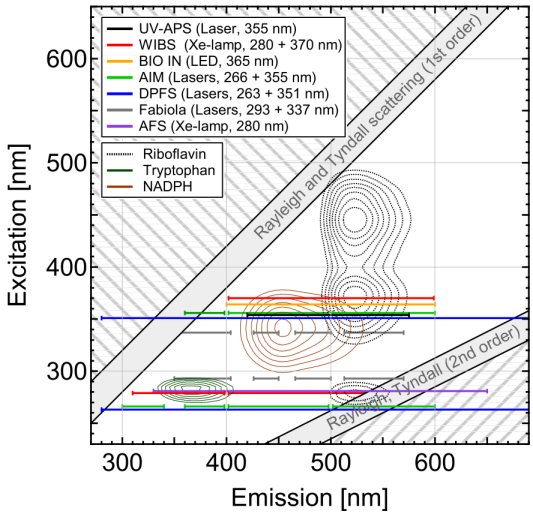
DROPLET MEASUREMENT TECHNOLOGIES

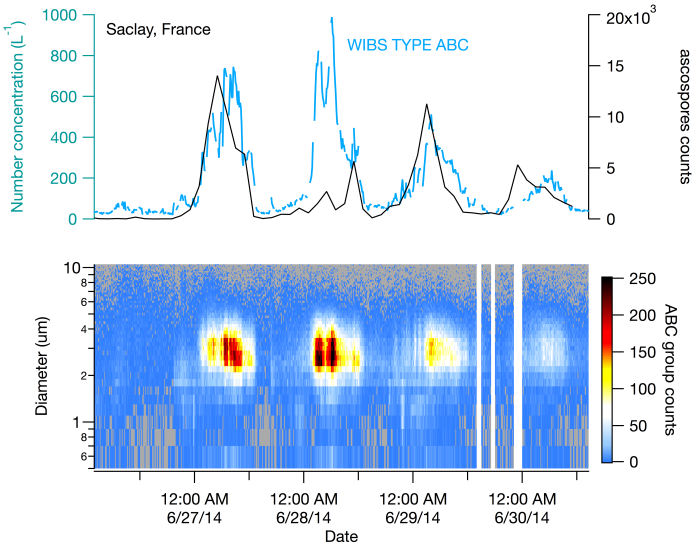
Guyline

WIBS-4A data applications



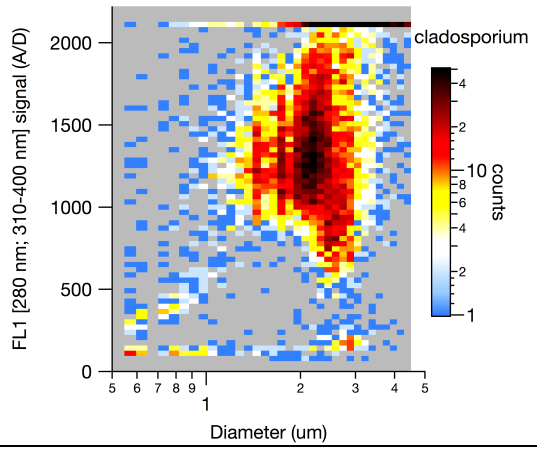
Excitation-emission plot showing three biofluorophores (NADPH, tryptophan and riboflavin) that are used to identify biological particles using fluorescence. Measurement regions are indicated for several different fluorescent aerosol spectrometers, including the DMT WIBS-4A.

Figure credit: Pöhlker, C., J. Huffman, U. Pöschl, 2012, Autofluorescence of atmospheric bioaerosols – fluorescent biomolecules and potential interferences, Atmos. Meas. Tech., 5, 37-71



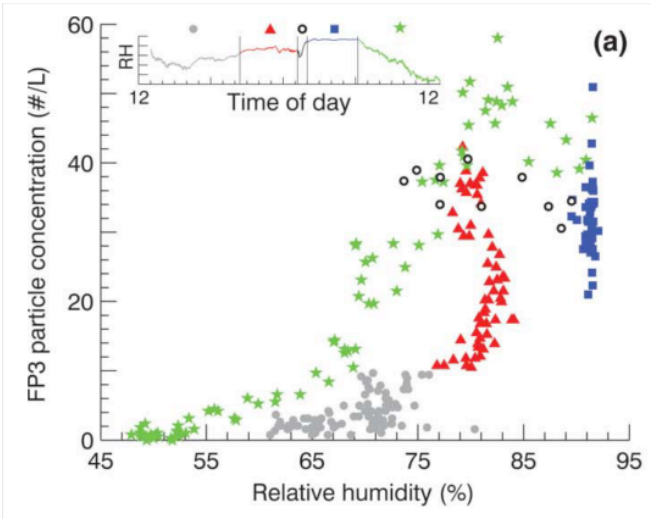
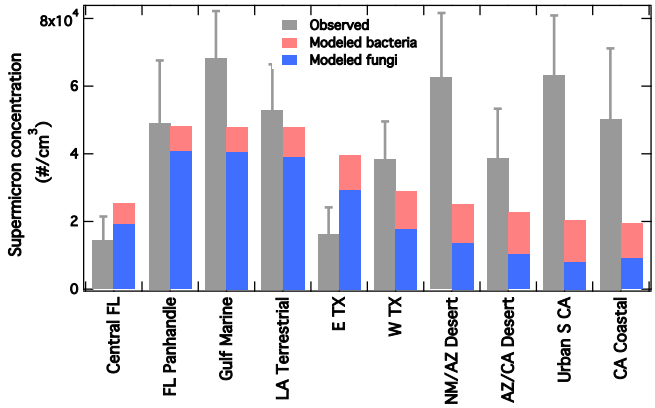
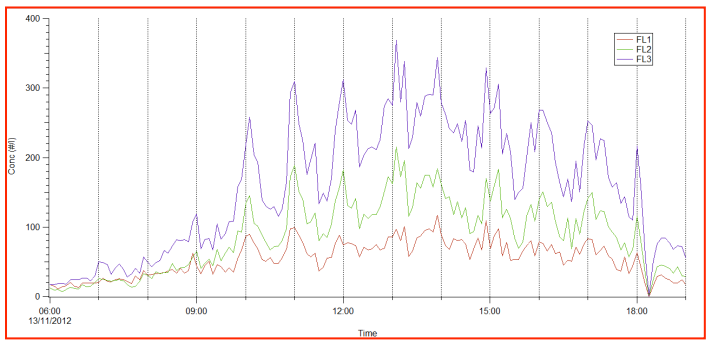
Ambient number concentrations and number distributions for particles falling in the WIBS ABC category (fluorescence in all channels). Note correlation with ascospores counts (fungal spores) measured independently using an off-line method. Measurements were performed during the BIODETECT inter-comparison study in Saclay, France (southwest of Paris). Fluorescent particle concentrations spiked when westerly winds brought air to the site from a nearby forested area.

Figure credit: DMT, data courtesy Roland Sarda-Esteve, CEA, France



Particle counts measured by a WIBS-4A sampling cladosporium (fungal) spores in a laboratory chamber. Hotter colors indicate higher counts for particles with the specified diameter and fluorescence signal in the FL1 (280 nm exciation, 310-400 nm emission) band. Response data such as this can be used to help map characteristic response to known biological particle types to aid classification of ambient samples.

Figure credit: DMT, data courtesy Mark Hernandez, University of Colorada, USA

	Fluorescent particle concentrations plotted as a function of relative humidity for ambient measurements in Raleigh, North Carolina associated with a frontal passage. Fluorescent particle concentrations were correlated with ambient ice nuclei concentrations, consistent with a mechanism for release of biological ice nuclei during high relative humidity periods. Figure credit: Wright , T. P., J. D. Hader, G. R. McMeeking, and M. D. Petters, 2014, “High relative humidity as a trigger for widespread release of ice nuclei”, Aer. Sci. Technol. 48, i-v
	Concentrations of super-micron fluorescent particles classified as biological compared to model predicted concentrations of bacteria and fungi over a cross-section of the southern United States. Observations were performed aboard a blimp flying in the boundary layer during a month-long transect across the US. Figure credit: Perring, A.E., et al., in review, “Airborne observations of regional variation in fluorescent aerosol across the United States”, submitted to J. Geophys. Res. Atmos.
	Particle concentrations in each WIBS-4 channel measured inside a building containing numerous lecture halls and classrooms at the University of Manchester in the UK. Concentrations peak each hour during transitions between different lectures, potentially from particle re-suspension or indoor/outdoor air exchange during transition periods between lectures. Figure credit: M. Gallagher, University of Manchester, UK

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