

LOAC (Light Optical Particle Counter)

a new aerosols counter for the determination of their sizes and their main nature under meteorological balloons

Different types of aerosols in the troposphere and the stratosphere, having different origins:



Disintegrated meteorites

Interplanetary grains

Volcanoes

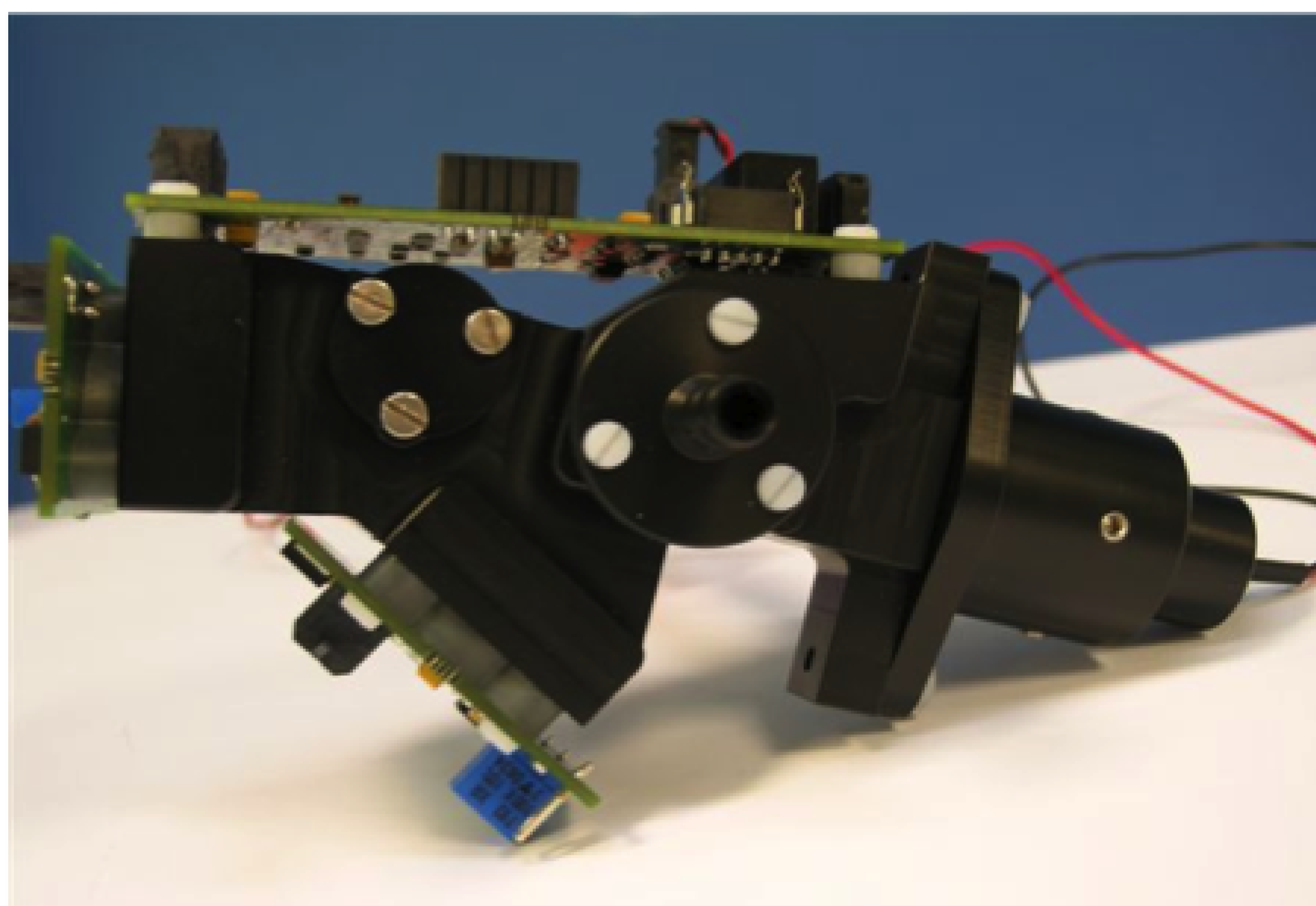
Biomass burning (and pyroconvection)

Transported sands

Pollution

LOAC is a light optical aerosol counter to detect this aerosols

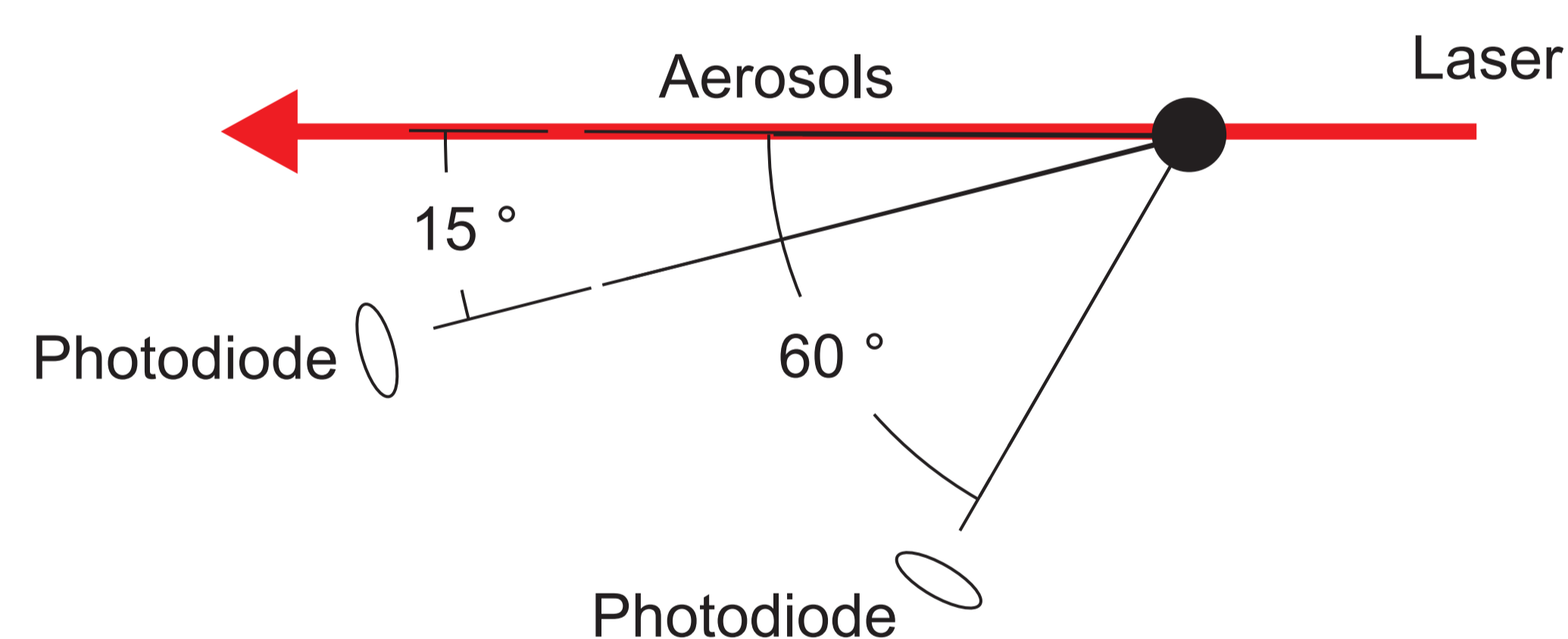
LOAC determines the concentration of aerosols (numbers of aerosols per cm³) for 20 size classes between 0.3 and 100 μm (with 10 size classes between 0.3 and 5 μm). The instrument can be used to document the physical properties the aerosols in the lower and middle atmosphere during specific events like pollution, transported sands, volcanic ashes, and for long-term monitoring. The data are available every 10 seconds. With a typical balloon ascent of 5 m/s, measurements are available every 50 m. Using a new optical design, LOAC can provide also an estimation of the main nature of aerosols, for 5 size classes (typically <1 μm, 1-5 μm, 5-10 μm, 10-20 μm, >20 μm). These natures are liquid aerosols, carbon particulates (like soot) and non-carboneaceous solid particulates (mainly minerals).



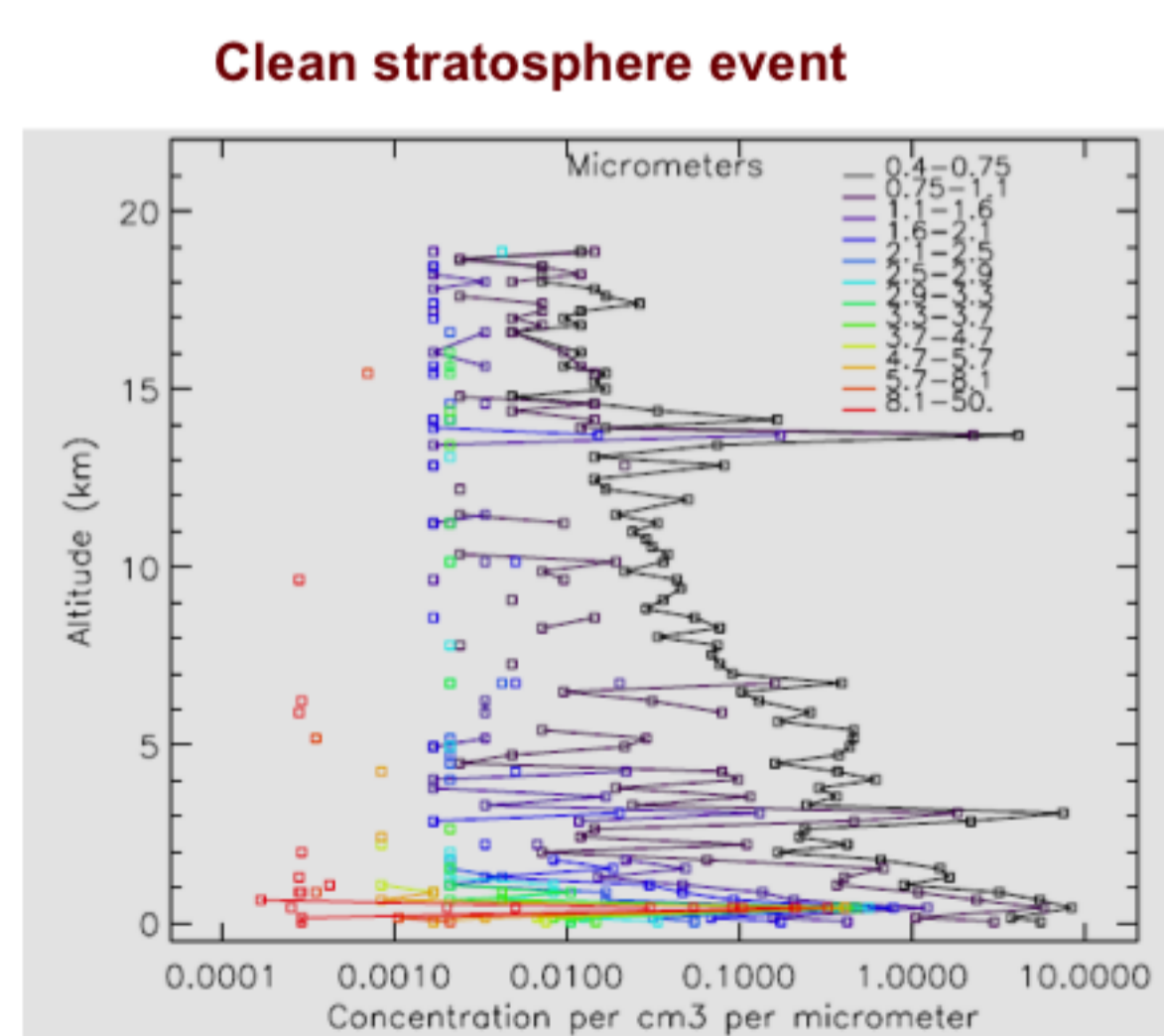
LOAC : Light Optical Aerosol Counter (patented concept):

Measurements at 2 scattering angles :
Where the scattered light is insensitive to the aerosols nature
Where the scattered light is strongly sensitive to the aerosols nature

Combining the measurements
Accurate determination of the size distribution
Estimation of the main nature of the aerosols



West Iceland, 20 July 2011 (meteo balloon, Iceland meteo office launch)

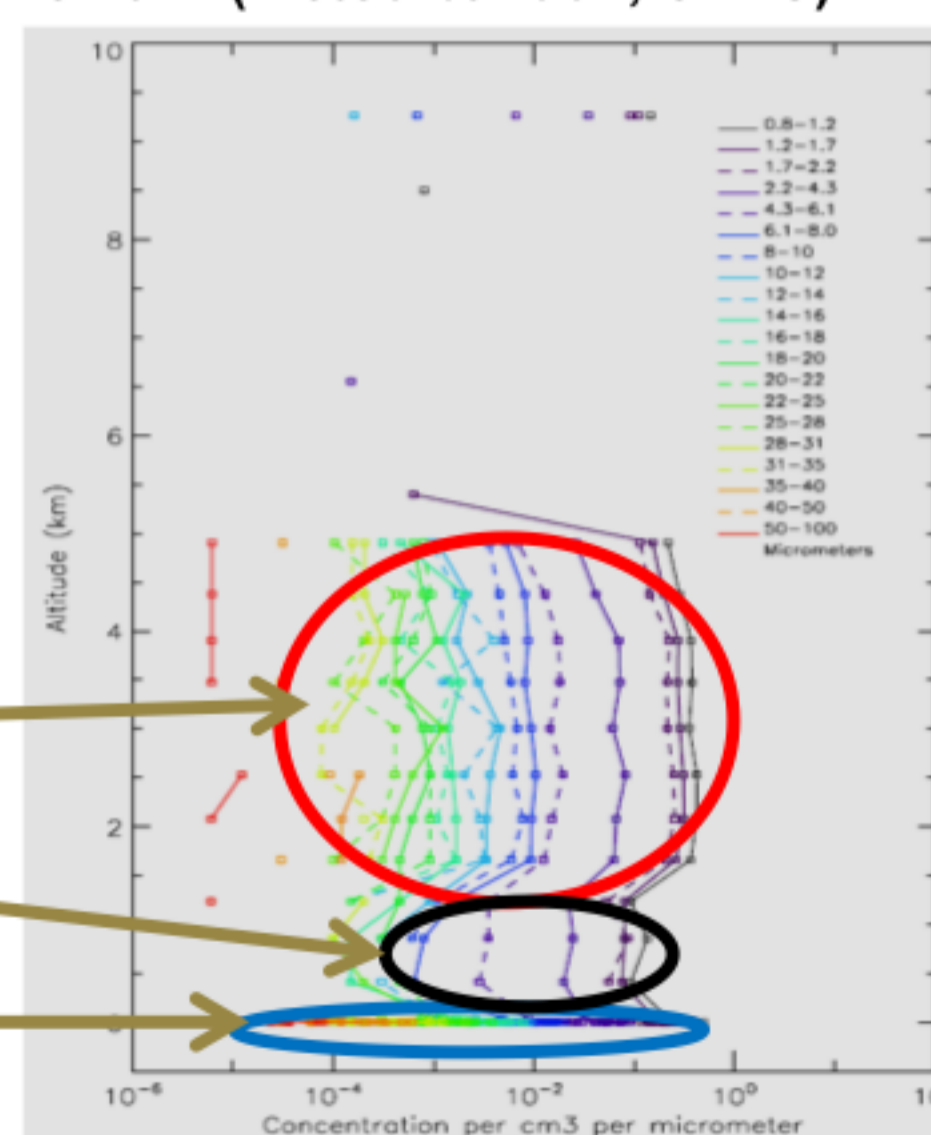


Sausset-les-Pins (France), 28 June 2012 (meteo balloon, CNES)

Flights during an strong episode of sand above Mediterranean sea

Size grains : 5-30 μm

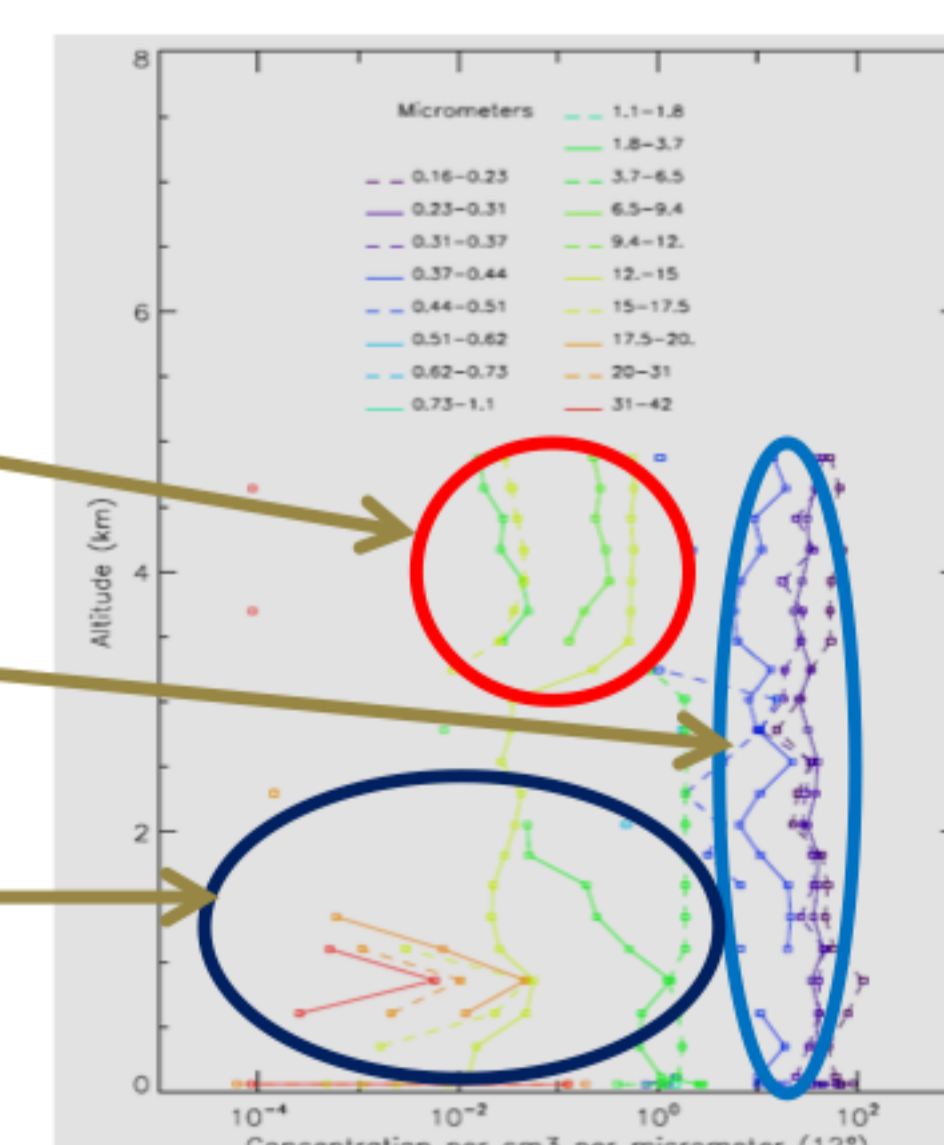
Sand
Soot (pollution)
Sea droplets



Candillargues (France), 23 September 2012 (MeteoFrance)

Hymex campaign

Sand
Small liquid background aerosols
Clouds/haze



MODEM

Upper Air system

Meteomodem.com