

# Studying infrasound propagation in the middle atmosphere with ICON and UA-ICON: comparison with the IFS and ground-based remote sensing

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Infrasound signals are used to monitor various anthropogenic and natural sources. To determine accurate source locations and energy, an accurate model of wind and temperature from the surface up to the lower thermosphere is necessary, hence operational NWP products are of great importance for routine infrasound monitoring activities. However, many of these models focus on tropospheric conditions, and the middle atmosphere (MA), where the relevant infrasound waveguides for long-range propagation are found, is not well represented. UA-ICON is an upper atmosphere version of the ICON model that provides modelled atmospheric parameters up to 150 km.

First, to assess ICON and IFS operational analysis products, comparisons to lidar observations are made. The main differences between both products were analysed with respect to winds and temperatures in the MA, and hence with respect to the infrasound guide prediction. Second, UA-ICON simulations were performed to demonstrate the increased wave activity above ~30 km with UA-ICON. The added value of UA-ICON with respect to ICON and IFS products for infrasound propagation simulations is discussed. The comparisons between the remote sensing instrumental results and the models will be presented, as well as comparisons between modelled and measured infrasound propagation for known events such as Hukkakero.

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