



ESA-JAXA Pre-Launch EarthCARE Science and Validation Workshop

13 – 17 November 2023 | ESA-ESRIN, Frascati (Rome), Italy

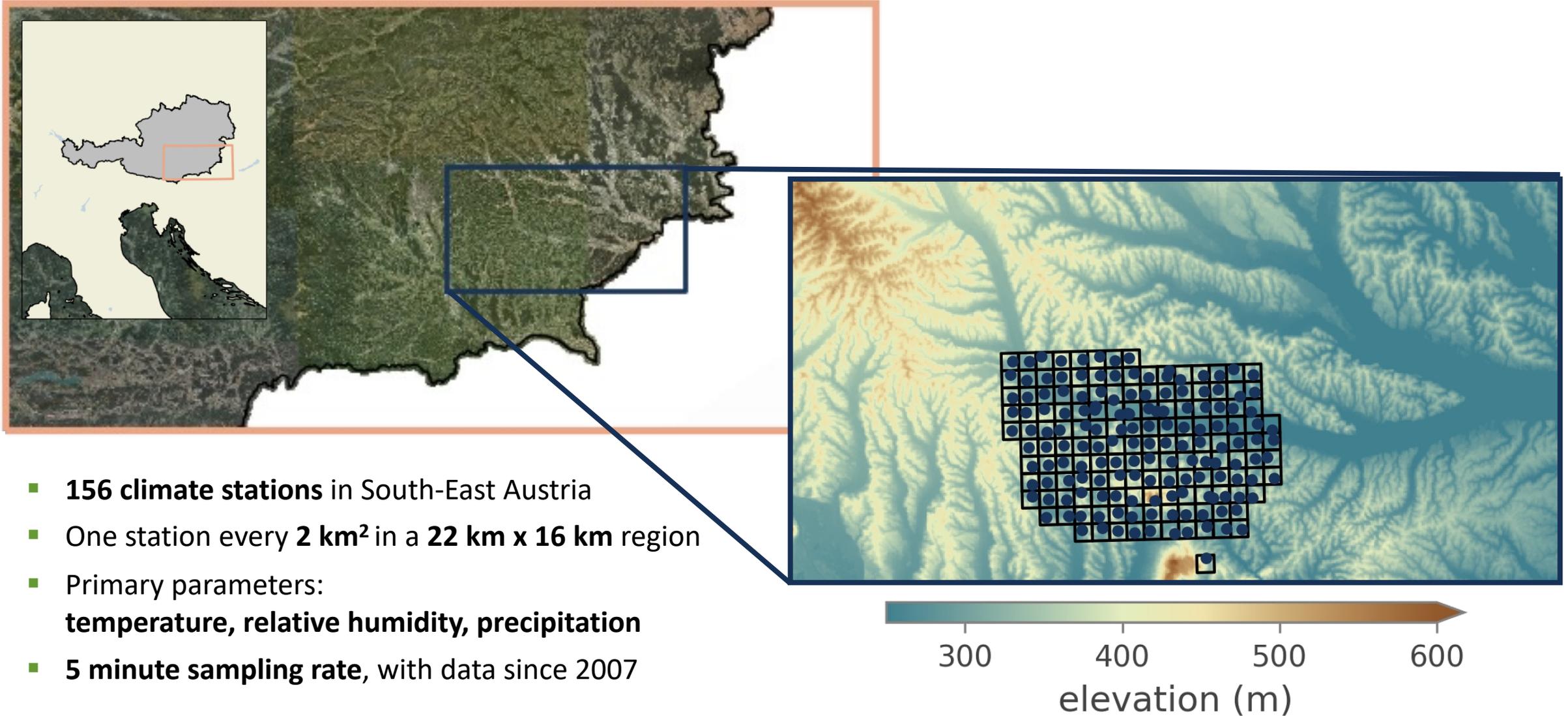
EVID34: WEGN4CARE: The WegenerNet 3D Open-Air Laboratory for Climate Change Research and its Potential for the Validation of EarthCARE Cloud and Precipitation Products

*Andreas Kvas¹ (Co-I), Jürgen Fuchsberger¹ (Co-I), Ulrich Foelsche^{2,1} (Co-I),
Gottfried Kirchengast^{1,2} (PI), Robert Galovic¹, Daniel Scheidl¹, and Christoph Bichler^{1,2}.*

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WegenerNet 3D Open-Air Laboratory



WegenerNet 3D Open-Air Laboratory



- The WegenerNet 3D Open-Air Laboratory extends this climate station network with **atmospheric sounding capabilities**
- Sensors complement the existing 2D ground station infrastructure and offer rich synergies

X-Band Precipitation Radar



GNSS Water Vapor Sounding Network GNSS-StarNet



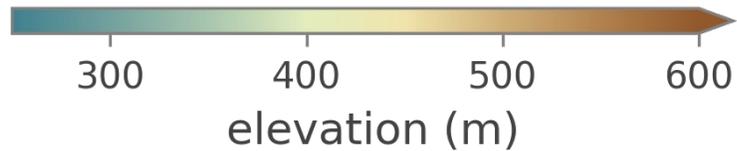
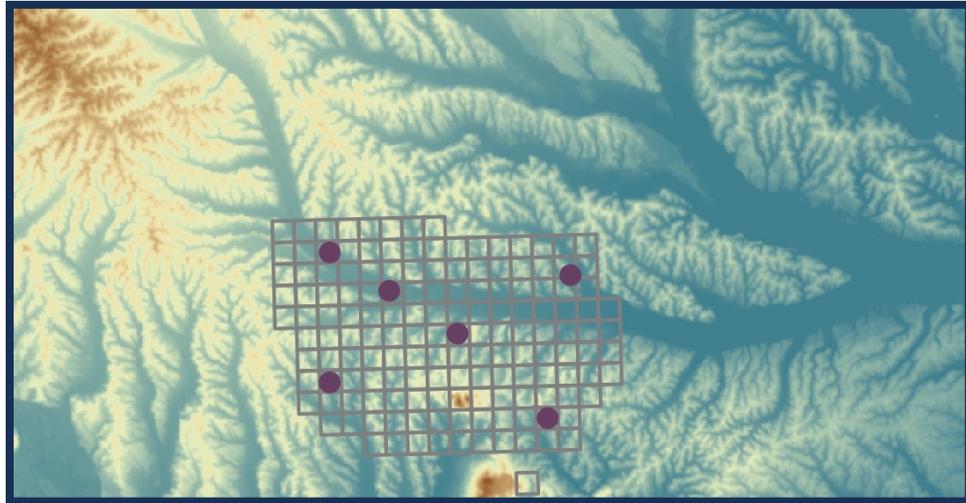
Infrared Cloud Structure Radiometer



Microwave Tropospheric Profiling Radiometer



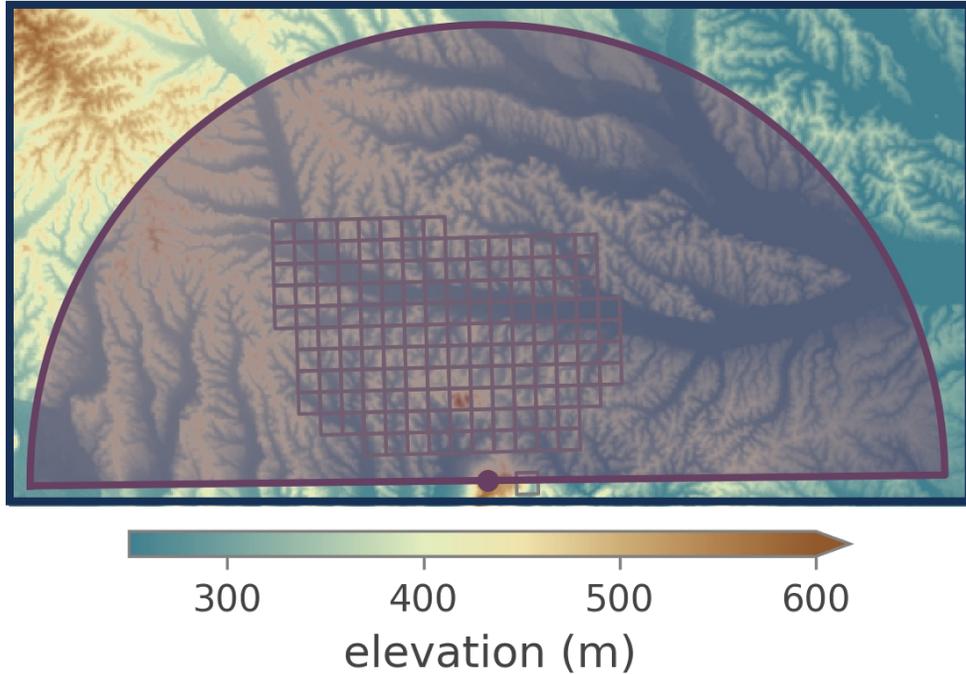
- 3D Instrumentation **operational in current configuration since 2021-05**



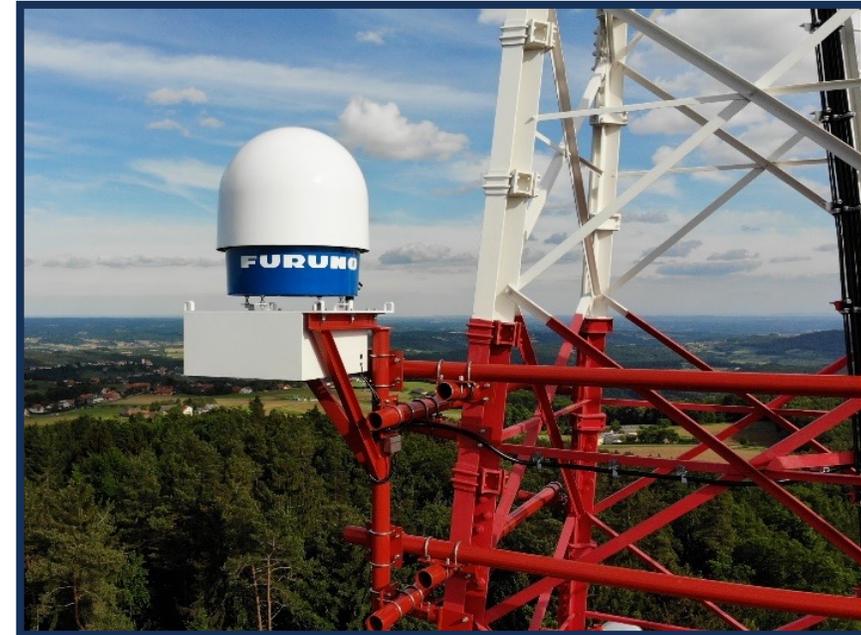
- **6 multi-GNSS receivers** in (nested) star configuration
- Primary parameters: **tropospheric path delay in slant and zenith direction, integrated water vapor (IWV), tropospheric gradients**

Six-station GNSS-StarNet tracking data processed by GFZ German Research Centre for Geosciences

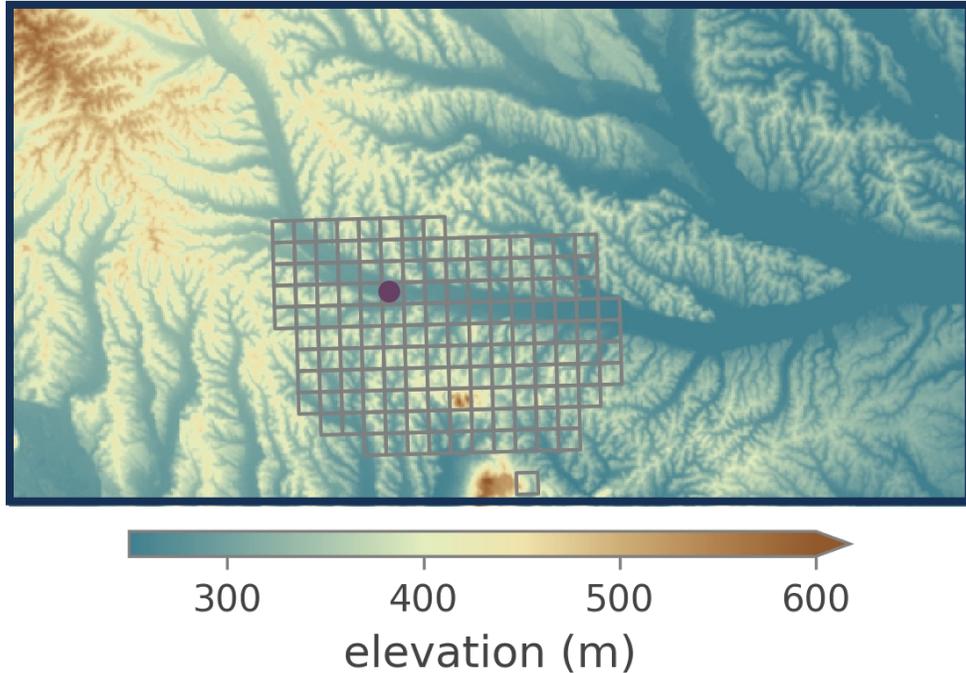




FURUNO WR2120 X-Band Precipitation Radar



- X-Band dual-polarization weather radar, focus precipitation
- Primary parameters: **precipitation rate, attenuation-corrected reflectivity, hydrometeor and precipitation type**
- **2.5 minute sampling** for full volume scan (3D field)



RPG HATPRO G5 **Microwave Tropospheric Profiling Radiometer**



NubiScope **Infrared Cloud Structure Radiometer**



- **Temperature and humidity profiles** up to 10 km
- All-sky maps and zenith-direction measurements of **liquid water path, integrated water vapor, tropospheric path delay**
- **10 minute sampling** for profiles and all-sky maps

- Full all-sky map of infrared brightness temperature every **10 minutes**
- Combined with temperature profiles to determine **3D cloud structure** maps at several cloud levels

Primary Output Parameters



Water Vapor

Integrated Water Vapor (IWV)

Tropospheric Path Delay

Tropospheric Gradients

Clouds

3D Cloud Structure

Liquid Water Path (LWP)

Liquid Water Content
Maximum (LWCM)

Precipitation

Precipitation Amount

Convection Classification

Hydrometeor Type

Atmospheric Properties

Tropospheric Profiles

Boundary Layer Depth

Atmospheric Stability Indices

Primary output parameters target EarthCARE
cloud and precipitation products (partially):

L2a: C-TC, A-TC, M-CM, M-COP, C-CLD, C-RAS

L2b: ACM-CAP, ACM-COM, AC(M)-RAS



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