A LARGE APERTURE INFRASOUND ARRAY FOR INTERFEROMETRIC STUDIES

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The installation of the 'Large Aperture Infrasound Array' (LAIA) made a big progress the last months. LAIA is being installed by the Royal Netherlands Meteorological Institute (KNMI) in the framework of the radio-astronomical 'Low Frequency Array' (LOFAR) initiative. LAIA will consist of thirty microbarometers with an aperture of around 100 km. The in-house developed microbarometers are able to measure infrasound up to a period of 1000 seconds, which is in the acoustic-gravity wave regime.

The propagation of the infrasound depends on the temperature and the wind in the atmosphere. If one would like to isolate the influence of the atmosphere on the measured infrasound usually knowledge about the source is needed. One possibility to separate the influence of the atmosphere without knowing the source in detail is to use interferometry. The time lag between two microbarometers can be determined by crosscorrelating the ambient noise as measured by the microbarometers. Combining these lags with the distances between the microbarometers enables us to estimate a velocity model and consequently the parameters of the model of the atmosphere.

In this paper LAIA will be introduced and the simulation of a model of the atmosphere will be described. As a result the barograms of arbitrary distributed microbrarometers are obtained. The barograms take into account the travel time of the raypath, the attenuation of the different atmospheric layers, the spreading of the rays and the influence of caustics. The interferometry will be applied to the data obtained from this model and later to measured data of LAIA. This will enable the evaluation of atmospheric models. The results will directly be applicable to the verification of the 'Comprehensive Nuclear-Test-Ban Treaty' (CTBT), where uncertainties in the atmospheric propagation of infrasound play a dominant role.