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## Centimeter-scale-resolution airborne temperature measurements in clouds and in marine surface layer during EUREC4A

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Characterization of small-scale temperature structure of convective clouds and their environment is crucial to understand turbulent entrainment, mixing and its effect on cloud dynamics and microphysics. A newly constructed ultra-fast thermometer UFT2, developed from the former UFT-M, allowing for temperature measurements in clouds with the resolution better than few centimeters, was deployed on the British Antarctic Survey Twin-Otter research aircraft in the course of the EUREC4A research campaign. The goal was to perform first ever fine-scale temperature characterization of subtropical marine warm cumulus clouds.

The prototype instrument worked relatively well and allow to collect data from 7 of 17 research flights, including hundreds of cloud penetrations and segments of flights in the marine surface layer. Data, collected with 20 kHz sampling rate, after filtering and averaging allowed to achieve physical resolution of ~3cm at ~60m/s true air speed of the aircraft.

Performance of the UFT-2 sensor and its calibration will be discussed. The discussion will be illustrated with examples of multi-scale temperature records collected in cloud interiors, cloud edges, cloud shells at various altitudes as well as in the marine surface layer ~30 m above the sea level.