



Ionospheric irregularities observed during the St. Patrick's Day 2015 severe geomagnetic storm over the southern high latitude polar cap region: a case study from Antarctic Circle

Bapan Paul⁽¹⁾, Arup Patari⁽¹⁾, Barin Kumar De⁽¹⁾ and Anirban Guha⁽¹⁾

(1) Department of Physics, Tripura University, Suryamaninagar - 799022, Tripura, India, e-mail: bapanpaul88rocks@gmail.com; aruppatari@gmail.com; barin_de@yahoo.com; ANIRBAN1001@yahoo.com

The high latitude southern polar cap ionospheric irregularities observed during the St. Patrick's Day 2015 severe geomagnetic storm is reported using Total Electron Content (TEC) data of network of International Ground Stations (IGS) GPS receivers McMurdo-MCM4 (-77.83° S, 166.66° E), Casey-CAS1 (-66.28° S, 110.52° E), Davis-DAV1 (-68.58° S, 77.97° E), Mawson-MAW1 (-77.83° S, 166.66° E), East Ongle Island-SYOG Mawson-MAW1 (-67.61° S, 62.87° E) and Rothera-ROTH (-67.57° N, 68.13° E), in the Antarctic Circle. The irregularities of TEC phase fluctuation i.e. Rate of TEC (ROT) and TEC rate index (ROTI) expressed in TECU/min was estimated during the period of 16-18 March, 2015.

Dual peak activity/patches in ionospheric irregularities developed after the sudden storm commencement (SSC) and storm peak time and 2-8 times larger than the background is observed from receivers MCM4, CAS1, DAV1 and MAW1. Interestingly, a triple peak activity/patches (the second in between the SSC and storm time) 4-10 times stronger than the background, is reported from receiver SYOG. Single peak activity/patches 2-12 times stronger than the background is also observed during the storm time from receiver ROTH.

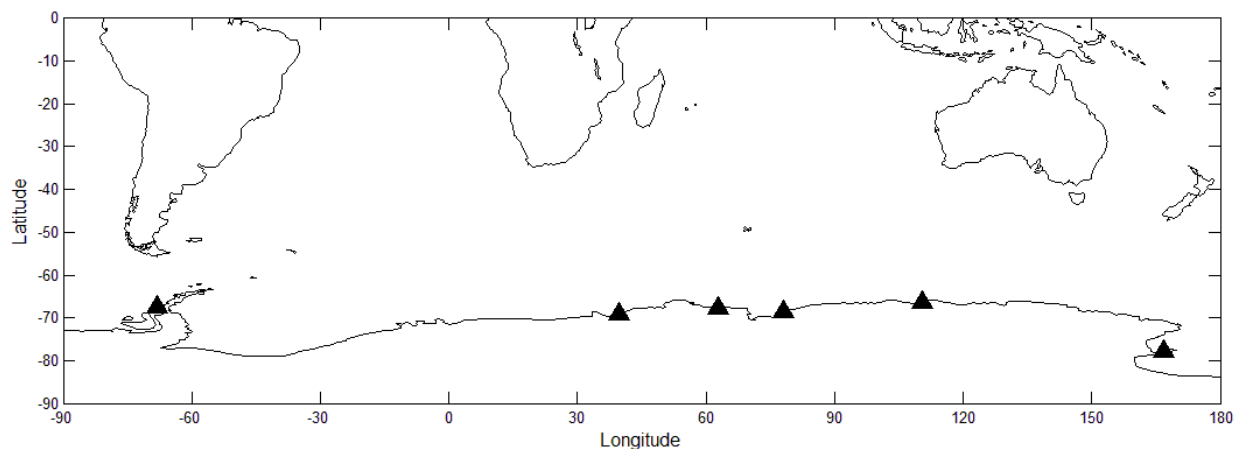


Figure 1. Geographical locations of the IGS GPS receivers McMurdo-MCM4 (-77.83° S, 166.66° E), Casey-CAS1 (-66.28° S, 110.52° E), Davis-DAV1 (-68.58° S, 77.97° E), Mawson-MAW1 (-77.83° S, 166.66° E), East Ongle Island-SYOG Mawson-MAW1 (-67.61° S, 62.87° E) and Rothera-ROTH (-67.57° N, 68.13° E) in the Antarctic Circle.