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The method of the ionograms interpretation quality estimation using a HF Doppler technique

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Nowadays, the digital ionosonde becomes a routine ground-based ionospheric observation instrument. It measures the real-time electron density profiles of the ionosphere by transmitting HF radio pulses. The original joint campaign of the Digisonde Portbale Sounder (DPS-4) measurements and a new Doppler type system measurement has been run at the Pruhonice ionospheric station since the beginning of 2004. All the equipment of the Doppler system including special software has been developed and constructed in the Institute of Atmospheric Physics, Prague (IAP). The measurement of the Doppler shift is done by means of spectral analysis of acquired data and is carried out continuously on frequency of 3.5945 MHz, so the radio wave is reflected most of the 24 hours. The receiver is located in the IAP and the transmitter of sinusoidal signal is located at the Pruhonice observatory at 7 kilometers distance from receiver. Thus we obtain the Doppler shifted signal nearly vertically reflected, and the ionograms from almost the same location. We eliminate the signal corresponding to the ground wave by digital processing in frequency domain. Additionally, the ground wave provides us the direct verification of the stability of the oscillators and zero drift line. To compare digisonde measurements with the Doppler data we selected 15 geomagneticlly quiet and 2 geomagneticlly disturbed days, when it was possible to select precisely trace of one radio ray on Doppler records. A phase path was calculated from both Doppler and digisonde records. Comparison of the phase paths was carried out by the method of the least squares. Some discrepancy under quiet ionospheric conditions was observed during the daytime. Under stormy condi-

tions the significant disagreement between both measurements has been found also during the evening and nighttime. We suppose that the discrepancies could be related to the uncertainties of the observational inputs and to the interpretation of the digisonde data. The presented method allows us to estimate accuracy of the ionogram interpretation.