Solar cycle influences on the shape and location of the Earth's magnetopause

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We have developed an automated magnetopause crossing detection routine to determine the location of the magnetopause using a combination of plasma and magnetic field data. The technique has been applied to almost two solar cycles of data (1996 – 2012) from the Geotail spacecraft, producing a database of 7770 magnetopause crossings. The magnetopause crossings are normalized for solar wind dynamic pressure, and the shape of the magnetopause is modelled with the functional form of Shue et al. (1997) empirical magnetopause model for each of the 17 years of data. We find that the yearly averaged level of flaring in the magnetotail and magnetopause standoff distance vary significantly throughout the solar cycle, and that our improved coverage on the flanks is essential for accurately characterizing the flaring of the nightside magnetopause. We postulate that a combination of the open flux content and the ring current strength may order the magnetopause shape and size.