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Dust deposition: the best way to constrain the simulated dust mass budget?

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Dust deposition is a key process of the dust cycle. In term of mass, deposition is equal to emissions and dust deposition being a size dependent process, the evolution of the size distribution during transport is in a large part controlled by the intensity of the deposition pathways. Moreover, the dust material removed from the atmosphere is a key component of many biogeochemical cycles: far from the source regions, atmospheric dust deposition supplies surface seawater with soil-derived elements, many of them (Fe, P. . .) being suspected to be limiting nutrients for oceanic ecosystems while in the continental areas, deposition contributes to soil formation in many surrounding desert areas. Finally, dust archives from deep ocean sediments, ice cores, lakes or continental loess deposits are used as proxies of past environmental and climate conditions. Thus, dust deposition is of high environmental interest and a special attention should be given to properly assess its intensity and spatio-temporal fields.

Despite the major role and the various impacts of dust deposition, little attention was given to both deposition measurements and modelling. However, a better knowledge of the spatial and temporal distribution of the deposition field would greatly help to better constrain the dust cycle. Indeed, even if recent progresses have been made in dust emission modelling, it could remain large uncertainties on the intensity of the simulated dust emissions. Having a good estimate of the deposition will contribute to better assess the relevance of simulated dust emissions.