

# Anmeldung eines Themas für eine Masterarbeit

Topic	Variability of Thermospheric Column Density Ratio ( $O/N_2$ )
Date	August 14, 2023
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Short description:	<p>The behavior of the thermosphere-ionosphere (T-I) changes based on the amount of radiation it receives from the Sun and can vary over different periods of time. However, during periods of low solar activity, the T-I region is influenced not only by solar radiation but also by lower atmospheric forcing (e.g., tides, planetary waves and gravity waves) and geomagnetic activity (e.g., Rishbeth and Mendillo, 2001). The column density ratio of atomic oxygen to molecular nitrogen (<math>O/N_2</math>) is a key parameter in detecting changes in the upper atmosphere modified by the abovementioned factors (e.g., Cai et al., 2021; Goel et al., 2023).</p> <p>The study examines the <math>O/N_2</math> fluctuations in the upper atmosphere during the low solar activity period. It identifies the factors contributing to these variations while exploring ionospheric behavior to quiet and disturbed geomagnetic activity using <math>O/N_2</math> data from NASA's Global-scale Observations of the Limb and Disk (GOLD) mission, Ionospheric Connection Explorer (ICON), and Coupled Thermosphere Ionosphere Plasmasphere electrodynamics (CTIPe) model simulations.</p>
Literature:	<p>Rishbeth, H. and Mendillo, M. "Patterns of F2-Layer Variability." <i>Journal of Atmospheric and Solar-Terrestrial Physics</i>, 63, 1661-1680. DOI: 10.1016/S1364-6826(01)00036-0, 2001.</p> <p>Cai et al. "Investigation of a neutral "tongue" observed by GOLD during the geomagnetic storm on May 11, 2019." <i>Journal of Geophysical Research</i>, 126, DOI: 10.1029/2020JA028817, 2021.</p> <p>Goel et al. "On the variation of column density ratio <math>\Sigma O/N_2</math> in the upper atmosphere using principal component analysis in 2-dimensional images." <i>Journal of Geophysical Research</i>, 128, DOI: 10.1029/2022JA031037, 2023.</p>