

Characterization of foF2 anomalies detected by the Rome ionospheric observatory during the last three solar cycles minima

A. Ippolito⁽¹⁾, L. Perrone⁽¹⁾, C. Cesaroni⁽¹⁾

⁽¹⁾ *Istituto Nazionale di geofisica e Vulcanologia, Via di Vigna Murata 605, Rome, ITALY*

A study on the characterization of the foF2 anomalies observed during the last 3 solar cycles minima has been conducted in the framework of LIMADOU-Science project, an Italian Space Agency funded project. Hourly observations of the ionospheric parameter foF2 recorded by the ionospheric station of Rome have been considered, where the corresponding 27-day running median has been computed as background level. Deviations of foF2 $\delta f = (f(\text{hourly}) - f(\text{background}) / f(\text{background}))$, calculated between the hourly values of the ionospheric characteristic and the background, have been then studied. A distinction between moderate and strong foF2 disturbances, both positive and negative, have been made, according to the following criteria (Mikhailov et al., 2012): Moderate Negative $-0.25 \leq \delta f \leq -0.15$; Strong Negative $\delta f < -0.25$; Moderate Positive $0.15 \leq \delta f \leq 0.2$; Strong Positive $\delta f > 0.2$. For each observed foF2 anomaly, a study of the geomagnetic condition has been undertaken, considering the value of the Ap index at the time when the anomaly is detected and for the previous 24 hours. The auroral electrojet index AE has also been investigated, considering 6 hours before the occurrence of the anomaly since TADs, related to upsurges of auroral activity, can reach middle latitudes and consequently perturb the F2 layer. A catalogue of the observed foF2 anomalies is here presented. A number of anomalies is also showed in the details, with an explanation of the physical mechanisms involved.