New tool forecasting sporadic E layer appearance on the basis on magnetic eta index

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We present new tool developed in SRC PAS used for forecasting sporadic E layer appearance. In the previous work we had shown the correlation between the ionospheric characteristics and magnetic eta index proposed by Ernst & Jankowski (2005). Our previous results show the increase of eta value emerges 1-2 hours before the sporadic E layer appearance. The outcome of this conclusion is the possibility of forecasting of sporadic E layer appearance on the basis on real-time magnetic data, especially nontransparent sporadic E layer. (See for example: Dziak-Jankowska B., Stanislawska I., Ernst T., Tomasik L., Advances in Space Research 48, 2011, 850–856)

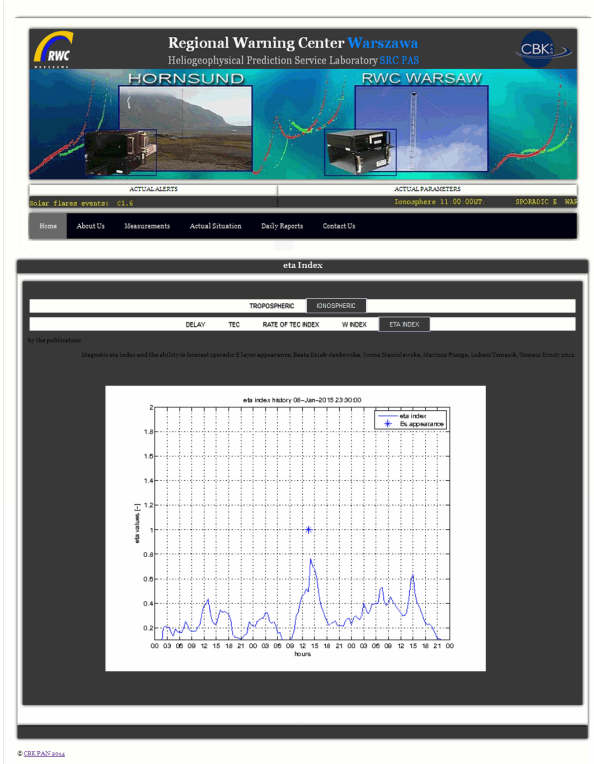
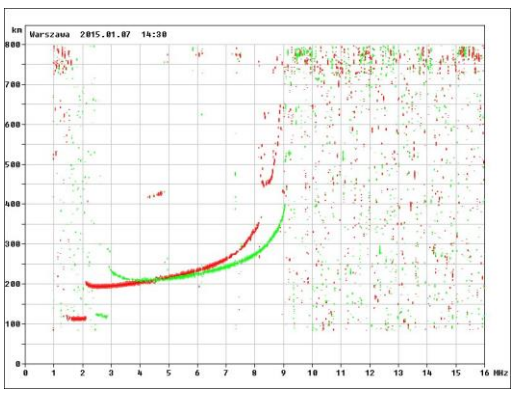


Figure 1 shows the new tool presenting on-line the changes of the eta magnetic index calculated for the local magnetic data from Belsk Magnetic Observatory. The values of eta typical ranged between 0 and 0.1 sometimes exceed 1 or even higher values which means that the changes of the vertical component of magnetic field is larger than the changes of the horizontal magnetic field components. Large gradients of eta give the information about ionospheric drifts. Data presented in this figure shows the changes of the eta index between 6th and 8th of January 2015. The asterisk indicate the significant increase of eta value and the possibility of sporadic E layer appearance.



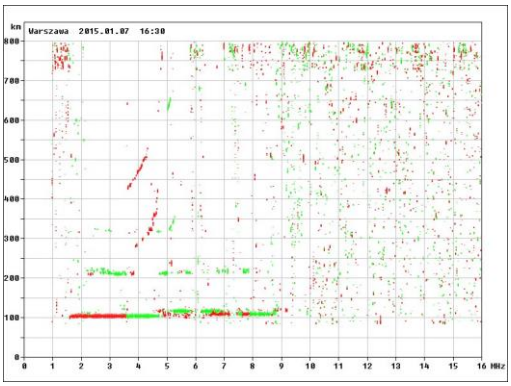


Figure 2 and 3 show the examples of Warsaw ionograms recorded on 7th January 2015 during the largest enhancement of eta index and 2 hours later presenting the appearance of non-transparent sporadic E layer.