SPACCIM model studies of the multiphase aerosol processing in warm tropospheric clouds

A. Tilgner, R. Wolke and H. Herrmann
Leibniz-Institute for Tropospheric Research, Permoserstr. 15, 04318 Leipzig, Germany
tilgner@tropos.de

Introduction and Model Outline

The parcel model SPACCIM (Specular Aerosol Cloud Chemistry Interaction Model; Wolke et al., 2005) has been applied to investigate the effect of aerosol-cloud chemistry on tropospheric aerosol processing in warm cloud microphysics. The simulation results are compared to the recent multiphase models of Herrmann et al. (2005) and Herrmann & Wolke (2007). The model includes a detailed description of the processing of gases and aerosol particles by clouds as well as chemical reactions in the gas phase and aqueous microdroplets. The model is based on the multiphase cloud model of Kajike et al. (2000) and includes a comprehensive set of chemical reactions for the gas and aqueous phases. All microphysical parameters required by the multiphase chemistry model are taken over from the microphysical model of Schütz and Herrmann (2004). The CLASMIC chemistry mechanism (Kreisz et al., 2005) is used to describe the chemistry in the gas phase. The aqueous phase chemistry mechanism is based on the PHOSCHEM-AF mechanism (Herrmann et al., 2005). The model has been validated against the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005).

Summary

SPACCIM simulations on the multiphase aerosol processing in warm clouds have been carried out for different atmospheric conditions containing a detailed multiphase and microphysical chemistry (RACM-SPACCIM). Significant effects on the tropospheric aerosol concentration and oxidative capacity of the gases in the atmosphere have been observed. The results of this study can be used to improve our understanding of the impact of multiphase processes on the atmospheric chemistry and aerosol evolution. The model results are compared to the recent results of Herrmann et al. (2005) and Herrmann & Wolke (2007). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2005). The model results are also compared to the results of the Climax long-term site (Clem, 2004) and the results of the CACE-2 experiment (Clem, 2004).