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Cloud Microphysics Measurements and the Development of Precipitation During EUREC4A

Gary Lloyd¹, Thomas Choularton², Alan Blyth³, Martin Gallagher², Keith Bower², Zhiqiang Cui³, and Leif Denby³

¹NCAS, University of Manchester, Manchester, UK

²University of Manchester, Manchester, UK

³NCAS, University of Leeds, Leeds, UK

EUREC4A is an international project that aims to address the current lack of understanding of the processes controlling the response of trade-wind cumulus clouds to changing environmental conditions in a warmer climate. The radiative properties of the trade-wind cumulus clouds have a major influence on the Earth's radiation budget. The response to global warming of these clouds is therefore critical for global mean cloud feedbacks. The EUREC4A field campaign took place in the vicinity of Barbados during January and February, 2020. The BAS Twin Otter aircraft was deployed in the project to make measurements of aerosols, cloud microphysics and boundary-layer processes in the life cycle of the clouds. In-situ measurements were made of the cloud droplet size distributions and the development of warm rain in multiple cases at different altitudes. We found significant variability in the development of precipitation between cases. The cloud structure appeared to have a significant impact on the precipitation, while the aerosol concentrations in the boundary layer were strongly related to the initial droplet number concentration at cloud base. We will present these findings by highlighting a number of cases with different cloud types and aerosol properties.