Scintillations in Southern Europe during the geomagnetic storm of June 2015: analysis of a plasma bubbles spill-over using ground-based data (ALERT project)

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The sensitivity of Global Navigation Satellite Systems (GNSS) receivers to ionospheric disturbances and their constant growth are nowadays resulting in an increased concern of GNSS-users about the impacts of ionospheric disturbances at mid-latitudes. The geomagnetic storm of June 2015 is an example of a rare phenomenon of a spill-over of equatorial plasma bubbles well North from their habitual. We study the occurrence of small- and medium-scale irregularities in the North Atlantic Eastern-Mediterranean mid- and low-latitudinal zone by analysing the behaviour of the amplitude scintillation index S4 and of the rate of total electron content index (ROTI) during such a storm. Large scale perturbations of the ionospheric electron density were studied using ground instruments to characterize a complex perturbation behaviour over the region mentioned above. The multi-source data allows us to characterize the impact of irregularities of different scales to better understand the ionospheric dynamics and stress the importance of a proper monitoring of the ionosphere in the studied region.