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# Ionospheric response to solar wind discontinuities

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We investigate the ionospheric response to solar wind discontinuities as shown by the solar wind - magnetosphere coupling efficiency and other ionospheric activity. We carry out a superposed epoch analysis of 236 pressure impulses and 171 sudden decompressions of the magnetosphere from the years 1998-2002, detected by the ACE/SWEPAM instrument. The data set includes events mimicking fast, slow and reverse slow shocks that we define as fast-type, slow-type and reverse slow-type discontinuities. We find that the coupling efficiency, defined as the ratio between the polar cap and magnetospheric potential, to sudden compressions depends on the internal structure of the impulse. Ionospheric activity as measured by the IMAGE magnetometer chain increseas (decreases) after sudden impulses (decompressions). The coupling efficiency increases (decreases) for slow-type (fast-type) discontinuities. However, the coupling energy estimated from the IMAGE magnetometer chain is larger for the fast-type events and stronger drivers. Hence, our results indicate that the magnetosphere uses the energy from the weaker driver more geoeffectively, while the energy associated with stronger drivers is partly transmitted through the system.