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# Organic aerosol in a global model: improved representation, ageing and water uptake

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Organic aerosol in global models is usually treated with substantial simplifications, i.e. for extensive simulations all organic aerosol is treated by a chemically non-reactive aerosol species that is emitted from various sources. However, this does not take into account the change of the organic aerosol composition due to chemical reactions that can alter the solubility and water uptake characteristics.
In this work we introduce a computationally cheap concept, that describes the chemical ageing of organic aerosols in terms of their O/C ratio depending on the OH exposure time, and a corresponding change in the hygroscopicity and analyse the impacts on the global scale with the chemistry climate model EMAC (ECHAM5 MESSy Atmospheric Chemistry).
Additionally, we propose a scheme of intermediate complexity for the exchange between gas and aerosol phase of water soluble chemical organic compounds (e.g. formic acid, glyoxal), that are usually not treated by current thermodynamic aerosol models. Furthermore, the scheme is capable of calculating subsequent chemical reactions in the aqueous aerosol phase, and we present the implications for the global budget.