Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)
Coupled Solar Wind-Magnetosphere-Ionosphere-Thermosphere System (C1.3)
Consider for oral presentation.

THE NEED FOR LOCAL, HIGH RESOLUTION, MULTI INSTRUMENT MONITORING TO STUDY COMPLEX EFFECTS OF SPACE WEATHER DISTURBANCES: A STUDY OF THE EVENTS IN FEBRUARY 2014

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A case study of the space weather events that took place in February 2014 will be presented. In particular, we investigate the influence of these events on the local ionospheric and magnetic conditions by using several collocated instruments – ionosonde, magnetometer, cosmic rays detector, and GNSS receivers – in operation at the RMI Geophysical Centre in Dourbes (50.1N, 4.6E). Because all these instruments produce data with a high temporal resolution (5 minutes for the ionosonde data, 1 minute for all other data), we can study the rapid variations in the ionosphere that are due to (traveling) small-scale disturbances associated with this geomagnetic storm. The digital ionosonde (Digisonde-4D) produces high-resolution ionograms and "skymaps" that provide a detailed image of the ionosphere in a region around the digisonde, showing the positions of all points from which the radio wave is reflected back to the sounder. This provides an opportunity to also study the anisotropy and gradients caused by these disturbances. The results of the local measurements are compared with those obtained by the ACE and GOES satellites, with regional TEC maps and global Kp and Dst indices. This comparison illustrates the limitations of global indices and maps, and the usefulness of local, high (temporal and spatial) resolution data in monitoring ionospheric disturbances. Also, it can be seen that different types of events (X-ray flares, influxes of low or high energy protons,...) produce different kinds of disturbances.