



Signatures of the lunar semi-diurnal tide in terrestrial airglow emissions as observed with SCIAMACHY/Envisat

Christian von Savigny, Olexandr Lednytskyy, and Georg Teiser

Ernst-Moritz-Arndt University Greifswald, Institute of Physics, Greifswald, Germany (csavigny@physik.uni-greifswald.de)

Many aspects of lunar tidal signatures in the atmosphere are not well understood. Regarding lunar tidal signatures in airglow emissions, the available results generally suffer from lack of statistical significance and are partly contradictory. This talk presents the first - to our best knowledge - statistically significant lunar semi-diurnal tidal signatures in several airglow parameters, i.e. OI green line emission rates, OH(3-1) emission rates, as well as OH emission altitude and atomic oxygen concentrations. Moreover, the established lunar semi-diurnal tidal signatures in mesopause temperature are clearly identified in OH(3-1) temperatures. All data sets were retrieved from SCIAMACHY/Envisat limb-emission measurements on the Earth's nightside. Apart from the presence of statistically significant lunar tidal signatures in the various airglow parameters, a coherent relationship is found between the studied parameters indicating that the observed signatures are largely driven by vertical motions, e.g. tidally driven downwelling leads to downward transport of atomic oxygen and hence enhanced OI green line and OH emission rates, as well as a temperature increase due to adiabatic warming.