# Radiogenic Sr, Nd and Pb isotopes in deflatable soil phases from North Africa

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Provenance determination in archives of eolian dust requires the characterization of potential source areas (PSA), which is most reliably done using radiogenic isotope fingerprinting. While aerosols collected over continents may be influenced by contributions from variable upwind sources, deflatable material in soils is likely representative of local dusts originating from the bedrock. In this study, we present Sr, Nd and Pb isotopes in fine fractions of North African soils from the Sahara and Sahel, which are regions responsible for nearly half of global dust emissions [1]. The deflatable silt-clay (<60 μm) phases of the soils were obtained by settling in water. Sr and Nd isotopes in these phases show a wide range in compositions, generally overlapping published data on carbonate-free bulk soils [2]. Soils from Algeria, Morocco and Tunisia have lower $^{87}Sr/^{86}Sr$ than in [2] but similar $\varepsilon_{Nd}$ indicating the presence of fine carbonates. Pb isotopic compositions of the soils (except from the Algerian plain) fall on a single linear array in Pb isotope space but show a large scatter in $\varepsilon_{Nd}$ vs. $^{206}Pb/^{204}Pb$, ruling out simple binary mixing between old and young rocks. By and large, spatial distributions of both Nd and Pb reflect the local lithology and geological age. Soils from Tunisia and Morocco lie within the young Atlas Orogen and exhibit less radiogenic lead. Conversely, unradiogenic $\varepsilon_{Nd}$ is found in soils from Mali, Niger and the Algerian plain, located in sedimentary basins on the older parts of the West African Craton. Soils from the Hoggar Plateau and Mali have more radiogenic Pb, similar to those reported for bulk soils from the Bodélé Depression, Chad [3]. Differences in isotopic compositions hint that soils in Mali and Niger are less likely downwind accumulations of Bodélé dust within the Harmattan belt. This dataset will prove indispensable in defining dust-emission sources from the Sahara and Sahel at the present day as well as in paleo-dust records from marine sedimentary cores.

[1] Prospero et al. (2002) *Rev. Geophys.* **40,** 1002, doi:10.1029/ 2000RG0000952 [2] Scheuvens et al. (2013) *Earth Sci. Rev.* **116**, 170–194 [3] Abouchami et al. (2013) *Earth Planet. Sci. Lett.* **380**, 112–123