



High ozone concentrations in the Cologne area during the summer heat wave in 2003: Possible impact of nearby petrochemical industry

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A complex three-dimensional air quality model is applied to a highly populated and industrialized area in the Cologne region. Nearby petrochemical industry with high emissions of olefines is located approximately 15 km southward from Cologne. Measurements from the network of the local environmental agency in North-Rhine-Westphalia (LANUV) did show high concentrations of ozone at the observational site of Huerth located about 10 km southwest from Cologne. During the heat wave episode in summer 2003 the concentrations exceeded 240 $\mu\text{g}/\text{m}^3$ on several days, with the highest value of 334 $\mu\text{g}/\text{m}^3$. Daily maximum values partially have occurred before local noon and could not be explained by photochemical production of ozone alone. Model applications show that advection of air from the petrochemical emission region might cause the high ozone values at late morning or around noon. Examples of model calculations and comparison with observations supporting this hypothesis are presented.