



PC index as verifier of suitability of solar wind parameters fixed in the point of libration L1

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The polar cap magnetic activity (PC) index is regarded as a proxy for energy that input into the magnetosphere during the solar wind-magnetosphere coupling [Resolutions of XXII IAGA Assembly, 2013]. Generally the PC time evolution follows the interplanetary electric field EKL determined by the solar wind parameters, which are measured in the point of libration L1 (at distance of ~ 1.5 million km upstream of the Earth) and reduced to the magnetopause, however this connection is broken sometimes. To reveal the reasons of violation, the relationships the EKL and PC quantities were examined in course of all isolated substorms observed during two last solar activity cycles (1998-2017). It turned out that correlation between EKL and PC was low or even negative in more than 10% of examined substorms, even though the substorm development was related to the preceding PC growth. It implies that the “estimated” solar wind, fixed in point of libration far in front of magnetosphere, did not encounter the Earth’s magnetosphere in these cases. In $\sim 1.5\%$ of the substorm events the correlation between PC and EKL was high, but the delay times in the PC response to EKL growth was negative, i. e. the real solar wind, responsible for the PC growth and substorm onset, encountered magnetosphere before the “estimated time“ of the solar wind arrival to magnetopause. In this case the real solar wind was evidently accelerated on way from the point of libration to magnetosphere. The results of analysis, carried out for substorms of different types and power, clearly demonstrate that PC index can ensure the prompt verification of suitability of the solar wind parameters measured in the point of libration.