

CN Davies Annual Report 2018: summary of a campaign to study long range transported desert dust at Barbados

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To investigate the role of desert dust in the atmosphere and its ability to nucleate ice in clouds I led a team of five on a campaign to Ragged Point, Barbados. Ragged point is the most easterly point of Barbados and is among the first landmasses to encounter long range transported dust emissions from Africa. This made it the ideal location to investigate ageing effects on desert dust, i.e. does the transport of desert dust change its ability to nucleate ice. The campaign involved using the ICEPOD, a portable laboratory, to make in-situ measurements at the site. Aerosol samples were collected onto filters atop a 17m high platform over a period of 2 months. The filter samples were then washed to collect the aerosol into an aliquot of pure water before testing them for their ice nucleating ability using an array of techniques including the Big-NIPI which I have developed over the course of my project. Other instruments which were also deployed involved an Aerodynamic Particle Sizer (APS), a Scanning Mobility Particle Sizer (SMPS) and a MOUDI cascade impactor. The APS and SMPS allowed us to make size distribution measurements alongside our collected filter samples and the MOUDI allowed us to investigate which size fraction was responsible for the nucleating ability of the collected aerosol.

The data is still very preliminary for the campaign but at first glance it appears that the INP concentrations at Barbados are very low (Fig. 1). When we compare the data to Cape Verde, another location which is heavily impacted by desert dust emissions, we see a striking reduction in activity. This may be evidence for an aging process as the dust is transported across the Atlantic but further investigation is still needed.

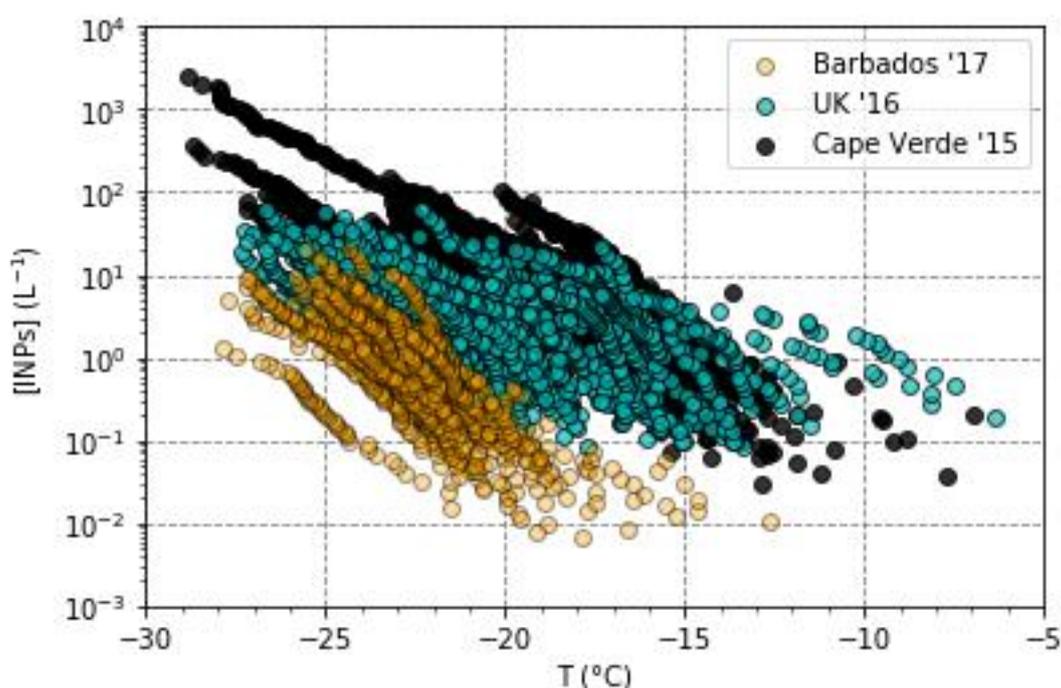


Figure 1. The cumulative number of INP active at a given temperature per litre of air sampled at 3 locations. These locations include two dust rich regions (Barbados and Cape Verde) and an agricultural site in the UK.