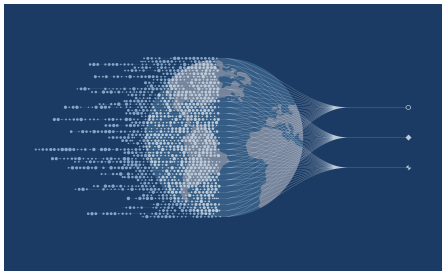

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# infrasound propagation in the middle atmosphere with the upper atmosphere model UA-ICON: parameterization and characterization of gravity waves

Infrasound signals are used to monitor various anthropogenic and natural sources. To determine precise 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 and upper atmosphere, where the relevant infrasound waveguides for long range propagation are found, is not well represented. UA-ICON is an upper atmosphere version of the ICOsahedral non-hydrostatic weather and climate model (ICON) that provides modelled atmospheric parameters up to the lower thermosphere. In addition, small scale perturbations, most notably gravity waves, have a large impact on both background wind and temperature patterns through energy deposition and drag, hence indirectly on infrasound propagation. They also directly impact infrasound by forming small scale atmospheric heterogeneities causing partial reflections of acoustic waves. Therefore, the 3-D version of the transient Multi-Scale Gravity Wave Model (MSGWaM) was used within UA-ICON to produce realistic background conditions, and predict global gravity wave activity. We will present the methodology used to generate the wind and temperature gravity wave perturbation profiles, and analysis of infrasound propagation using these gravity wave realizations.

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