decreases significantly with distance to the magnetic equator. Secondly, the sensitivity of the amplitude $\Delta$H of the quiet daily variation to solar cycle variations (in terms of sunspot numbers and solar flux F10.7) was determined. Thirdly, the sensitivity of $\Delta$H to changes of the geomagnetic main field strength (due to secular variation) was determined. We confirm an increase of $\Delta$H for the decreasing main field in this period, as expected from physics based models (Cnossen, 2016). Our measured increase of 4.4% (5.8 % considering one standard error) during this period is slightly smaller than the 6.9 % increase predicted by the physics based model. We use the resulting scaling law to predict the influence of the varying main field strength along the magnetic equator on the longitudinal variation of $\Delta$H.