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## **Study of the influence of various vertical turbulent diffusion profiles on the concentrations of secondary inorganic aerosol and their gas precursors over Central Europe**

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Uncertainties associated with the determination of model vertical turbulent diffusion profiles are generally considered to be one of the main causes of the discrepancies between modeled and measured pollutant concentrations. In this work, we performed four two-year long offline simulations, specifically for the period 2018–2019, using the WRF-CAMx model system over Central Europe with a horizontal resolution of 9 km x 9 km in which we used various methods of calculation of vertical turbulent diffusion coefficients (based on WRF meteorology) while the other meteorological fields we kept the same. Further, we analyzed the effects of these perturbations on spatio-temporal changes in concentrations of some components of the fine fraction of inorganic aerosols (ammonium, sulfates and nitrates) and their gaseous precursors (ammonia, NO<sub>x</sub>, sulfur dioxide). We also validated the surface concentrations of the mentioned pollutants using the AirBase and EMEP datasets.