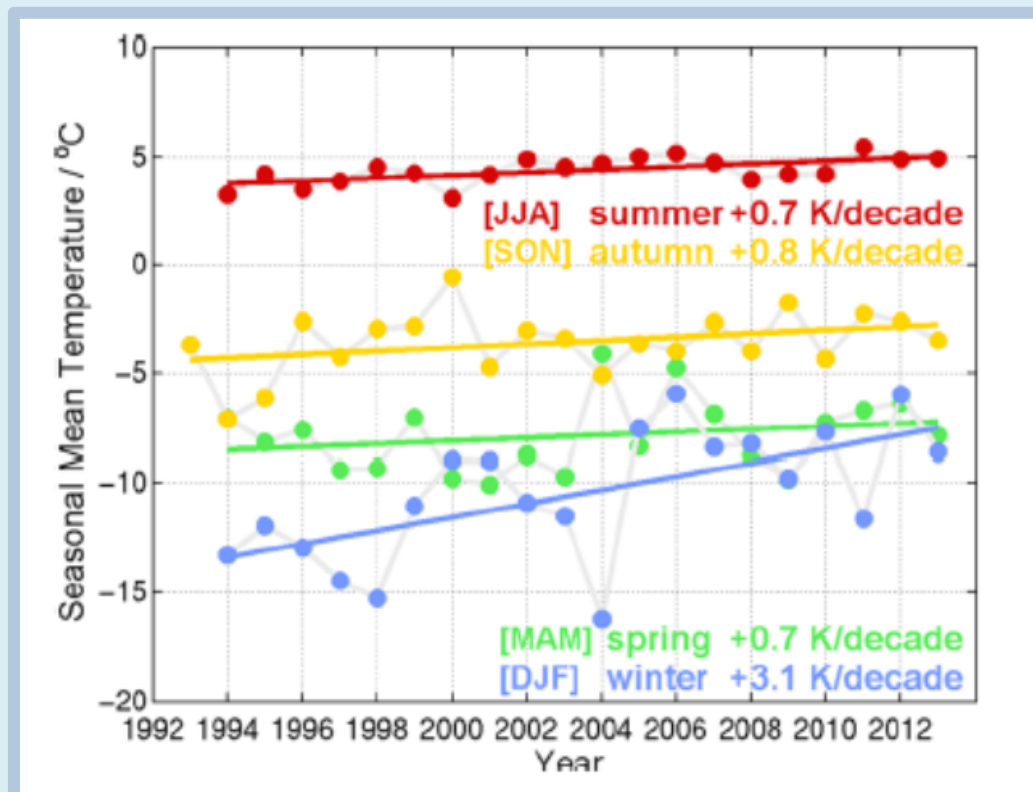


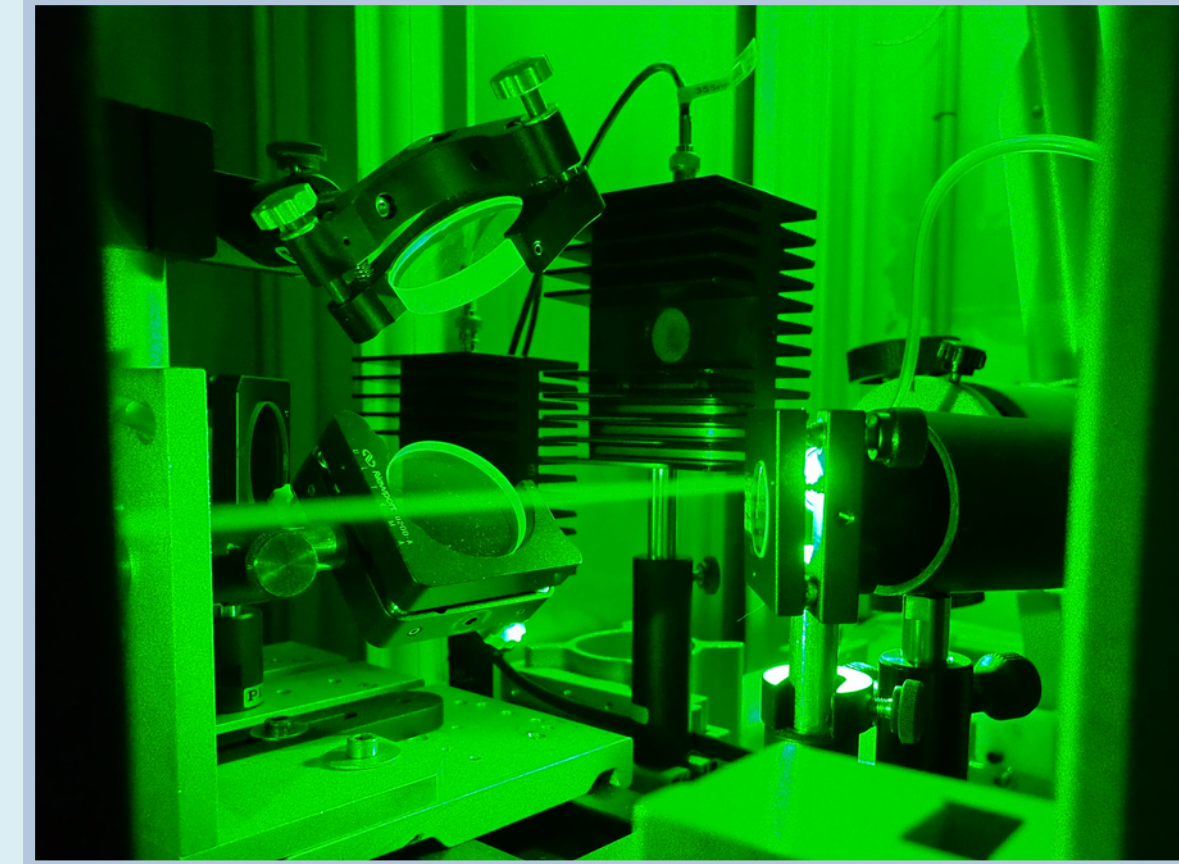
Aerosol Observations in Ny-Ålesund

Research Site: Ny-Ålesund

Ny-Ålesund, located at the northwestern coast of Svalbard, is a super-sight for environmental research in the European Arctic. Passive and active remote sensing are used by AWI to understand the role and impact of aerosols to water vapor. The region of Svalbard / Barents Sea plays a key role in regards to climate change. Long-term data already show temperature increases of more than 3K per decade especially during winter times.

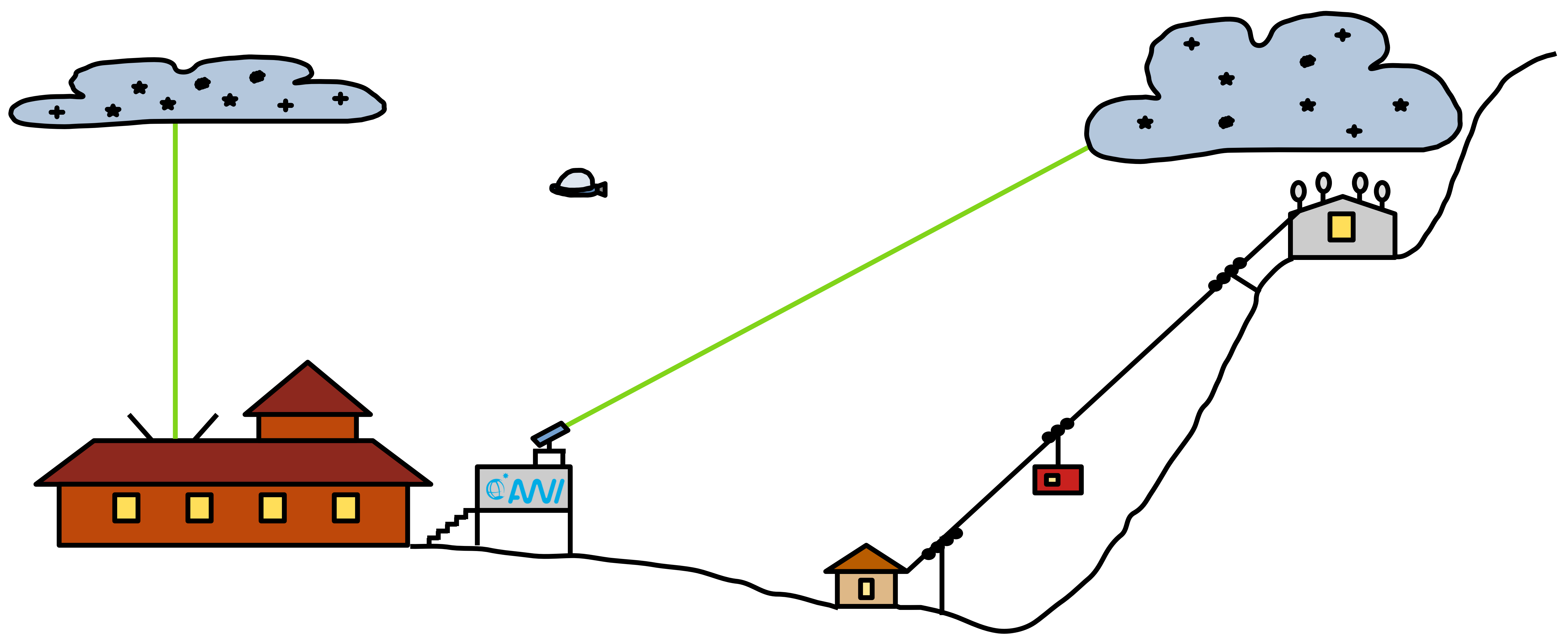


Koldewey Aerosol Raman Lidar



KARL is not only used for tropospheric applications but can also observe layers in the stratosphere. The laser beam can only point into zenith.

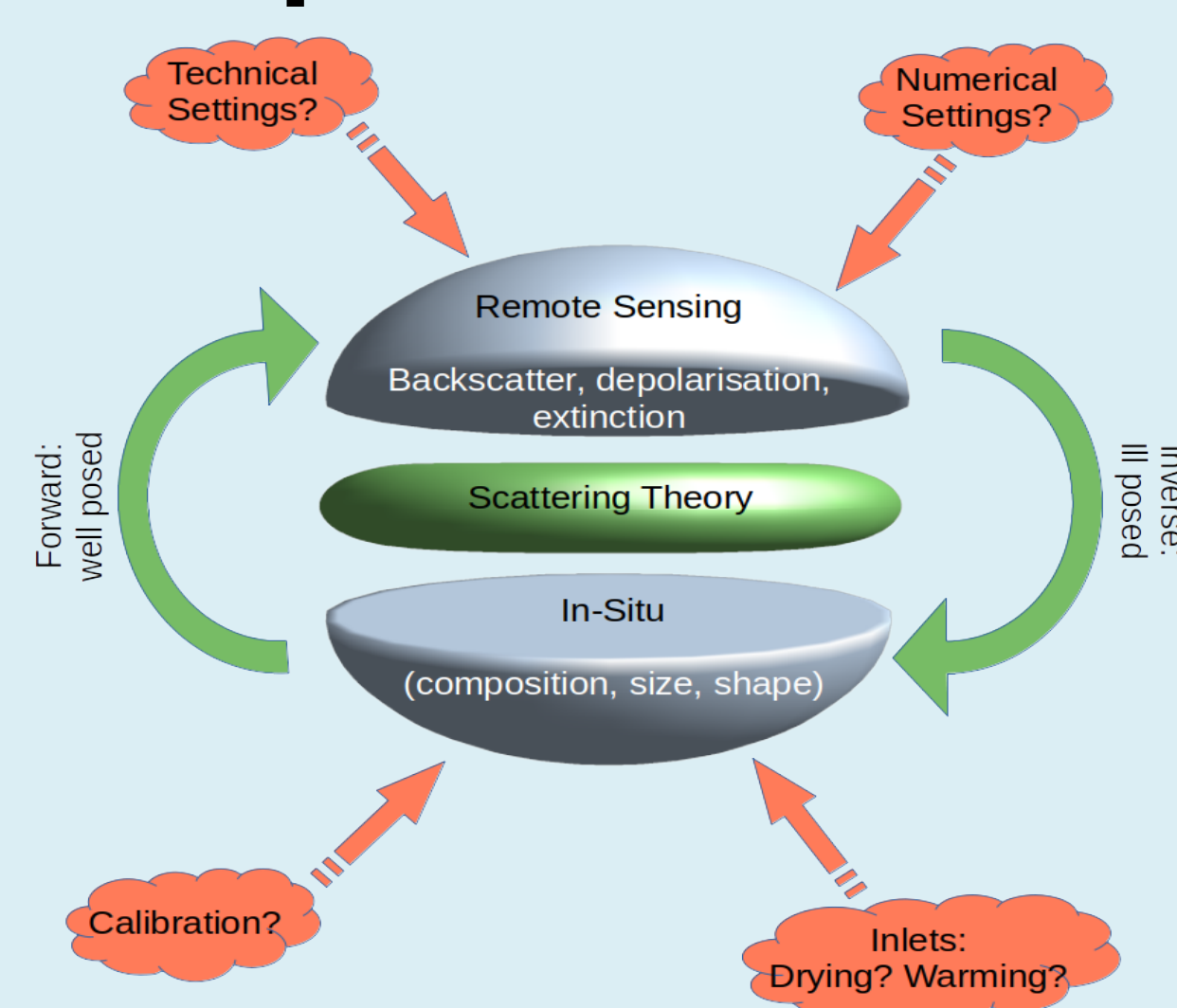
Lidar KARL measures in different wave-lengths (355nm, 532nm, 1064nm) back-scattering, depolarization and extinction of aerosols, but also the mixing ratio of H₂O with its 10cm thick laser beam.



Aerosol Closure Experiment

The comparison between in-situ observations and remote sensing in regards of aerosols a big challenge. Both measurement techniques determine only a selected number of physical properties. The unknown information about their properties are gained by so-called closure experiments by scattering theories.

Only if there was a scattering theory for arbitrarily shaped particles, both instrument types would measure the same. Therefore it is absolutely necessary to extend the measurement setup in Ny-Ålesund with high quality data of remote sensing. The research site will get a new Lidar with the possibility of tilting its laser beam. This makes it possible to simultaneously measure the same air parcel by in-situ and remote sensing instruments but also extend the observations by observing the interactions of aerosols and clouds.



Photometer

Aerosol Optical Depth (AOD) is continuously measured in Ny-Ålesund by Sun Photometers, during polar night by Star and Moon Photometers. Their measurement range is between 362nm to 1089nm in up to 17 filters with a temporal resolution of 1min (summer) and 5min (winter). During the «Arctic Haze» season in spring a significant higher AOD can be found (Graßl and Ritter, 2019). Additionally aerosol emitted by forest fires or volcanoes from many parts of the world can be observed by Lidar and Photometer in Ny-Ålesund.

