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The Impact of Landform Structure on the Formation of Fog - Numerical Simulations with COSMO-FOG

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Fog is a meteorological phenomenon of the boundary layer, thus the physical and thermodynamical structure of the surface layer has a strong influence on its formation, evolution and dissipation. Especially turbulent heat and moisture fluxes at the earth's surface and in the atmosphere have an effect on both, duration and intensity of fog events. Spatiotemporal patterns of the surface properties control these fluxes which depend in a complex way on physical conditions such as local soil properties, soil moisture, radiation received at the surface, specific land use and orography. In the same way, the soil-canopy-atmosphere interactions influence the formation and dissipation of fog. Simulations are performed with the three-dimensional fog forecasting model COSMO-FOG, which has been developed in our working group. The detailed parameterization of fog microphysics from the one-dimensional fog forecast model PAFOG (Bott and Trautmann, 2002) has been implemented into the numerical weather prediction model of the German Meteorological Service (DWD), the COSMO-Model (formerly known as Lokalmodell - LM). A more detailed set of external surface parameters like for example soil type, surface elevation, and vegetation parameters like LAI were used to take the high spatial variability of landform structure into account. The horizontal resolution is 1 km. In the operational COSMO-Model, the coupling between the atmosphere and the soil is done by the SVAT scheme TERRA-Multilayer, in which vegetation is not explicitly considered. For a better representation of vegetation, we have implemented a new parameterization for the air-land interactions based on the the soil-vegetation scheme VEG3D (Braun and Schädler, 2005). In this approach, the vegetation canopy is considered as one "big leaf" placed between the soil surface and the lower atmosphere. We will present in a comparison the influence of the different

SVAT-parameterizations for several fog events.