

Interactive comment on “A parameterization of size resolved below cloud scavenging of aerosols by rain” by J. S. Henzing et al.

J. S. Henzing et al.

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Referee #1

Specific comments Referee #1 suggested discussing the potential importance of aerosol scavenging by falling solid precipitation. We agree that an important fraction of precipitation is solid especially in the winter season and at high altitudes and latitudes. Scavenging of aerosols by solid precipitation may indeed influence the fractional contribution of below-cloud scavenging to the total amount of precipitation. Referee #1 therefore suggests including a discussion so that "the reader should get an idea on how important solid precipitation might be for below cloud scavenging of the sea salt aerosol." The problem here is that very little is known about how important scavenging by solid precipitation might be. Despite experimental and theoretical efforts in recent decades the understanding of the process involved in aerosol scavenging by solid pre-

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precipitation is far less understood than rain scavenging. Several factors of uncertainty are involved in the impaction scavenging of aerosol particles by natural solid precipitation. Most important may be the great variety of shapes, sizes and densities that remain unresolved in most simulations. This makes the speed of fall of solid hydrometeors highly uncertain and thus the induced flow around the flakes and crystals and the collection/collision efficiency. Therefore estimates of scavenging coefficients remain highly uncertain (witness the estimates that vary by orders of magnitudes). For this reason we cannot even estimate if below-cloud scavenging would become more or less important once the process is included. For this reason we cannot fulfill the Referees wish ("reader should get an idea"). However, we decided to include some text at the end of section 5 (Remaining uncertainties) to elucidate the fact that we did not estimate the scavenging of aerosols by solid precipitation despite its potential importance at high altitudes and latitudes.

We changed the manuscript according to the editorial comments given by Referee #1.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 1355, 2006.

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