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Modelling the impact of landform structure on fog formation

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The development of radiation fog is very sensitive to the physical and thermodynamical structure of the surface layer. Especially turbulent heat and moisture fluxes at the earth's surface have an effect on duration and intensity of fog events. Spatiotemporal patterns of the surface properties control these fluxes which depend in a complex way on physical conditions as local soil properties, soil moisture, radiation received at the surface, specific land use and orography. In order to take the high spatial variability of landform structure into account, simulations are performed with the three-dimensional fog forecasting model LM-PAFOG (Masbou and Bott, 2005). In this approach, a new microphysical parameterization based on the one-dimensional fog forecast model PAFOG (Bott and Trautmann, 2002) was implemented in the LM (Lokal-Modell), the numerical weather prediction model of the German Weather Service. To achieve a more realistic description of the earth's surface a more detailed set of external surface parameters (e.g. soil type, surface elevation, leaf area index) has been implemented into the LM. The geographic domain for this study is the catchment area of the river Sieg (Western Germany). We will present a comparison of LM-PAFOG simulations with the operational data set and simulations with a more detailed parameter set for a more accurate prediction of near surface fluxes.

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