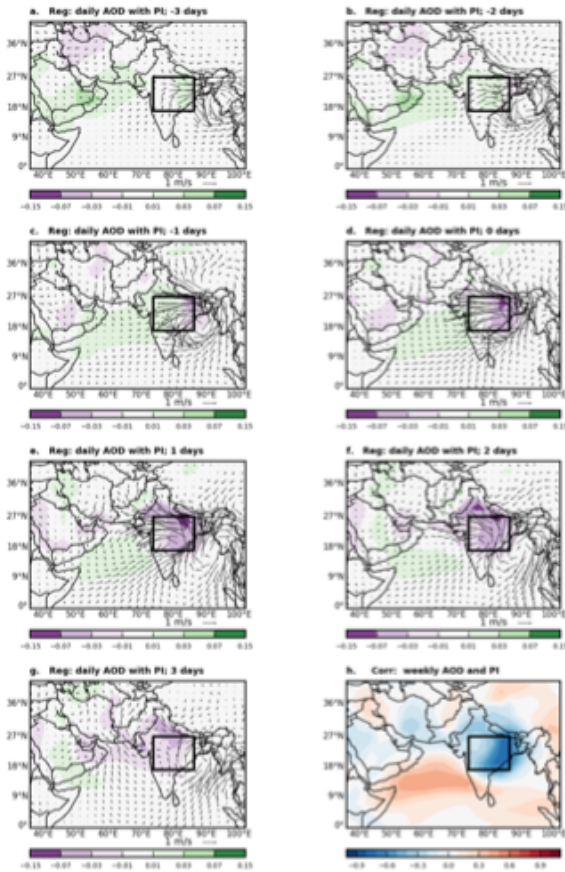


Revisiting the observed correlation between weekly averaged Indian monsoon precipitation and Arabian Sea aerosol optical depth

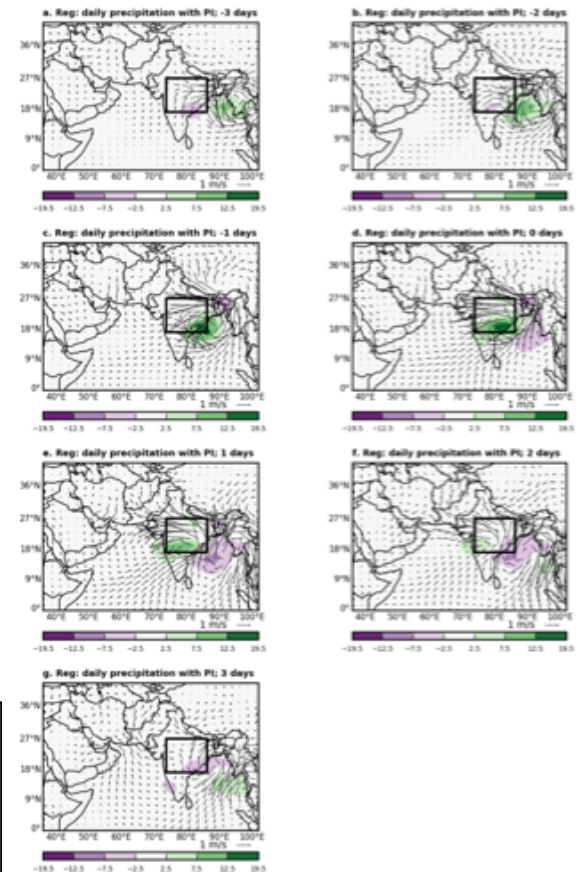
Disha Sharma and Ron L. Miller (2017), *Geophys. Res. Lett.*, 44, doi:10.1002/2017GL074373.



Dust Aerosol Optical Depth

- Indian monsoon rainfall is larger during weeks when the aerosol concentration is higher over the Arabian Sea. The increase of rainfall has been hypothesized to result from radiative heating by soil dust particles transported from the Arabian Peninsula.
- The NASA GISS Earth System ModelE reproduces the observed correlation between weekly rainfall and dust, despite the omission of dust radiative heating (left figure, panel **h**).
- This suggests that the weekly correlation results from the effect of precipitation on dust emission and transport through the cyclonic circulation associated with the synoptic monsoon depressions that travel westward from the Bay of Bengal (right).
- Low-level winds that deliver moisture to the depression raise dust far upwind, including over the Arabian Peninsula.
- ModelE suggests that synoptic variations of Indian monsoon precipitation enhance dust emission and transport to the Arabian Sea. The feedback of dust radiative heating upon weekly monsoon variations remains to be determined.

Caption: Regression of *daily average* (left) dust aerosol optical depth (AOD) and (right) precipitation with the daily normalized central India Precipitation Index (PI), constructed from precipitation averaged within the rectangle. The vectors show the regressed model winds near 840 hPa. The lag is relative to the PI; for negative lags, AOD leads precipitation. (left, panel **h**: correlation of *weekly averages* of AOD and central India PI.)



Precipitation