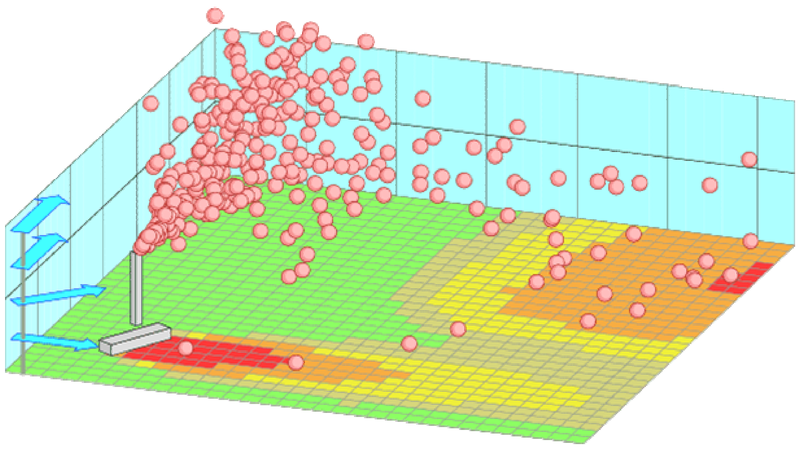
EXPERIENCES WITH THE GERMAN REGULATORY MODEL AUSTAL2000 IN GERMANY AND IN OTHER COUNTRIES IN THE FRAMEWORK OF EU TWINNING PROJECTS

Müller, Wolfgang J.[1]; Janicke, Ulf [2]

[1] former Lower Saxony State Agency for Ecology (NLÖ), Hannover, wjmueller@web.de, [2] Ingenieur-Büro Janicke, Überlingen

INTRODUCTION

AUSTAL2000 was introduced for regulatory purposes for for permits and assessments of industrial and agricultural sources (i.e.near-ground sources, odour frequency, ammonia).



AUSTAL2000

is a Lagrangian particle model in compliance with the German guideline VDI 3945/3 (2000). This model type simulates the trajectories of a sample of particles. From these trajectories the values of concentration and deposition are derived. The model contains no calibration parameters but relies solely on meteorological parameters that can be determined without dispersion experiments.

Introduction of AUSTAL2000 usually followed the sequence

1.COPY → 2.ADJUST → 3.CALCULATE

1. Step COPY

Download free of charge http://www.austal2000.de
AUSTAL2000 is a public program system which includes GNU-licensed source code, executables, documentation, examples Windows and Linux Version.

2. Step Model ADJUST

input data file austal2000.txt

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----------------------------------------------------------------------------
- input data file austal2000.txt
- (a comment line starts with "-", a comment in a line with "'")
‘ Model parameters
ti  "harmo11"              ' title of the project
os  NESTING                ' options (here: nested grids)
qs  0                      ' quality level (controls number of particles)

‘ Meteo timeseries
az  "anno95.akterm"   ' name of the meteo timeseries
z0  0.2               ' (m) average surface roughness length
ha  11.2              ' (m) anemometer height above ground

'  point / line / volume sources
hq   50   6    5          ' (m) height of the lower edge
cq    6   5    0          ' (m) vertical extent
xq   80   0   -8          ' (m) lower left corner, x-coordinate
yq   80  20  -30          ' (m) lower left corner, y-coordinate
aq    0   0   16          ' (m) extent in x-direction
bq    0   0   60          ' (m) extent in y-direction

' emissions:
no2   2.78     0     0     ' (g/s) 10 kg/h
no    1.81     0     0     ' (g/s) 10 kg/h
so2   5.56     0     0     ' (g/s) 20 kg/h
pm-1  2.78     0     0     ' (g/s) 10 kg/h
pm-2  2.78     0     0     ' (g/s) 10 kg/h
nh3   0        5     5     ‘ (g/s) ammonia
odor  0     5000 5000      ' (GE/s) odorant (result: frequency
                             of odour hours)

' monitor points:
xp  100 200 300 400 500 600 700 800   ' (m) x-coordiante
yp    0   0   0   0   0   0   0   0   ' (m) y-coordinate
----------------------------------------------------------------------------
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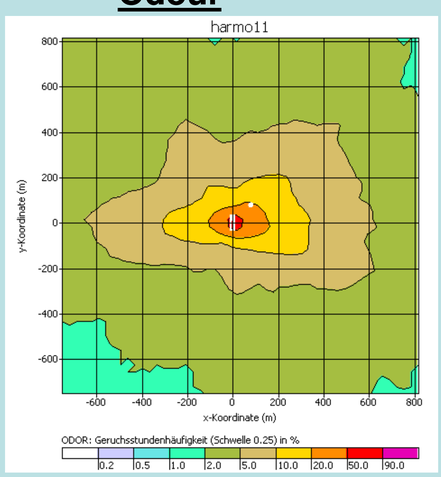
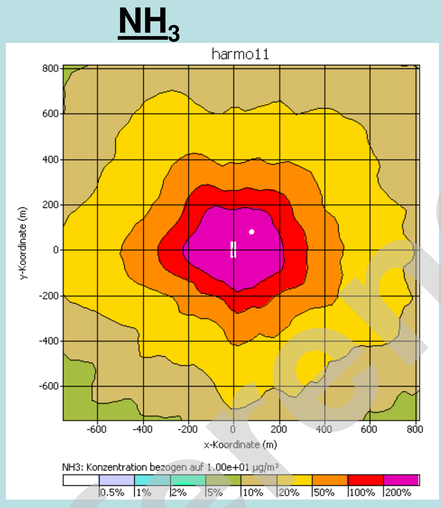
3. Step CALCULATE simultaneously

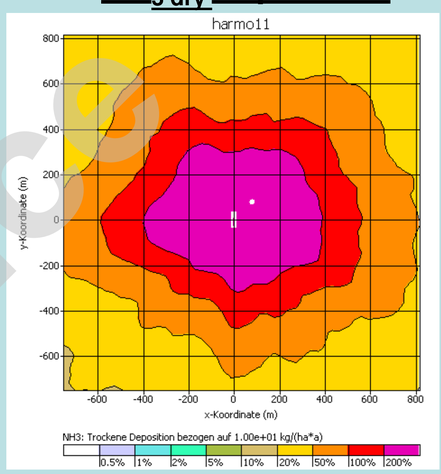
Odour



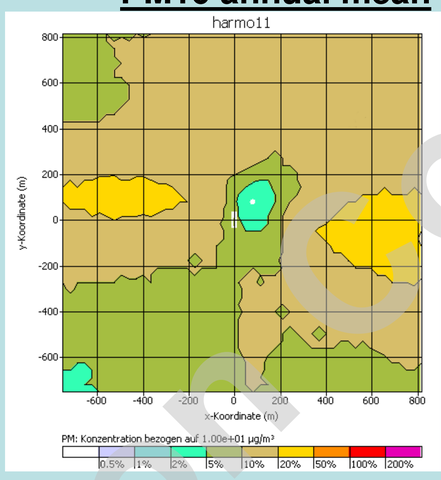
NH_3



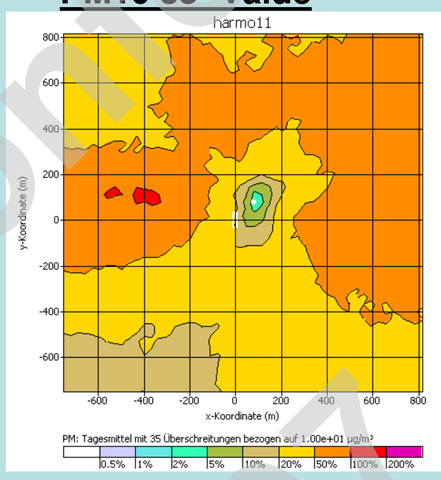
$NH_{3\ dry}$ Deposition



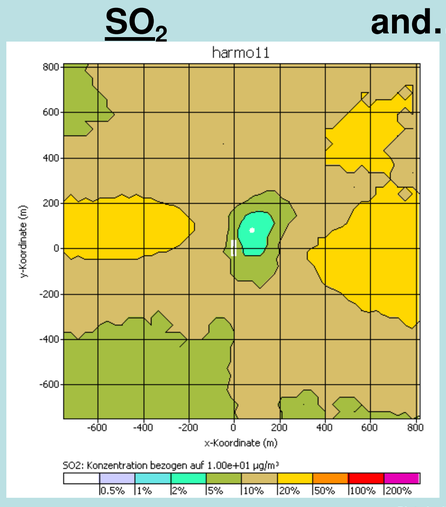
PM10 annual mean



PM10 35thValue



SO_2 and….



Plots by IBJDIS

Meteorological Data

One of the main problems turned out to be the availability or preparation of suitable and representative meteorological data.

AUSTAL2000 requires either a time series with hourly means of wind velocity, wind direction and stability measure (scheme Klug/ Manier) or the Monin-Obukhov length or a dispersion class statistics;

Quality management by log file + by external check list

Other problems were connected to the provision of data and the quality control of the process of data acquisition, dispersion calculation, and result evaluation.
Quality control was facilitated and supported by the transparency of the
→ model structure
→ documentation,
→ source code,
→ guidelines,
→ project-specific log files that allows retracing a dispersion calculation and applied parameter settings.

Preparation of a dispersion calculation and quality assurance can be supported by the provision of a detailed external check list.
Based on a long experience checking reports a list is in preparation in Germany in form of VDI guideline 3783/13 (Environmental meteorology; quality control concerning impact forecast plant-related pollution control). It allows checking and controlling the completeness and plausibility of data sources, input data, assumptions and documentation.

Experiences in all Twinning countries have shown that the analytic methods applied in the measurements of emission and meteorology must be boosted in quality management too.

Training Knowledge Base

Training of unexperienced personal was strongly required and it was crucial to reserve adequate financial and time resources.

After a few adoptions, which mainly concern translations to the local language, *the powerful AUSTAL2000 system could be successfully run and applied in the context of Twinning Projects.*

Although application of the dispersion model was usually straightforward, quality assurance by an organized step-by-step check of the input data, the model usage, and the according documentation turned out to be essential to identify deficiencies in information and background knowledge of the involved persons.