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The density of humic acids and humic like substances (HULIS) from fresh and aged wood burning and pollution aerosol particles

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Abstract. Atmospheric aerosols play significant roles in climatic related phenomena. Size, density and shape of particles affect their fluid-dynamic parameters which in turn dictate their transport and lifecycle. Moreover, density and shape are also related to particles' optical properties, influencing their regional and global radiative effects. In the present study we have measured and compared the effective densities of humic like substances (HULIS) extracted from smoke and pollution aerosol particles to those of molecular weight-fractionated aquatic and terrestrial Humic Substances (HS). The effective density was measured by comparing the electro mobility and vacuum aerodynamic diameter of aerosol particles composed of these compounds. Characterization of chemical parameters such as molecular weight, aromaticity and elemental composition allow us to test how they affect the effective density of these important environmental macromolecules. It is suggested that atmospheric aging processes increase the effective density of HULIS due to oxidation, while packing due to the aromatic moieties plays important role in determining the density of the aquatic HS substances.

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