Determination of κ for LASIC

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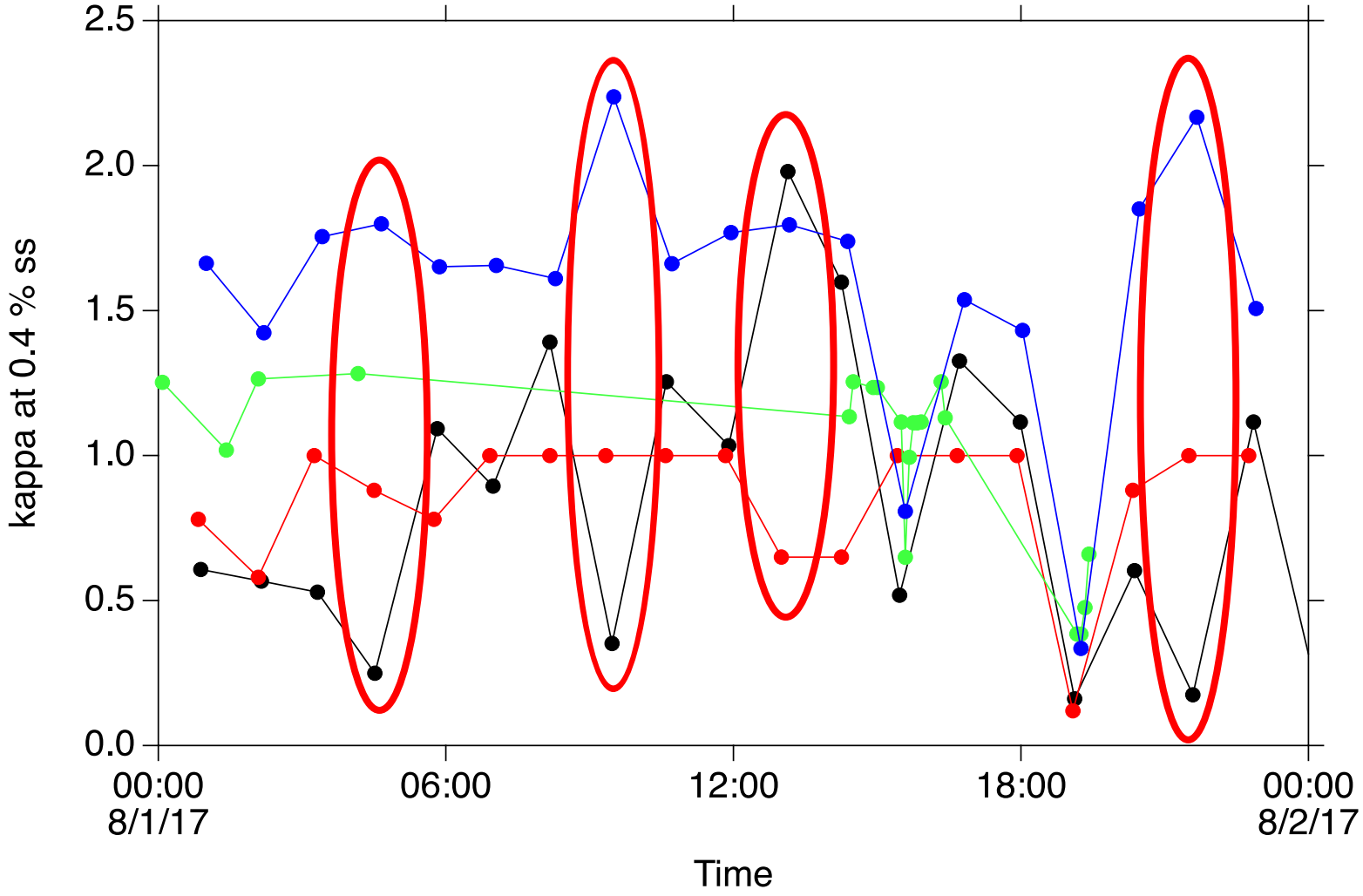
- The quantity κ, which attempts to capture the hygroscopicity properties in a single number, is explicitly defined for a particle, but not for an aerosol (a collection of particles).
- Different groups have used an operational definition to determine κ for an aerosol during the LASIC field campaign using CPC and SMPS measurements.
- Results for the entire month of August, 2017 are compared, including uncertainties in κ resulting from conservative uncertainties in the measurements.

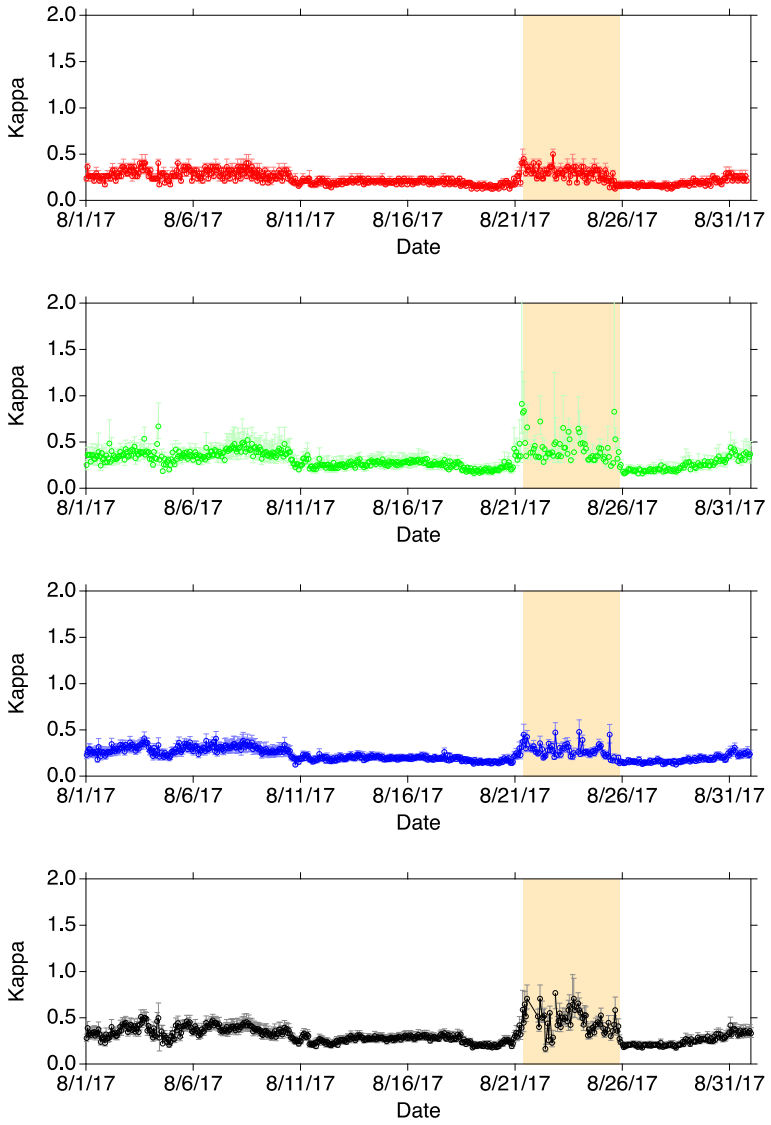
κ(ss=0.4%) for August 1, 2017 at Ascension Island (LASIC)

4 Methods – *all used the same data!* (one is the ARM VAP).

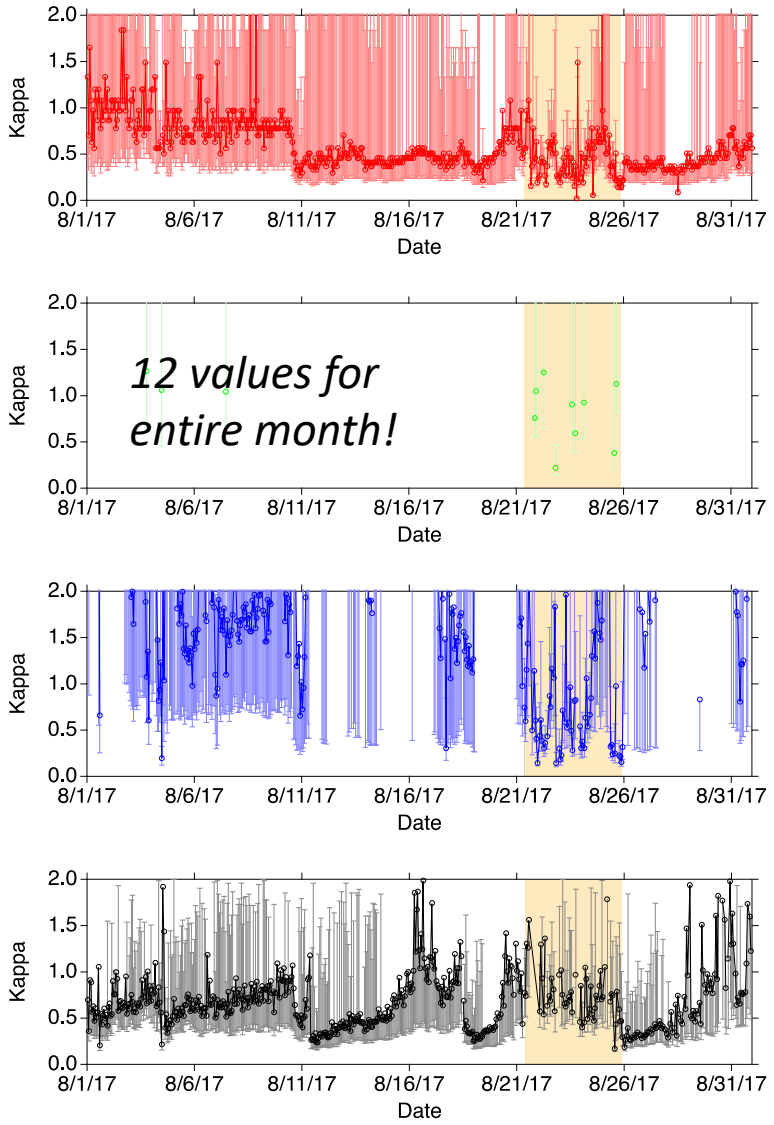


HUGE differences among different methods!

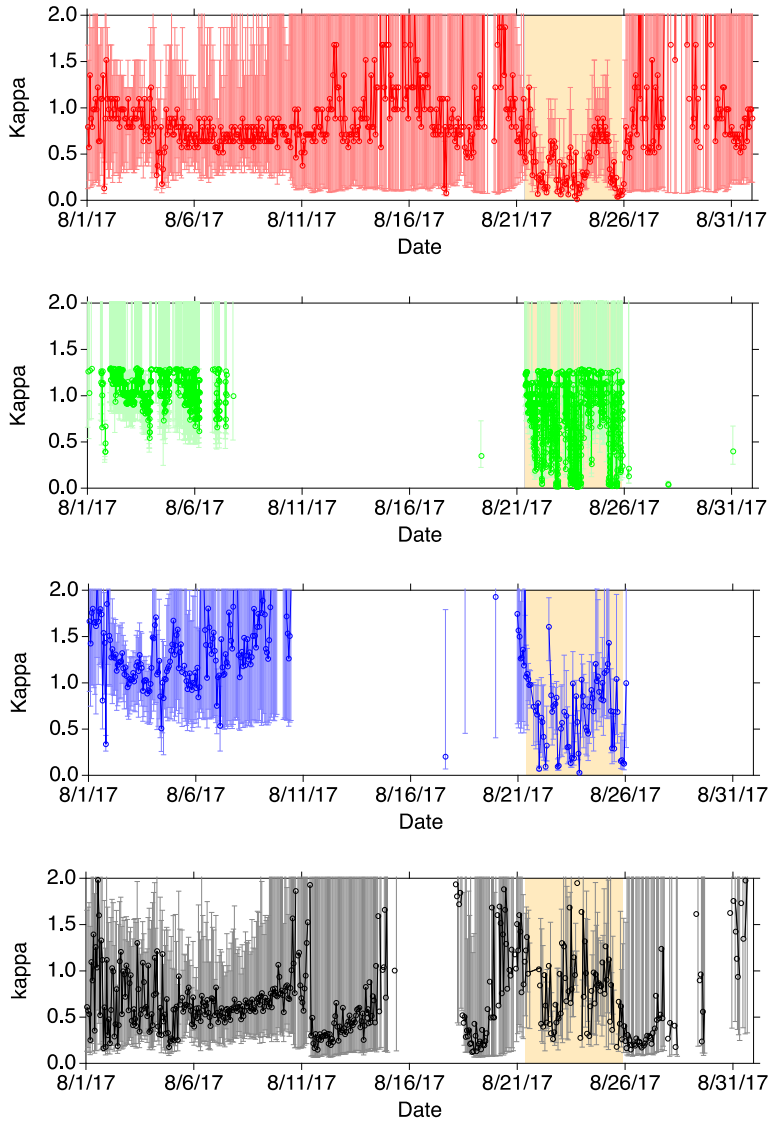
Supersaturation 0.1 %



Supersaturation 0.2 %



Supersaturation 0.4 %



Very few values obtained for 1.0 % supersaturation.

Summary and Conclusions

There is *MUCH* variability among the various ”standard methods,” all of which used the same data.

There is *HUGE* uncertainty for any one method when conservative uncertainties are included.

Some of the reasons for the variability and differences are known – the methods depend on a small difference of two large numbers.

Uncertainties will be instrument-specific – *and thus site-dependent*! – and they may also have temporal variability at multiple scales.

Values of κ determined using any “standard method” are *suspect.*