



Project acronym: LowTropVRS

Project title: Studies of the lower troposphere at Villum Research Station

Project leader: Jakob Abermann, Graz University, Austria

Discipline: Earth Sciences & Environment: Global change & Climate observation

Station(s): Villum Research Station (VRS) (Greenland/Denmark)

Arctic inversion layers are characteristic for the lower troposphere. They manifest in a temperature increase with height that evokes stability for the air below. This stable layer has multiple consequences for the environment. While vertical gradients of flora and fauna are impacted by them, they also have a direct consequence on physical characteristics such as cloud formation, permafrost thaw depths or snow cover. Inversions impede atmospheric mixing which in turn is relevant for the distribution of pollutants or aerosols. The depth and strength of the inversion layer varies in space and time. Generally, the strength increases with latitude and it is stronger in winter than in summer. However, the picture is more complex and depends largely on surface property, synoptic conditions and local topography. Measuring inversion depths and strength is locally restricted to radiosondes or passive microwave technology. With this project we propose to measure atmospheric inversions at high temporal resolution at Villum Research Station (VRS) in Northeast Greenland during summer 2022 using UAV-based atmospheric measurements. At VRS we can complement the existing atmospheric focus and test the local spatial variability depending on surface type and topography. The dataset will build the basis for parameterizations of spatial inversion upscaling efforts.