LIVAS: a desert dust climate data record based on particle depolarization/backscatter lidar observations

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The LIVAS four-dimensional, global, and multi-year climate data record of the pure-dust component of the total aerosol load is presented [1]. The separation of the dust component in detected atmospheric aerosol layers is based on the one-step POlarization LIdar PHOtometer Networking (POLIPHON) technique, established in the framework of the European Aerosol Research Lidar Network (EARLINET), applied to Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) optical products (Version 4.52). The LIVAS final data record provides the atmospheric pure-dust component in terms of (1) backscatter coefficient at 532 nm, (2) extinction coefficient at 532 nm, (3) mass concentration profiles, and (4) dust deposition fields. Intermediate steps involve the implementation of geographically dependent dust lidar-based lidar-ratio values and AErosol RObotic NETwork (AERONET) based extinction-to-volume conversion factors, allowing conversion of dust backscatter coefficient profiles into extinction coefficient profiles and subsequently extinction coefficient profiles into mass concentration profiles, respectively. The climate data record is provided into different spatiotemporal resolutions; (1) along the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) orbit-path with the original Level (L2) horizontal (5 km) resolution, and (2) aggregated in mean profiles of monthly-temporal resolution and 1o×1o spatial resolution, both with the original vertical (60 m) resolution of CALIPSO. The LIVAS pure-dust climate data record is unique towards a wide spectrum of potential applications, including among-others climatological analysis over different geographical domains and temporal periods, validation of atmospheric dust model outputs and datasets, enhancement of assimilation activities, and air quality assessment.

References

[1] Amiridis, V., Wandinger, U., Marinou, E., Giannakaki, E., Tsekeri, A., Basart, S., Kazadzis, S., Gkikas, A., Taylor, M., Baldasano, J., and Ansmann, A., 2013: Optimizing CALIPSO Saharan dust retrievals. *Atmos. Chem. Phys.*, **13**, 12089–12106.

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