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# Investigation of aerosol variability induced by sea breezes in a coastal area of Senegal, North-Western Africa

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During the first Intensive Observation Period (IOP1) of the SHADOW (SaHAran Dust Over West Africa) campaign from March to June 2015, the M'Bour site, located on the Atlantic coast of Senegal, was expanded with a large set-up of in-situ as well as remote sensing instruments to measure the aerosol optical, physical and chemical properties and the dynamical features over the site. Here we use this dataset to study the impact of Sea Breeze (SB) on the aerosol properties.

Two case studies were selected: (i) one representative of SB events observed under typical continental trade winds (Harmattan conditions), (ii) and one representative of SB events observed during a Harmattan desert dust outbreak characterized by high PM10 concentrations (up to 350 $\mu$g.m-3). Both cases show a strong influence of the SB phenomenon on the dry Mass Scattering Efficiency (MSE), which increases by a factor up to 1.4. Given the fact that SB frequently occurs (65% of days during the IOP1) and that the ambient relative humidity may reach 96%, the effect of such events on the radiative forcing may not be negligible.

Recirculation and stagnation factors were computed from the observed horizontal wind components. The high air mass recirculation factors (between 0.84 and 0.98) imply that aerosols previously transported from land over sea could have been then transported back to land. During both cases, air mass stagnation is observed right before the SB establishment, but its location varies: over the sea during the first case with an air mass largely influenced by the marine air, and near the coast during the second case for which the contribution of local anthropic sources is higher, as indicated by an increase of the organic species mass concentrations within the PM1 fraction. This air mass stagnation strongly affects the aerosol evolution, notably with an increase in the fine aerosol (PM1, PM2.5) concentrations probably due to new particle formation.