

BAIVEC project: Validation of Atlid products using in situ aerosol and cloud measurements performed by instruments under weather balloons

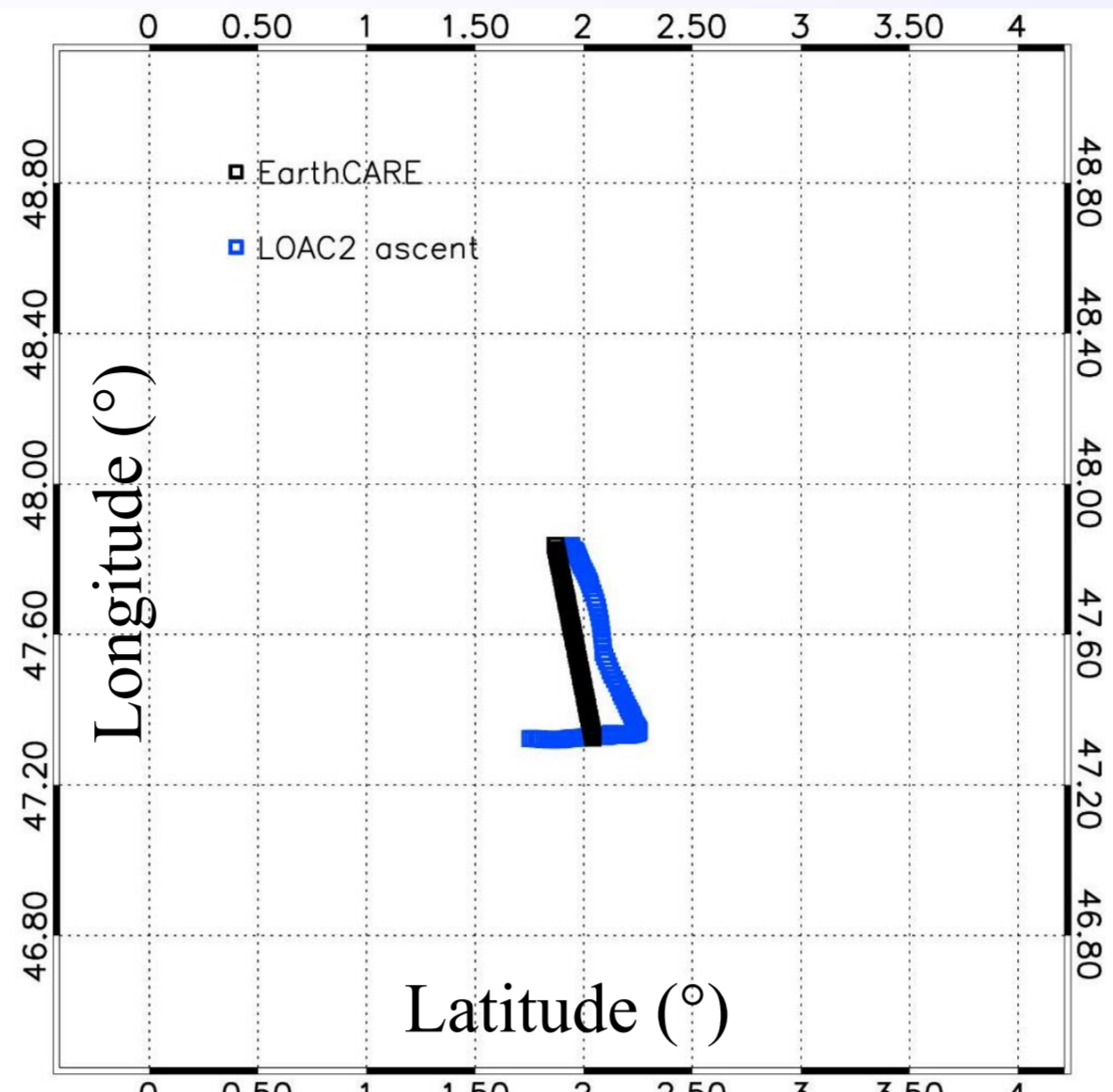
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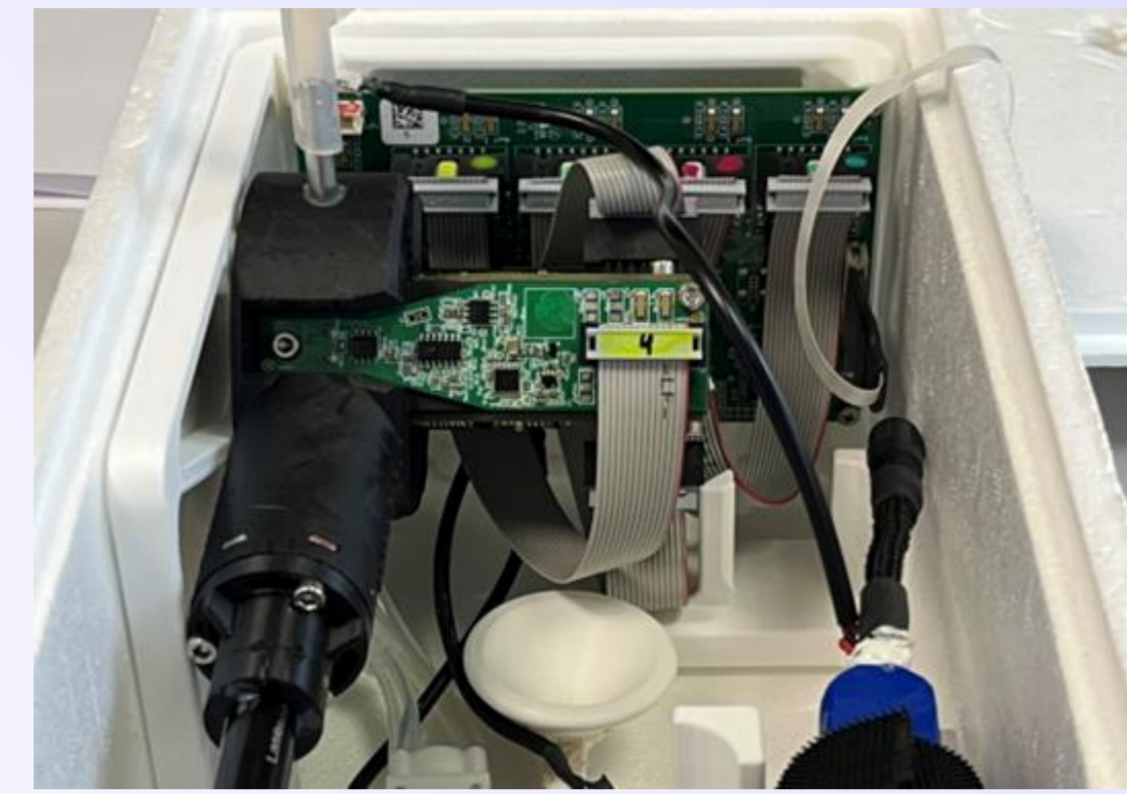
- Validation of Atlid/EarthCARE extinction and backscatter profiles using the LOAC2 aerosol counter carried by weather balloons, flights mainly from France.
- Good temporal and spatial coincidences (typically < 100 km and < 2 hours).



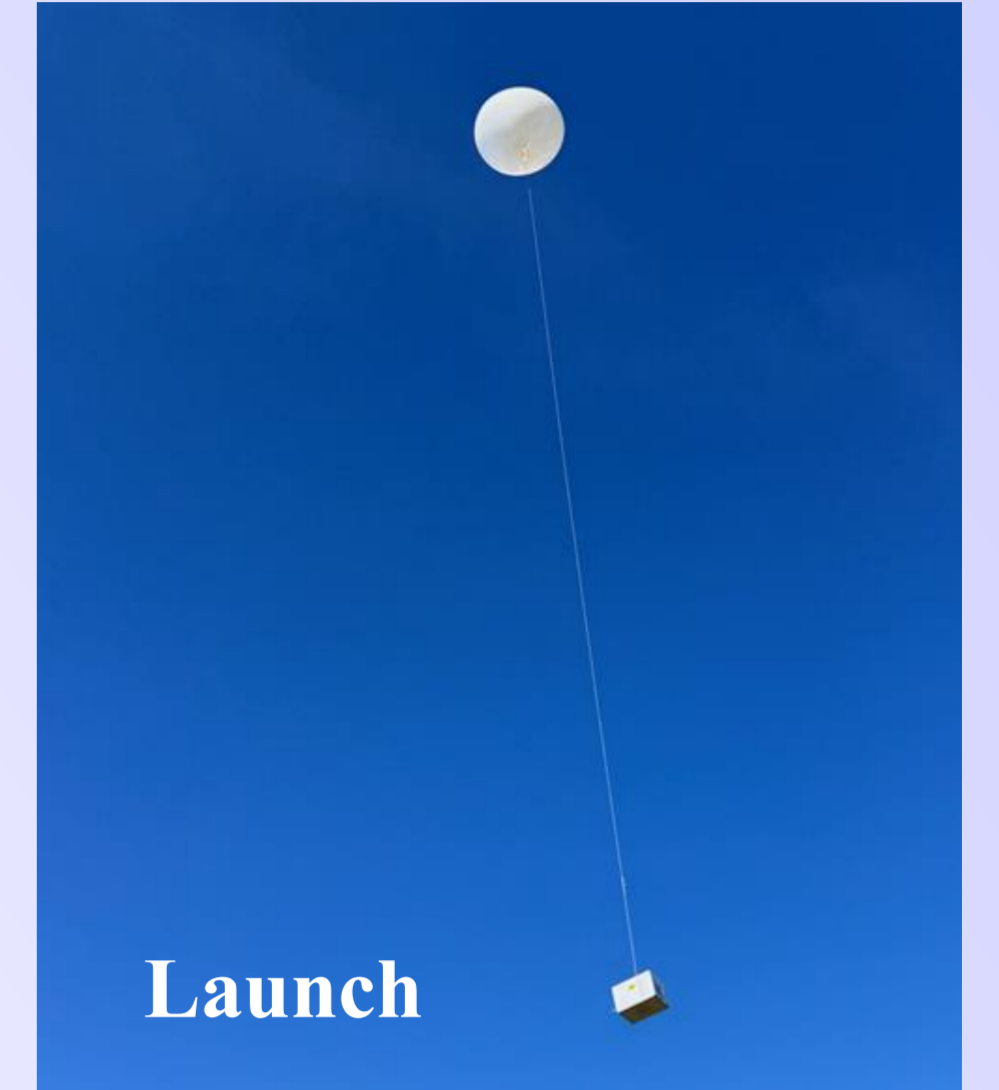
Example of a good coincidence: 29 July 2025



- LOAC2 determines the aerosol concentrations for 19 size classes ranging from 0.15 to 50 μm , and the typology of the particles.
- Measurements can be converted into extinction at 355 nm (lower limit), using measurements at 4 scattering angles.

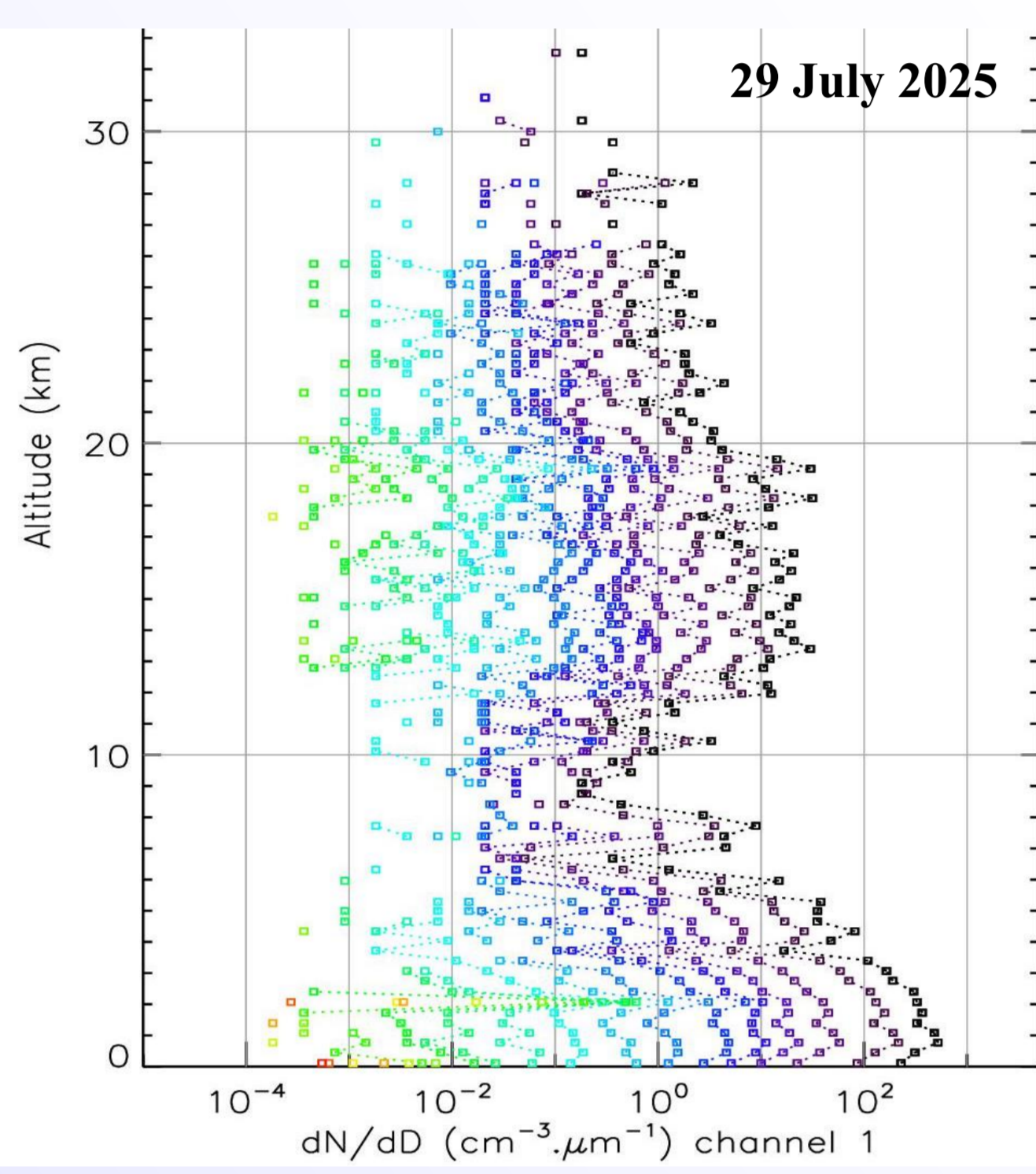


LOAC2 gondola

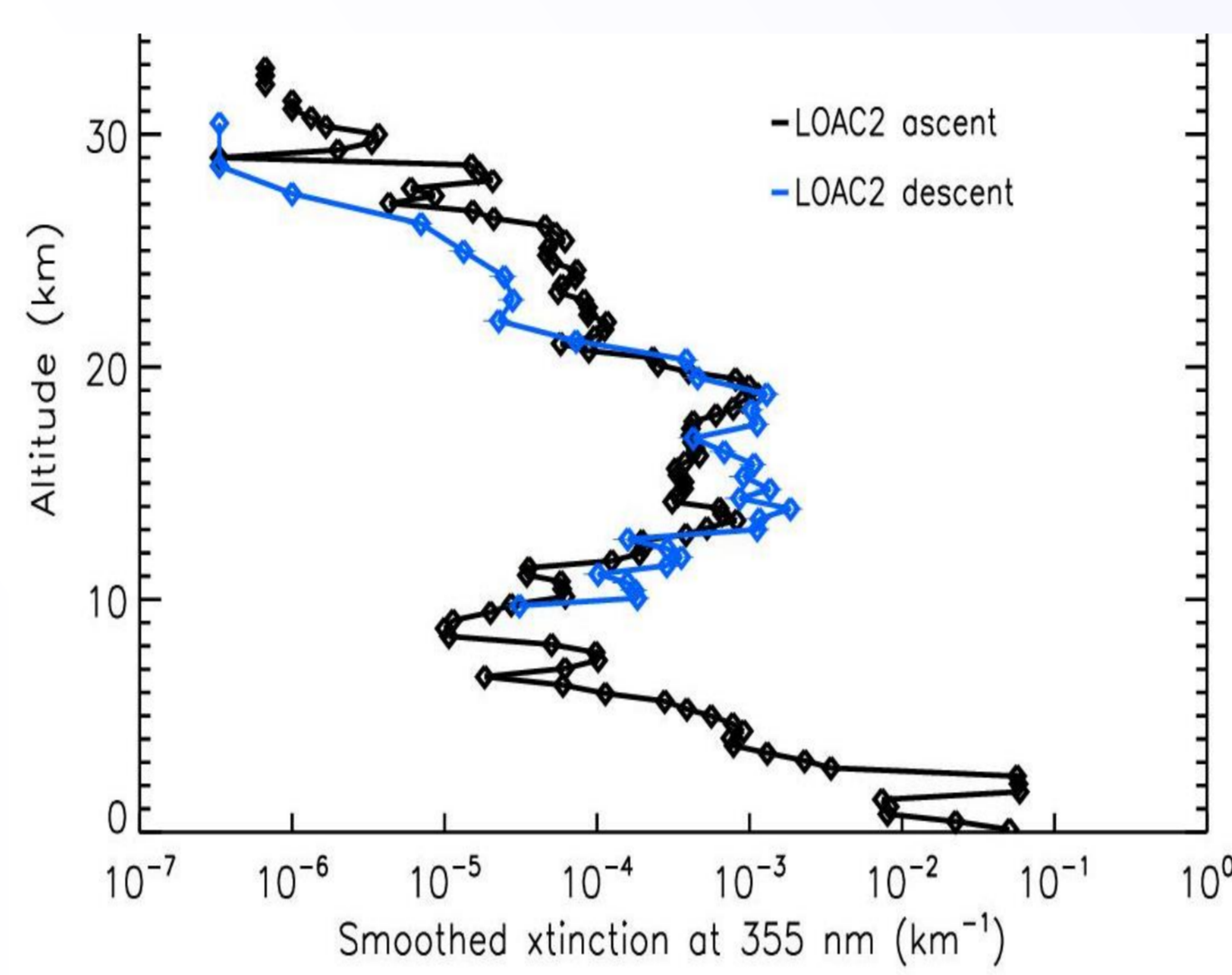


Launch

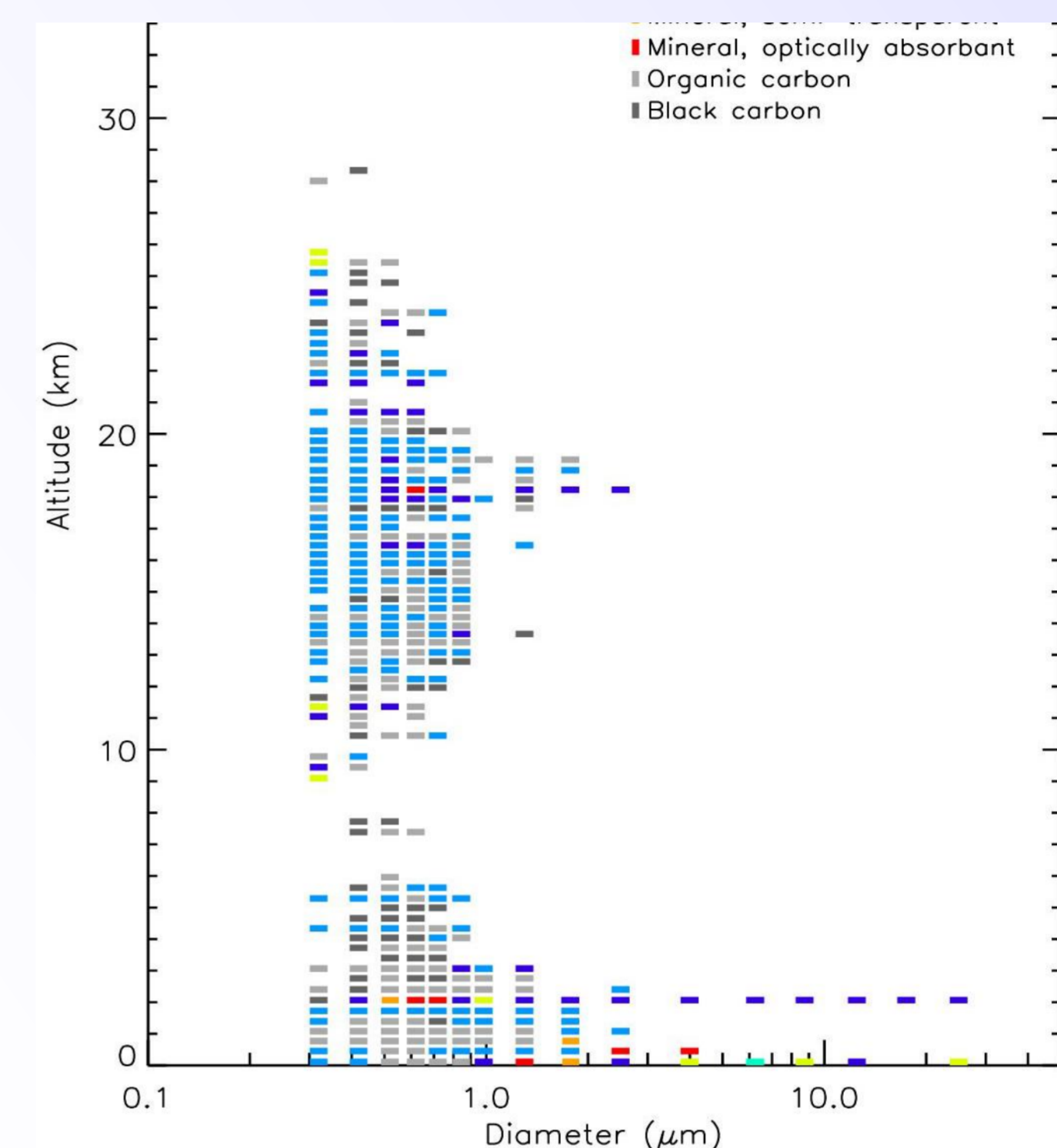
60 LOAC flights already conducted since the end of 2024 in coincidence with EarthCARE. Example for the 29 July 2025 flight from Orléans, France



Concentrations

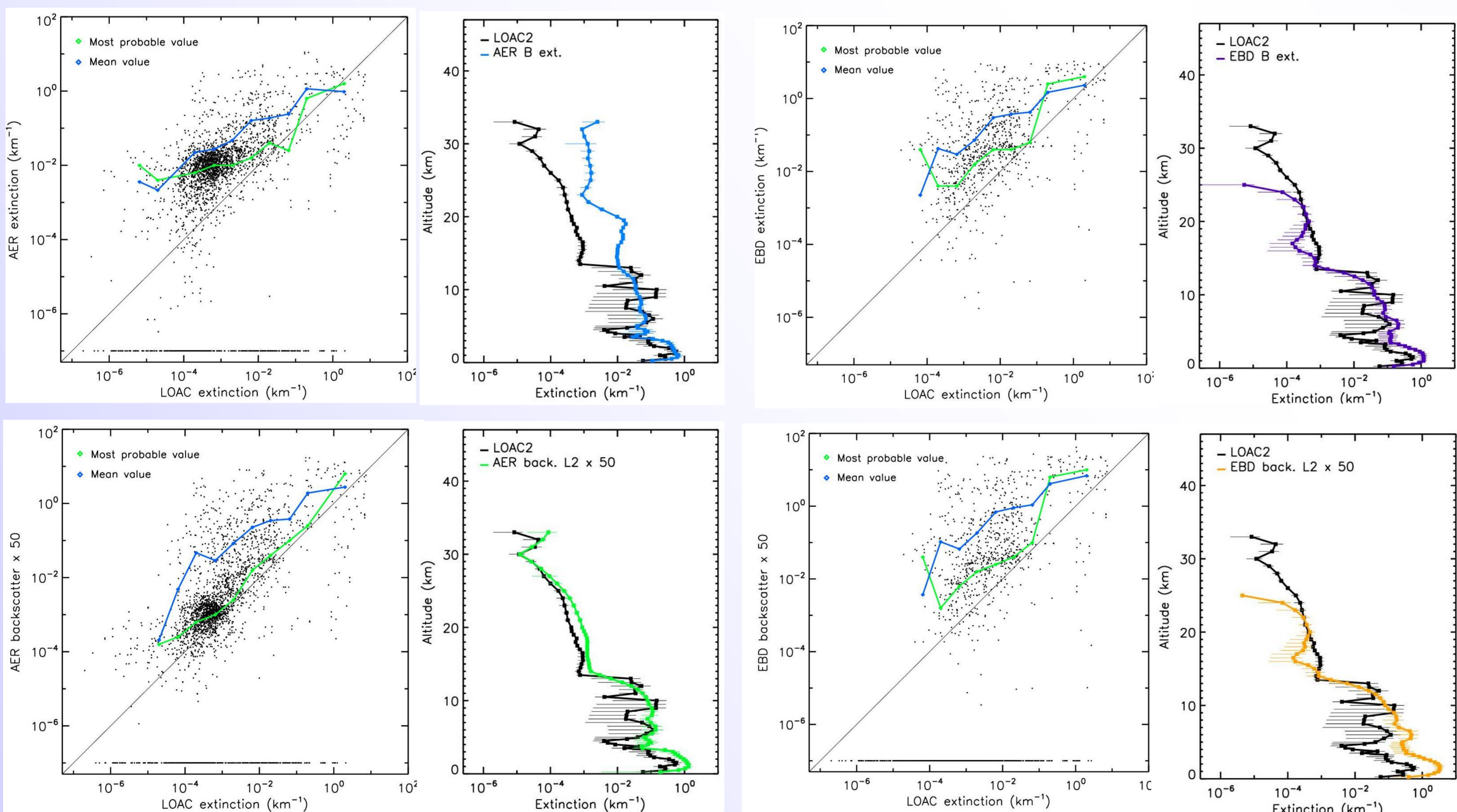


Extinctions

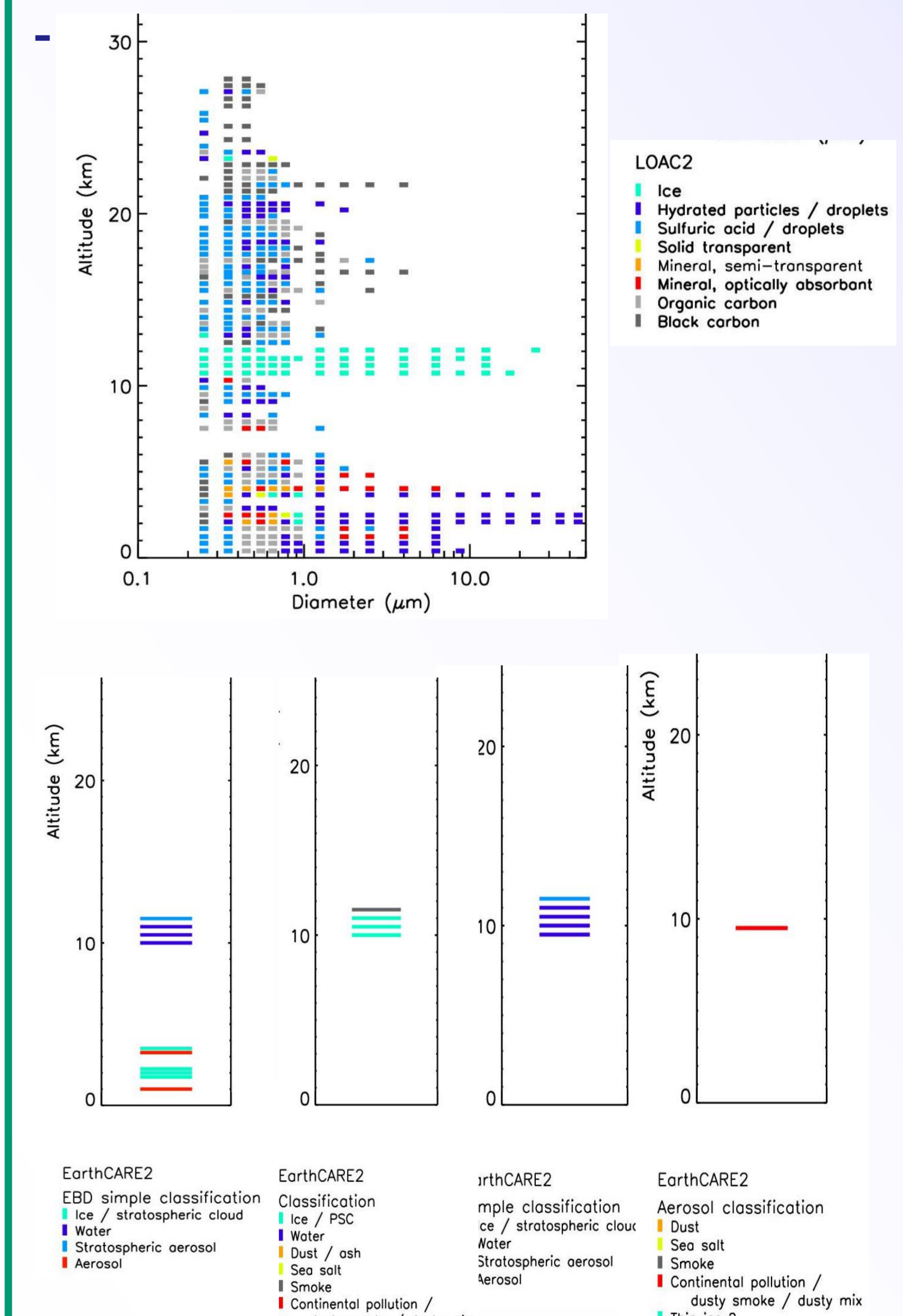


Typology identifications

- Atlid data: extinction AER and EBD, and backscatter AER and EBD multiplied by 50 (typical lidar ratio)
- Synthesis of the intercomparison with LOAC2:



Example of typology identification from LOAC2 and Atlid: 16 March 2026



Main conclusions:

- Good agreement between LOAC2 and Atlid (several tens of profiles averaged) in cases of thick aerosols layers (as soot and dust plumes) or clouds in the troposphere and stratosphere, for extinctions greater than $\sim 10^{-2} \text{ km}^{-1}$.
- Poor agreement for individual profiles in the stratospheric under background conditions.
- Good agreement in the stratospheric (down to 10^{-5} km^{-1}). when averaging hundred of profiles, for AER backscatter products only.
- Do not use the EBD products in the stratosphere for background aerosols studies, because of the presence of unrealistic zero values.
- The Atlid aerosol identifications are of poor quality and incoherent.
- 25 LOAC2 flights will be conducted 2026 with flights of various ballon-borne instruments dedicated to counting, extinction and backscatter measurements.