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Understanding the central west Saharan summertime dust hotspot: Identification and classification of active dust emissions and associated processes from Caliop analysis

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A central question to understanding the climate of North Africa is to better comprehend and explain the existence of the Central Saharan dust loading maxima in summer. This dust 'hotspot' has been apparent in many satellite products. However, The actual physical processes involved are not clear. Indeed, qualitative maps of dust emissions suggest that emission sources are not co-located with the aerosol optical depth maximum. Therefore, it is not known to what extent the hotspot represents local emission and/or transport from remote emission sources. In this work, we aim to address this question by analysis of the long-term six year Level 1 and 2 Caliop data archive. The vertical profiles of aerosol from the caliop lidar potentially enables identification and quantification of active dust emission events. We then classify emission events according to the driving meteorological processes (e.g. harmatan flow, monsoon flow, mixing of low level jets, cold pools, etc.) from coincident analysis/reanalysis fields. This identification from caliop and classification of processes is based on a set of 'rules' informed by analysis of dust events during the Fennec project observational campaign.