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Ground-based lidar measurements within the framework of AEROCLO-SA

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A specific instrumental synergy, associating ground-based lidar, airborne and spaceborne remote sensing measurements, was set up as part of the field campaign of the AErosol, RadiatiOn and CLOuds in southern Africa (AEROCLO-sA) project. The overarching objective of AEROCLO-sA is to improve our knowledge about the role of atmospheric aerosols on the specific climate of southern Africa. For this reason, the Henties Bay experimental site of the Research Centre of the University of Namibia (22° 6' S, 14° 17' E) in the Orongo region has been selected to implement a ground-based lidar between 22 August and 12 September, 2017. The geographical position of the site is favorable for such a study, it is bounded on its western side by the Atlantic Ocean and by the Namibia desert (∼800 m amsl) on its eastern side. A big part of the year, as the west coast of South Africa, Henties Bay is covered with low clouds of stratocumulus type with very frequent fogs, and often overflown by air masses loaded with aerosol of various origins: forest fires, pollution, desert and/or ocean. Strong contributors to the aerosol load are the forest fires occurring during the dry season between August and October. Biomass burning aerosols exert a strong influence on the Earth's radiation budget by scattering and absorbing solar radiation, and influence the cloud formation and life time. The vertical distribution of absorbing aerosols is of paramount importance as it significantly influences the vertical profile of radiative heating in the atmosphere and, by this way, the stability of the atmosphere, thereby modifying convective and turbulent motions and clouds. The main vertical aerosol structures observed by lidar will be present and discussed. Passive (MODIS) and active (CALIPSO, CATS) space-borne observations coupled with back trajectory studies will allow for regionalized the local lidar observations.