

Evolution of Tar Balls

Objective: Examine the near field evolution of Tar Balls (TBs) using electron microscopy

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Challenges or needed resources/collaborators:

- Very little is known about the formation mechanism(s) and evolution of Tar Balls.
- AMS measurements may provide useful information on mass loadings and oxidation states of TBs, in addition to microscopy techniques, but the refractory character of TBs may also impact AMS detection efficiency.
- Controlled laboratory study is needed to augment field observations on TB formation and to further examine preliminary heating experiments.

Summary of progress: Evolution of Tar Balls clearly observed in BBOP Samples.

Combining SP-AMS, TEM, SP2 datasets enables estimate of TB mass fraction in plume.

Evolution and Mass Fraction of Tar Balls

Lingering uncertainty about TB Formation mechanism

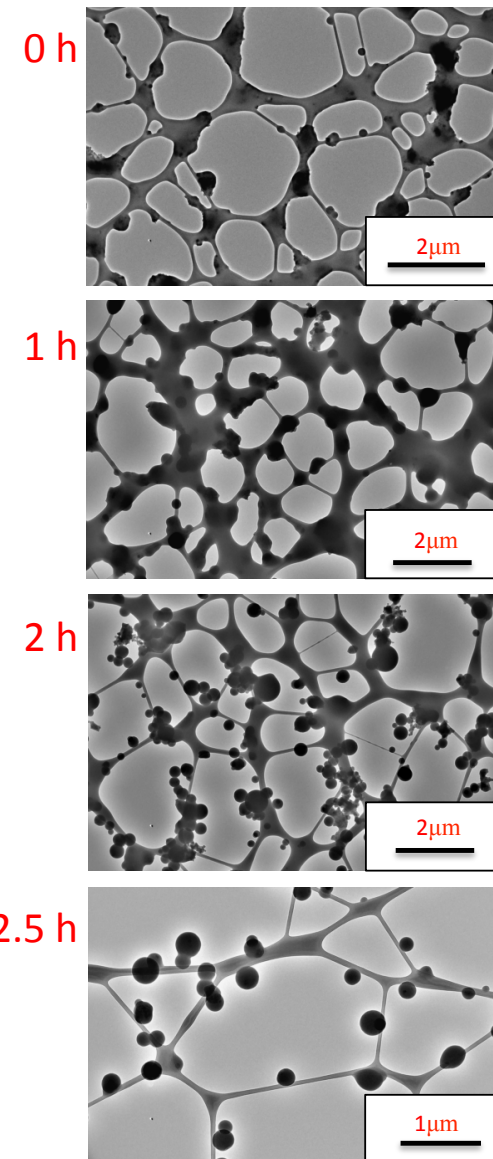
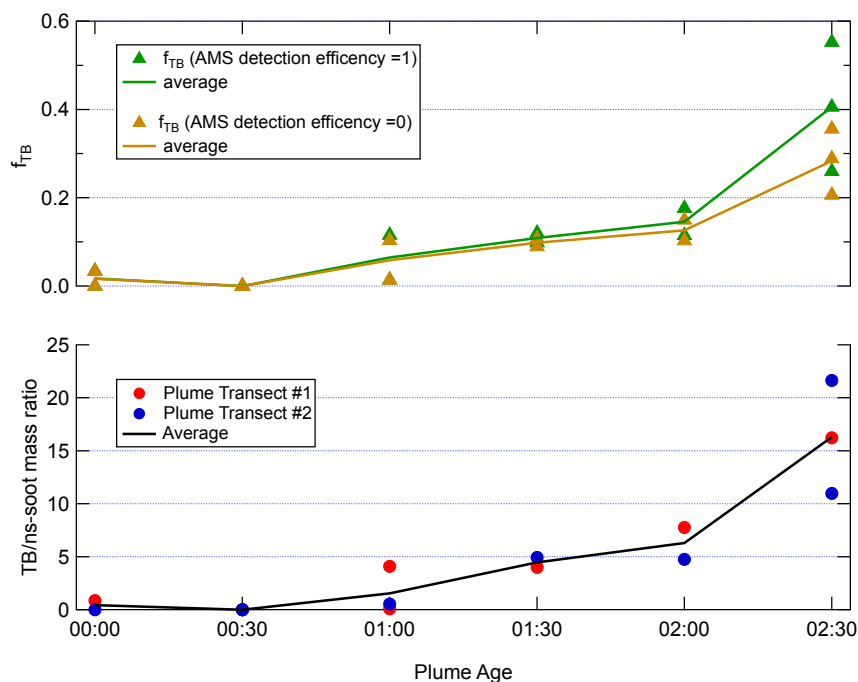
- Primary: rapid heating of primary plant emissions
- Secondary: oxidation/photolysis of POA

BBOP data shows increase in TBs number as a function of plume age

Combine TEM, AMS, and SP2 to estimate the TB mass fraction

- TEM : μ_{TB} , $\mu_{ns-soot}$
- AMS : μ_{org} , μ_{inorg}
- SP2 : μ_{rBC}

rBC (SP2) = soot (TEM)



First report of TB mass fraction, f_{TB}