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Progress in Long-Term Trend Investigations in the Ionosphere

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Long-term increase of atmospheric concentration of CO_2 impacts the whole atmosphere including the ionosphere. However, the ionosphere is affected also by long-term changes of geomagnetic and solar activity, by secular change of the Earth's magnetic field, by long-term changes of atmospheric wave activity and related changes in winds, and in its lower part by changes of stratospheric ozone. The ozone trend reversed in the mid-1990s. Geomagnetic activity was increasing almost throughout the last century but now it is low. Secular change of magnetic field ha strong effect in some limited areas, particularly in northern part of South America but in other regions like Europe this effect is quite negligible. The atmospheric wave activity displays regionally different and temporally unstable trends. Therefore we can hardly expect spatially homogeneous and temporally stable trends in the ionosphere. Trends in parameters of ionospheric F2, F1, E and D regions and in TEC will be briefly summarized.