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What are the aerosols serving as CCN for the formation of squall lines? And what are their impacts on the atmospheric iron flux to the marine biosphere?

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One of main scientific axe of AMMA campaign was to investigate the formation, the propagation and the evolution of precipitating systems in the West Africa Region. These systems are essential to aliment the African region in water, but it is known that the large dust storms are the main source of iron to the ocean. The formation of clouds is closely related to the presence of aerosol having the ability to serve of cloud condensation nuclei (CCN). In particular in these region were the aerosol component results from a mixing of mineral dust coming from the Sahara and/or the Sahel, biomass/domestic burning aerosols, aerosols produced from biogenic emissions, the questions were: What are the efficient aerosol to act as CCN? And are these aerosol important in the flux of iron to the ocean Atlantic?

This CCN property being directly related with the soluble fraction of the aerosol, we have conducted a study on the relation about the influence of the particulate/soluble part of inorganic/organic species on the CN/CCN ratio in the Banizoumbou supersite. This site is situated in the Sahelian zone to about 60 km to the East of Niamey. In this purpose, a sequential rain-gauge has been used enabling to a time-resolved collect rain to partitioned CCN and scavenged aerosol. The laboratory analysis of particulate and dissolved of every rain sample consist to measure the chemical composition of dissolved and particulate phases, the iron content and its redox speciation, the number size distribution, the mineralogy and the shape of aerosols incorporated in the rain.

We have collected 7 rains including 4 rains from local convection and 3 rains from convective systems issued to a larger scale. The first results emphasize the predomi-

nance of dust as incorporated aerosols in the precipitating clouds whatever their origin. The ratio organic/mineral species in the condensed phase is correlated to the particulate loading of rain: 5% of organic species in the beginning of rain up to 50% to the end of the rain. This rising is related to a net increasing of the concentration of the organic species in the condensed phase, supposing that the aerosol serving as CCN correspond to a mixing between dust and organic species. The analysis of this organic species shows the presence of carboxylic acids, known to be anthropogenic origin, notably from biomass combustion.

The parallel study on the iron shows that these rain are very charged in dissolved iron, around 30 ppb in average, and in consequence a potential significant source from the oceanic biosphere. It is known that the complexation between iron and organic chelatant is a critical factor to determine the bioavailablity of atmospheric iron. Our first results on the content of organic species and iron in rain seem to emphasize the importance of convective system during wet season on the supply of iron for the marine biosphere of the Atlantic Ocean.