

# Applications and further development of the OFIS model

A contribution to subproject SATURN

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The OFIS model, which is a two-dimensional Eulerian photochemical dispersion model, allows an adequate description of atmospheric dynamics and photochemical transformation processes in an urban plume at a very low computational effort. Thus it may be used for calculating urban scale ozone levels and for detecting exceedances of ozone threshold values based on large-scale meteorological information and long range transport information over a longer time period (typically six months).

The typical computational domain ( $150 \times 150 \text{ km}^2$ ) is separated into three major regions: urban area, suburban area and rural area. For each day in the period of interest, pollutant transport and transformation downwind of the city is calculated, assuming the prevailing wind direction for the respective day, an initial plume width according to the city diameter and a plume widening angle of  $30^\circ$ .

The OFIS model is being further developed. Several chemical mechanisms (CBM-IV, KOREM, RACM) have been implemented in the model to strengthen its validity and model results are presented for selected cases. A new feature of the model is the simulation of size and chemically resolved primary and secondary aerosols. The aerosol module used for the preliminary calculations presented, is based on the generic aerosol module of the EZM system.

In the present work results are presented for three case studies, Thessaloniki, Greece, Genova, Italy and Gdansk, Poland. Particularly, AOT60 values are presented, as well as the number of 8-hour averages exceeding  $120 \text{ } \mu\text{g}/\text{m}^3$  for the whole computational domain and examined period. In addition, the maximum occurring hourly concentrations are presented.

In the cases of Genova and Gdansk, remarkably high values of the maximum occurring hourly concentrations are calculated. On the contrary, the corresponding concentrations in Thessaloniki are rather low. In the case of Genova the number of 8-hour averages exceeding  $120 \text{ } \mu\text{g}/\text{m}^3$  is high, while in the other two cities the exceeding averages are fewer. It has to be noted that the model input data were provided by the local authorities of each city and therefore have still to be validated.