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## Ionospheric indices GIX and SIDX for the regional characterization of ionospheric perturbations degree

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The total electron content (TEC) measured along different satellite-receiver links is strongly sensitive to severe spatial gradients and rapid changes in the ionosphere. Therefore, key information on space weather conditions and, in particular, on the perturbation degree of the ionosphere is crucial to assure stable and reliable services using Global Navigation Satellite Systems (GNSS) signals. By using dual-frequency GNSS measurements, the German Aerospace Center has developed the Gradient Ionospheric index (GIX) and the Sudden Ionospheric Disturbance index (SIDX) as proxies capable of estimating spatial and temporal perturbations degree of the ionosphere instantaneously, without the necessity to include historical data in the analysis.

In this talk, we present our advances for characterizing spatial and temporal ionospheric perturbations by utilizing GIX and SIDX in the framework of the Coordinated Ionospheric Study of Scales and Indices (CISSI) initiative, within the scientific activities of the Committee on Space Research (COSPAR). Namely, we report on the outcomes achieved with these approaches when applying them to GNSS datasets acquired over Europe and South America during a stormy and a quiet period of geomagnetic activity in 2015 (Day of Year 75-78 and 142-145, respectively). Moreover, we examine the scientific potential of these ionospheric perturbation indices at different GNSS configurations, latitudinal zones and distance ranges, and discuss their applicability in space weather services.