EPIC spectral observations on the global mean and variability of Earth's reflectance

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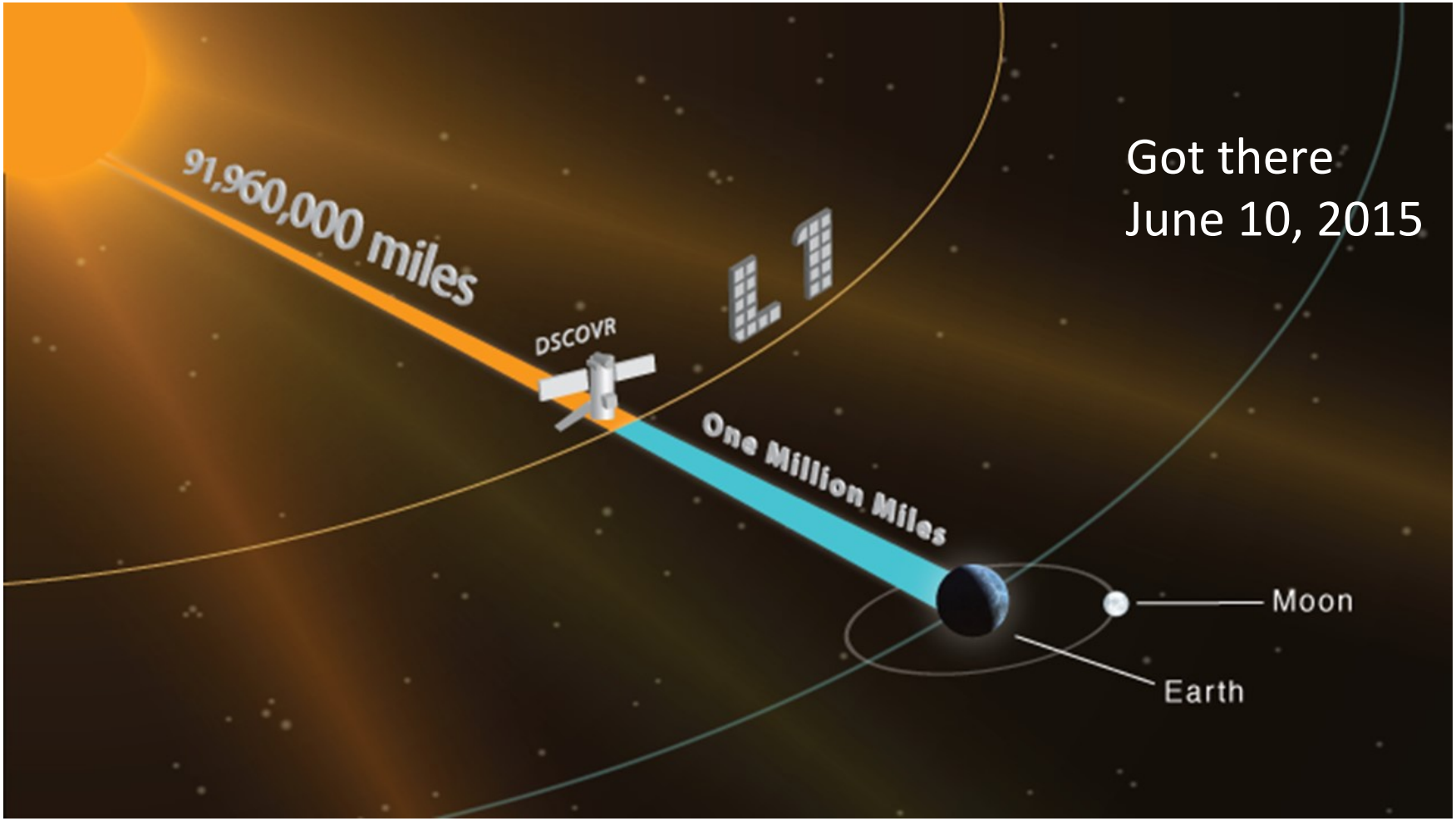
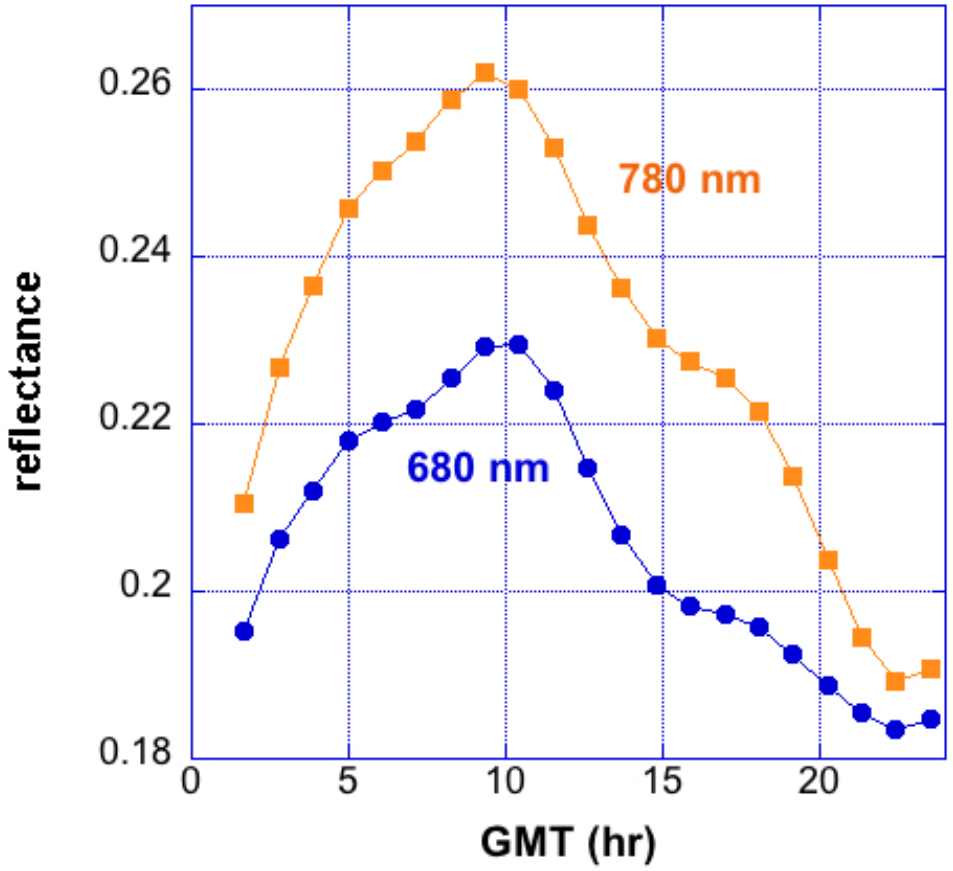
DSCOVR at Lagrange-1



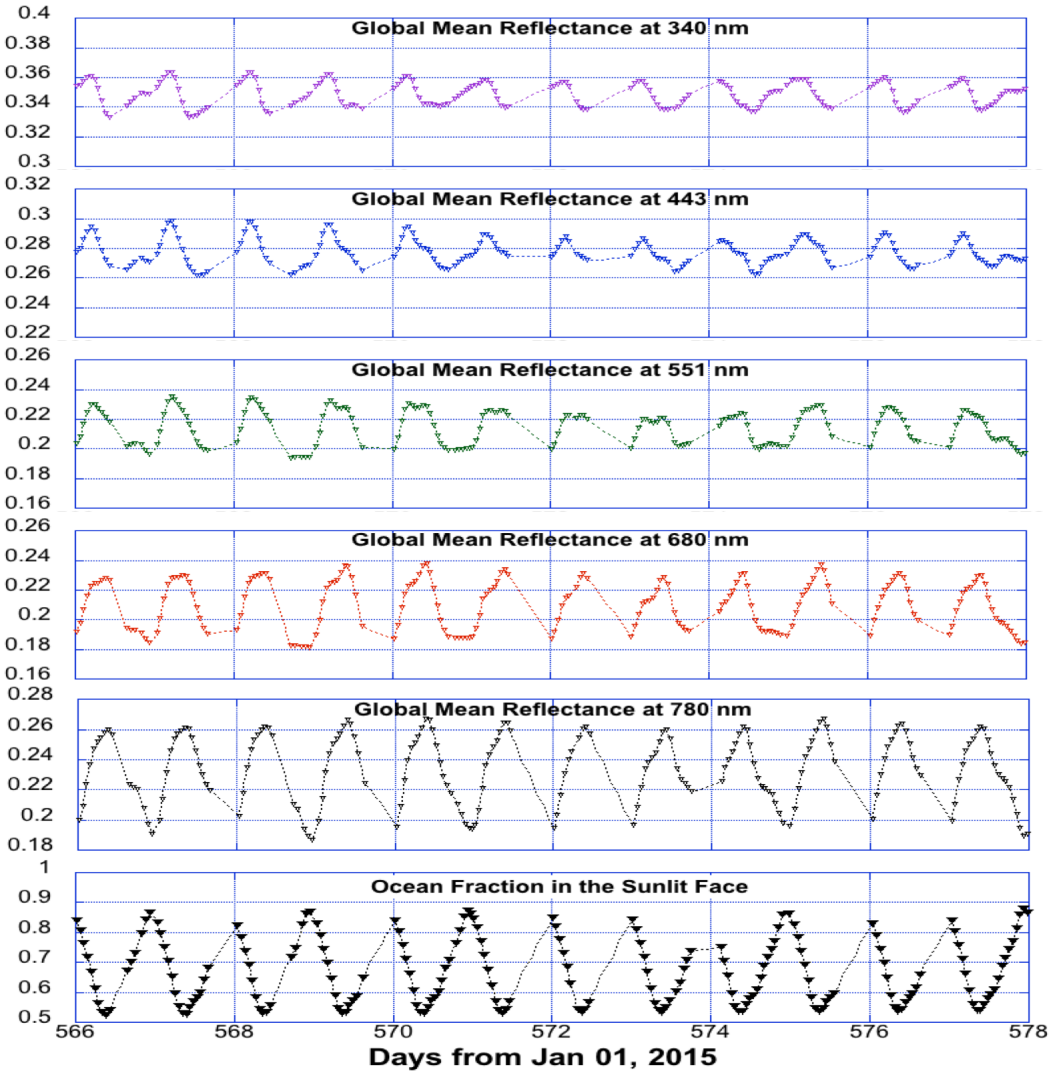
At L1, the neutral gravity point between the Sun and the Earth, DSCOVR will remain near the same position relative to the Earth and Sun

How variable is the Earth's reflectivity during the day?

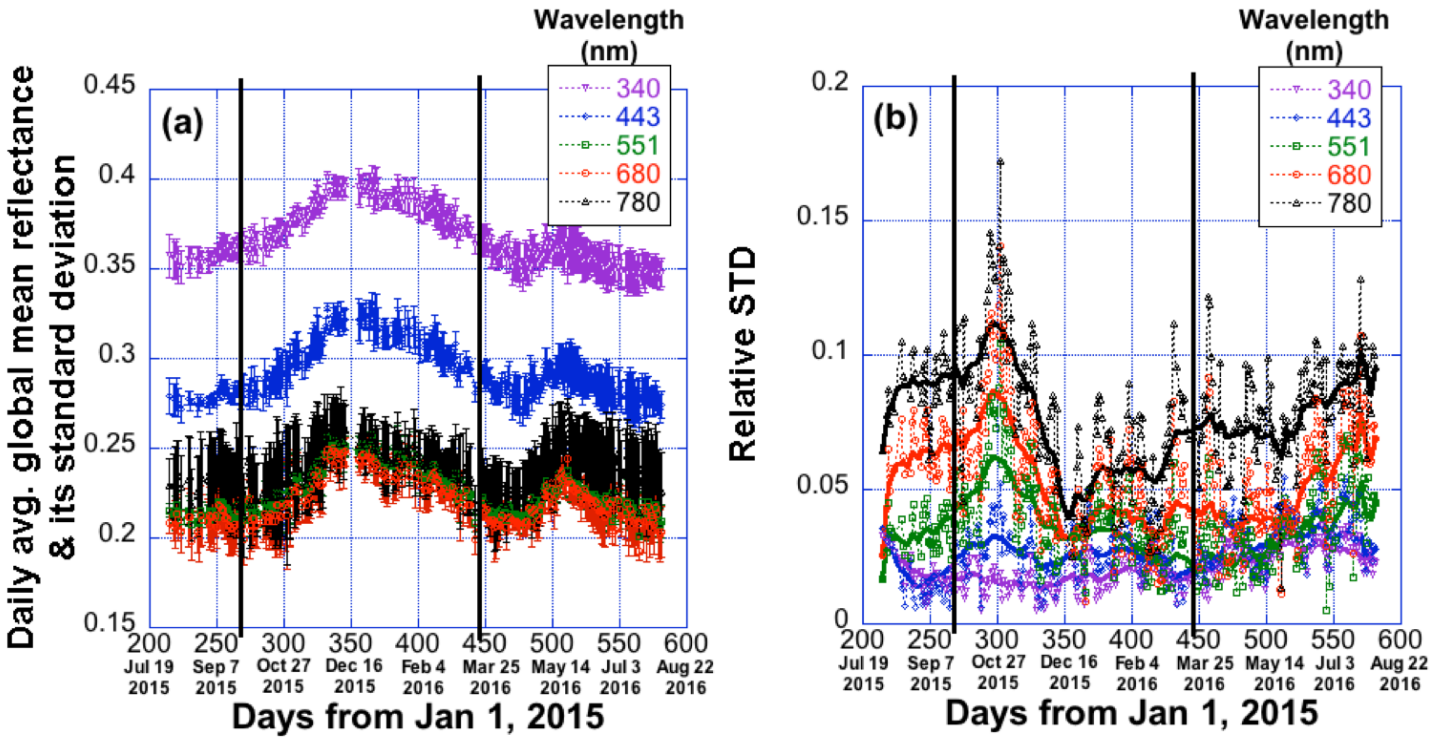
Day 571, July 31, 2016



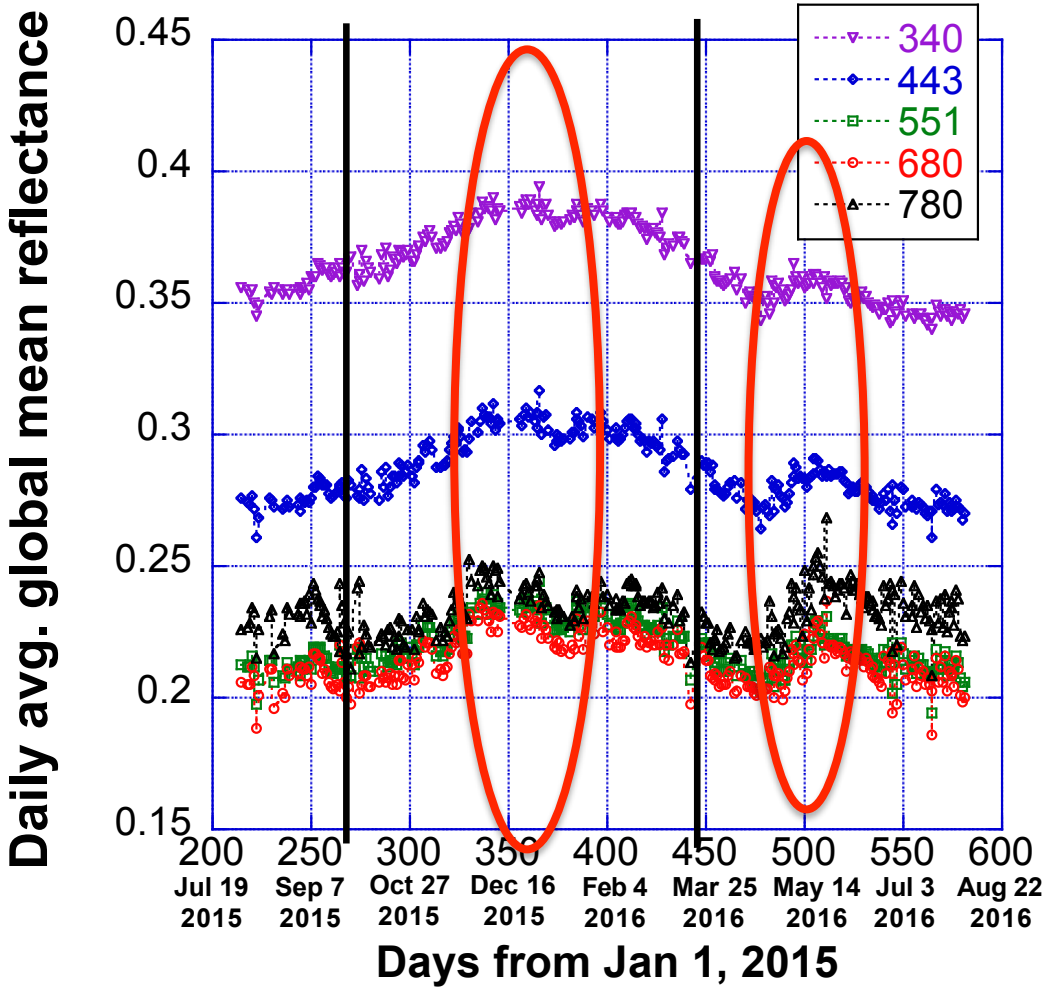
How variable is the Earth's reflectivity during the day? its relations with ocean fraction of the sunlit face



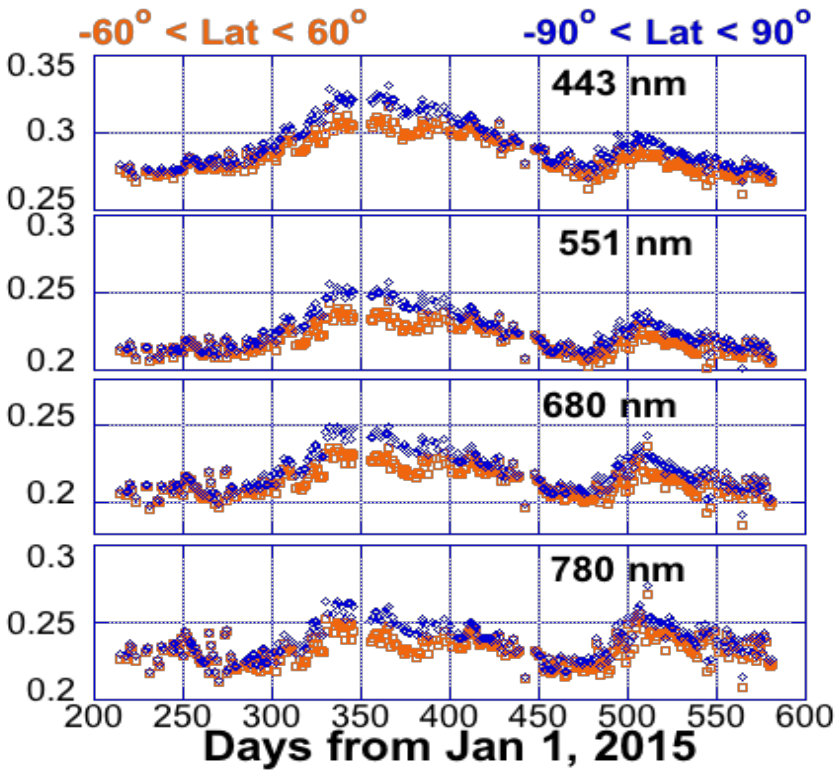
Daily avg. reflectivity and its diurnal variability during the year

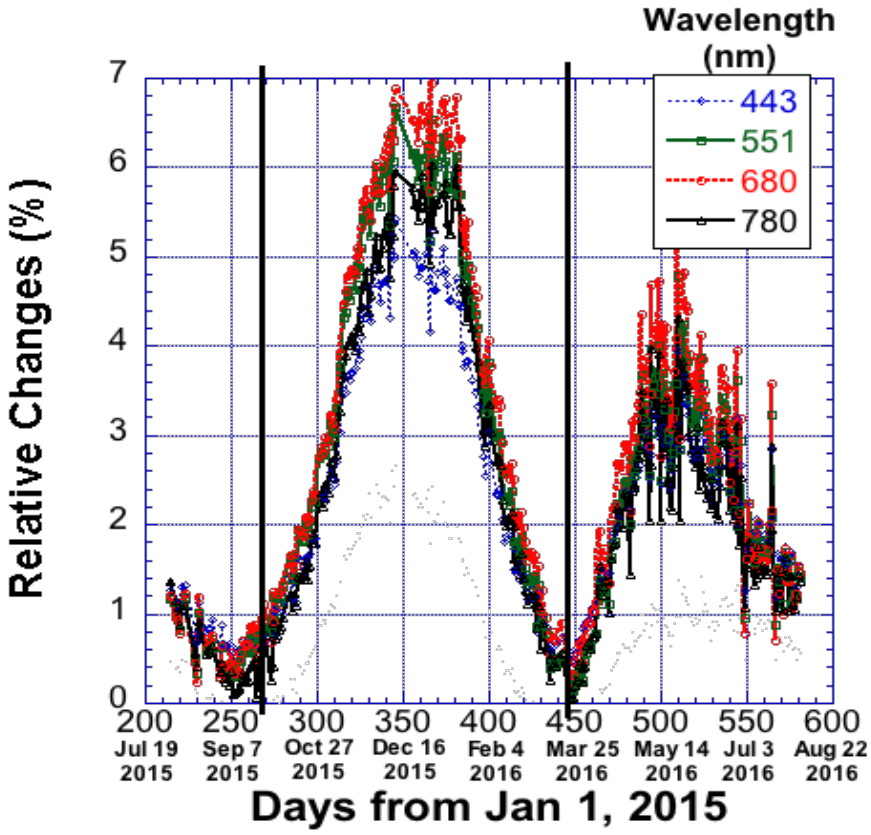


Features in the variability during a year



How bright are the Earth's polar regions?

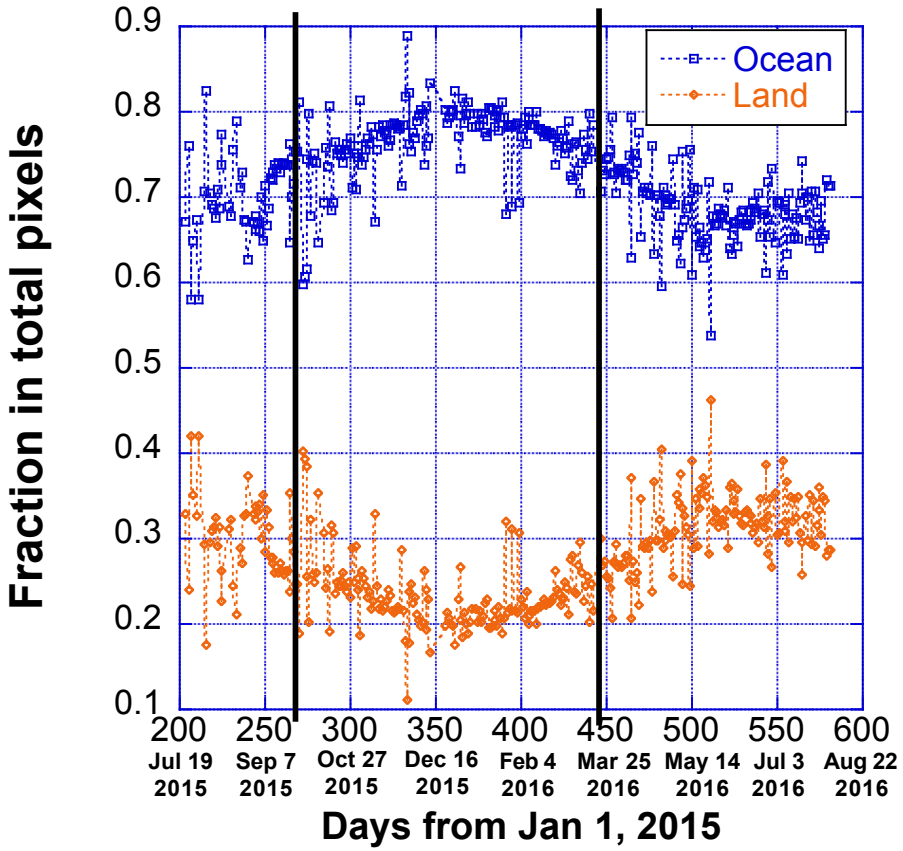




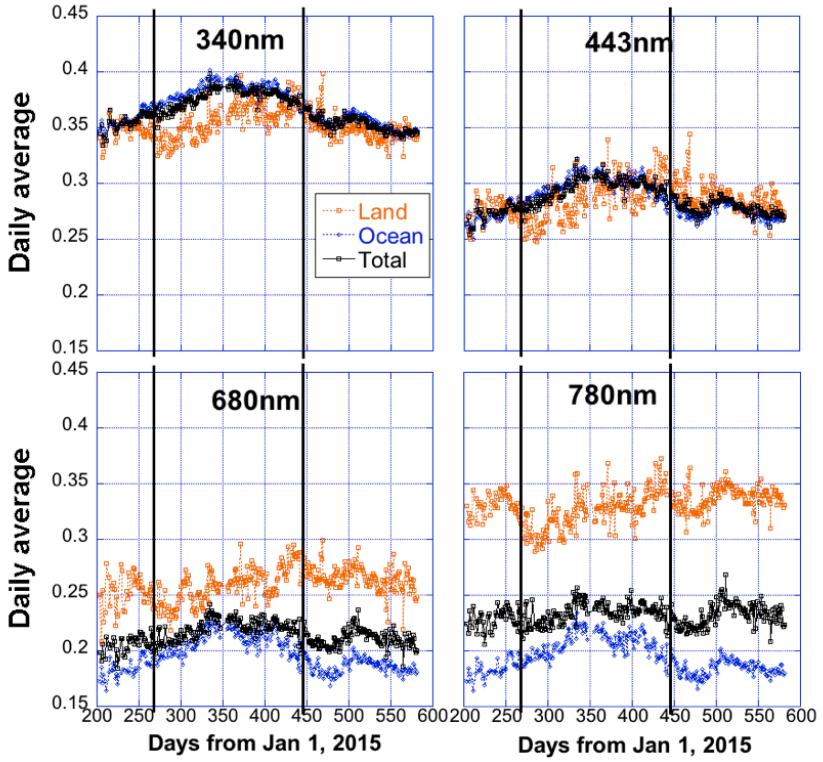
Spectral difference in reflectance between the whole Earth with and without the polar regions (60°N to 60°S).

Land and ocean pixels

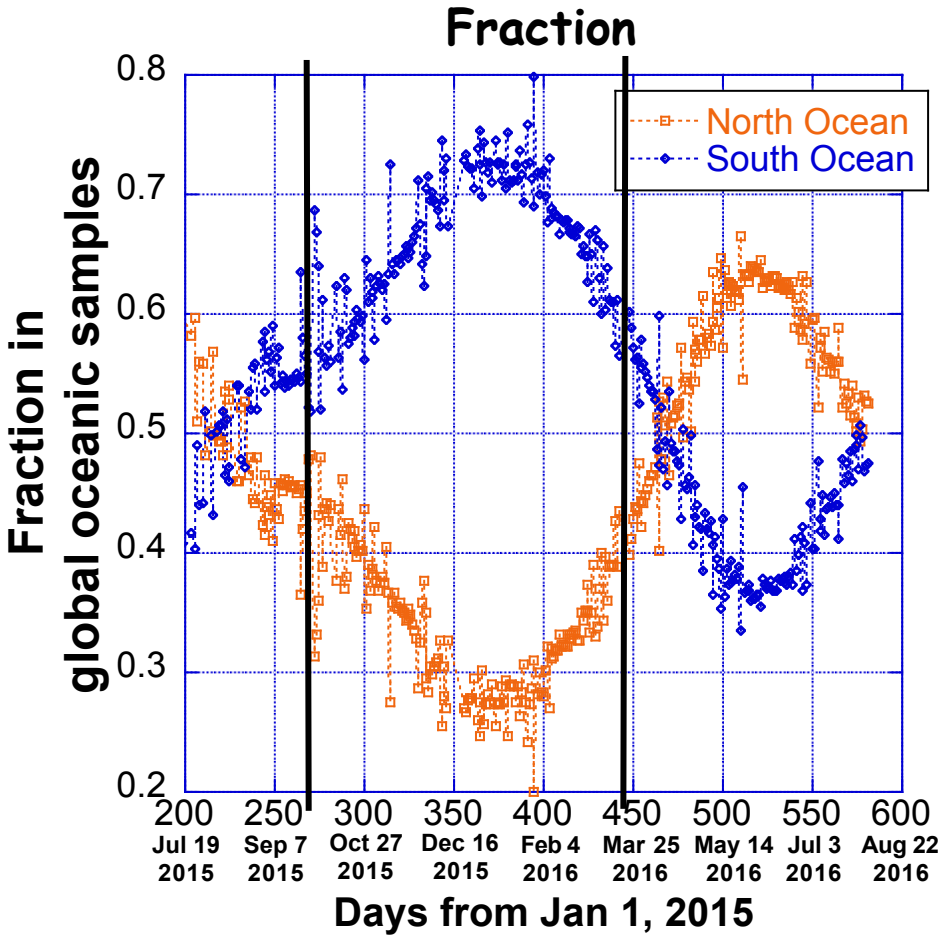
Fraction of land and ocean pixels

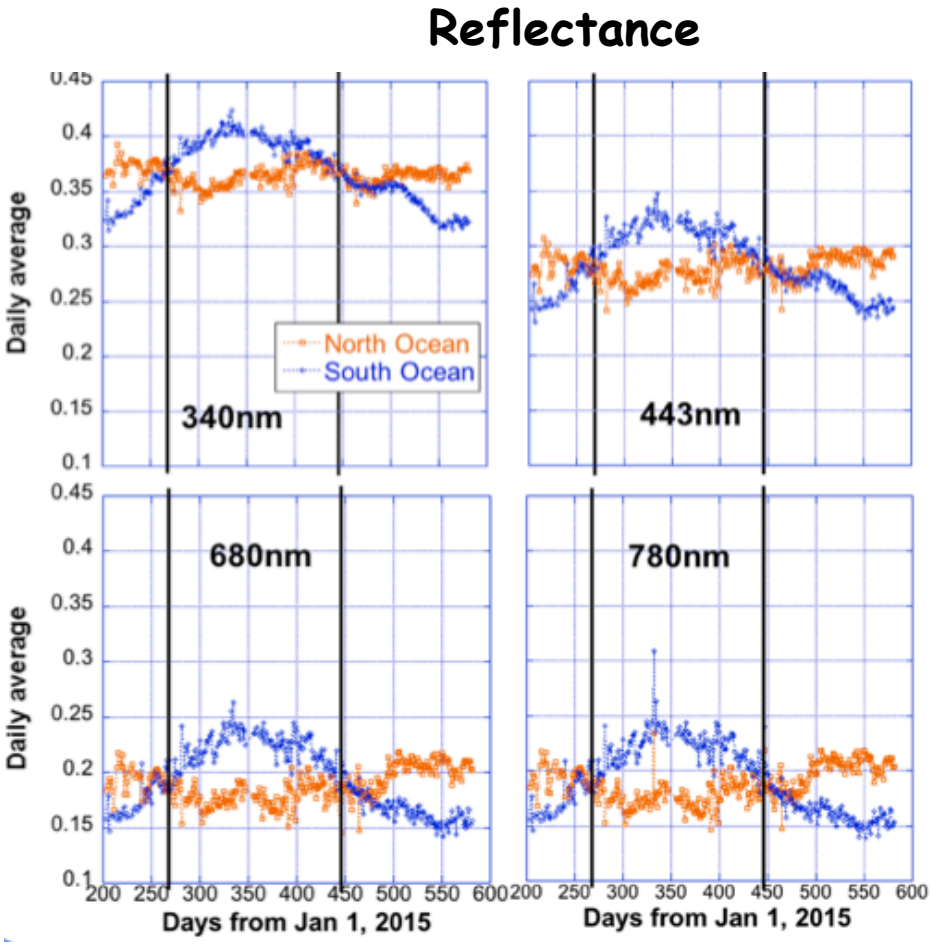


Reflectance of land and ocean pixels

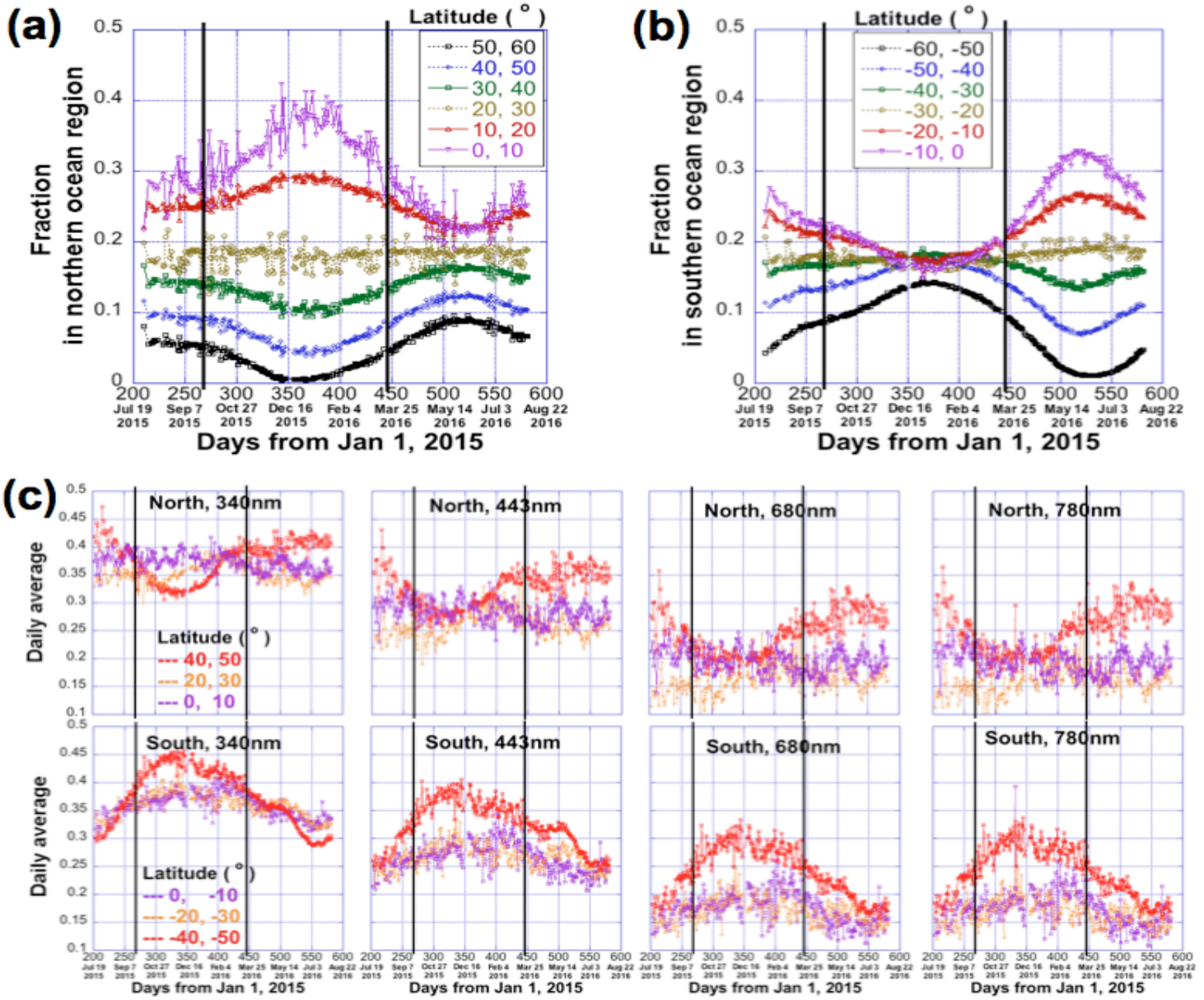


South and North Oceans



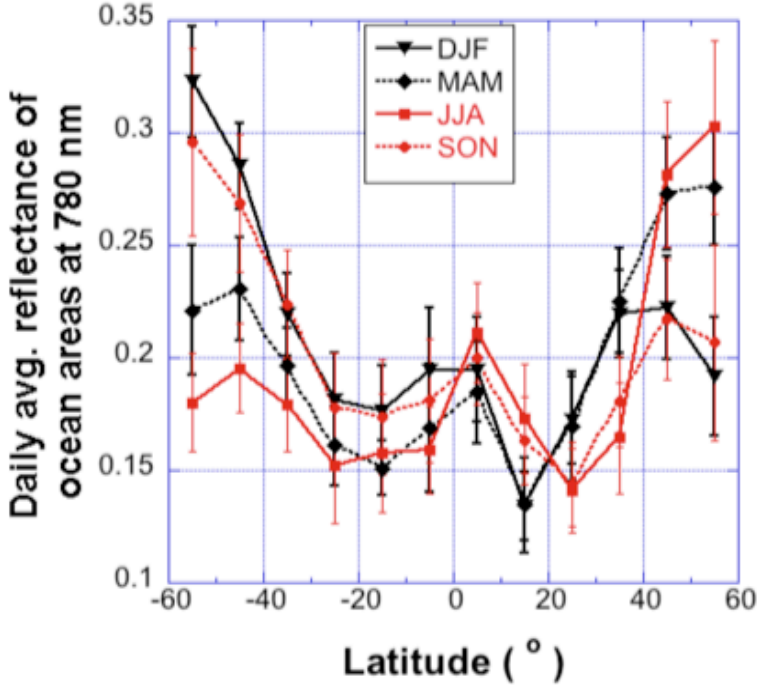


Dependency on latitudes

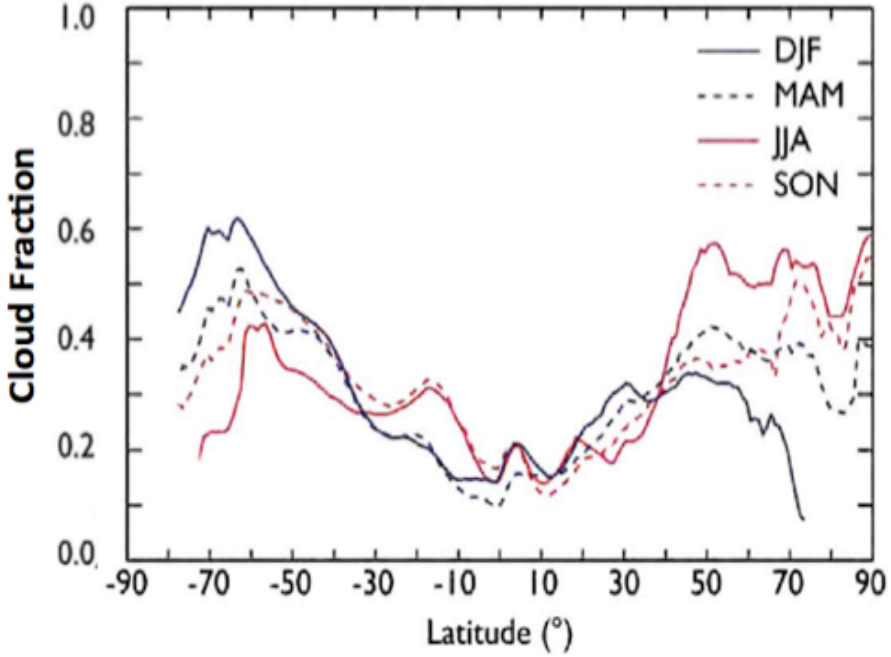


Effect of clouds:
Reflection from ocean at different latitudes

(a) Daily avg. reflectance at 780nm over ocean from EPIC.



(b) Liquid water clouds over ocean from MODIS observations by King et al., 2013.



Take home message

- The variability of Earth's reflectivity is about 10% during the day; the around-noon-measurements do not represent daily averages, at least over clouds;

- The Earth polar regions increase the Earth brightness by 5-7% in winter and 3-4% in summer;

- Earth's global spectral reflectivity is determined by
  - land over ocean ratio and
  - distribution of clouds