

# Model Analysis of high Aerosol Loads over India

As observed by MISR

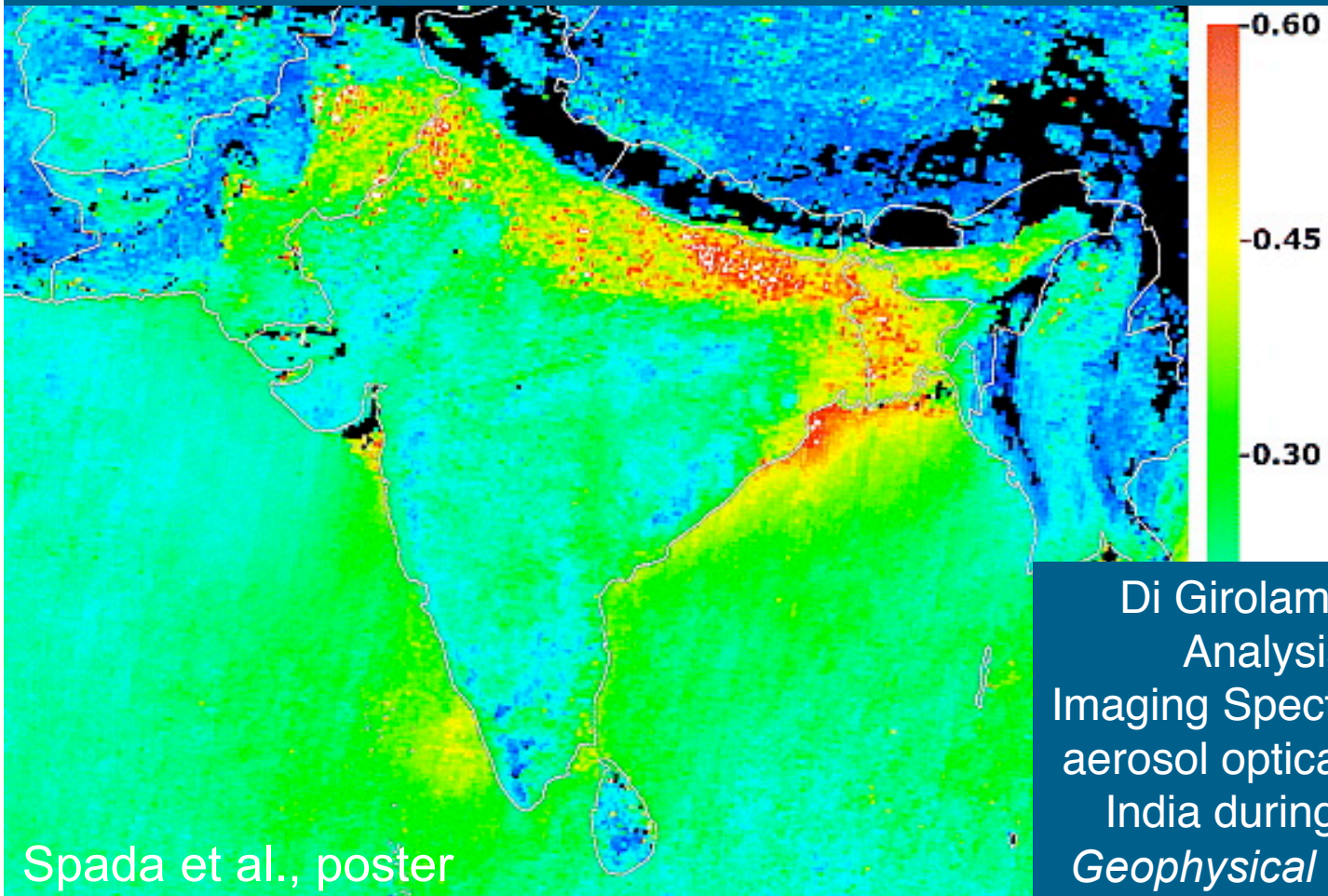
Maarten Krol, Larry Di Girolamo, Alexander de Meij & Frank Dentener



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# Research Question

- Do we understand high AOD in N-india?

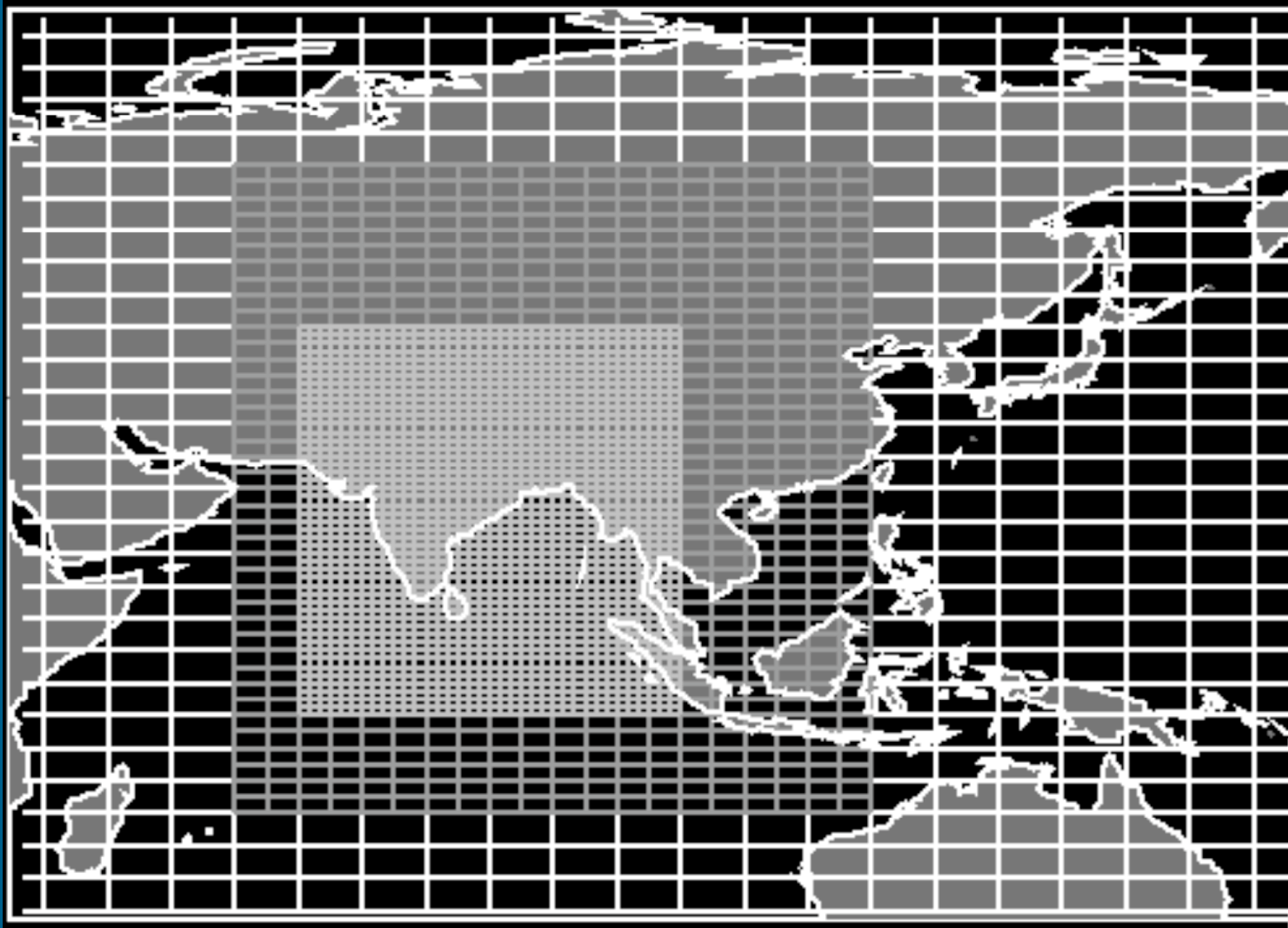


Di Girolamo, L., et al. (2004),  
Analysis of Multi-angle  
Imaging SpectroRadiometer (MISR)  
aerosol optical depths over greater  
India during winter 2001-2004,  
*Geophysical Research Letters*, 31.

# TM5: global zoom model

- Chemistry (CBM4)
- 5 aerosol classes
  - BC
  - POM
  - Sea salt (+ water)
  - Dust
  - Inorganic (SO<sub>4</sub>, NO<sub>3</sub>, NH<sub>4</sub>, + water)
- Emissions based on AEROCOM intercomparison
- Optics: externally mixed

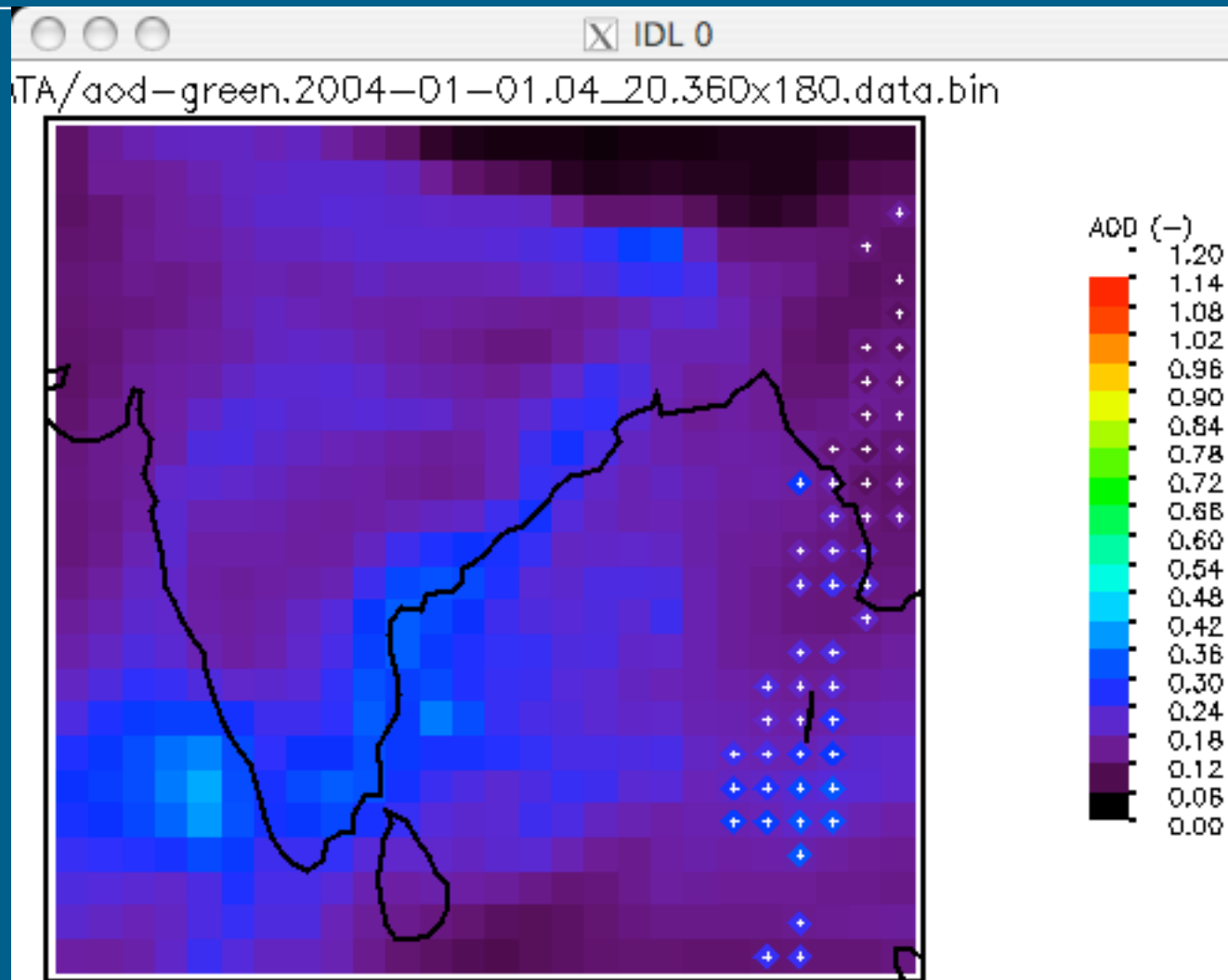
# Model set-up for Jan-Feb 2004 simulation



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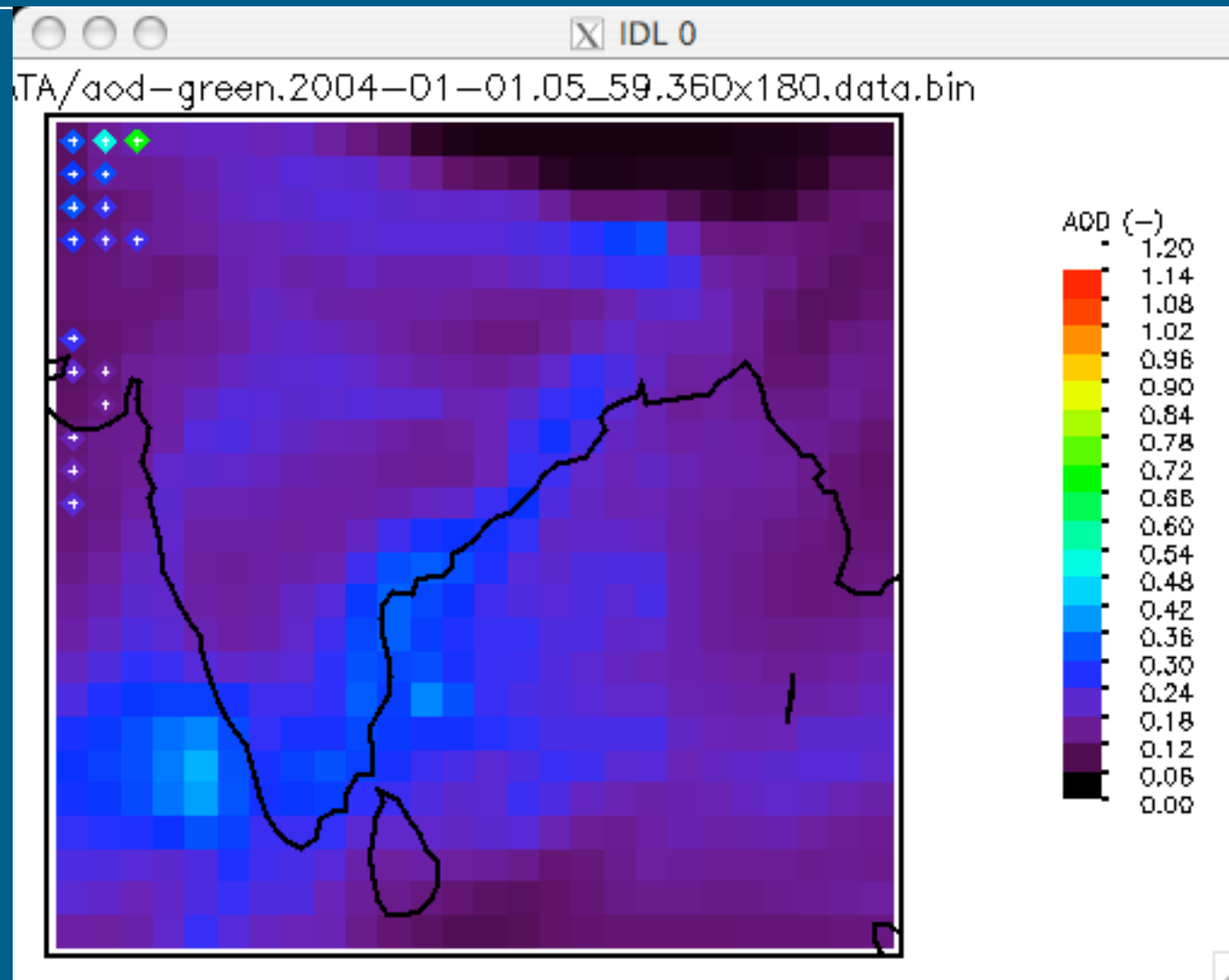
# Analysis Swath by Swath

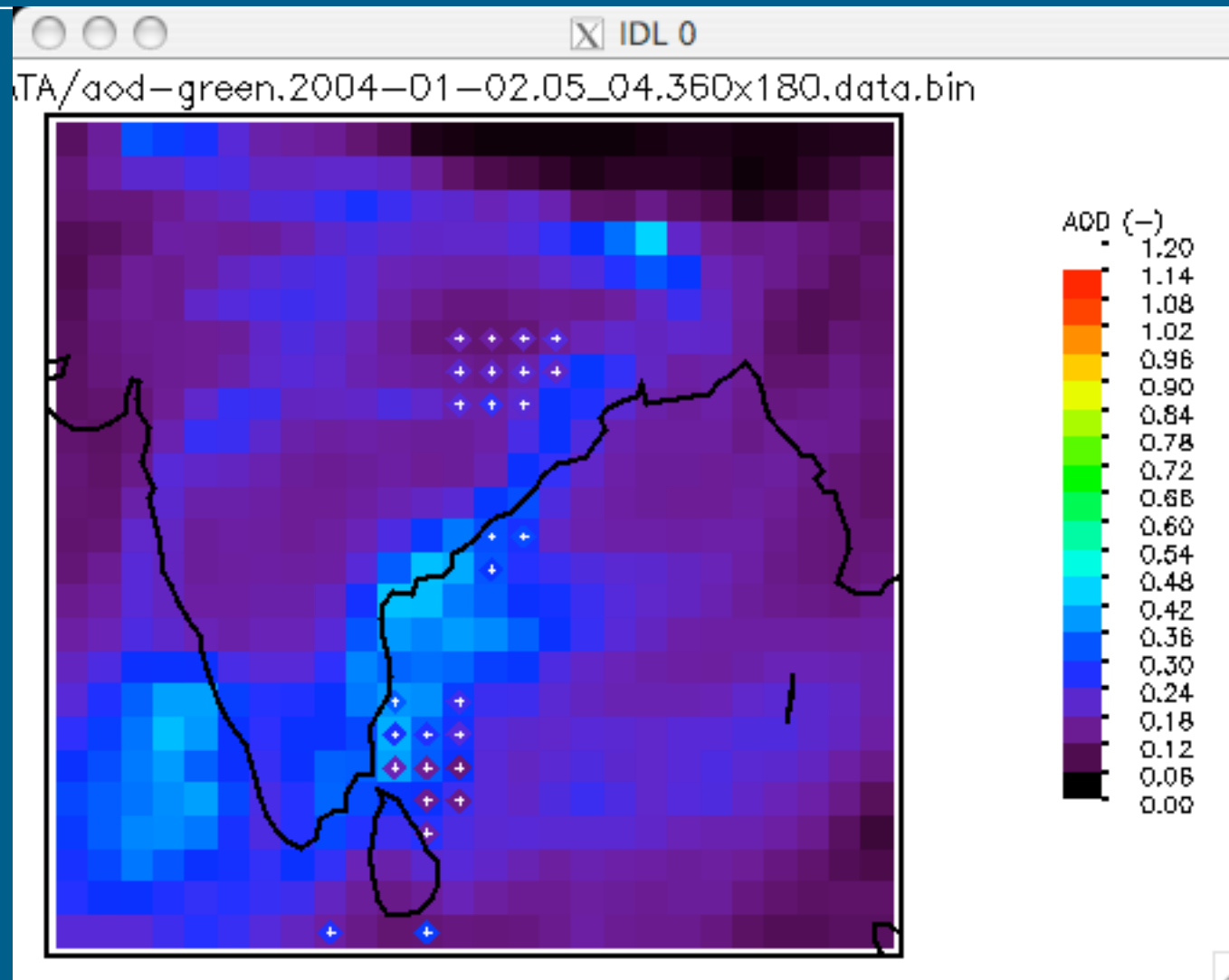


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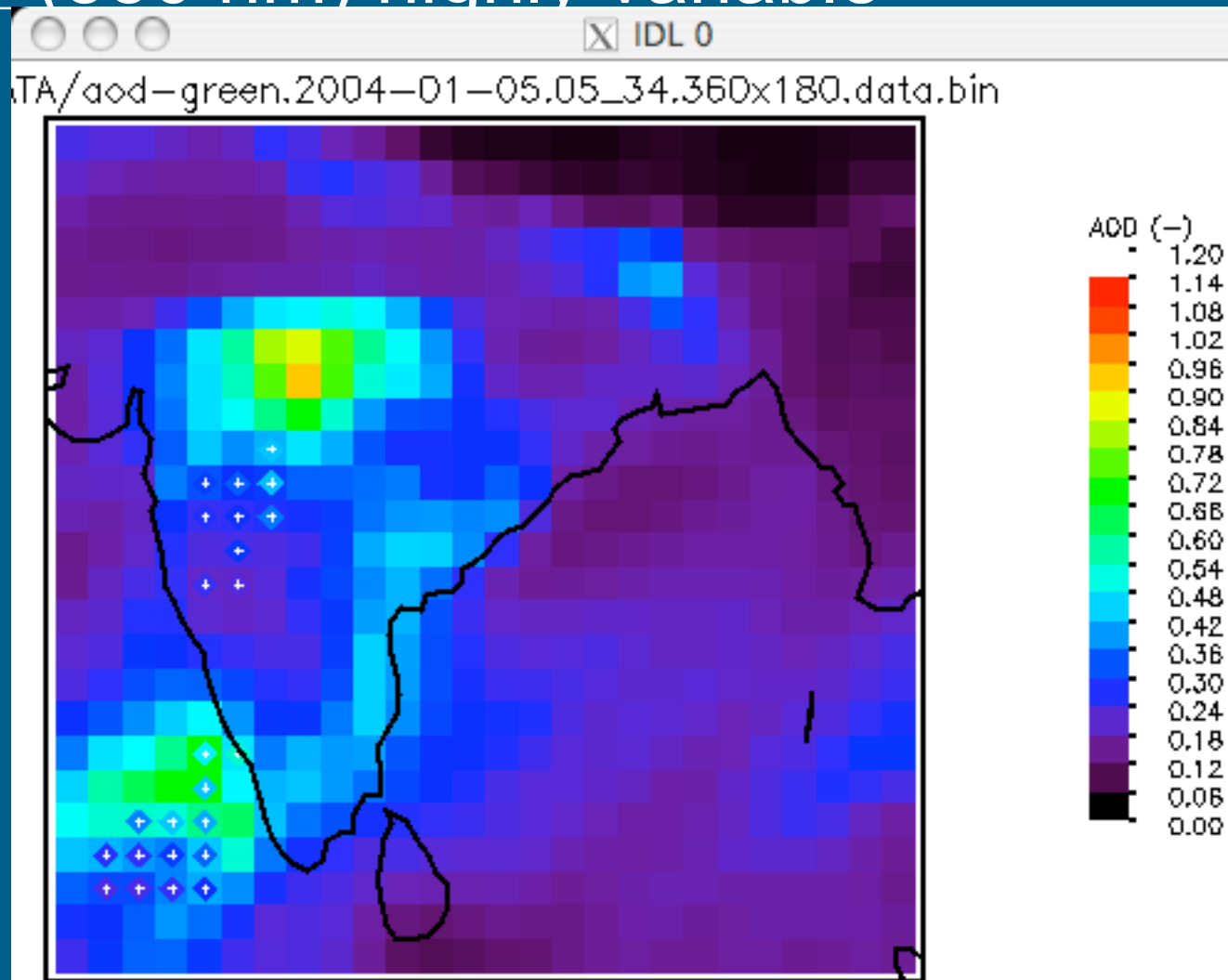




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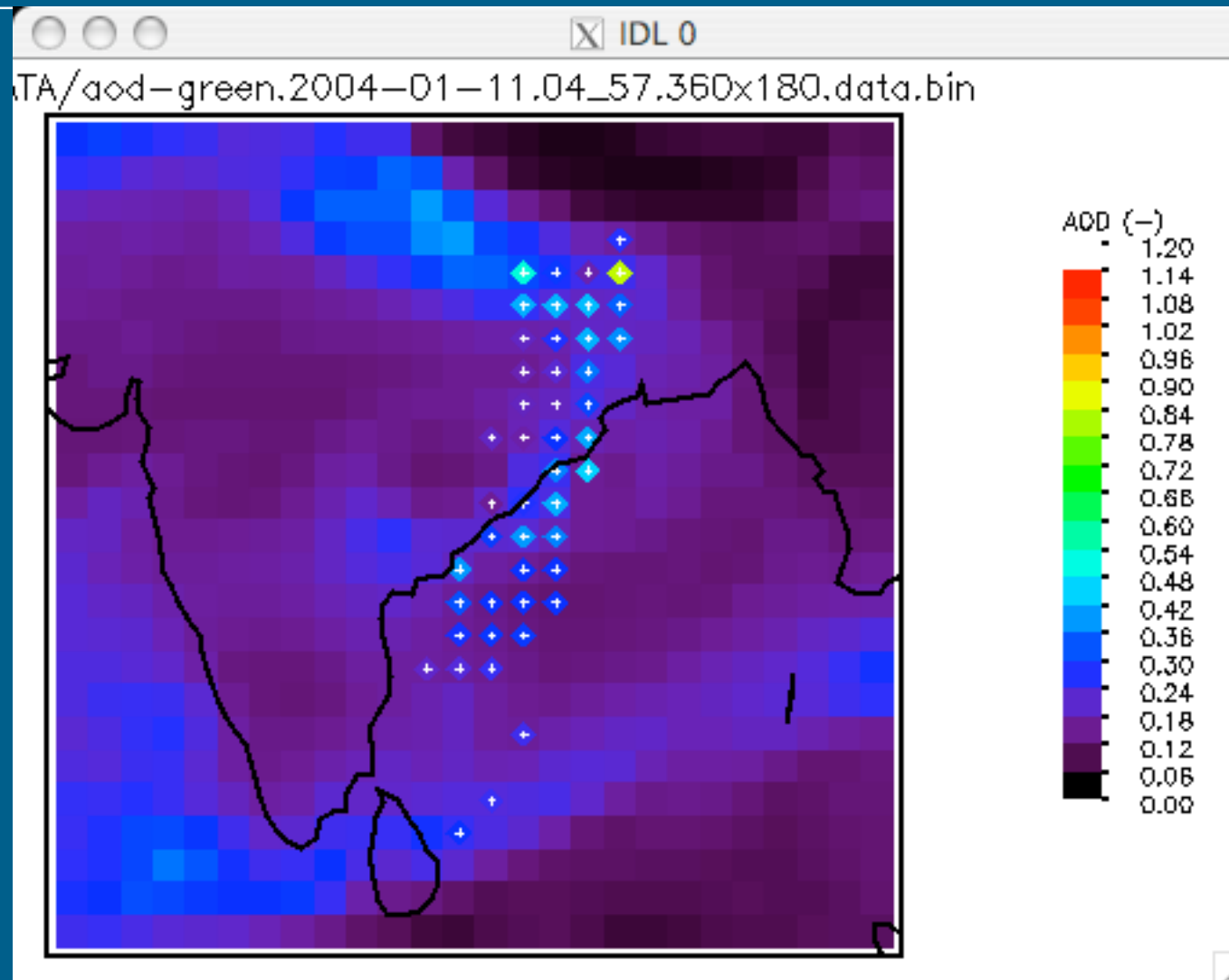
# AOD (550 nm) highly variable

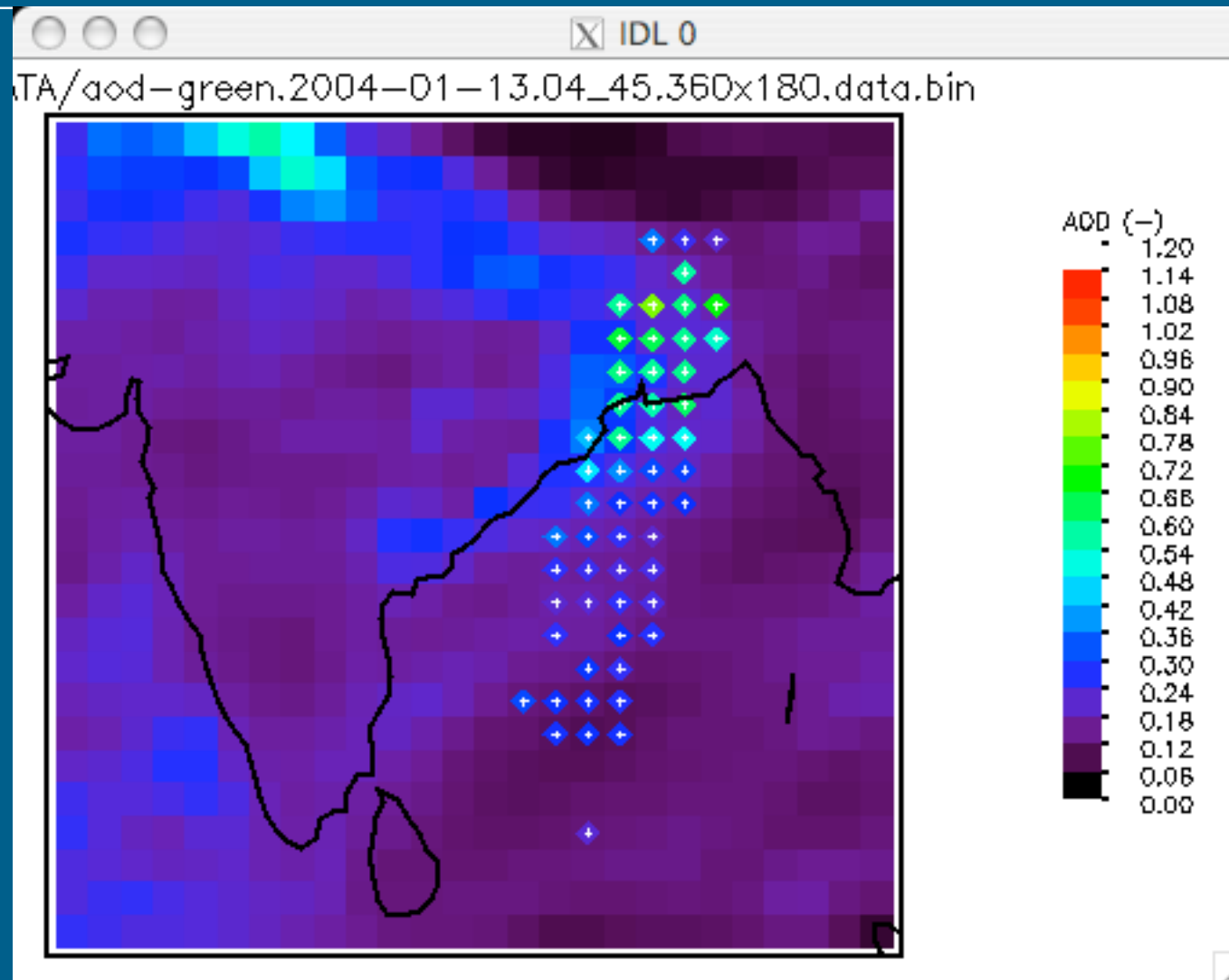


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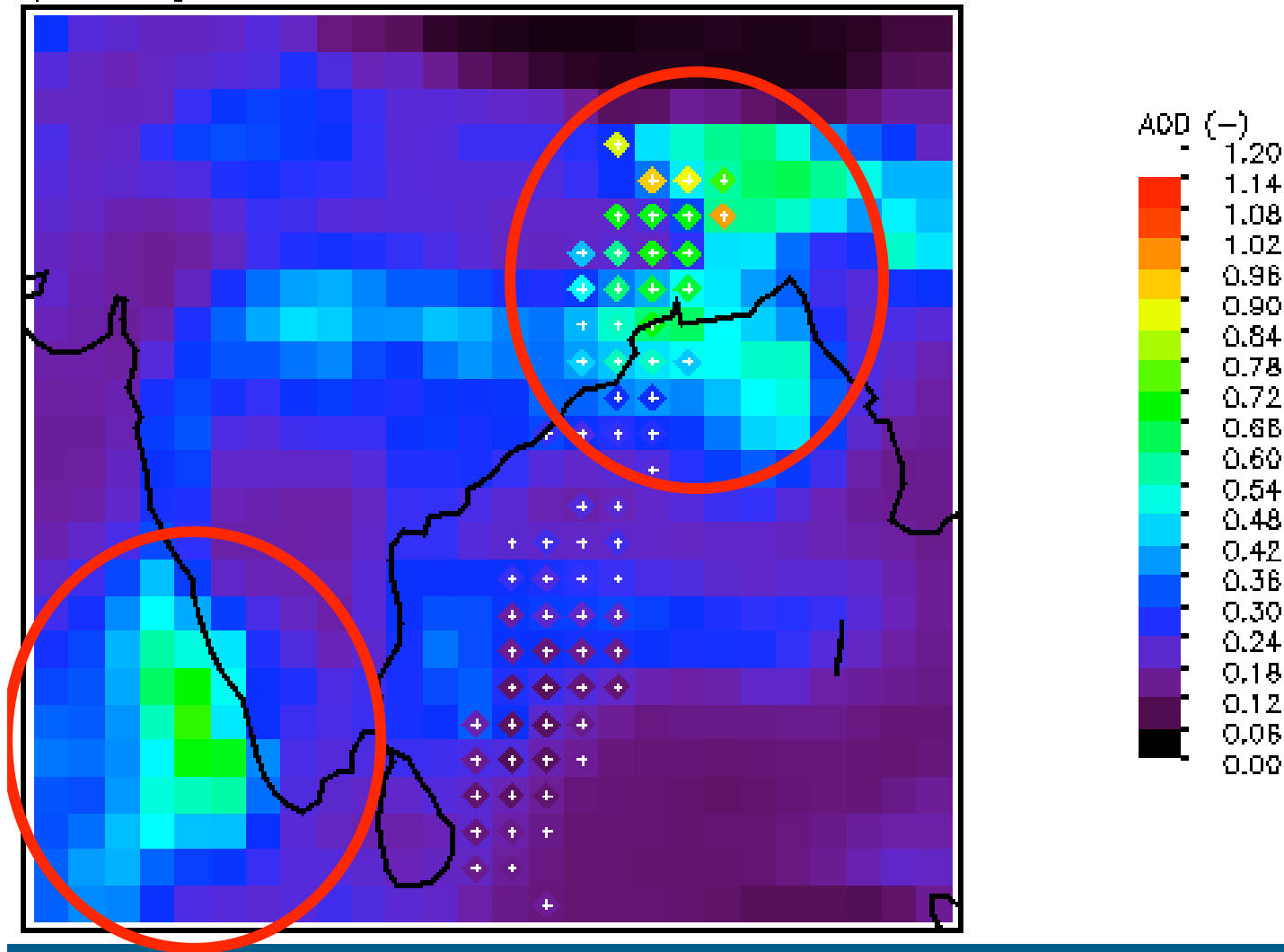
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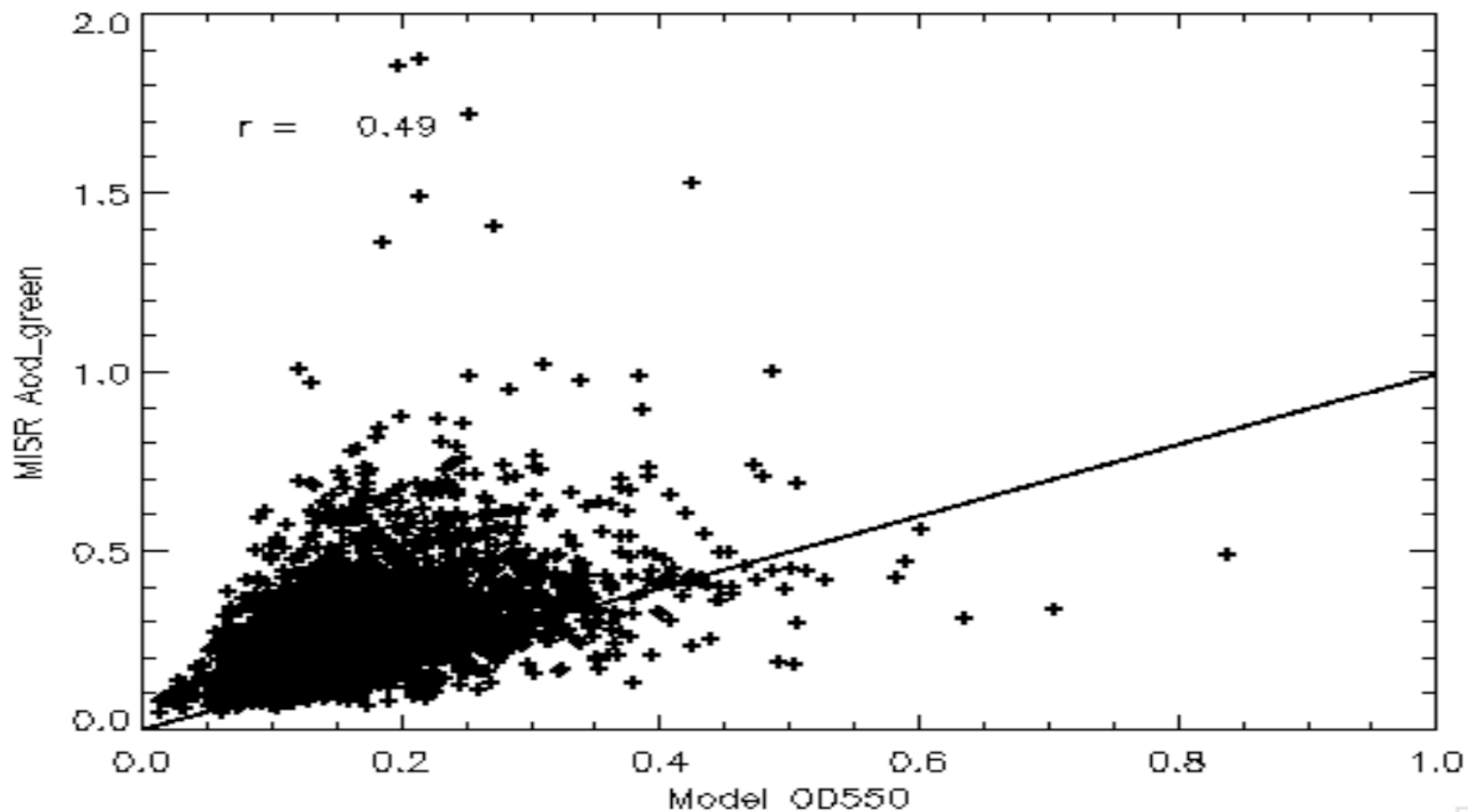
# Enhancements over SW outflow region + NE



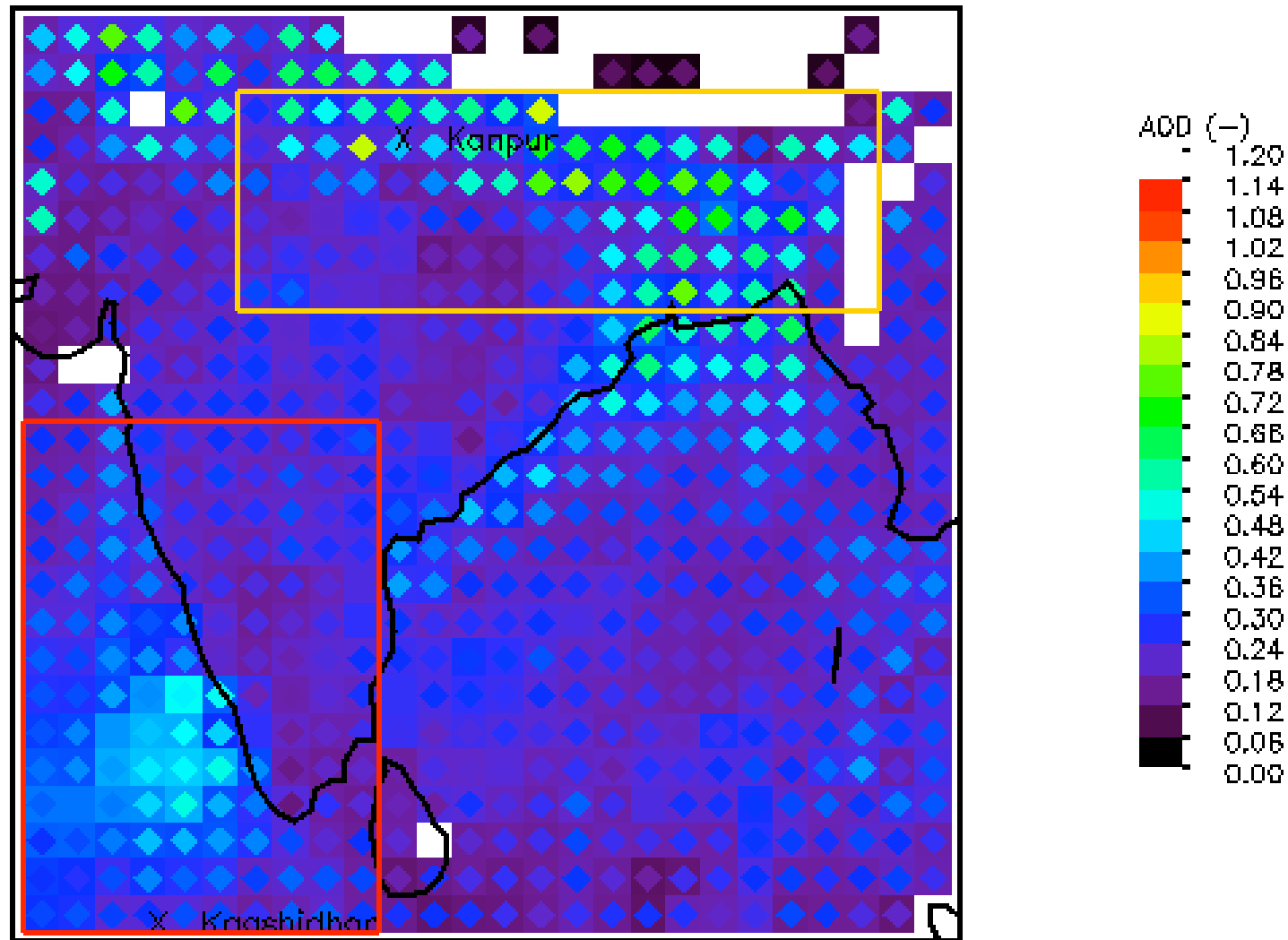
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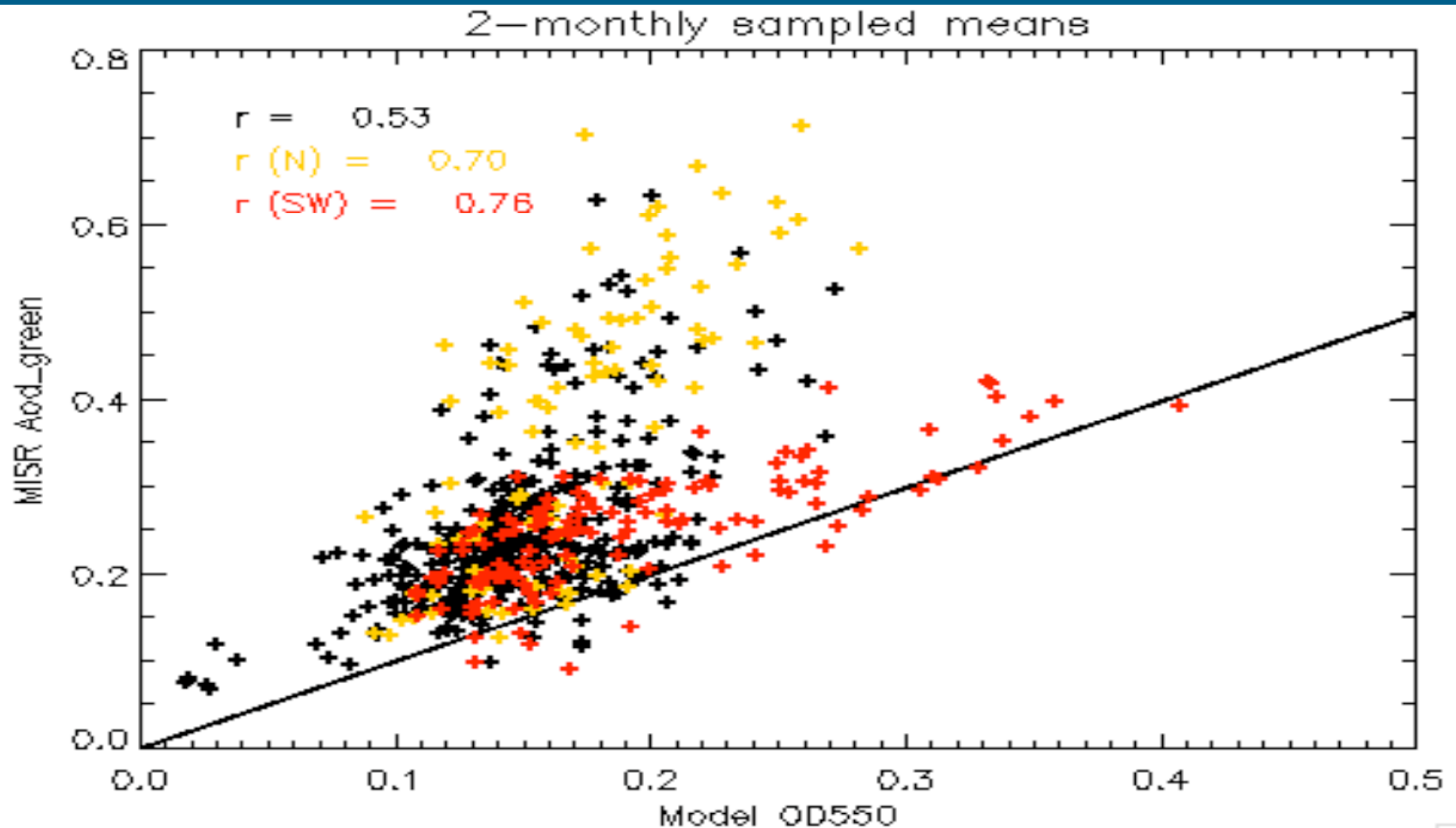
# All individual data points



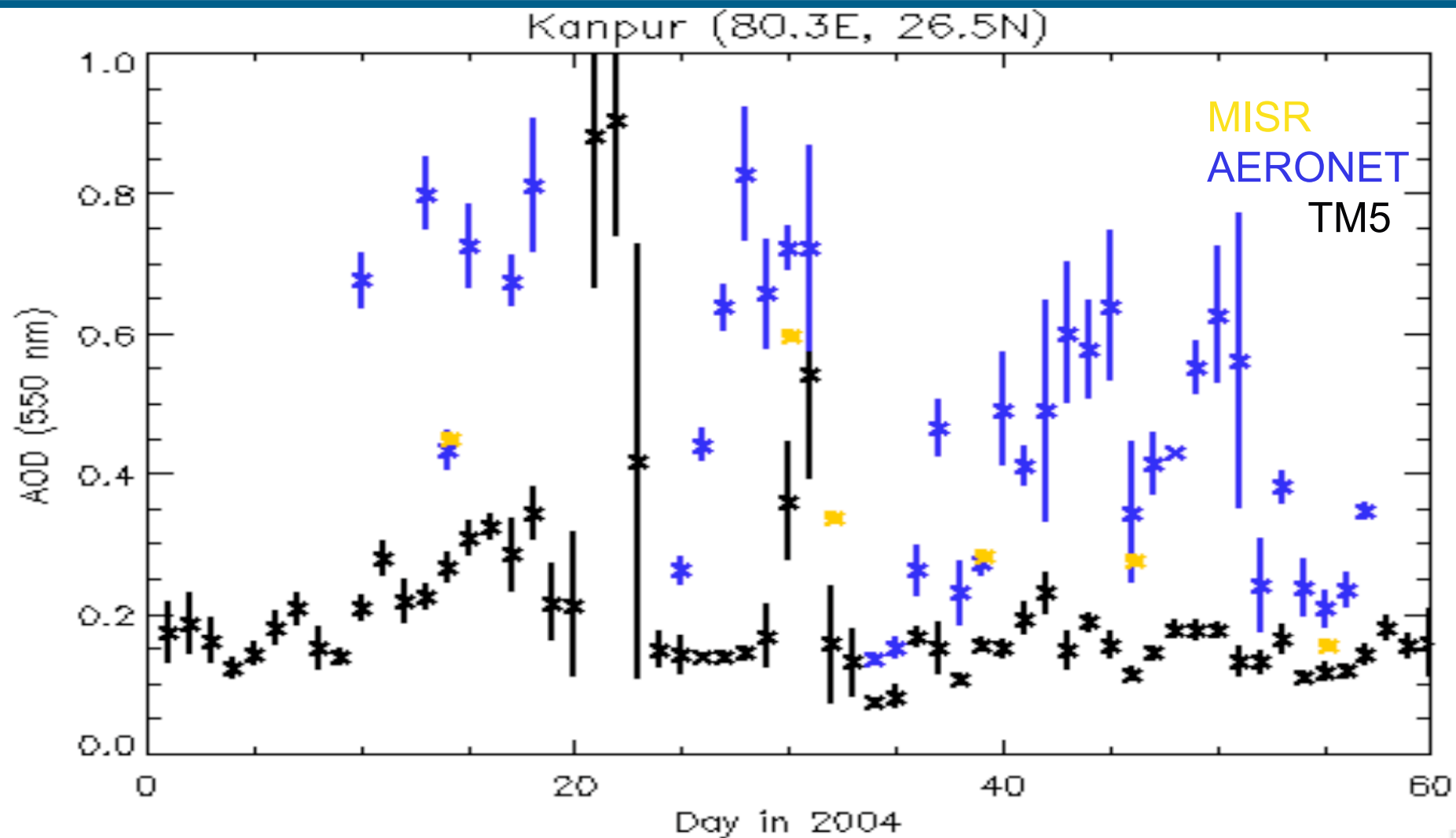
## 2-monthly sampled mean (jan-feb 2004)



# Spatial Correlation ( $r=0.46$ for unsampled mean)



# AERONET station Kanpur

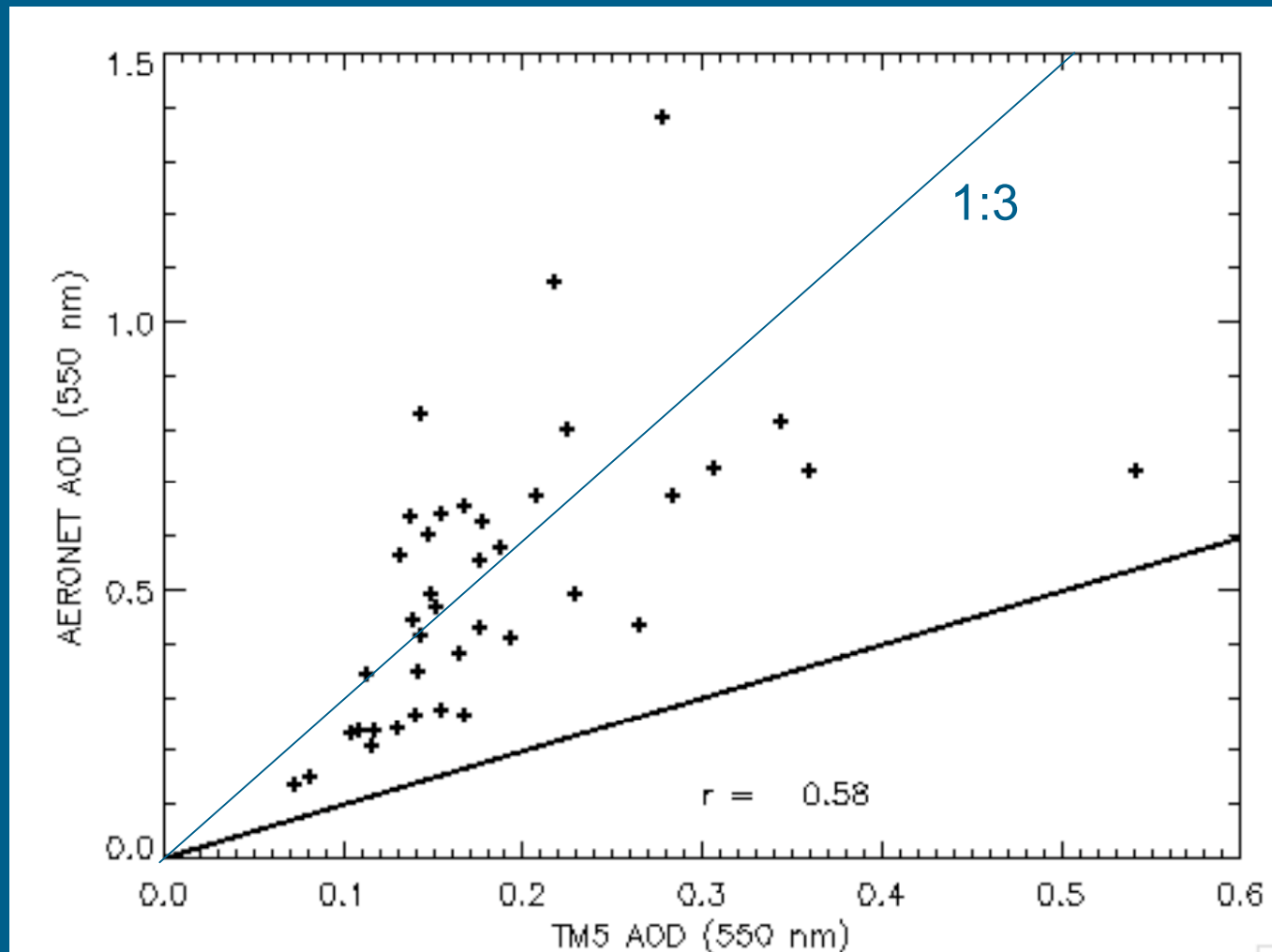


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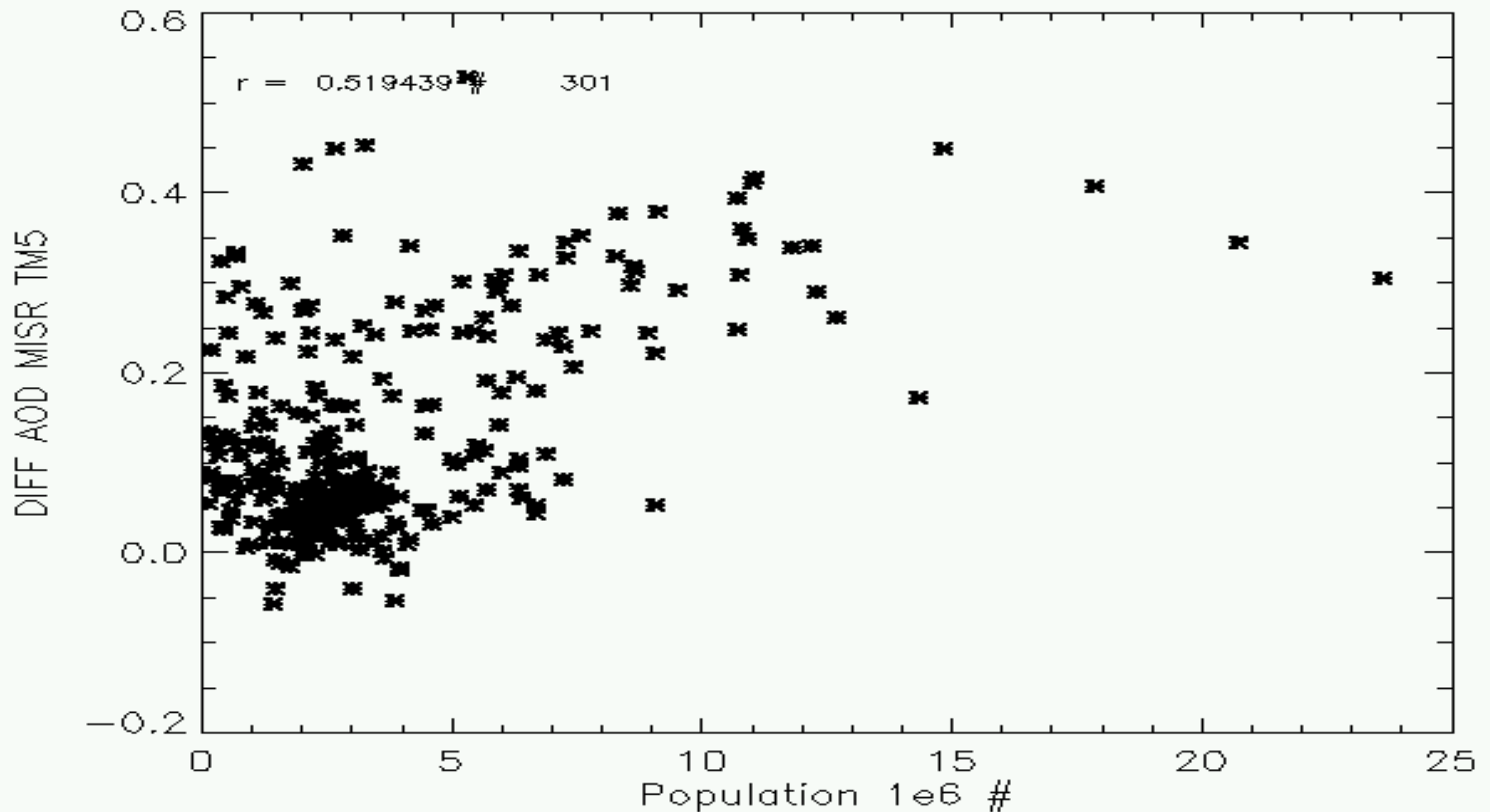
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# Kanpur: temporal correlation



# What AOD sources are missing over N-India?



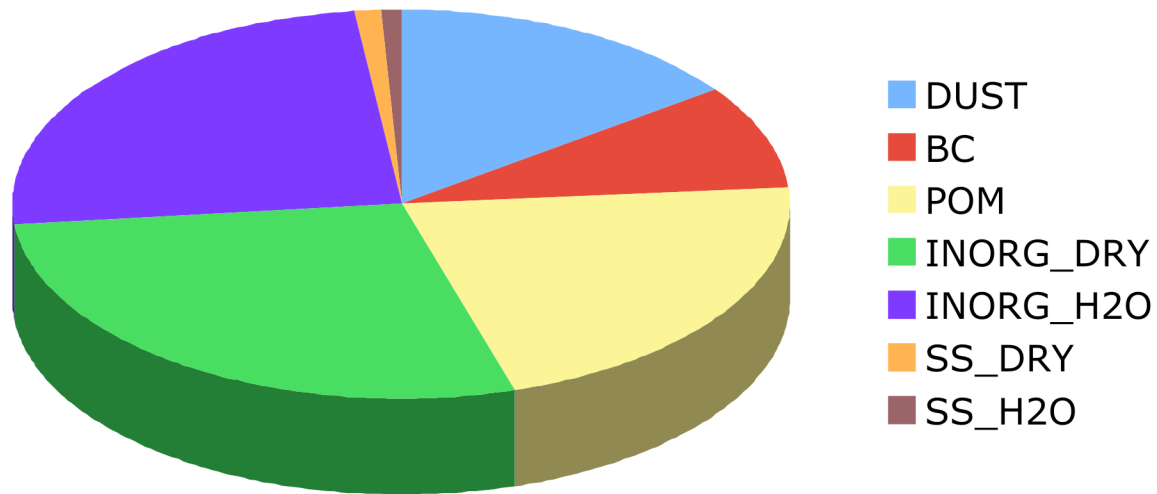
# Conclusions

- AOD comparison swath-by-swath
- Sampling issues are important
- TM5-MISR comparison reasonable
- N-India: underestimate AOD ( $>$  factor 2)
- Blame emission inventories?

# Extra slides

# Aerosol composition

**Indo-gangetic valley (AOD = 0.19)**



# SW outflow area

**SW outflow (AOD = 0.21)**

