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The dynamics and morphology of the Main Ionospheric Trough during storm active periods

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Mid-latitude trough, or Main Ionospheric Trough (MIT) lies on the equatorward edge of the auroral oval and plays a role as a boundary layer between the region of closed and open magnetic field lines. Here the magnetosphere-ionosphere-thermosphere coupling processes can be studied because MIT is controlled by both Earth's magnetic field and the IMF (Interplanetary Magnetic Field).
MIT is well known from its magnetic storm phase dependence. With the storm onset the structure moves to lower latitudes. It narrows and deepens with the increase of the storm. During recovery phase the intensification of the electromagnetic emissions and energetic particle precipitation can be observed within the latitudes of MIT, what may explain the high variability of the trough location and shape in that time.
Analysed magnetic storms have fallen into solar activity minimum, nevertheless causing strong modifications in Earth's plasma environment.