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Test of proxies for characterising the polar current system at very quiet times

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The magnetic activity at auroral latitudes is strongly depending on season. For the characterisation of the polar current system at very quiet times we therefore concentrate on northern and southern winter days. During the dark season, when the solar zenith angle in the polar region is larger than 100° at all local times, the ionospheric conductivity is much reduced, and generally low activity is encountered. Time intervals, during which the geomagnetic field readings are only slightly affected by ionospheric currents (in particular, the field magnitude), are of special interest for the main field modelling. Based on CHAMP data, this study examines how these quiet periods are reflected in the different magnetic field components. Magnetic deflections resulting from horizontal currents or field-aligned currents (FACs) look quite different. We have used the peak FAC density as a possible proxy for the deviation of the total field, and as a second option the transverse field component which is aligned with the auroral oval (a measure for the FAC total current). Correlation analyses of both proxies with the scalar residuals are performed. As the activity at high latitudes is strongly controlled by the solar wind input, we also consider external quantities which may support very quiet conditions. Correlations of the magnetic field scalar residuals with the merging electric field reveal promising result. This is true, in particular, when considering only passes in the dayside sector.