Status and Direction of Aerosol Best Estimate Product

ARM
Atmospheric Radiation Measurement

- Provides column and vertical profiles of aerosol properties for BBHRP on as nearly continuous basis as possible. Towards this end, measurements were selected based on highest availability/reliability.
- The original goal to augment this baseline with “conditional retrievals” from lidar and IAP profiles has been in in competition efforts to implement it for new sites.

ABE at SGP

- **AOD:** MFRSR C1, Raman Lidar, regression vs RH(sfc), tscat(sfc), and RH_{BL}
- Angstrom exponent: MFRSR, RL, AOS
- ext(z): climatology versus season and AOD
- ssa(z) and g(z): AOS surface tscat, bscat humidified thru sonde RH profile using measured f(RH) with abs coef assumed constant thru BL
- Processed 2000 to 2005, thanks to Chitra Sivaraman. 2006-present available shortly.

ABE at NSA

- **AOD:** MFRSR and NIMFR, regression vs RH(sfc), tscat(sfc), and RH_{BL}
- Angstrom exponent: MFRSR, AOS
- ext(z), ssa(z), and g(z): AOS surface tscat, bscat humidified thru sonde RH profile using proscribed f(RH) with abs coef assumed constant thru BL
- Processed 2004 only but no fundamental limitation to further processing.

Next steps

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- Adopt mergesonde for consistency with BBHRP
- Future sites are missing critical inputs to ABE
  - TWP, no surface aerosol measurements
  - Pt. Reyes, sparse AOD
- Fill out SGP ABE with complementary measurements.
  - Develop MPL extinction climatology similar to RL.
  - AOD and angstrom exp from all possible sources.
  - Column SSA and g retrieved from radiometers
- Use this more robust set to improve the estimate but also to validate techniques when missing elements.

For example, ABE at TWP

Suffers from lack of AOS surface measurements.

1. Use MPL ext(z) climatology for ext(z).
2. Retrieve column SSA and g from MFRSR or Cimel.
3. Distribute column SSA and g vertically with the extinction profile from the lidar climatology.

We are struggling for little information regarding the "proper" distribution of these column quantities but could provide two estimates assuming well mixed versus stable.

ABE at Pt. Reyes, other AMF?

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- Pt. Reyes may be challenging due to sparse AOD availability. First cut might be to extrapolate AOS surface properties as at NSA to generate vertical profiles of ext, SSA, and g.
- Compare to MPL ext profile “calibrated” (that is scaled) to match AOS at surface.

Evaluate ABE with SGP IOPs

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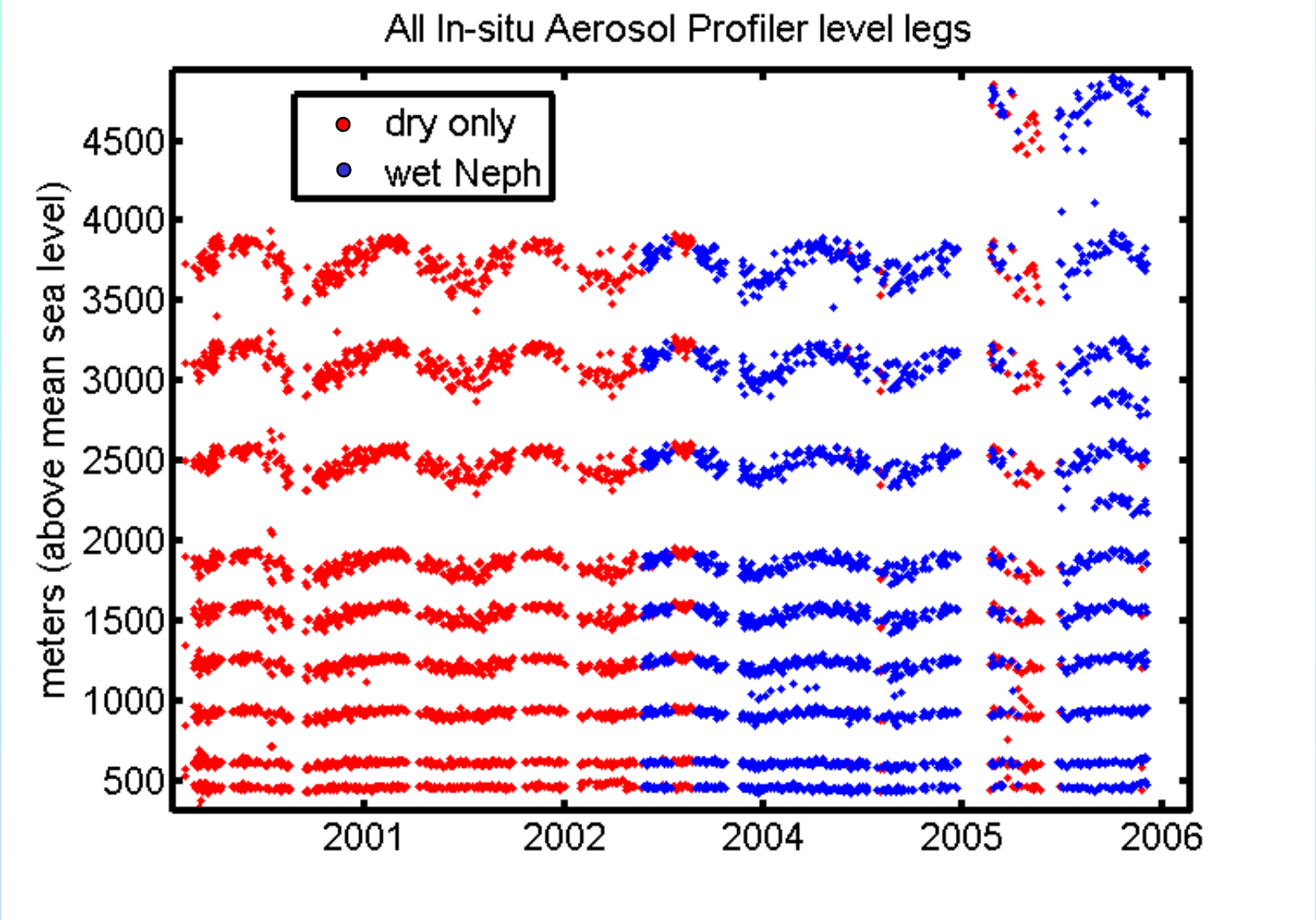
- Aerosol IOP 2003
- Alive IOP 20095
- CLASIC/CHAPS

- And with IAP profiles. We have over 2500!

Compare SGP IAP vertical profiles to ABE vertical profiles. Many many cases.

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