Small-scale wavelike structures in the Alpine Region observed in OH-Airglow - Comparison of measurements at Oberpfaffenhofen, Germany and Sonnblick, Austria

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The OH-airglow layer in about 87 km altitude is well-suited for the investigation of atmospheric dynamics, allowing continuous observations of the night-sky throughout the year. Especially, atmospheric gravity waves are prominent features in the data of airglow imaging systems.

Our system FAIM 1 (Fast Airglow IMager 1) focusses on small-scale wave-like structures in the range of 1 km to 30 km with a spatial resolution of about 200m at mesopause heights and a FOV of about $20°$ to $25°$. Covering the brightest OH vibrational bands between 1.0 μm and 1.7 μm, a temporal resolution of 2 frames per second is acquired. The instrumental setup is designed to cover small-scale gravity waves as well as larger scale instability structures.

The instrument FAIM 1 is operational since 2014 as part of the Virtual Alpine Observatory program (VAO). For the first 1.5 years it was placed at Oberpfaffenhofen, Germany, afterwards it has been set-up at Sonnblick Observatory, Austria. This currently provides about 3 years of data at two sites. The two-dimensional FFT is used for the extraction of horizontal wavelengths and propagation directions from the images. Additionally, a new approach based on the so-called structure tensor is tested in order to overcome the disadvantages of the FFT. For both stations, the dominating horizontal wavelengths and propagation directions are retrieved; the similarities and differences are presented and discussed.