



Geomagnetic Effectiveness of the High Speed Streams (HSSs) in the Solar Wind

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It is well-known that geomagnetic disturbances are produced by the impact of the heliospheric magnetic perturbations and high speed solar wind on the terrestrial magnetosphere. Practically, the solar sources of these perturbations in heliospheric magnetic field and solar wind are responsible for geomagnetic disturbances. Physical conditions of these sources as well as heliospheric and solar wind parameters which determine the geomagnetic effectiveness of these perturbations are not yet well understood. This paper analyses the geomagnetic variability during the 23rd solar cycle (1996-2007) using the indices Ap, IHV, IDV, Dst in comparison with the HSS parameters (the duration, the maximum velocity, the maximum velocity gradient and, the importance). The World Data bases for geomagnetic indices and the HSS Catalogue for solar cycle 23 (Maris & Maris, 2007) were used. This study as well as the HSS catalogue for the 23rd cycle is done in the frame of the IHY Coordinated Investigation Program 69. Some individual pairs of events "HSS - geomagnetic disturbance" (cause - effect) are analysed in detail to reveal the peculiarities of the geomagnetic disturbance as a function of the HSS parameters and its solar source nature. The most powerful geomagnetic disturbances were registered as a consequence of composed external perturbation, e.g. a superposition of two HSS with different solar sources or a HSS combined with the inhomogeneous heliospheric current sheet (the change of the magnetic polarity) inside them. The heliospheric position and extension of certain solar sources (e.g. coronal holes, coronal mass ejections) or the intensity of eruptive solar sources (flares) also contribute to the HSS geomagnetic effectiveness.