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Dust mineralogical composition to study Iron nutrient solubility (FERATMO+ project)

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Mineral dust emitted into the atmospherebywind erosionin aridareas andsemi-aridareas,are composed ofa complex mixture ofvarious minerals.The nature and the relative abundance of the mineralogical species as well as the way they are mixed together have been shown to be influent factors of the different environmental impacts.ForHNLC("high-nutrient, low-chlorophyll") or oligotrophicoceanic regions, mineral dust can be a main sourceof nutrients inputs, especially Fe. Indeed, the fraction of dissolvedFe in wet dust deposition during precipitationcan allowthe development of oceanic biota, increasing the sequestration of atmosphericCO_2in the ocean.Measurements of thedissolved fractionofFeshow thatthistermvaries greatly,from 0.01% to80%. Nowadays, large uncertainties on the quantification of dust biogeochemical and chemical impacts are due to the remaining misunderstanding on dust aerosol intrinsicproperties and notably their mineralogical composition.In the framework of the FERATMO+ project, we focus on the understanding of processes that controlled the dust Fe bioavailability in relation with the dust mineralogy. Recently a new generator system has been developed in LISA especially to study the size resolved mineralogical fractionation (“Générateurd’AérosolMinéralEnLaboratoire”, GAMEL). Investigations by XRD methods of the mineralogical composition of pure minerals as well as dust aerosols generated from only some grams of desert soils are presented with a focus on Fe. Moreover, the effect of the mineralogical composition on the Fe solubility is also investigated by lab studies.