Geophysical Research Abstracts
Vol. 17, EGU2015-10305, 2015
EGU General Assembly 2015

Effects of the 20 March 2015 total solar eclipse on the ionosphere-thermosphere system

Maxime Grandin (1), Aurelie Marchaudon (2), Anita Aikio (1), Pierre-Louis Blelly (2), Alexander Kozlovsky (1), Frederic Pitout (2), Thomas Ulich (1), Mark Lester (3), Ethan Miller (4), and Tim Yeoman (3)

(1) SGO, University of Oulu, Sodankylä, Finland (mgrandin@sgo.fi), (2) IRAP, CNRS/UPS, Toulouse, France (aurelie.marchaudon@irap.omp.eu), (3) RSPPG, University of Leicester, Leicester, United Kingdom, (4) Space Department, Johns Hopkins University Applied Physics Laboratory, Laurel, USA

A total solar eclipse is a spectacular natural phenomenon whose consequences over the underlying ionosphere and thermosphere remain complex and not fully explained.

On 20 March 2015, a total solar eclipse lasting almost 2 hours passed over the Atlantic Ocean, then over Svalbard. These specific regions are extremely interesting as they are covered by several ground-based instruments: SuperDARN radars, EISCAT Svalbard radar (ESR), magnetometers, and imaging instruments. We take advantage of this excellent instrumental configuration coupled with results from detailed ionosphere models to study the dynamic consequences of this eclipse on the underlying ionosphere and thermosphere. In particular, we run specific scanning modes on the SuperDARN radars in order to identify a possible generation of Atmospheric Gravity Waves (AGW) caused by the eclipse.

We present the observations of the different instruments and compare them with initial simulations made with the TRANSCAR ionosphere model. As this eclipse is first located on closed field lines, we also investigate the possible exchange of energy and particle fluxes with the opposite sunlit hemisphere by running the interhemispheric version of our ionosphere model.