

EGU22-880

<https://doi.org/10.5194/egusphere-egu22-880>

EGU General Assembly 2022

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First results from comparison ERA5 and Aeolus measurements: Lidar measurements to Identify Streamers and analyze Atmospheric waves (LISA) (Aeolus+Innovation)

Michal Kozubek¹, Jan Lastovicka¹, Jaroslav Chum¹, Tereza Sindelarova¹, Katerina Podolska¹, Lisa Kuechelbacher², Sabine Wuest², and Michael Bittner²

¹Institute of Atmospheric Physics CAS, Aeronomy, Prague, Czechia (kom@ufa.cas.cz)

²German Aerospace Center, DLR-DFD, OBERPFAFFENHOFEN, Germany ; Institute for Physics, University Augsburg, Germany

For a better understanding of atmospheric dynamics, it is very important to know the general condition (dynamics and chemistry) in the atmosphere. Aeolus wind measurements provide wind measurements from satellite instrument. ERA 5 can produce very detailed information about dynamics without gaps in time series in high resolution (0.25°). Planetary waves (PWs) are global scale waves, which are well-known as main drivers of the large-scale weather patterns in mid-latitudes on time scales from several days up to weeks in the troposphere. When PWs break, they often cut pressure cells off the jet stream. A specific example are so-called streamer events, which occur predominantly in the mid- and high-latitudes of the lower stratosphere. Streamers are characterized by ozone-poor airmasses occurring mainly in the Northern Atlantic / European section and leading to various consequences due to a strong increase of UV radiation. We compare ERA5 reanalysis with Aeolus measurements. This comparison can bring us an answer if we can use ERA5 instead of Aeolus measurements in case of time gaps. We also use homogeneity test for ERA5 time series. Moreover, we also analyze characteristics of gravity waves (GW) in the ionosphere using continuous Doppler sounding and in the troposphere using large aperture array of microbarometers. Similarly, ground based infrasound monitoring is performed. We investigate, if there are any changes of GW or infrasound characteristics related to stratospheric processes, e.g., streamer events.