Development of an aqueous chemistry formation mechanism of organic aerosols in the atmosphere, suitable for a global climate model: first steps towards brown carbon modeling

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Abstract.
Aerosols are affecting climate via absorption and scattering of solar radiation (direct effect) and impact on clouds (indirect effect). Other than black carbon and dust, currently no other aerosols are considered absorbing in models. Nevertheless, brown carbon, an absorbing form of organic carbon, is known to significantly modify total aerosol absorption under certain conditions, contributing to atmospheric warming. In the proposed work we plan to create the infrastructure for simulating the climate effects of brown carbon, by developing and testing in a box model an aqueous chemical mechanism, the main chemical pathway of brown carbon in the atmosphere, suitable for climate simulations. Both cloud and aerosol water reactions will be introduced in the box model, although it is known that most of the absorbing organics that are being formed in the aqueous phase are produced via aerosol water chemistry.