Accuracy requirements of data products and their challenges

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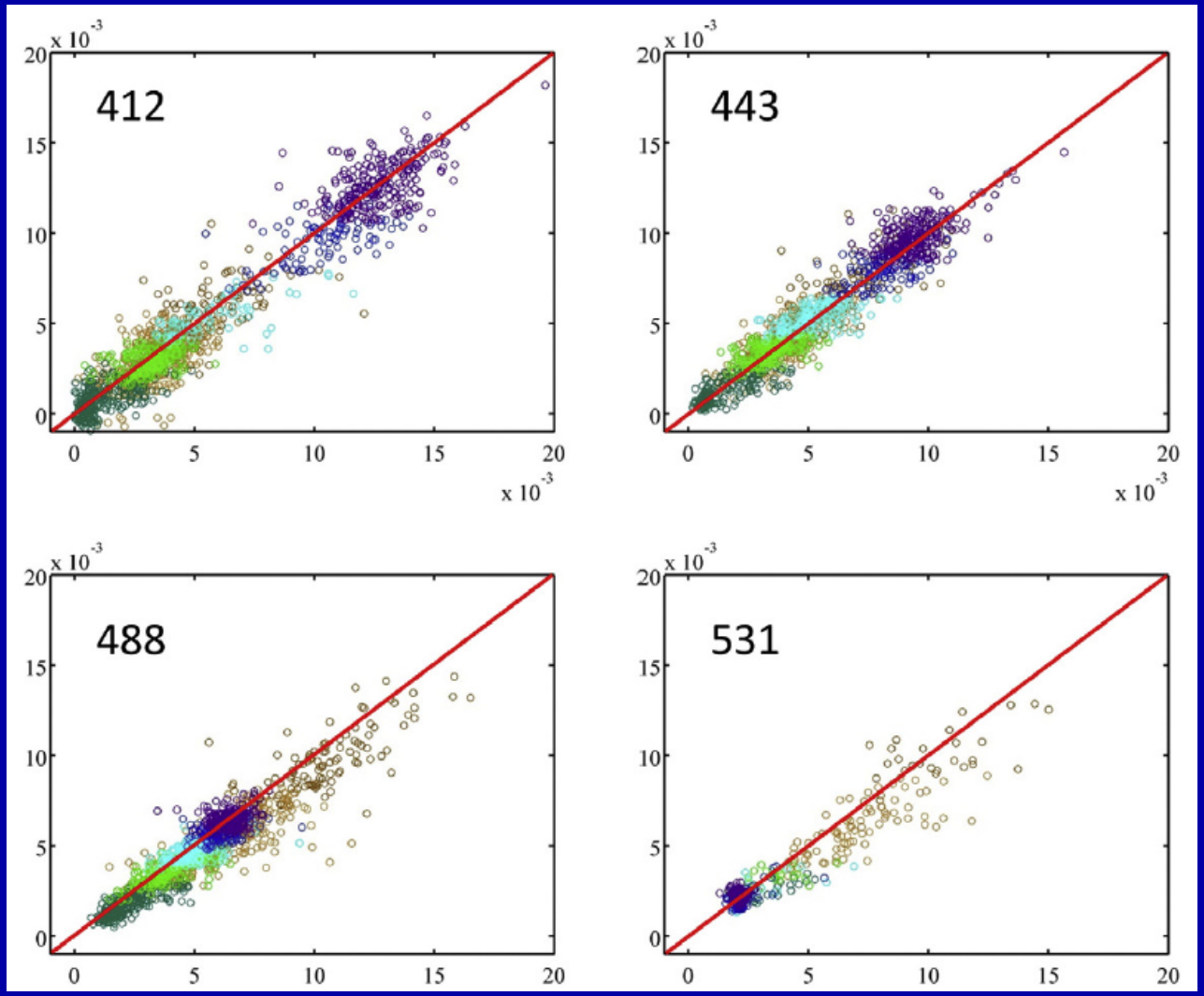
Questions

- What are the uncertainties in the current satellite-derived products
  - Definition of uncertainties
    - RMS difference? Mean absolute difference? Spatial/Temporal scales
  - Rrs uncertainties
    - Global, regional, fixed locations (numerous papers)
    - Typically ~>10% between satellites and field Rrs for blue bands
- Can current algorithms and processing approaches meet the requirements GEO-CAPE mission goals, e.g., resolving diurnal changes?

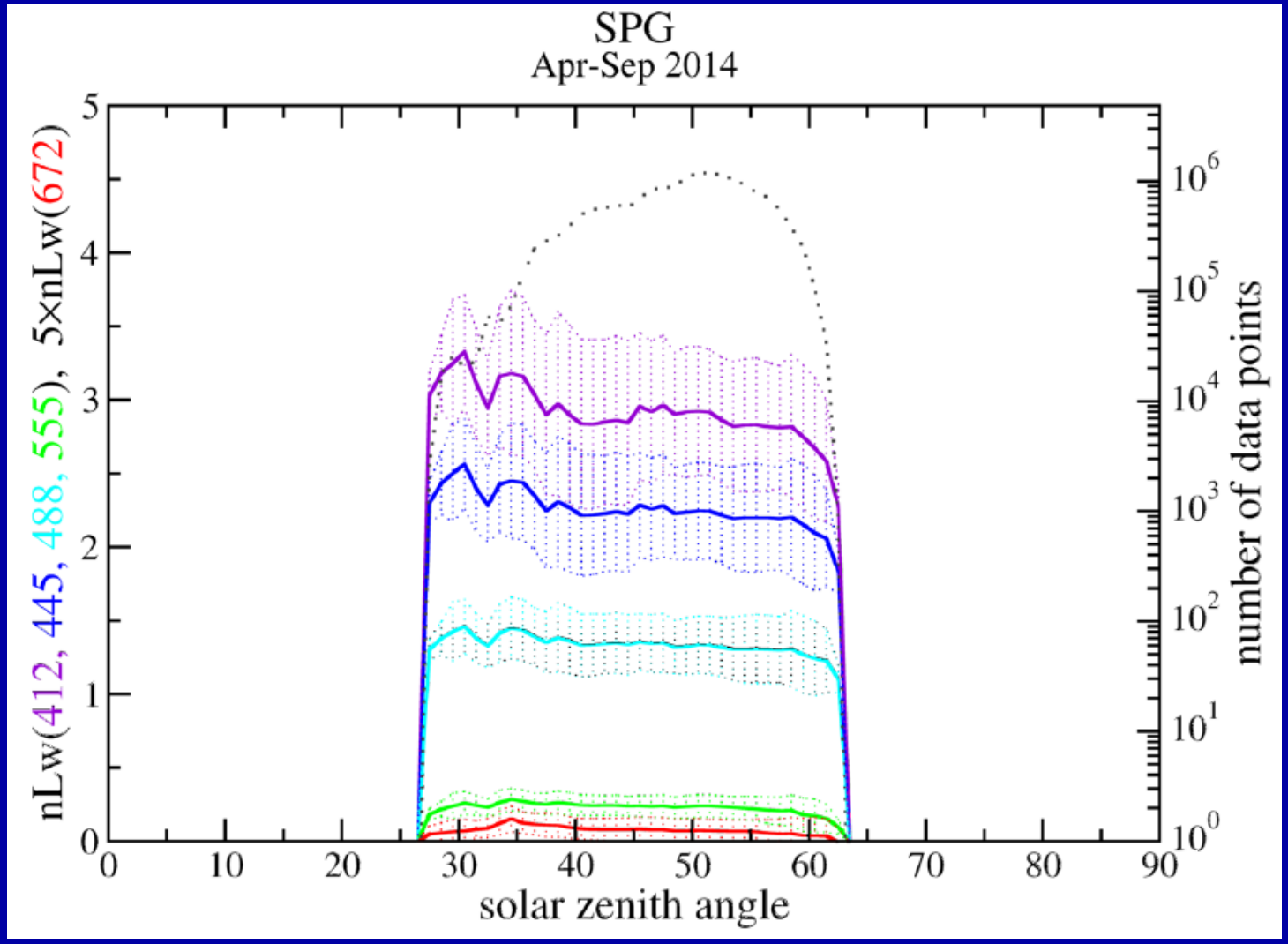
Rrs uncertainties from satellite – in situ matchups

From Moore et al. (2014, RSE), different water types are color coded



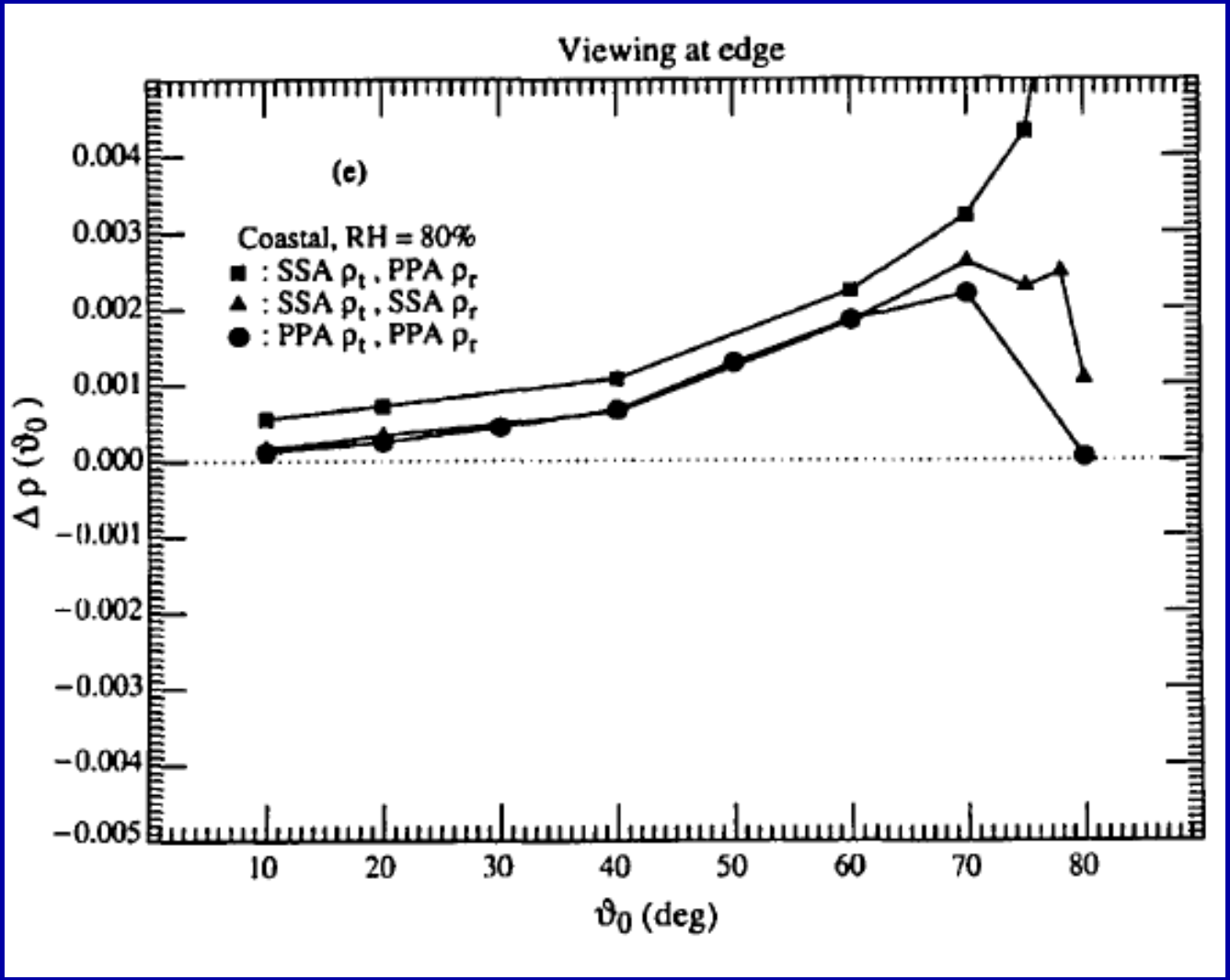
Dependence on solar zenith angle

From Mikelsons et al. (unpublished), NOAA/NESDIS, VIIRS analysis



Dependence on solar zenith angle

From Ding and Gordon (1994) radiative transfer simulations



Questions

- Can current algorithms and processing approaches meet the requirements GEO-CAPE mission goals, e.g., resolving diurnal changes?

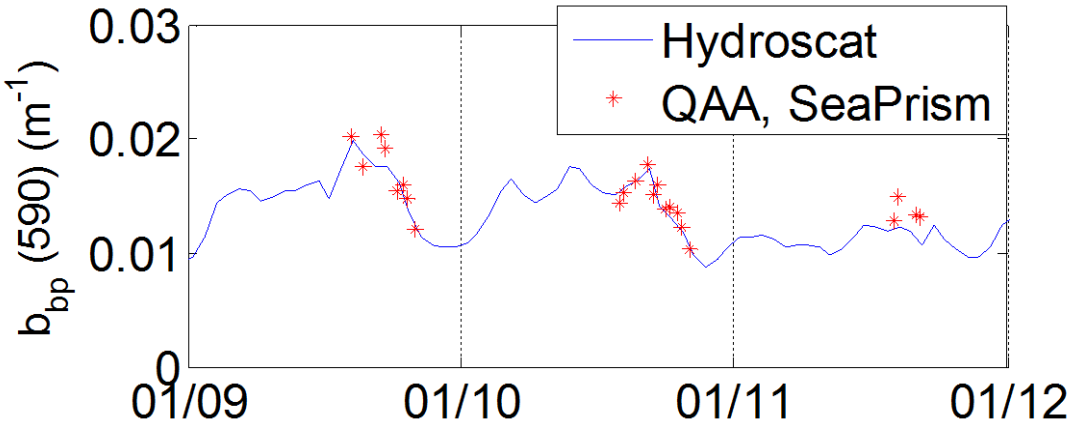
MVCO

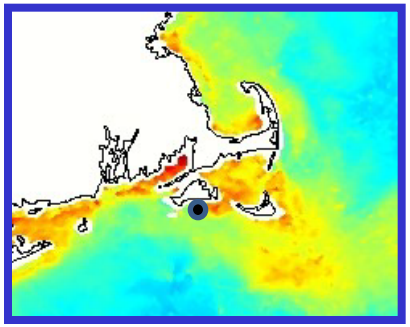
in situ Hydroscat-6

AERONET-OC / SeaPRISM,

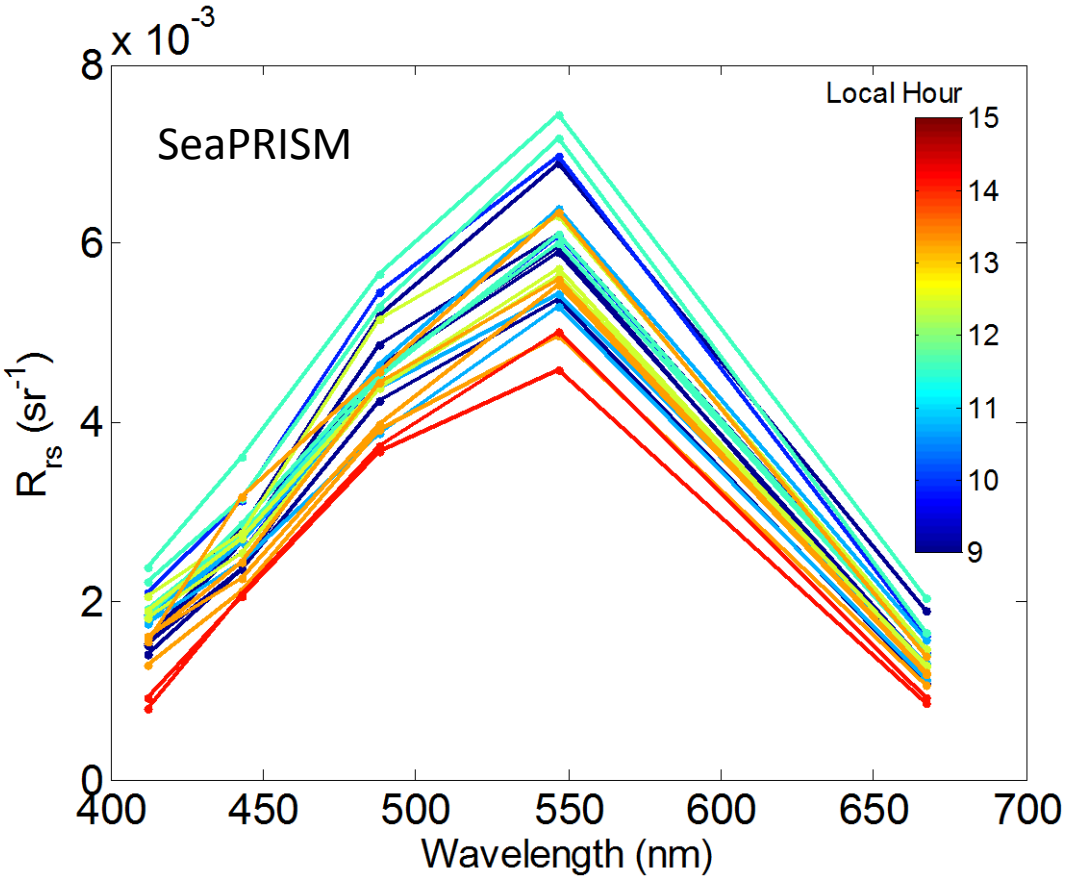
* IOPs from QAA algorithm

3-day period



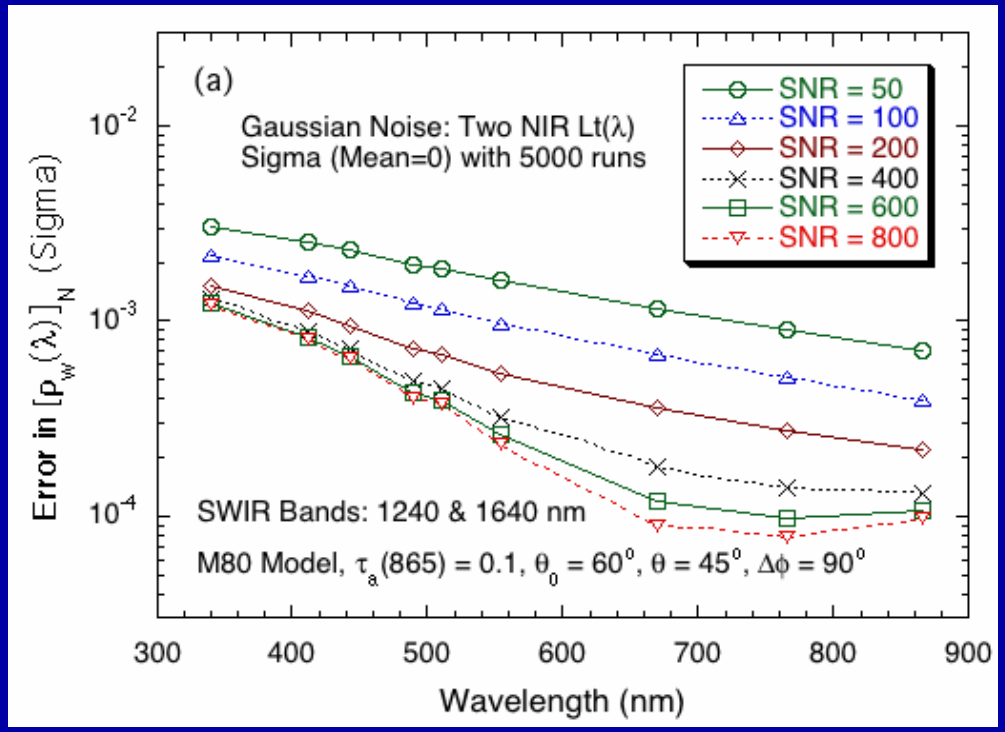


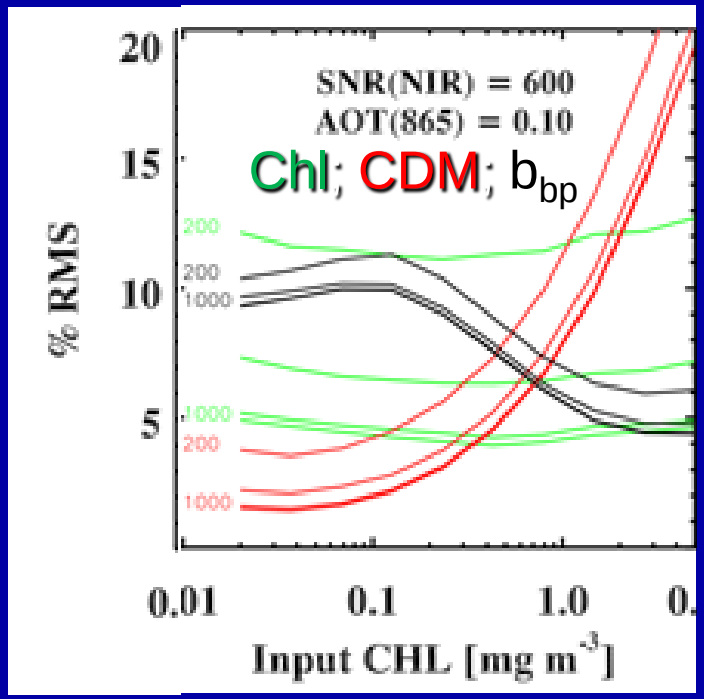
Sosik, Feng, et al.



Error propagation and error tolerance

From ACE whitepaper by Menghua Wang et al.





Some remarks to stimulate discussion

- Satellite Rrs uncertainties higher than the Gordon & Wang algorithm limit.
  - These represent point-to-point matchups. When averaged over larger spatial and longer temporal scales, uncertainties will reduce
- Diurnal changes in the examples are typically 50% - 100%.
  - Field Rrs can resolve these changes with existing algorithms. How about satellite Rrs?
- Algorithm improvement in both atmospheric correction and bio-optical inversion – need to consider error tolerance
- How do we reduce Rrs uncertainties for large SZA?