

CONCLUSIONS

Evaluation of atmospheric pollution of the Netherlands by lead in 2007 was prepared with the use of detailed country-specific data on emissions and monitoring and modelling with fine (5x5 km²) spatial resolution. Results of this work were compared with information annually prepared by EMEP for the Netherlands. In particular, in addition to the annual country-specific data, the country is informed about pollution levels with fine spatial resolution, pollution levels caused by emission source categories, and transboundary transport between individual provinces. The preparation of this assessment was possible because of availability of highly detailed and diverse national data and due to close co-operation with national experts from the Netherlands. The main conclusions of this work are formulated below:

- Spatial distribution of lead levels over the Netherlands is not uniform. In the northern part of the country (provinces Groningen, Friesland, Drente, Flevoland, Overijssel) the range of air concentrations is 4-5 ng/m³, and that of deposition - 1-2 kg/km²/y. The highest air concentrations (more than 30 ng/m³) and deposition (more than 4 kg/km²/y) levels are noted for the province Noord-Holland. The levels obtained for 50-km resolution are generally similar to those for 5x5 km², but ranges between maximum and minimum values are smaller.
- Total deposition of lead to the Netherlands in 2007, simulated with fine (5x5 km²) spatial resolution, is almost 48 tonnes. About of 18% are caused by national sources, 27% - by anthropogenic sources from foreign EMEP countries, 52% - by contribution of wind re-suspension. The fraction of non-EMEP sources is minor (around 3 %). The contributions to individual provinces vary largely. The ranges of the contributions are 13-38% (foreign anthropogenic sources), 8 – 46% (national sources), 38 – 59% (re-suspension) and 2 – 4% (non-EMEP sources). Impact of re-suspension (55%) and foreign sources (29%) to deposition in the Netherlands as a whole simulated with coarse resolution (50x50 km²) are similar to those modelled with fine resolution. However, the contribution of national sources is considerably lower (12%).
- Contribution of foreign emission sources to deposition from the anthropogenic sources in the Netherlands ranges from 25% to 80% over most part of the country. The highest contribution is noted for the Dutch-Belgian border, while the lowest – for the central part of the country (province Noord-Holland).
- Contributions to anthropogenic deposition from the EMEP countries and from the Dutch provinces were established. In the most of the Dutch provinces the main contribution to anthropogenic deposition is made by foreign emission sources of Belgium, Germany, the United Kingdom, and France, and by national emission sources of the Noord-Holland province.
- From 5% to 12% of lead is deposited to territory of a province where it is emitted, and from 4 to 19% - to other provinces (Fig. 2.15). The most of lead (72-90%) emitted in the Dutch provinces is transported through the state borders to foreign countries. For country as a whole 19% of emitted lead are deposited to the country's territory. When modelling with coarse resolution, this fraction is around 13%.
- Contributions of emission source categories to deposition from national sources in the Netherlands were estimated. The main contribution (63%) to deposition in the country

is caused by “*Iron and steel production*”, followed by “*Transport (except aviation)*” (16%), “*Industrial processes*” (9%), “*Small combustion installations*” (6%) and “*Aviation*” (5%). The highest contribution of “*Iron and steel production*” is noted for Noord-Holland province (91%), “*Transport (except aviation)*” – in Gelderland (28%), “*Industrial processes*” – in Limburg (34%), “*Small combustion installations*” – in Noord-Brabant and “*Aviation*” – in Groningen.

- Refinement of spatial resolution leads to general reduction of discrepancies between modelled and measured pollution levels in the Netherlands. Besides, the correction of wind re-suspension parameterization favours further improvement of the modelled concentrations in air in the Netherlands. Application of the same correction to the EMEP region as a whole could help to increasing agreement between modelled and measured levels in some regions (the Netherlands, Belgium, the United Kingdom). For the other parts of the EMEP region additional research is needed to achieve the improvements.