Analysis of the ionospheric behavior during the September 2017 geomagnetic storm

Barbara Matyjasiak (1), Mariusz Pozoga (1), Hanna Rothkaehl (1), Marcin Grzesiak (1), Lukasz Tomasik (1), Dorota Przepiorka (1), Katarzyna Budzinska (1), and Richard Fallows (2)

(1) Space Research Centre Polish Academy of Sciences, Warsaw, Poland (bmatyjasiak@cbk.waw.pl), (2) Netherlands Institute for Radio Astronomy, ASTRON, Dwingeloo, Netherlands

The geomagnetic storm which took place on the 8th of September 2017 was one of the strongest events in the 24th solar cycle. What is significant, it occurred in the declining phase of the solar cycle. It was preceded by the first, since 2015, flare of class X (X9.33) and also the strongest solar flare of solar cycle 24.

Such intense events may lead to a very rapid and unpredictable changes in the ionospheric conditions and may affect performance of many technologies such as: radio communication, satellite positioning, power lines, etc., which impacts our day to day life.

Using LOFAR interferometer data and dedicated tooling for ionospheric parameters analysis, we present here study of the local ionospheric conditions during mentioned strong geomagnetic storm. The analysis of scintillation parameters, which can be treated as a measure of changes in the ionosphere on the path of the observed radio signal is presented. We also study changes in the ionospheric sub-auroral region caused by the evolution of the geomagnetic storm.

The work is made on the basis of the data obtained from the LOFAR interferometer.