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Parameters of sporadic E layers during the Weddell Sea Anomaly at different levels of solar activity as deduced from measurements at the *Akademik Vernadsky* station

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Sporadic E layers (Es) are the plasma structures characterized by increased electron concentration or intensive plasma irregularities located at the heights of E region. The occurrence, disappearance and variability of Es are irregular; their behavior is not repeated from day to day. On the other hand, some characteristics of Es such as heights demonstrate good repeatability from day to day and possibly demonstrate the height of wind shear provided by tide waves [1] in the lower thermosphere. Since Es depend on wind structures, it looks interesting to analyze their behavior in the region of Weddell Sea anomaly (WSA) that is increase of foF2, concentration and total electron content around the midnight in the summer appeared as a result of strong impact of thermospheric winds on the main ionospheric plasma characteristics [2]. We are analyzing the Es data accumulated at the Ukrainian Antarctic station *Akademik Vernadsky* (UAS) during 22 years of observations. UAS is located in the heart of WSA (geographical coordinates: 65.25^0 S, 64.27^0 W; CGM: -51^0, 09^0). This paper aims to analyze the heights of Es during the WSA under the different levels of solar activity. As one can see, the heights of Es at the nighttime are bigger under the high solar activity and lower at the low one (Fig. 1). At the daytime the situation is opposite, Es heights are bigger for the quiet Sun (Fig. 1). The explanation of those dynamics could be the next. The horizontal gradients of the pressure and as a result the wind speed in lower thermosphere should increase with growth of solar UV flux. That should lead to decreasing the height of wind shear at the daytime when polar-ward thermospheric winds are prevailed, and to upwelling the wind shear near midnight with equator-ward thermospheric winds. The morphology and causes of this phenomenon will be discussed in detail.

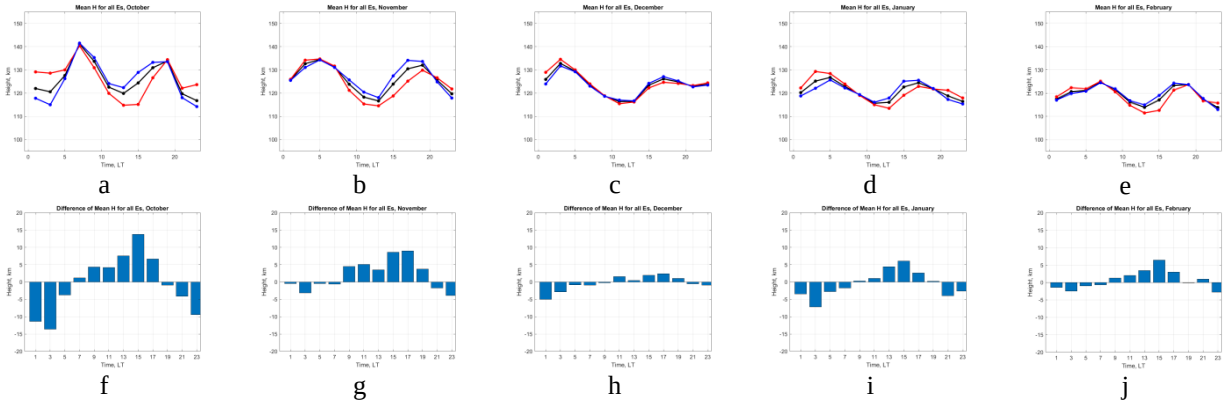

Figure 1. Diurnal variations (in local time) of Es height median values (a-e), black – all data, red – F10.7 > 95, blue – F10.7 < 95. (f-j) Diurnal variations of difference of Es heights under the low (F10.7 < 95) and high (F10.7 > 95) solar ultraviolet flux. (a, f) – October; (b, g) – November; (c, h) – December; (d, i) – January; (e, j) – February.

References

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