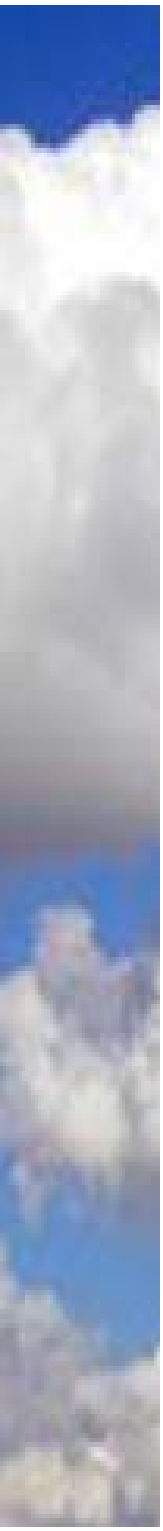
# MSc Thesis in Remote Sensing of the Atmosphere

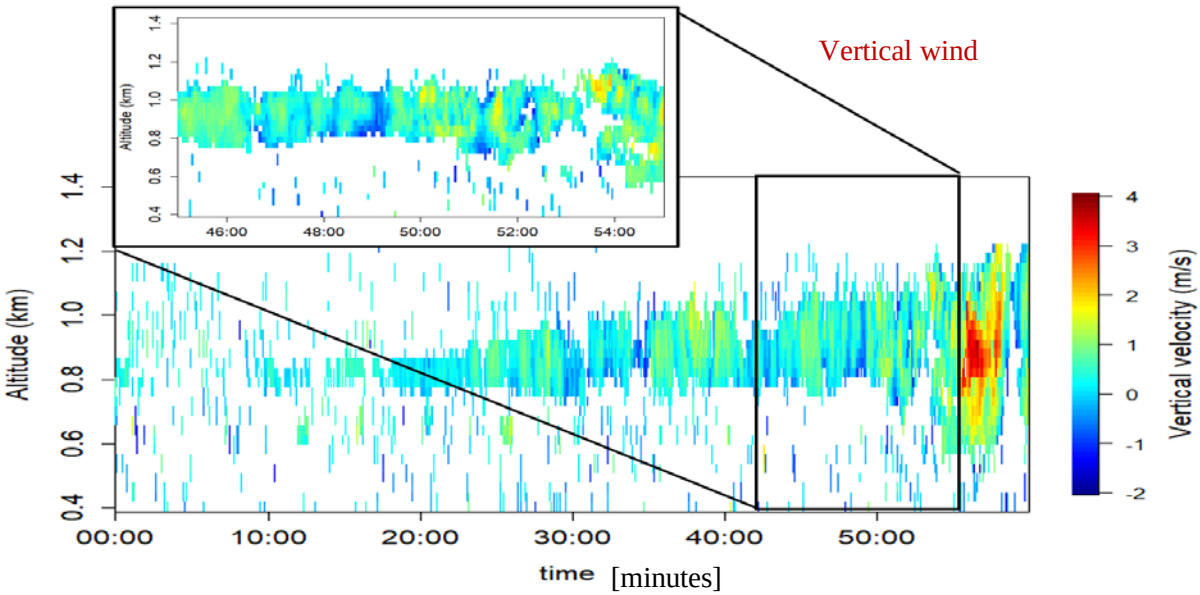
# Unravelling liquid water clouds



The formation process of clouds is governed by many (micro)physical processes and dependent on several variables like: temperature, pressure, supersaturation and aerosol concentration. Aerosols are essential in cloud formation because they are the foundation of droplets. Therefore the size distribution of aerosols and liquid water cloud droplets within a defined air volume can give us important information about the physical and chemical cloud properties and formation processes. Especially continuous and vertical air profiles can offer insights into the development of a cloud from ground to upper troposphere. Cloud radars offer such measurements.

This project focusses on the use of mm-wavelength radar to examine non-precipitating liquid water cloud droplets specifically. The aim is to obtain vertical profiles of vertical wind and liquid water cloud droplet size distribution at high time and spatial resolution. For this purpose, investigation of Doppler power spectra, which are the radar measured reflection versus fall velocity (or cloud droplet diameter), may lead to these two crucial dynamical parameter and size distribution.

A new cloud radar of Ruisdael Observatory locates in a meteorological site at the interface sea-land where in-situ measurements of aerosols are conducted. Using a microwave radiometer, profiles of thermodynamic variables are also available. When these retrieval procedures are created and validated, this offers the possibility to start a long-term study of the aerosol-cloud interaction with marine and land aerosols.




For the interested student, this topic provides a great experience in data analysis, research and methodology development, which can be applicable to other instruments and media. The societal impact, creating retrievals of physical quantities for studying and monitoring cloud formation process in the context of a warming climate, is large.

## Contact information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