DUST LAYER PROFILING USING AN AEROSOL DROPSONDE

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Routine met data is obtained in the atmosphere using disposable radiosondes, giving temperature, pressure, humidity and wind speed. Additional measurements are obtained from dropsondes, released from research aircraft. However, a crucial property not yet measured is the size and concentration of atmospheric particulates, including dust. Instead, indirect measurements are employed, relying on remote sensing, to meet the demands from areas such as climate research, air quality monitoring, civil emergencies etc. In addition, research aircraft can be used *in situ*, but airborne measurements are expensive, and aircraft use is restricted to near-horizontal profiling, which can be a limitation, as phenomena such as long-range transport depend on the vertical distribution of aerosol.

Centre for Atmospheric and Instrumentation Research at University of Hertfordshire develops light-scattering instruments for the characterization of aerosols and cloud particles. Recently a range of low-cost, miniature particle counters has been created, intended for use with systems such as disposable balloon-borne radiosondes, dropsondes, or in dense ground-based sensor networks. Versions for different particle size ranges exist. They have been used for vertical profiling of aerosols such as mineral dust (Nicoll et al.) or volcanic ash (Harrison et al.). A disadvantage of optical particle counters that sample through a narrow inlet is that they can become blocked, which can happen in cloud, for example. Hence, a different counter version has been developed, which can have open-path geometry, as the sensing zone is defined optically rather than being delimited by the flow system. This counter is now used for ground based air-quality monitoring around Heathrow airport (Mead et al.). The counter has also been adapted for use with radiosondes or dropsondes. The dropsonde version has been successfully tested by launching it from research aircraft together with the so-called KITsonde, developed at the Karlsruhe Institute of Technology, which determines standard meteorological variables and GPS position for transmission back to the aircraft (Wieser et al.).

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