

EGU21-15408

<https://doi.org/10.5194/egusphere-egu21-15408>

EGU General Assembly 2021

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Why sometimes its simply sunny (in the trades)

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Cloud free skies are rare in the trades. We analyze conditions in which cloud-free conditions prevail. For this purpose Raman water vapor measurements from the Barbados Cloud Observatory, complemented by ship-based measurements during EUREC4A are used to explore water vapor variability in the marine boundary layer. We explore the consistency of the inferred cloud base height with estimates of temperature and water vapor from the lidar signal, and examine the co-variability of these quantities. After having established the properties of these measurements, we seek to use them as well as others, to explain in what ways periods of cloud-free conditions are maintained, investigating the hypothesis that only when the wind stills is it simply sunny.