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Are historical values of ionospheric parameters from ionosondes overestimated?

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Ionogram-scaled values from pre-digital ionosonde times had been derived from ionograms under the assumption of the vertical reflection of ordinary mode of sounding radio waves. Classical ionosondes were unable to distinguish between the vertical and oblique reflections and in the case of the Es-layer also between the ordinary and extraordinary mode reflections due to mirror-like reflections. However, modern digisondes determine clearly the oblique or extraordinary mode reflections. Evaluating the Pruhonice digisonde ionograms in "classical" and in "correct" way we found for seven summers (2004-2010) that among strong foEs (> 6 MHz) only 10% of foEs values were correct and 90% were artificially enhanced in average by 1 MHz, in extreme cases by more than 3 MHz (some oblique reflections). 34% of all reflections were oblique reflections. With other ionospheric parameters like foF2 or foE the problem is less severe because non-mirror reflection makes delay of the extraordinary mode with respect to the ordinary mode and they are separated on ionograms, and oblique reflections are less frequent than with the patchy Es layer. At high latitudes another problem is caused by the z-mode, which is sometimes difficult to be distinguished from the ordinary mode.