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FUTURE WORK

The project will continue in 2018 focusing on establishing a more detailed spatial emission inventory for County Dublin. The bottom-up data for Dublin will be compared to top-down models using the Δ -tool developed within the FAIRMODE project. The knowledge gained in this comparison will be used to further refine the spatial model.

The spatial model will be updated taking into account the latest available information, e.g. the results of the 2016 census. Further, GeoKey time series will be prepared for relevant sectors.

Additionally, the project will develop temporal profiles for all emission sources, which will enable an even better atmospheric modelling of emissions.

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NATIONAL MAPPING OF GHG AND NON- GHG EMISSIONS SOURCES

A research project for Ireland's
Environmental Protection Agency

Mapping of emissions is of great importance in order to be able to model concentrations or air pollutants and assess human exposure to air pollution.

Additionally, mapping of emissions will allow for an assessment of areas with high emission intensity and hence the possibility to target policies and measure to problematic areas.

Exposure to air pollution is linked to health effects in the population and to related external costs. The health impacts depend on the concentrations of air pollution that people are exposed to and hence on the amount, characteristics and dispersion of emissions. The spatial emission inventory is crucial for the quality of the ambient air modelling, and hence the applicability and reliability for policy makers.

Spatial emissions are used in assessment as well as in the work on solving transboundary air pollution problems, e.g. under the EMEP programme. For this purpose, Ireland and other European countries report spatial emissions under the UNECE LRTAP convention. The EMEP model calculations have been supporting the decision-making within the LRTAP convention for more than 30 years

The spatial model

The model is constructed in a database system. The main input are the official emission inventory data for Ireland compiled by Ireland's Environmental Protection Agency.

The model domain is the exclusive economic zone of Ireland and the model is designed to run on a high resolution (1 km x 1 km).

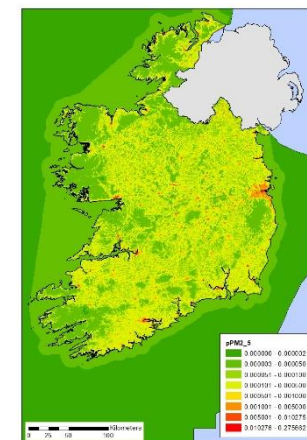
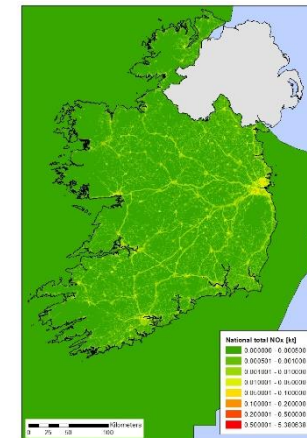
In the project, spatial distribution keys (GeoKeys) have been developed for all emission sources and pollutants included in the Ireland's emission inventory. In total, the model covers 177 sectors and 32 pollutants. Emission mapping is carried out for the year 2015 and used for reporting to the UNECE LRTAP convention. The model is prepared for emission mapping for other years based on either the present GeoKeys or new time dependent GeoKeys.

The model integrates official statistics and spatial information to produce the high-resolution emission maps. The official statistics include, but are not limited to, population census, animal census, transport statistics, and building heat demand. To achieve the best quality of the input data, Irish stakeholders, institutions and organisations have contributed and kindly provided knowledge and data to the project.

The development of GeoKeys are done using the best available spatial datasets. The datasets vary from being information on the exact location of a source, e.g. a power plant, to a line theme, e.g. the road network or railways network, to a polygon theme, e.g. land parcels. Some of these spatial datasets are further combined e.g. land parcel information with information on the density of animals.

Emission maps

Below are two examples of the emission maps produced showing the 1 km x 1 km distribution of NO_x and PM_{2.5}. Road transport are dominating the NO_x emissions pattern, while PM_{2.5} emissions to a greater extent reflect population density.



For more information: www.mapeire.dk