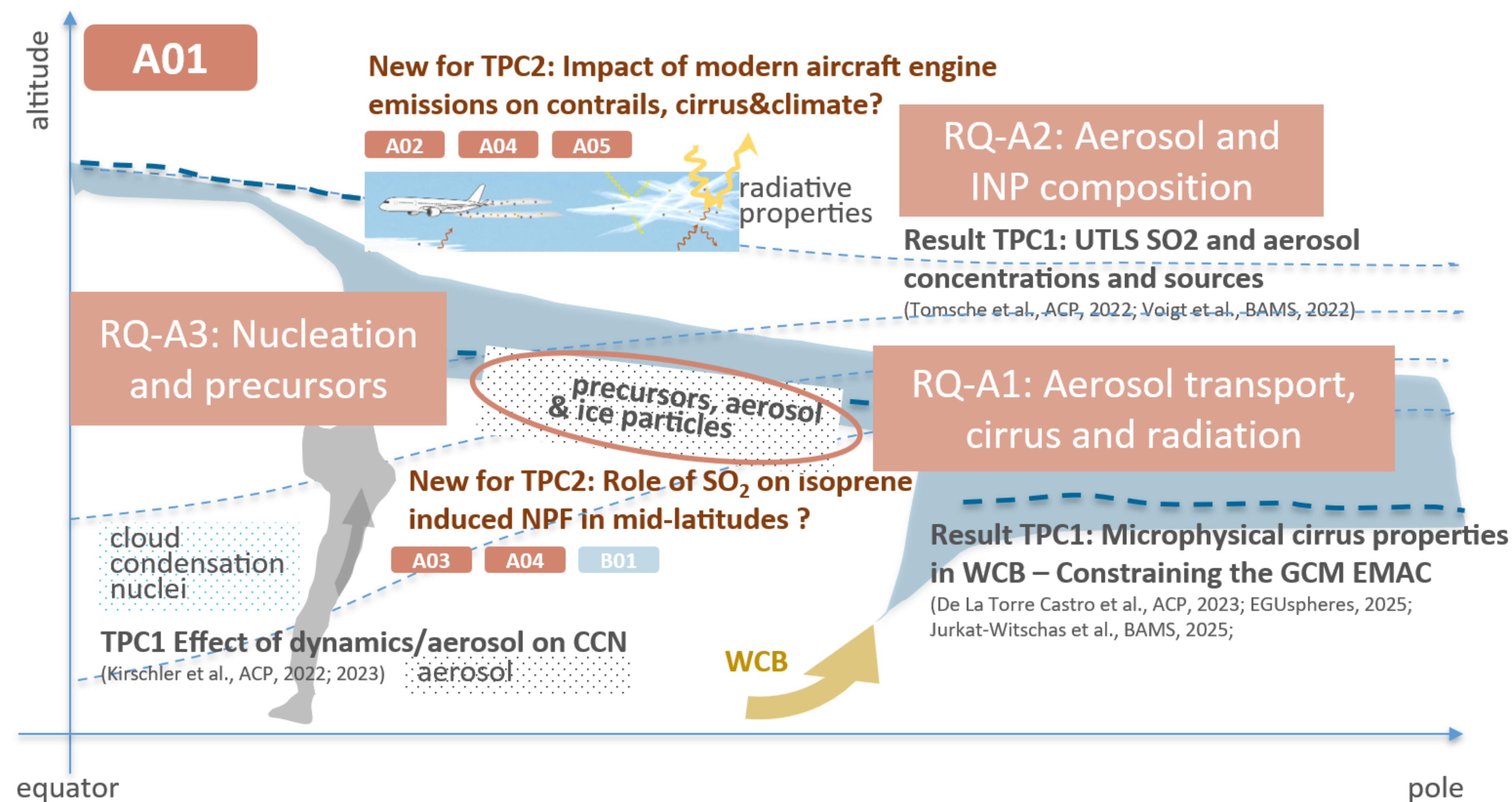


A01 Impact of aircraft emissions and convection on the composition of the UTLS

Christiane Voigt (JGU, DLR), Laura Tomsche (JGU), Tina Jurkat-Witschas (DLR), Simon Kirschler (JGU), Manuel Moser (JGU)

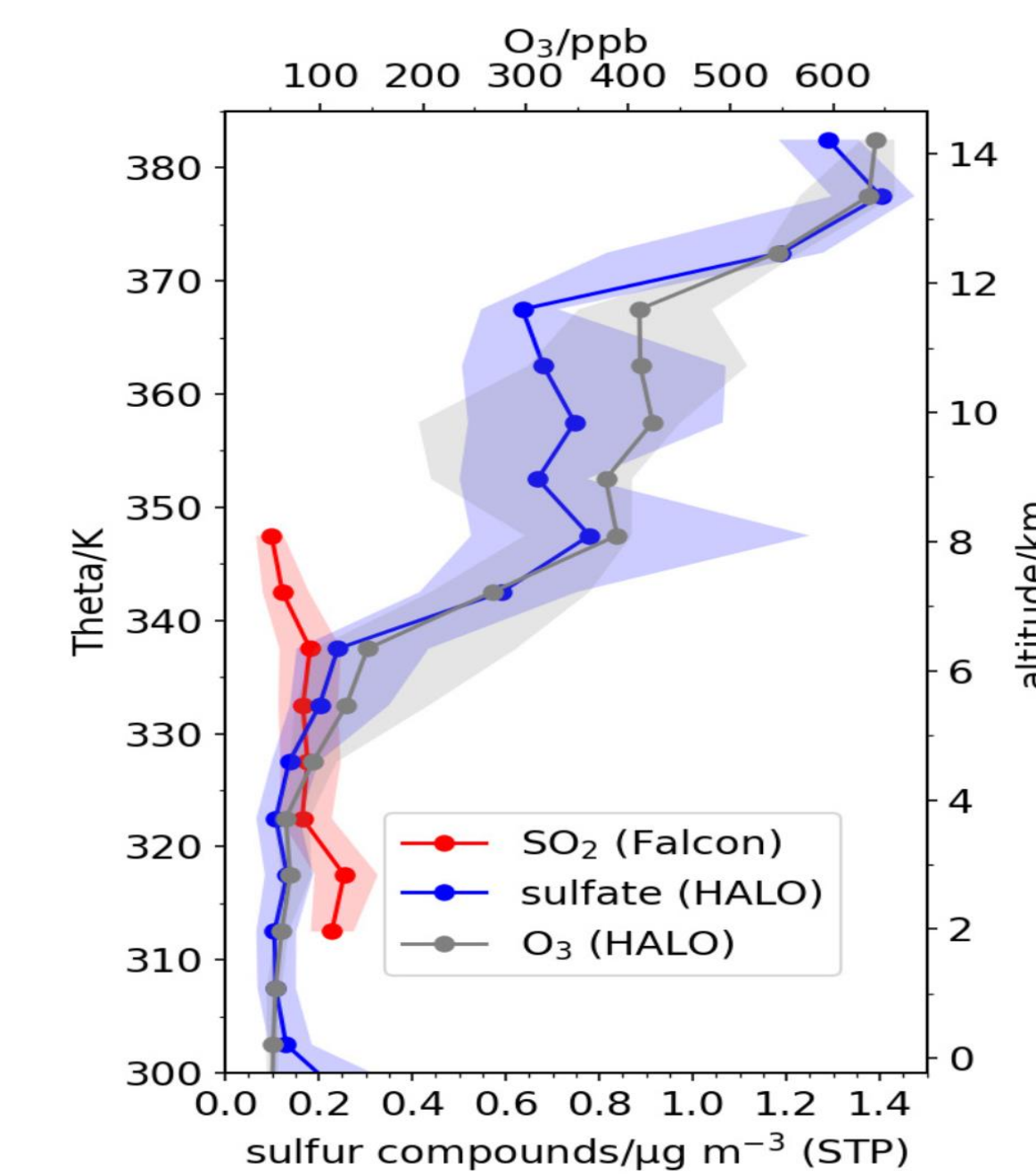
Motivation



Results from phase I

SO₂ in the UTLS: sources, transport, processing

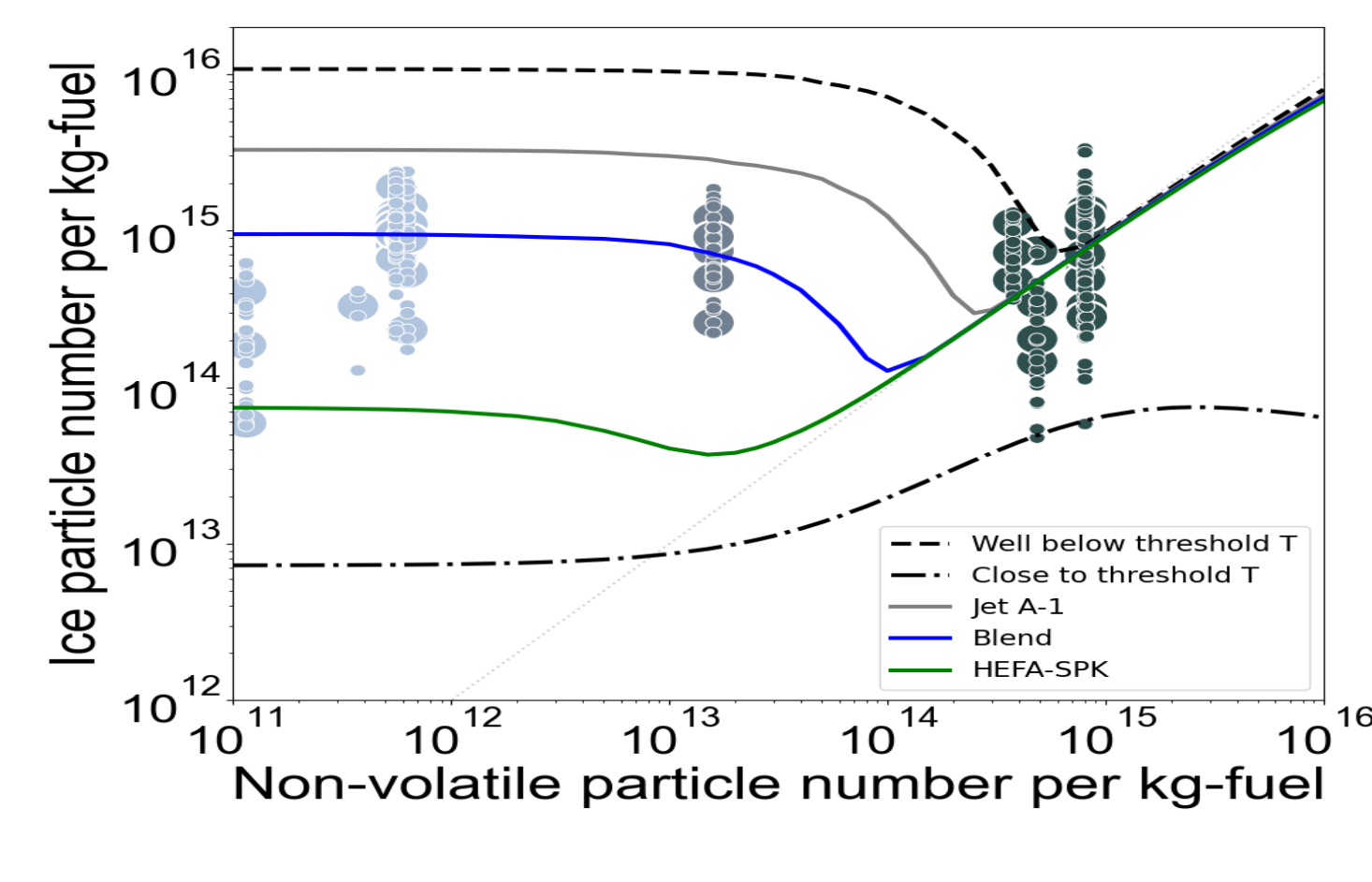
Unprecedented atmospheric conditions were probed with HALO over Europe during the first COVID19 lockdown. Lower particle concentrations were measured due to reduced pollution levels.



A01 Research plan for phase II

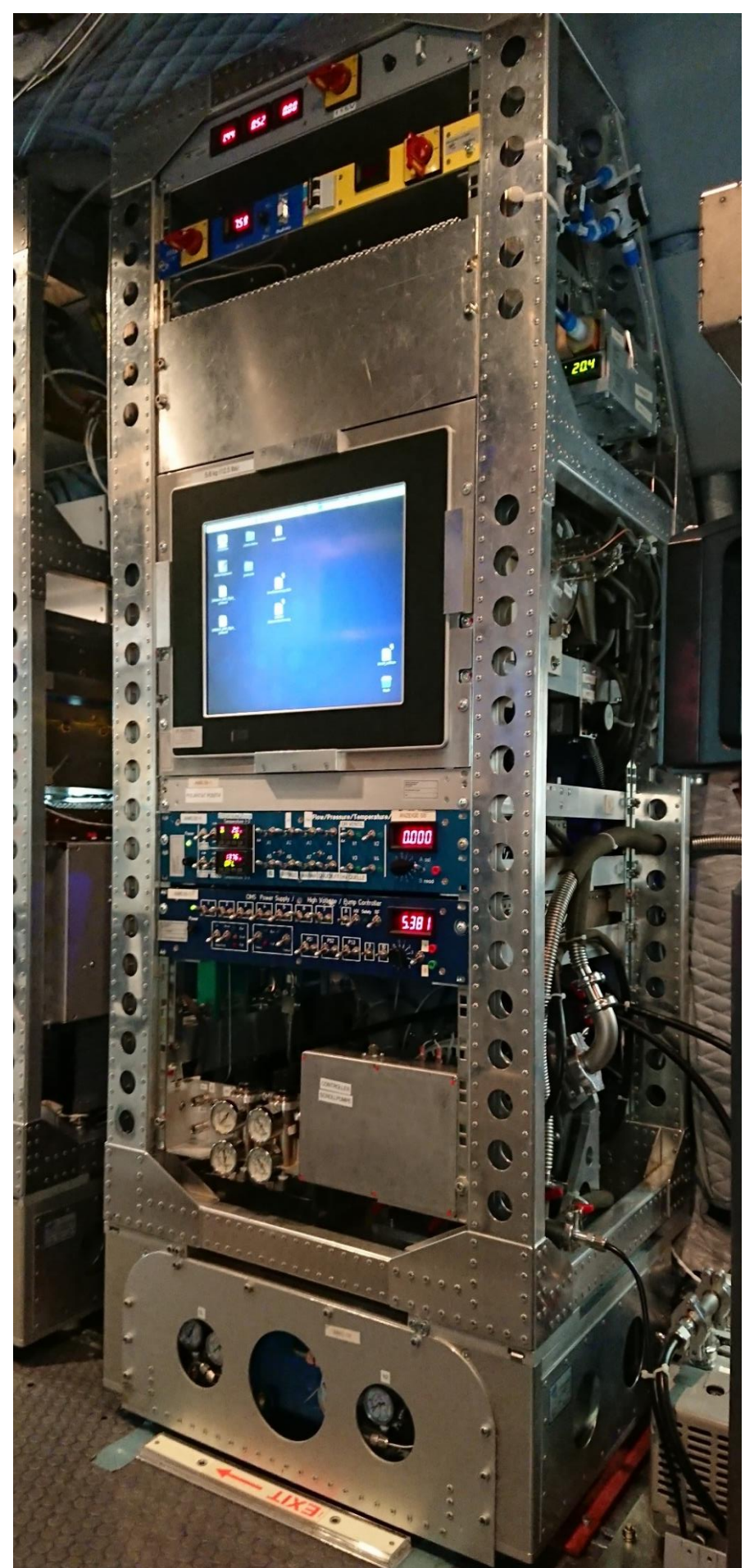
Main goal: Impact of aircraft emissions on contrails and cirrus New: Contrail ice nucleation on volatile aerosols at low soot emissions levels

Microphysical properties of contrails & cirrus will be measured during AEROCLOUD 2027 to support data-based decision-making by policy & industry on clean aircraft technology development.

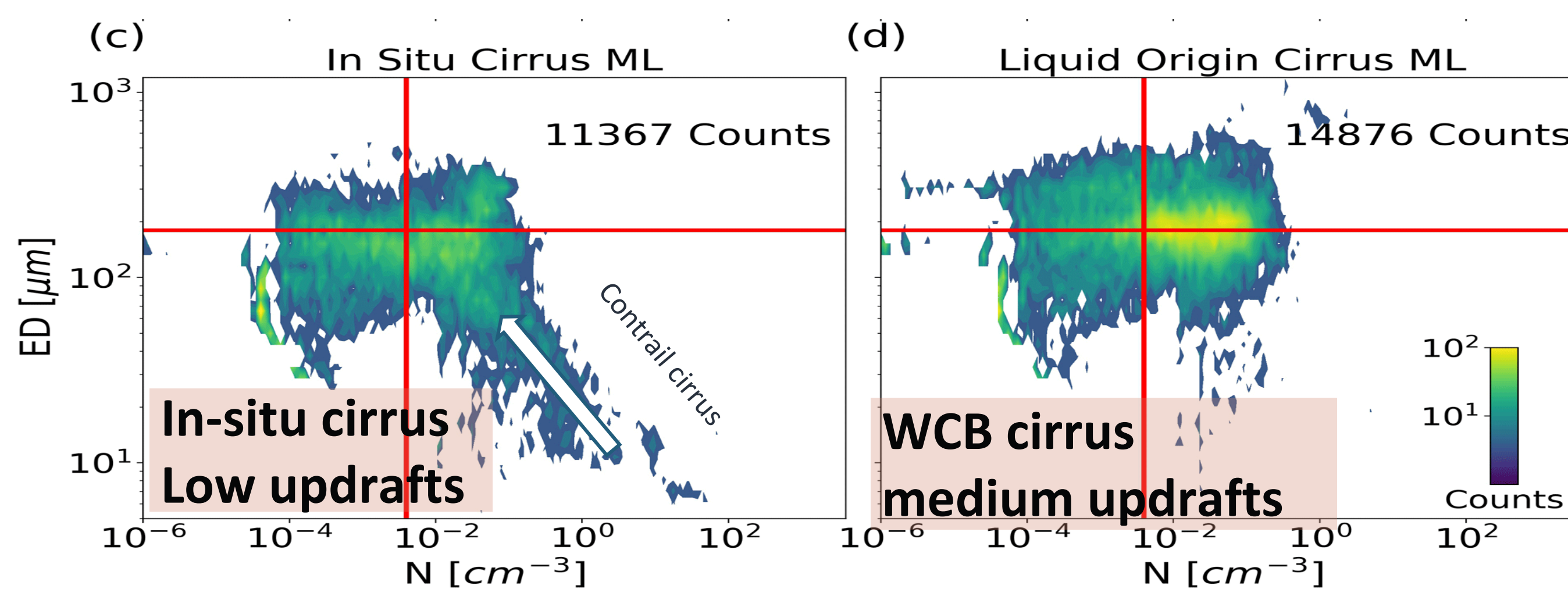


Main goal: Role of SO₂ & HNO₃ on isoprene induced NPF in the mid-latitude UTLS

Mass spectrometric measurements of SO₂, HNO₃, HONO and HCl will be performed during CONTANGO-FIRE 2028 to explore the dependence of NPF in the extra-tropical UTLS on SO₂ and HNO₃ and to investigate the influence of convection.



Differences in microphysical properties of in situ and WCB cirrus



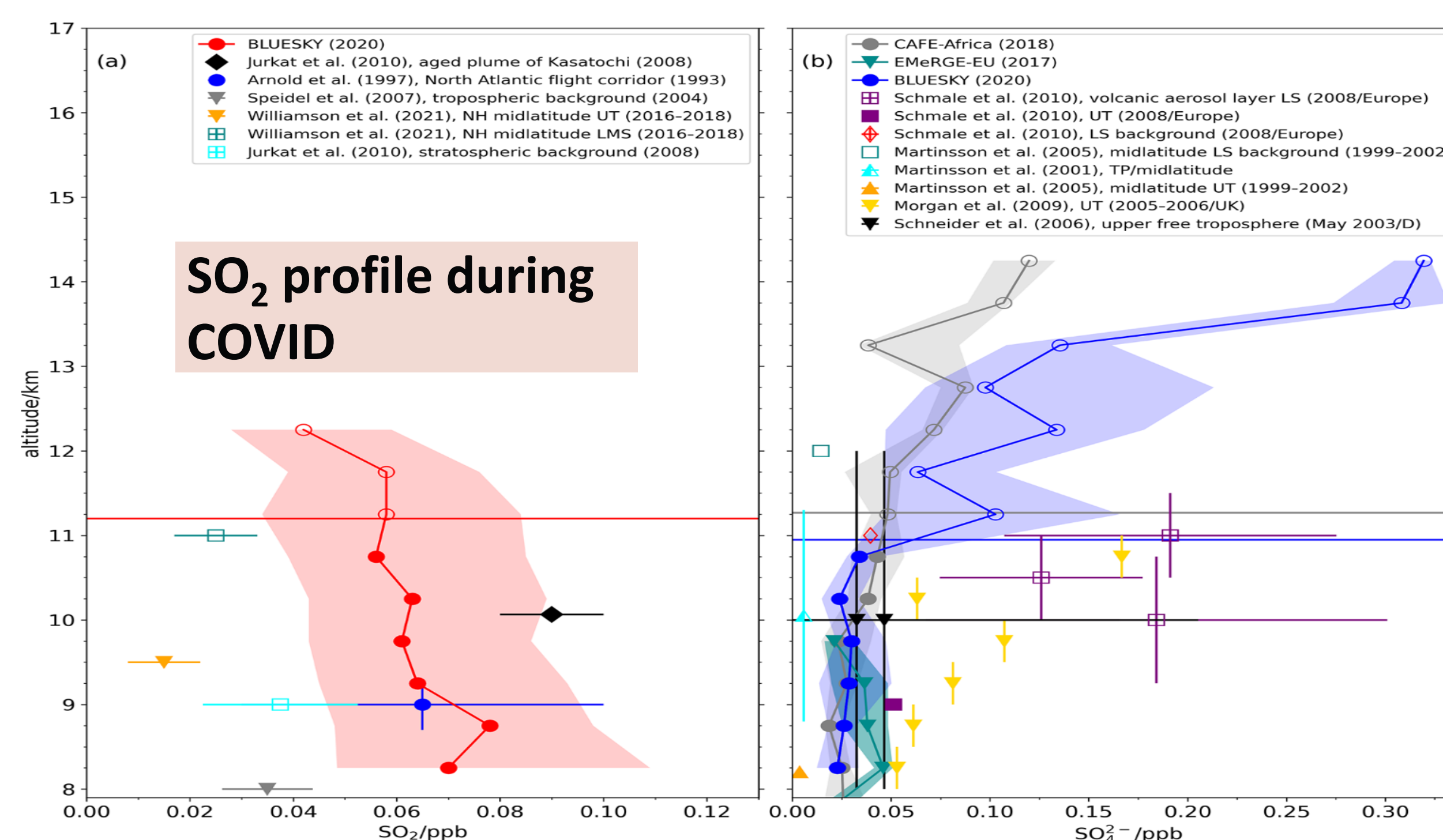
DeLaTorreCastro et al., ACP, 2023, Jurkat-Witschas et al., BAMS, 2025

Collaborations within TPChange

- A02** Comparison of satellite and in-situ cirrus cloud properties
- A03** Dependence of NPF on aerosol precursors, here SO₂
- A04** Analysis of UTLS sulfur budget
- A05** Organic aerosol composition contribution to contrails
- B01** Fine scale gradients and mixing at the tropopause
- Z03** Data exchange of cirrus cloud properties and trace gases

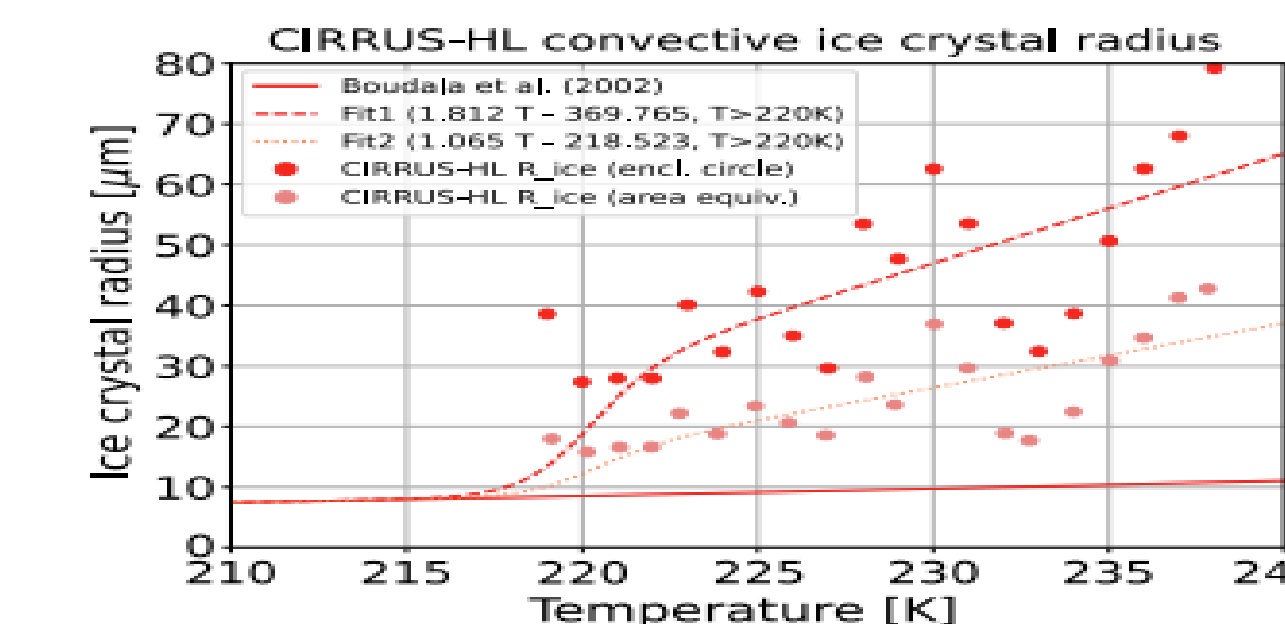
UTLS SO₂ profiles

UTLS SO₂ profiles measured during the COVID19 lockdown over Europe were compared to other observations in the UTLS.

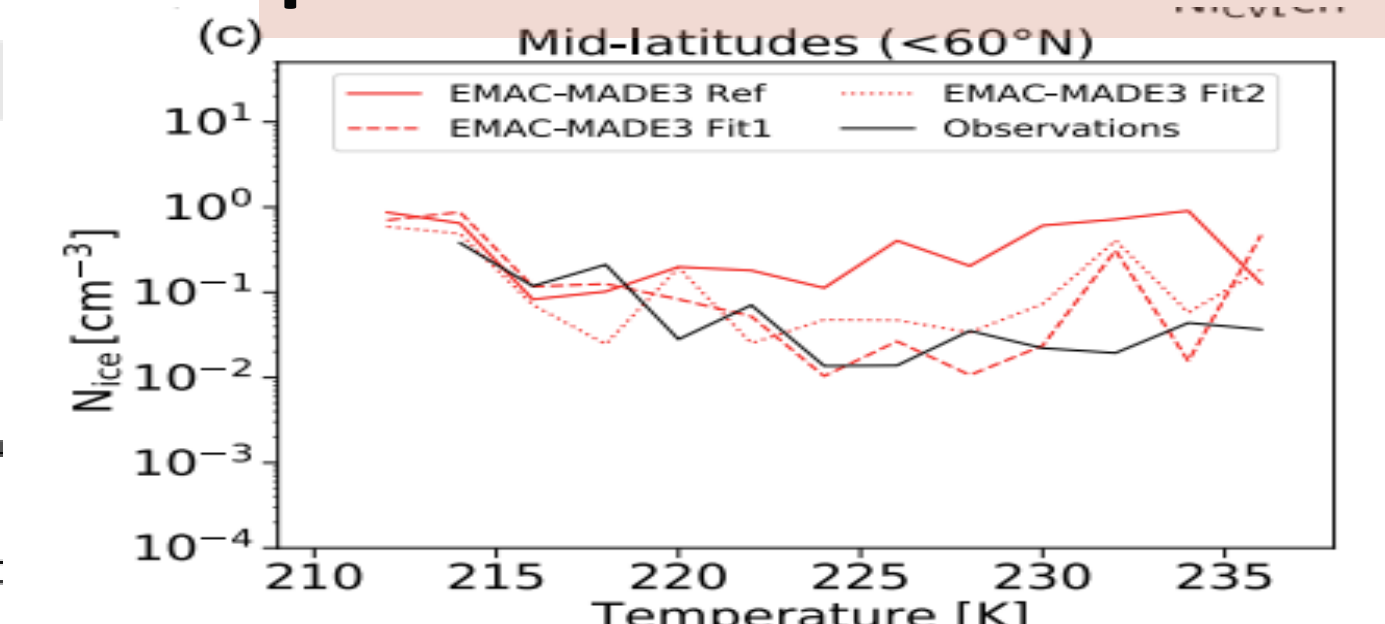


Constraining the GCM EMAC with observations

Data for new parameterization of convective cirrus in EMAC-MADE



EMAC with new convection parameterization



DeLaTorreCastro et al., <https://doi.org/10.5194/egusphere-2025-3913>, 2025

Beyond TPChange: National and international activities

DFG SPP1294 HALO international projects (EU A4CLIMATE), EU policy & industry decisions for clean fleet development

