

WHY

Aerosol-cloud interactions constitute one of the largest uncertainties in climate research. To extend our understanding (beyond processes in microphysics we turn to global observations. Here, correlations between retrieved aerosol and cloud properties of the MODIS sensor are explored to provide clues on aerosol-cloud interactions and to assist in the evaluation of theoretical concepts in global modeling

AEROSOL-CLOUD INTERACTIONS

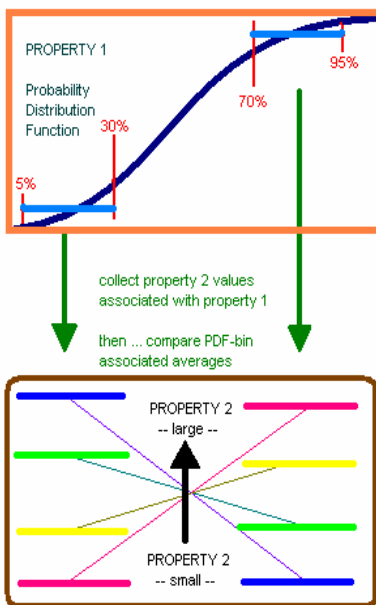
Correlations among retrieved properties with the MODIS sensor

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CONCEPT

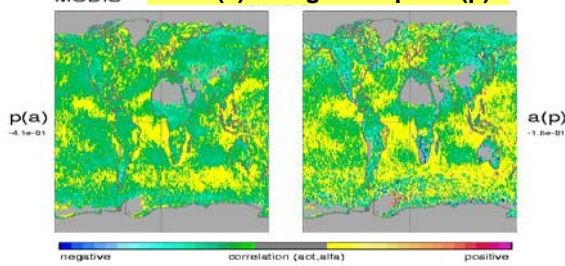
- rank by value all data (MODIS daily 10^*10^0 data) of Properties 1
 - determine averages for the value falling into the 5-30% and 70-95% range of the prob.distr.function
 - determine averages from the associated values of Property 2
 - determine correlation if slopes among averages of each property agree (+) or disagree (-)
 - determine correlation strength from steepness in slope of associated Property 2.
- [Property 2 (Property 1)]
- repeat procedure by exchanging properties [Property 2 (Property 1)]



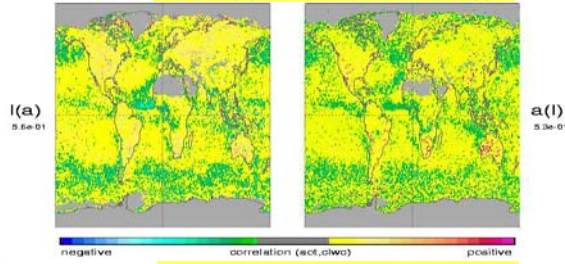
CORRELATION strong negative strong positive
 weak negative weak positive

Selected Correlations ⇨

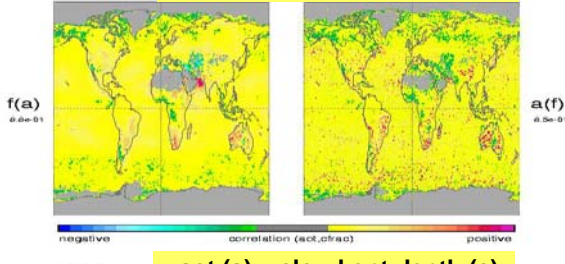
• aot (a) – Angstrom para. (p)



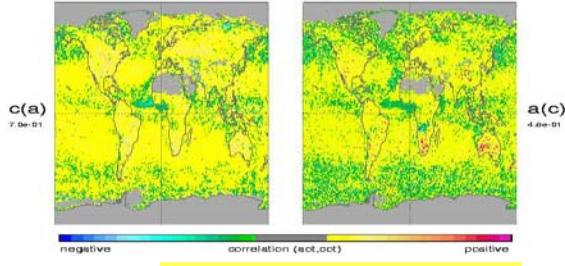
• aot (a) – cld liquid water (l)



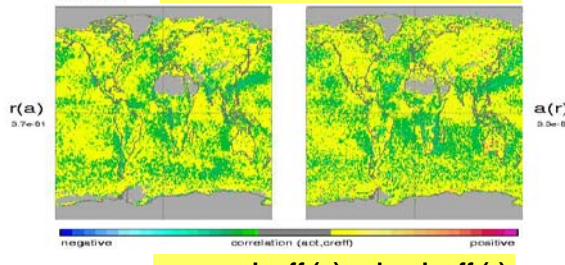
• aot (a) – cloud fraction (f)



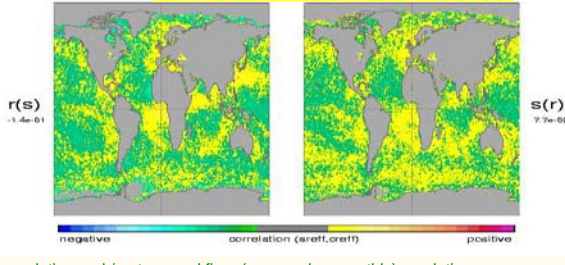
• aot (a) – cloud opt.depth (c)



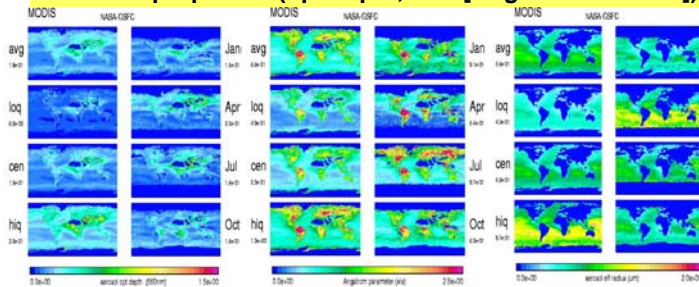
• aot (a) – cloud reff (r)



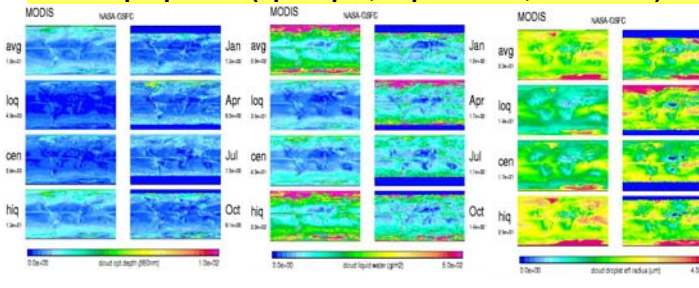
• aerosol reff (s) - cloud reff (r)



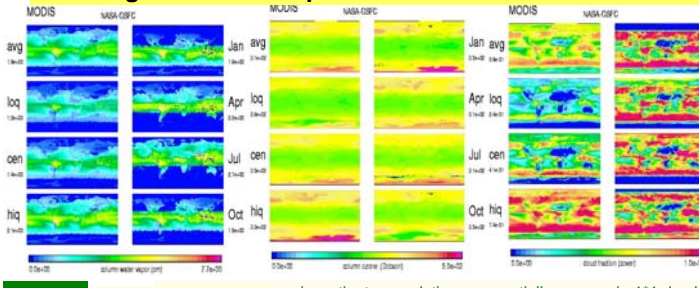
• aerosol properties (opt.depth, size [Angstrom and reff])



• cloud properties (opt.depth, liquid water, eff. radius)



• trace-gases: water vapor and ozone / cloud cover



next steps

- investigate correlations on spatially coarser (> 1° deg lat/lon) resolution and / or temporal finer (seasonal or monthly) resolution
- include adjacent data-points for better statistics and / or investigate correlations between data combinations (e.g only clouds at low altitudes)
- expand from correlation pairs to correlation investigations involving associations to multiple properties (tighter constraints to interactions)