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Orographic influence in measurements and nested simulations of CO and radionuclides in the Black Forest

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The German Federal Office for Radiation Protection (Bundesamt für Strahlenschutz) maintains monitoring sites for airborne radioactivity measurements. For our work, we are focusing on the mountain station Schauinsland (1200 m) and the station Freiburg im Breisgau (270 m), located in the Rhine Valley. In addition, the Federal Office of Environment (Umweltbundesamt) carries out monitoring of background atmospheric conditions at Schauinsland. Observations in the past have shown that both stations may sample different air masses depending on the meteorological situation. This is of considerable interest for the determination of the origin of airborne radioactivity, since local sources are of small importance, and therefore long-distance range transports have to be taken into account. For the investigation of atmospheric trace substances, receptor-oriented dispersion models with meteorological input data from ECMWF or NCEP analyses are used. Furthermore, it is obvious that the differences in the origin of air at the two stations are not easily captured by such simulations. Thus, one of the main purposes of this work is to answer the question if a highly-resolved nested simulation has the ability to improve the identification of the origin of air in such highly complex area topography as compared to a global model, and how such differences depend on the local meteorological conditions. The PSU/NCAR MM5 model has been set-up (mother domain and 4 nests down to 1 km resolution) whose output will be used as input for the dispersion model FLEXPART. Results of this simulation will be compared and validated mainly with CO measurements at Schauinsland and will be presented at the conference.

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