On the study of Saharan mineral dust over Latin America: the complexity of aerosol typing at São Paulo

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Abstract: To achieve a better understanding of the spatio-temporal variability of the complex aerosol distribution on both regional and global scales, the transcontinental transport of aerosols is of special importance and must be understood. This is the first time that remote sensing analysis evidences the arrival of transcontinental advection of Saharan dust at latitudes very far from the Equator, in South America. This study highlights the need of thorough observation systems, including passive/active remote sensors on ground and on board satellites, to properly quantify aerosols. In particular, the synergetic combination of several approaches, including active (lidar) and passive (sun-photometer) remote sensing from ground and satellite platform (CALIPSO), were used to characterize the transatlantic transport over the period 6th-26th December 2007. Our analyses indicated that a Saharan dust layer probably originated over Northern Mali, Southern Mauritania and Northern Senegal travelled westwards overpassing Dakar ($AOD_{675} \sim 0.27$ and $AE_{440-870} \sim 0.57$, from sun-photometer) before leaving Africa. Over the Atlantic Ocean, a clear decoupled Saharan dust layer was detected over the marine boundary layer (particle depolarization ratio δp,max=0.28 and <0.08, respectively, from CALIPSO). Finally, CALIPSO detected a mixture of Saharan dust and polluted dust, near the coast of São Paulo (CALIPSO's mask [1]), in agreement with the lidar ratio profiles monitored over São Paulo during the night of 26 December.

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References

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