SUDDEN IMPULSES AT GEOSYNCHRONOUS ORBIT AND AT GROUND

U. Villante[1], MIRKO PIERSANTI[2]

1. Department of Physics, University of L'Aquila (Italy), umberto.villante@aquila.infn.it
2. Department of Physics, University of L'Aquila (Italy), mirko.piersanti@aquila.infn.it

Sudden Impulses of the magnetospheric and geomagnetic field are caused by sudden increases in the dynamic pressure of the solar wind, generally associated with the Earth's arrival of interplanetary shock waves. At geosynchronous orbit, the magnetospheric response (mostly along the northward component, B_Z) reveals an explicit LT dependence, with greater values at satellites located closer to noon meridian. In the dayside hemisphere the magnetospheric response is basically consistent with the magnetic field jump expected for changes of the magnetopause current alone; by contrast, in the dark hemisphere, the competing contributions of several current systems (from the magnetopause, cross-tail current, ring current, Birkeland current) determine a large variety of responses that cannot be univocally interpreted. A different situation emerges in ground observations, where the responses along the northward component, H, are typically greater than expected for changes of the magnetopause current; they are also accompanied by significant changes of the eastward component, D. Both these aspects suggest additional ionospheric contributions. The comparison between geosynchronous and ground observations for the same set of events, as well as with the predictions of theoretical models, represents an useful tool for a better understanding of the basic aspects of the SI manifestation and for the discrimination of the role of the different magnetospheric and ionospheric current systems.

Sudden Impulses, Magnetospheric and Ground Observations

Umberto Villante, University of L'Aquila, via Vetoio 6, 67100 L'Aquila, tel: +393393920175,
e-mail: umberto.villante@aquila.infn.it