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Exceptionally strong variation of galactic cosmic ray intensity at solar rotation period after the maximum of solar cycle 24

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After the reversal of solar polarity in 2014, the Sun is now in the early declining phase of cycle 24. Soon after the polarity reversal, the galactic cosmic ray intensity, as observed, e.g., by neutron monitors at several latitudes (cut-off rigidities) depict an exceptionally large variation at the solar rotation period. This recurrence started in mid-2014 and continues until now (the first half of March 2015). Several parameters characterizing solar activity, like sunspots and F10.7 radio flux, also depict similar enhanced variability, which started slightly earlier than in neutron monitors. Some solar wind properties also show this periodicity, although less systematically and for a shorter time. This excessively strong periodicity in GCR can be related to the rather rapid growth of an asymmetric polar coronal hole in the southern hemisphere, leading to a very asymmetric magnetic configuration at mid- to high heliospheric latitudes. This also leads to the fact that the tilt angle of the heliospheric current sheet is wavier during this cycle than at similar early declining phases of the previous solar cycles.

Collaboration

– not specified –

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