

Using Black Carbon Mixing State to Probe Biomass Burning Aerosol (BBA) Lifecycle

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Black Carbon Mixing State as a Proxy for BBA Evolution

- The BC mixing state defined as the relative amounts of coating to BC core
- Black carbon is a conserved tracer whereas the coating can undergo processing (e.g., chemistry)
- Assumption: aging trends observed in the coating will mimic trends exhibited by co-emitted, non-BC containing particles (POA & SOA).
- The SP2 provides a measurement methodology to probe the BC mixing state at a size-resolved level.
- Combine SP2 measurements from three field campaigns (BBOP, LASIC, and ORACLES) to examine the lifecycle of biomass burn-BC aerosol particles, and, in turn, BBA evolution.

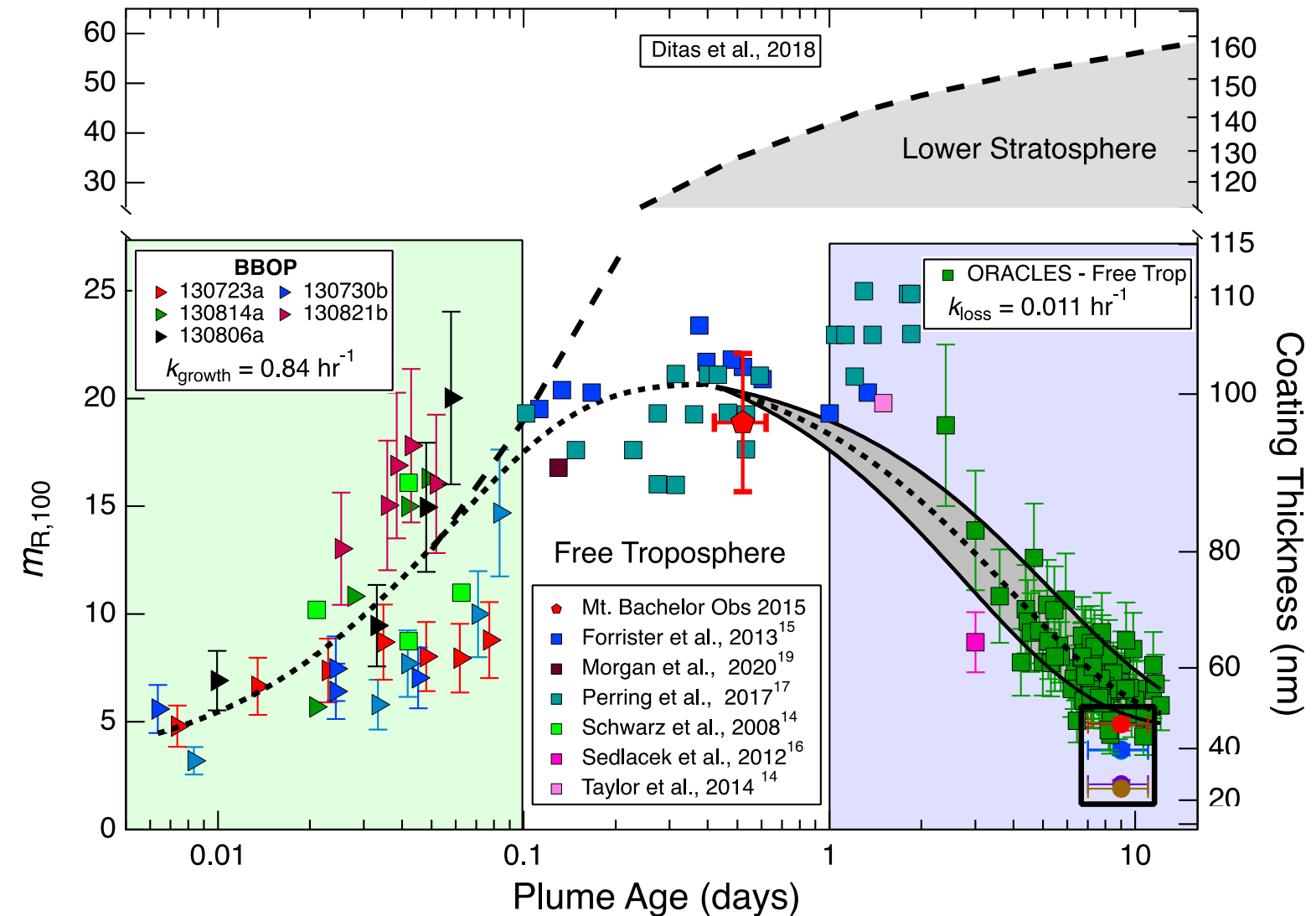
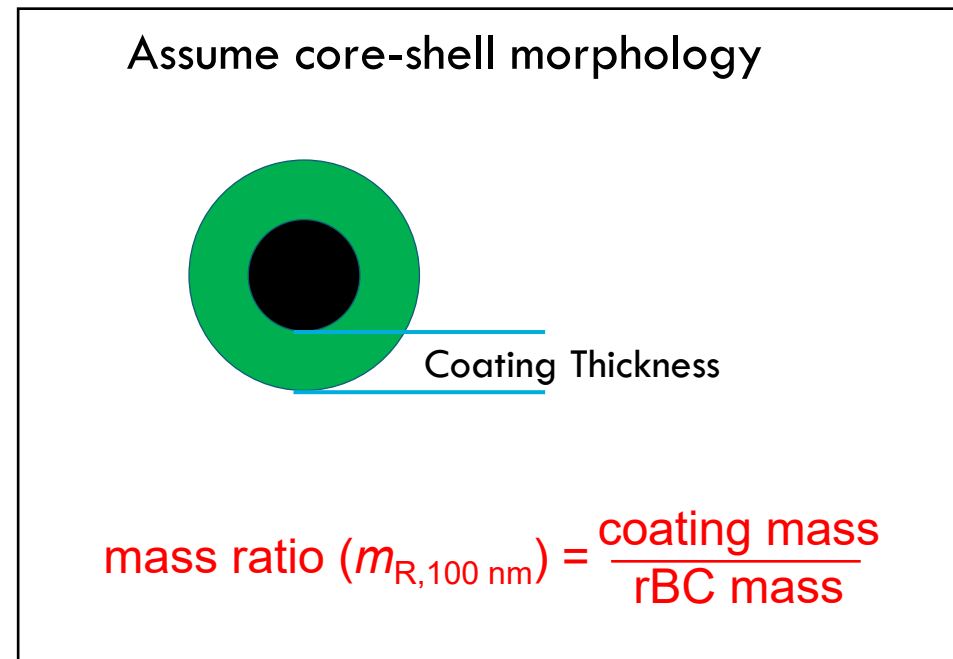
Mixing State of Tropospheric BB-BC Particles is Dynamic Throughout its Lifecycle

As a black carbon-containing particle ages, the amount of **organic coating** will change.

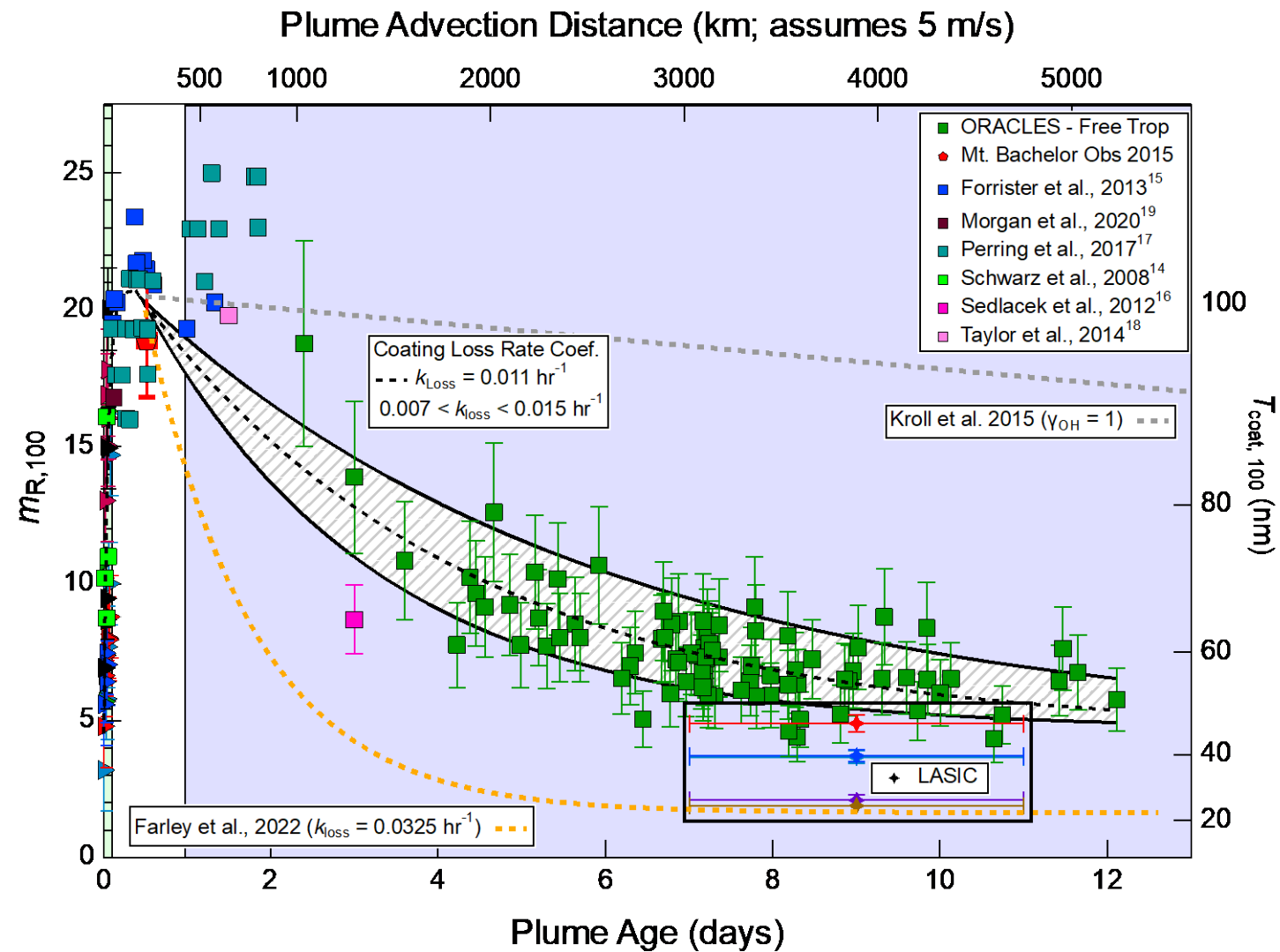
Take advantage that:

1. BC core mass **does not** change with age
2. Amount of **organic coating does** change with age

Use the change in coating thickness to learn about how smoke aerosols age.

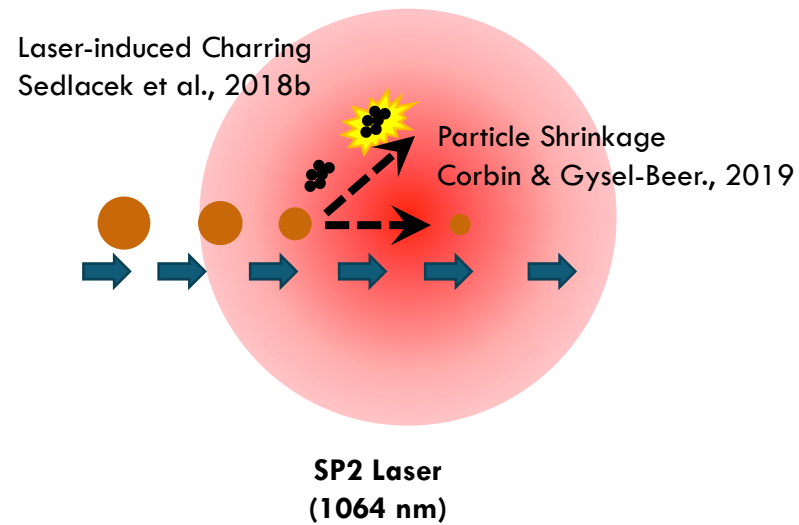
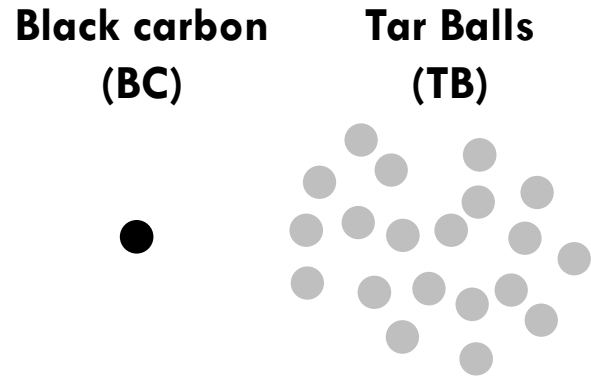


Coating Loss is Dominate Process in Tropospheric BB-BC Particle Lifecycle

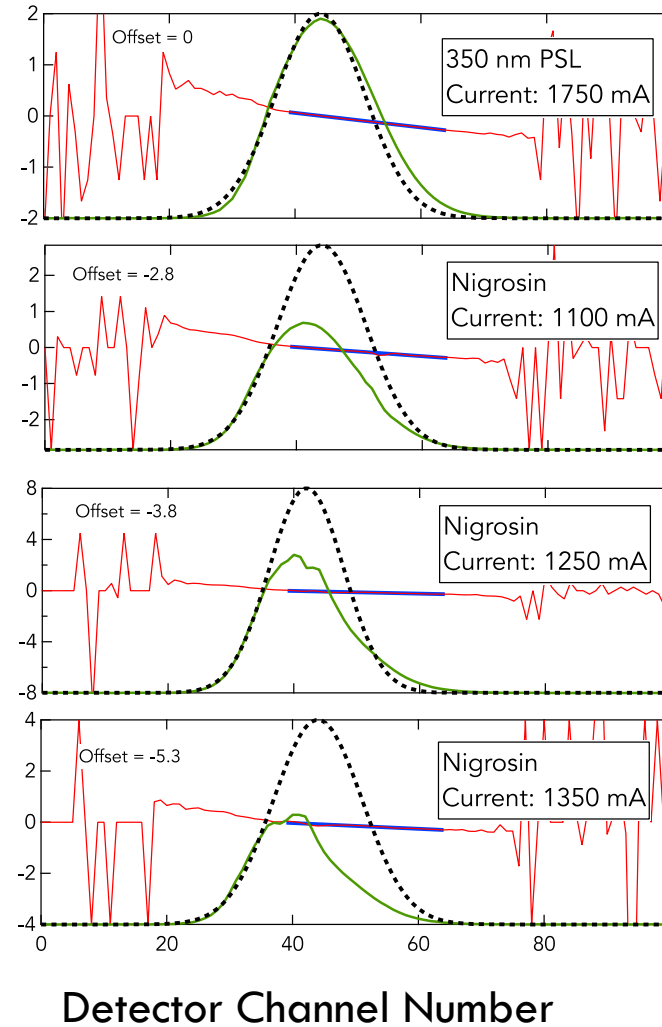


Most models use data collected at or representative of near source emissions

NIR Light Absorbing Aerosols, Non-Black Carbon Particulate Material from Biomass Burning



Nigrosin used for NIR absorbing Particles



Preliminary analysis suggests the presence of NIR light absorbing BB particles

