Characterization of Dust Type and Properties at Niamey, Niger Using Downwelling Infrared Radiance Data

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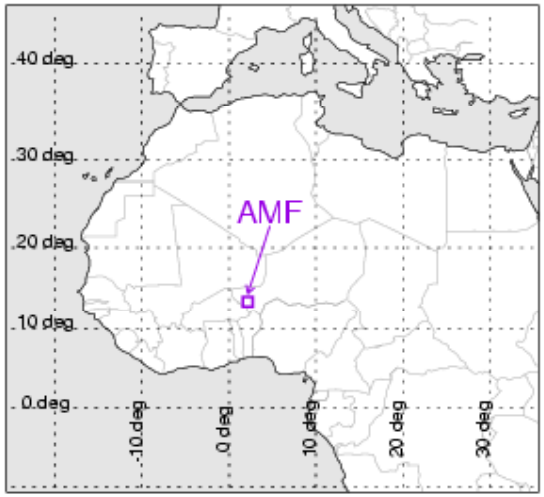
Background

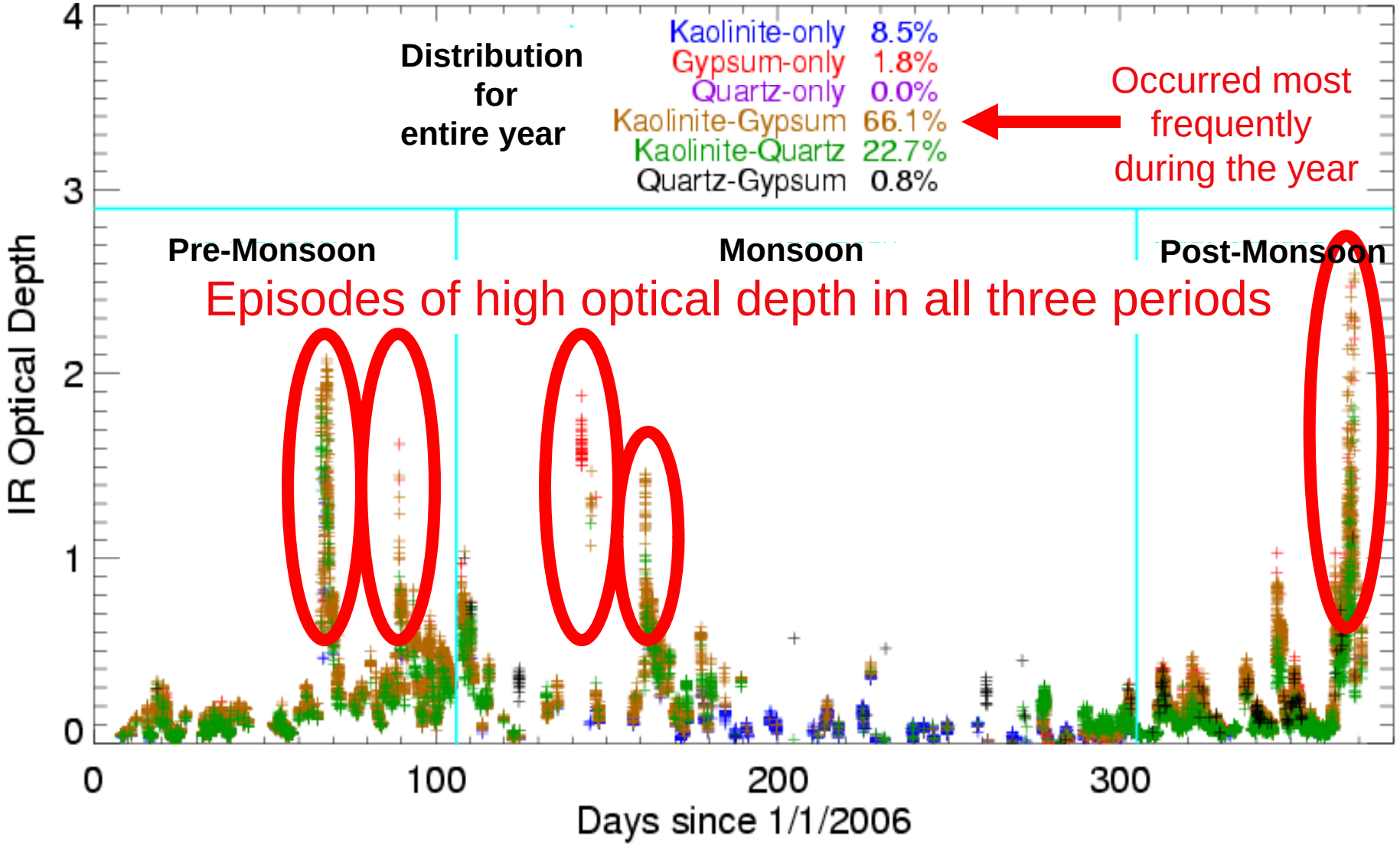
- Airborne dust is common in the Sahel region of Africa
- How important is this dust to the radiative balance and atmospheric heating in that region?
  - AMF was deployed to Niamey, Niger to help answer this question
- Niamey experiences two distinct weather patterns due to the location of the ITCZ
  - Are the dust properties correlated with the ITCZ location, and if so, how?



Approach

- Downwelling IR radiance is sensitive to dust composition, optical depth, and effective radius
  - To detect differences in composition, each mineral must absorb in different spectral regions
  - Able to distinguish between quartz, kaolinite, and gypsum using IR data
- Performed 6 sets of retrievals on manually identified cloud-free periods
  - Quartz-only, kaolinite-only, gypsum-only
  - Quartz+kaolinite, quartz+gypsum, kaolinite+gypsum
- Retrieval with the best statistical fit for each sample was identified
- Results analyzed as function of season and local meteorology

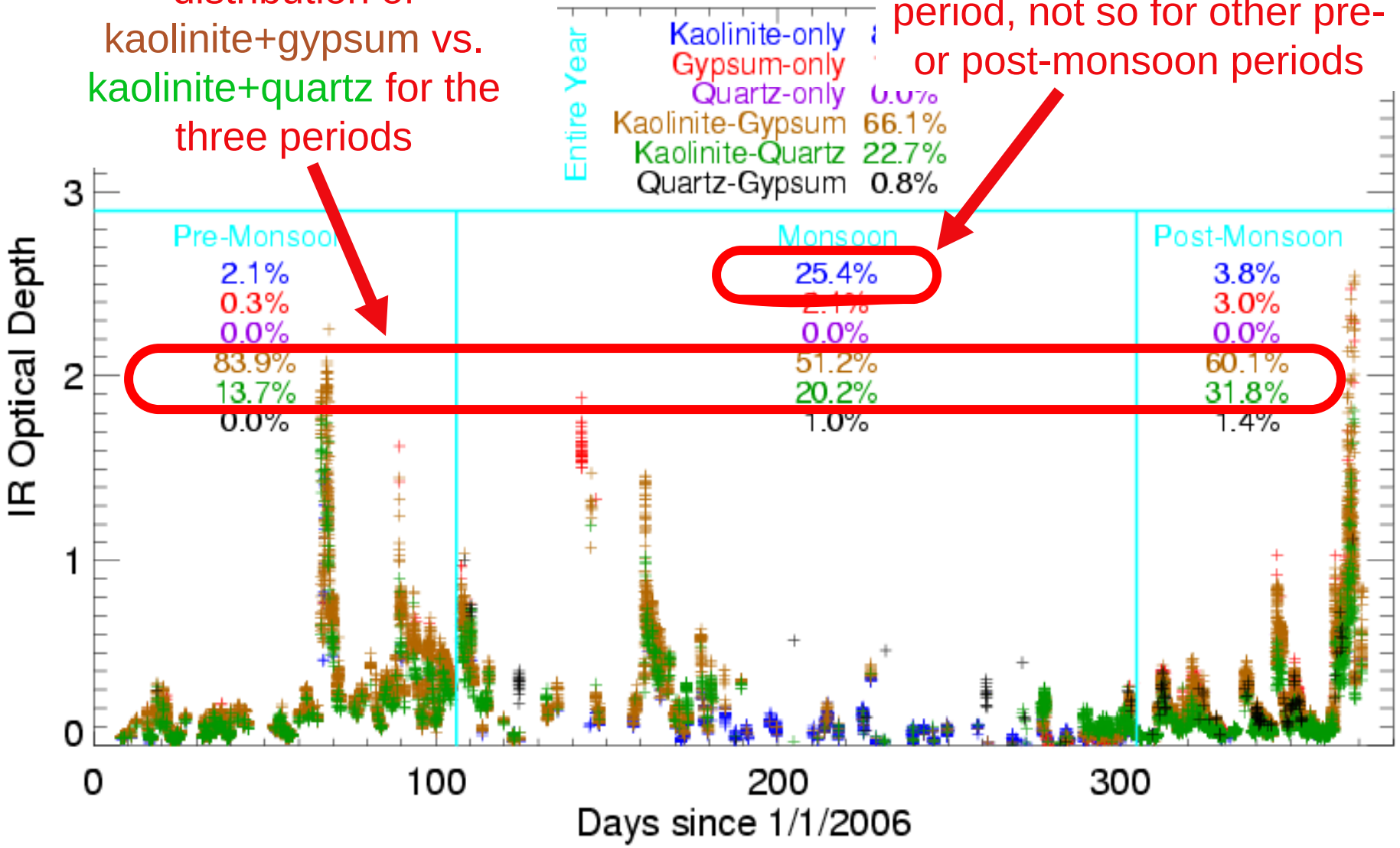
Dust Optical Depth and Composition Distribution



Dust Optical Depth and sition Dist

Significantly different distribution of kaolinite+gypsum vs. kaolinite+quartz for the three periods

Kaolinite-only was best fit frequently during monsoon period, not so for other pre- or post-monsoon periods



There are several other interesting results from this analysis.

Please stop by our poster (Bedka and Turner, Row 6-H) for more details!

Thank you to Beat Schmid for presenting this for us.