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Sharp solar wind density changes and their connection with heliospheric current sheet

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Poor-investigated sharp changes of solar wind plasma density (its increases and decreases in several times during several minutes or even seconds), simultaneously observed by Interball-1 and Wind spacecraft near the Earth, on the average, several times per day, are considered. Firstly they had been found due to analysis of Interball-1 one-second plasma data and were called as SCIFs (sharp changes of ion flux).
Features and sources of irregularity of their temporal distribution are discussed.
Case study and statistical investigations show that the observed phenomenon is associated with areas in solar wind, where solar wind density and interplanetary magnetic field, as well as their variability, are increased.
It is shown that daily number of SCIFs (according to Interbol-1 data for 5 years) correlates with modeling function, using daily OMNI2 solar wind density, magnetic field and their standard deviations as parameters, at the level $\sim$0.7. It demonstrates a nonrandomness of the combined influence of the specified parameters on propagation (or creation) of sharp small-scale boundaries in solar wind.
It is shown that the overwhelming majority of sector boundaries (85%) contain studied jumps of density, and the specific solar wind conditions in heliospheric current sheet coincide with revealed ones for the best survival and propagation of SCIFs. Meanwhile not all observed density jumps have been found in current sheets. Only 40% of all observed density jumps are associated with sector boundaries, and the others 60% are not connected neither with heliospheric current sheet, nor with any other brightly allocated structures like magnetic clouds or CIRs.
Questions of an origin, propagation and a survival of sharp small-scale boundaries in solar wind are discussed.
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