

Ioanna Tsikoudi<sup>1</sup>, Eleni Marinou<sup>1</sup>, Lukas Pfeitzenmaier<sup>2</sup>, Shannon Mason<sup>3</sup>, Dimitra Karkani<sup>1</sup>, Andreas Karipis<sup>1</sup>, Kalliopi Artemis Voudouri<sup>1,4</sup>, Alexandra Tsekeri<sup>1</sup>, Ewan O'Connor<sup>5</sup>, Pavlos Kollias<sup>6</sup>, Bernat Puigdomenech Treserras<sup>7</sup>, Alessandro Battaglia<sup>8</sup> and Vassilis Amiridis<sup>1</sup>

<sup>1</sup> Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing, National Observatory of Athens, Athens, Greece

<sup>2</sup> Deutsches Zentrum für Luft- und Raumfahrt (DLR), Oberpfaffenhofen, Germany

<sup>3</sup> European Centre for Medium-Range Weather Forecasts (ECMWF), Reading, UK

<sup>4</sup> Aristotle University of Thessaloniki (AUTH), Thessaloniki, Greece

<sup>5</sup> Finnish Meteorological Institute (FMI), Helsinki, Finland

<sup>6</sup> Stony Brook University, Stony Brook, NY, USA

<sup>7</sup> Department of Atmospheric and Oceanic Sciences, McGill University, Montréal, Canada

<sup>8</sup> Consiglio Nazionale delle Ricerche – Istituto di Metodologie per l'Analisi Ambientale (CNR-IMAA), Italy

Contact:  
jtsik@noa.gr

## OVERVIEW - METHODOLOGY

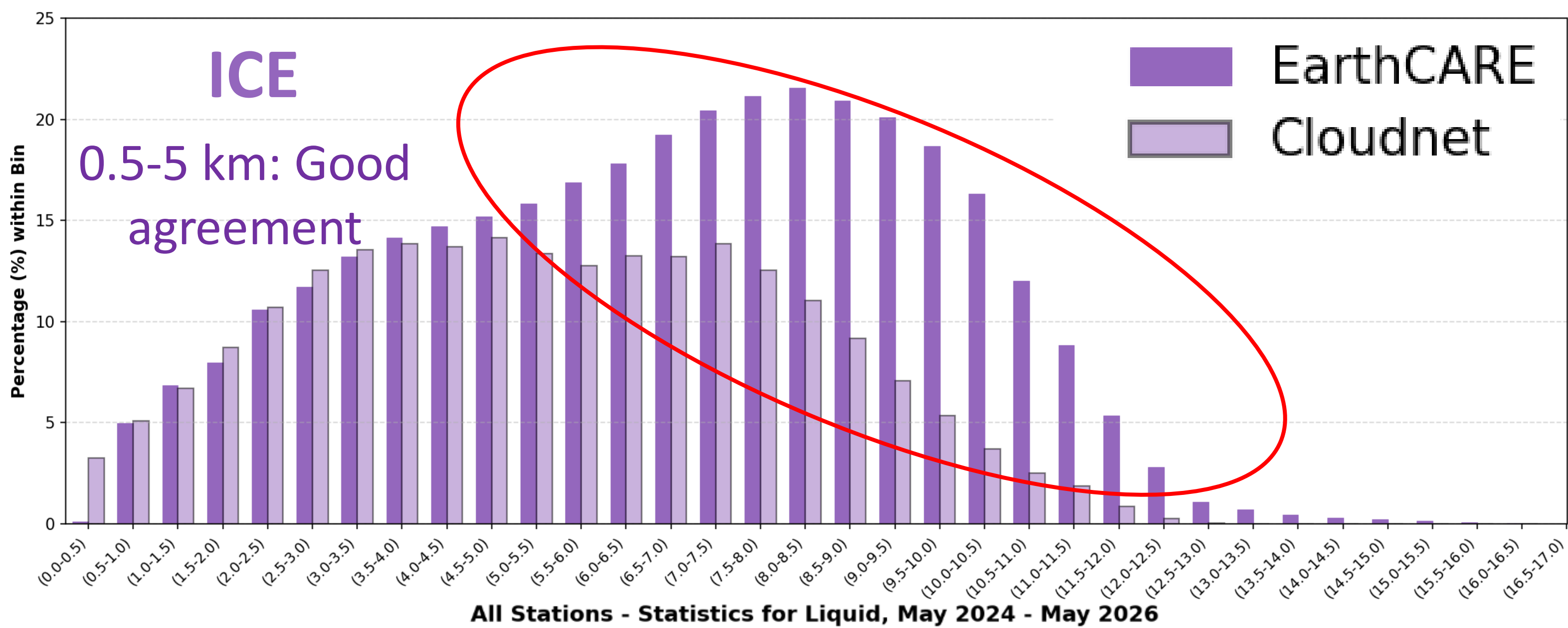
### AC-TC, ACM-COM Baseline BA, BC vs Cloudnet

- 21 Cloudnet Stations, May 2024 – May 2026
- 1114 collocated cases:
  - ± 5 minutes around overpass time
  - <50 km radius around site

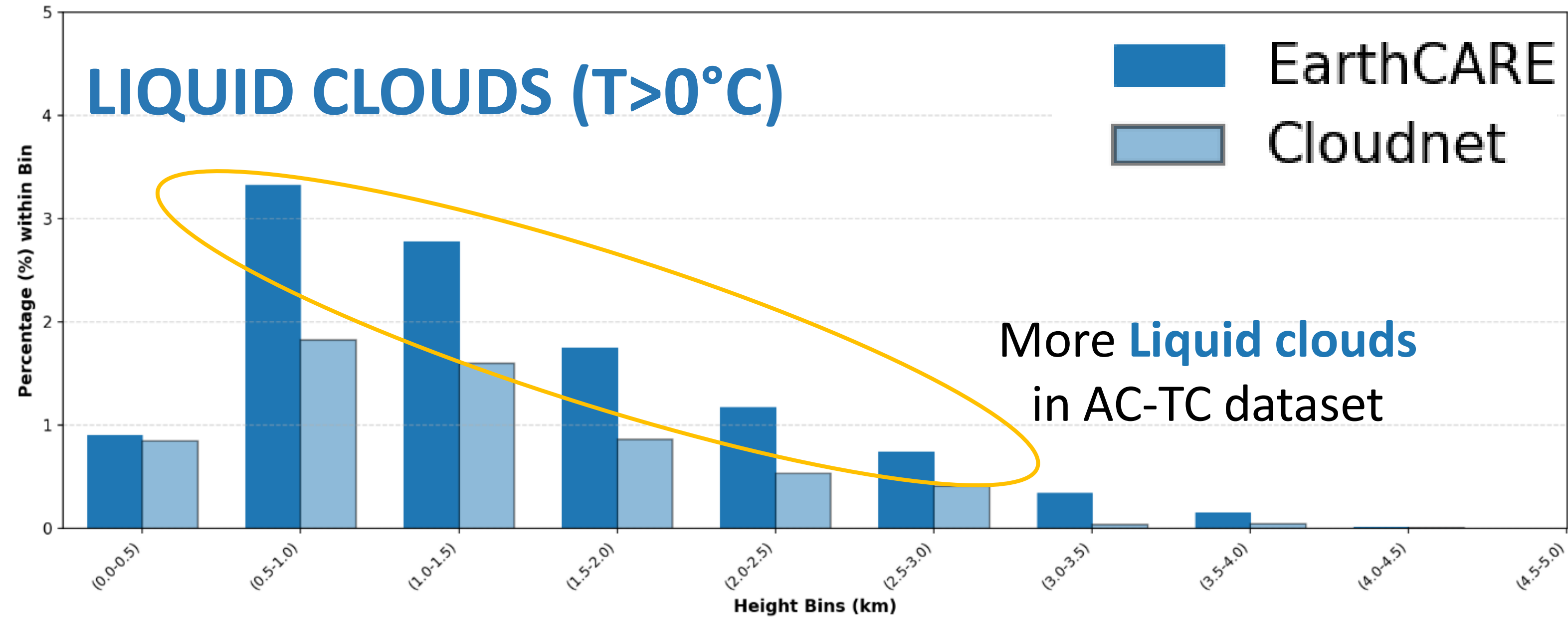
- combined classification
- case-by-case comparison - homogeneous cases

## 2 YEARS STATISTICS – Typing (AC-TC)

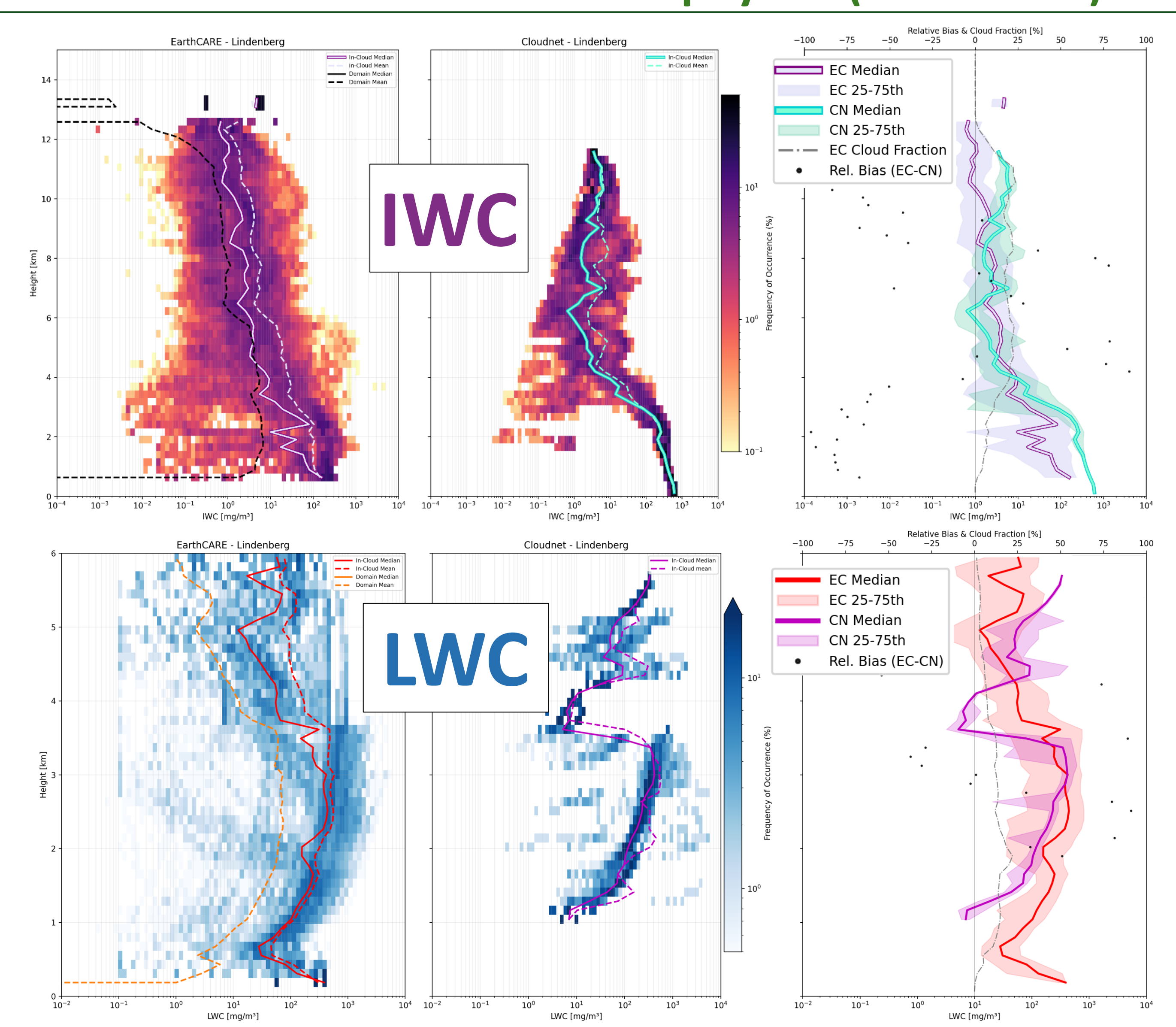
All Stations - Statistics for Ice, May 2024 - May 2026



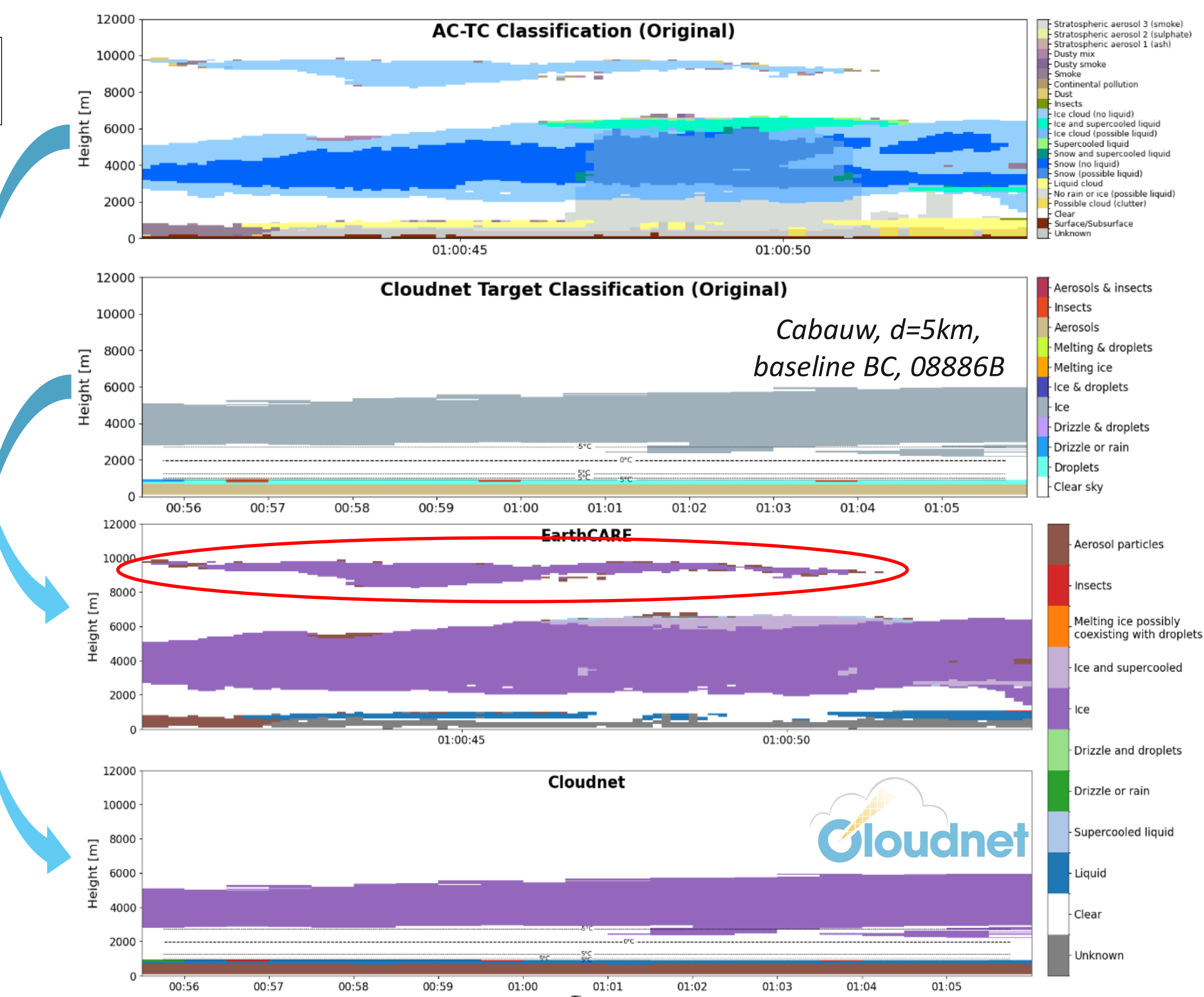
All Stations - Statistics for Liquid, May 2024 - May 2026



## 2 YEARS STATISTICS – Microphysics (ACM-COM)



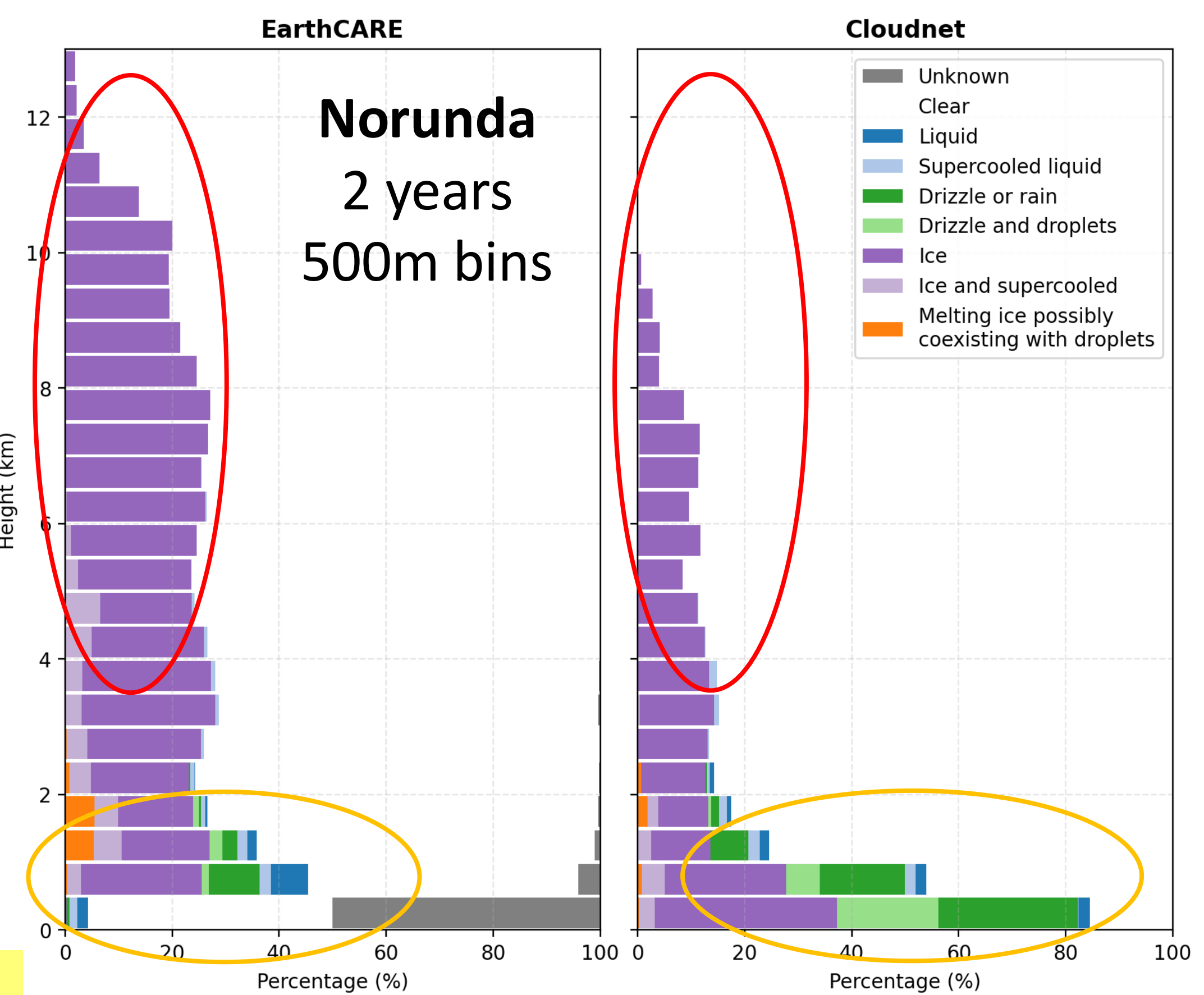
- Bulk comparison (CFADs) of all collocated cases shows consistent agreement for both **IWC** and **LWC**.
- Differences in the 0-2 km range are expected due to EarthCARE attenuation/clutter



Above 5km: more ice clouds in AC-TC dataset

possible misclassification of Drizzle/rain as liquid in AC-TC

See also T323 Marinou et al.



## Obs3RvE

- This is the first step for validating the Obs3RvE 3D cloud products with cloudnet observations.
- For this validation we will focus on the area with the best agreement between Cloudnet + Earthcare ice scenes which is 3-5km. Validation of Observe 3D cloud scenes will also be held with ORCESTRAS PERCUSION airborne observations.
- More info about Obs3RvE:
  - Girtsou et al., Mon 16:54, T130 "Machine Learning Retrieval of Near-Real-Time 3D EarthCARE Scenes from MTG-FCI Observations"
  - Karkani et al., Tue, Fri, P098 "Reconstructing the "unknown" features in AC-TC, utilizing an ML-based approach"
  - Kouklaki et al., Wed 11:54, T313 "Quantifying 3D radiative transfer effects of clouds using ML-generated 3D cloud scenes for EarthCARE, and airborne observations from ORCESTRAS/PERCUSION campaign"

**Acknowledgments:** This work has been financially supported by the European Space Agency, within the framework of the Obs3RvE project (Optimising 3D RT Earthcare product using geostationary observations and AI), with Contract No. 4000147848/25/1/AG and by the EarthCARE DISC project, funded by the European Space Agency under Contract No. 4000144997/24/1-NS.

