Abstract.

# A new global mineralogical database for studying dust properties

Emilie Journet[1], Yves Balkanski[2] and Sandy Harrison[3].

[1]*LISA UMR CNRS 7583, Un. Paris 7 Denis Diderot, Un. Paris Est Créteil, Créteil, France*
[2]*LSCE, UMR CNRS 8212, CEA-CNRS-UVSQ, Gif sur Yvette, France*
[3]*Macquarie University, Sydney, Australia*

The core information from this database is provided by nearly seven hundred soil descriptions have been gathered from more than one hundred fifty citations. The analyzed cores cover North and Central America, South America, Europe, Africa, the Middle-East, Asia, and Australia. There is a lack of information available for Russia. We distinguish between two size fractions the clay (< 2μm) and the silt ( > 2 and < 64 μm).
Following Claquin et al., 1999, we make the hypothesis, that the mineralogy of the surface depends on the size distribution, the chemistry and the color of the soil and that an average mineralogical composition can be inferred to each soil types of the FAO Soil Classification. This allows an extension of the information from the soil descriptions to the globe. We describe eleven minerals in the clay fraction: Kaolinite, illite, smectite, chlorite vermiculite, feldspars, quartz, calcite, hematite, goethite and total iron; and seven of them in the silt fraction: chlorite, feldspars, quartz, goethite, mica, gypsum and total iron.
We then infer from the relative content of these minerals in soil the differences in radiative properties of dust by regions: a) before it is transported on the soil surface and b) as we transport the minerals individually and report optical properties and radiative perturbation from the minerals themselves.
This database opens the way towards new approaches of the effect of dust on radiation, atmospheric chemistry and iron fertilization.