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Detection of Contrails – Challenges and Future Perspectives

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Contrail and cirrus that evolve from contrails represent the **largest share of the climate impact from aviation**, even larger than the contribution from CO₂. In order to reduce this climate impact and the uncertainties related to it, the fundamental science of contrails and their impact on the atmosphere from a present and future aircraft fleet needs to be based on accurate and reliable airborne measurements.

Research at DLR has focused on the detection of contrails in a suite of **measurement campaigns** in the past decade. Different evolution stages of contrails from the first second behind the aircraft until they evolve into contrail cirrus have been measured with national and international partners like NASA and NRC. We present recent results on contrail properties measured with DLR's unique research aircraft fleet. The observations are further used to guide model evaluation from the plume to the global scale.

While new carbon-free technologies like **hydrogen powered engines** now come into perspective, their impact on contrail formation is largely unknown. We will comment on the importance of airborne measurements of these new type of contrails, the challenges and potentials that come with it to frame a sustainable future air traffic.

Dr. Tina Jurkat-Witschas is Project Leader of the DLR Research Group H2CONTRAIL and Prof. Dr. Christiane Voigt is Head of Department Cloud Physics at the DLR and Professor at the University of Mainz.

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