

Submitted Abstract

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Abstract

Aerosols play a crucial role in climate through different feedback mechanisms, affecting radiation, clouds and air column stability. This study focuses on the altitude-dependence of the cloud mediated indirect effects of aerosols in the Great Alpine Region (GAR), an area characterised by high pollution levels from anthropic activities in the Po Valley and a complex orography with the highest mountains in Europe. Using the Weather Research and Forecasting model, 5-years long convective-permitting sensitivity experiments have been run with different surface aerosol fluxes over the GAR. Results indicate that the indirect effects of aerosols modify cloudiness, temperature and precipitation and that the response to pollution is both elevation and season dependent. Physical mechanism at the base of those differences are discussed.