Evolution of ionospheric convection and ULFs during the 27 March 2017 storm: ERG-SuperDARN campaign

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The Exploration of energization and Radiation in Geospace (ERG) satellite, which was nicknamed "Arase" after its launch on late December, 2016, has successfully started the regular observation recently. In concert with in situ measurement made by Arase in the inner magnetosphere, the campaign observation of SuperDARN radars has been conducted with a special scan mode "interleaved_normalscan" since March, 2017. Some of the radars being operated in the special mode observed dynamic evolution of ionospheric convection and superimposed ULF-like convection fluctuations with frequencies of ˜mHz over North America and Canada during a moderate magnetic storm on March 27, 2017. Large-scale evolution provided by the radar observations made at mid-latitudes in the early morning sector show that ionospheric convection changed its direction between westward and eastward several times in the course of the storm main phase. It is also seen that some meso-scale patchy structures seen on the 2-D profile of line-of-sight (LOS) velocity propagated both westward and eastward just after a major intensification of substorm. Interestingly, those velocity fluctuations were accompanied by a drifting energetic electron population as observed by particle instruments onboard Arase. A simulation of the inner magnetosphere coupled with a global MHD simulation for this event reproduces intense particle injections in the premidnight sector, consistent with the energy dispersion of the observed drifting population. A detailed interpretation of the observations including those captured by Arase will be discussed considering the simulation results.