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A condensed-mass advection based model for the simulation of liquid polar stratospheric clouds

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Abstract. We present a condensed-mass advection based model (MADVEC) designed to simulate the condensation/evaporation of liquid polar stratospheric cloud (PSC) particles. A (Eulerian-in-radius) discretization scheme is used, making the model suitable for use in global or mesoscale chemistry and transport models (CTMs). The mass advection equations are solved using an adaption of the weighted average flux (WAF) scheme. We validate the numerical scheme using an analytical solution for multicomponent aerosols. The physics of the model are tested using a test case designed by Meilinger et al. (1995). The results from this test corroborate the composition gradients across the size distribution under rapid cooling conditions that were reported in earlier studies.

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