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Mapping the peak height of the ionospheric F2 region on individual occasions

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Regular near-real-time soundings of the ionosphere provide the basis for geographical numerical representations of ionospheric characteristics and of vertical distributions of electron concentration useful for radio-communication assessments. In recent years many techniques have been used to construct instantaneous maps from spatially distributed measurement data and many mapping models have been created. However, different approaches reveal that such results often contain unacceptable discrepancies. We present analyses of the accuracy of the crucial parameter hmF2 in cases where this quantity is determined by empirical expressions in terms of the characteristics foF2, M(3000)F2 and foE.. Comparison of the values obtained by means of spatial mapping of such direct ground-based measurements and those deduced from the 3D representation of electron concentration height profiles is produced. Choosing one mathematical technique for both applications, maps are constructed for the European region. Assuming that for the calculations for selected points authentic data are available, examination of the usefulness of both approaches is displayed. The paper demonstrates the behavior of hmF2 for regional and global quiet and disturbed ionospheric conditions.