This short overview provides a brief introduction to the standard resolution and high resolution MarcoPolo inventory. More details can be found in the basic description accompanying the data set (Hooyberghs et al. 2016).

Standard resolution inventory (0.25 x 0.25 degree)

The MarcoPolo inventory provides monthly emissions for the year 2014, for the pollutants NO_x, $PM_{2.5}$, PM_{10}, BC, SO_2, VOCs, NH_3 and CO, for East- and Central China. The emissions are categorized in six different sectors: industry, residential, energy, transport, agriculture and international shipping.

The inventory is mainly based on (a) top-down satellite emission estimates for the year 2014, and (b) source sector information of existing bottom-up inventories (see Figure 1). The satellite-based estimates derived in work package three of the MarcoPolo project provide total anthropogenic and biogenic emissions for $PM_{2.5}$, NO_x, SO_2 and VOCs. Emissions for missing pollutant have been based on (local) ratios to $PM_{2.5}$ contained in top down inventories (for PM_{10} and BC), or have been copied from these inventories (for CO, NH_3). The split of the emissions between the six different sectors is based on the Multi-resolution Emission Inventory for China (MEIC), a bottom-up inventory with monthly emission data for 2012 developed by Tsinghua University. Outside China, the MEIC-inventory has been complemented with the MIX-2010 inventory (Li et al. 2015). For international shipping emissions in ports, the sector contribution relies on existing bottom-up literature data.

A first analysis using chemical transport models (by KNMI, BIRA and TNO) points at realistic outcomes for VOCs, SO_2 and NO_x, with improvements for modelled total vertical columns and mixed results for ground concentrations (Timmermans et al. 2016). For $PM_{2.5}$, the MarcoPolo inventory leads to realistic results in summer, but it also leads to an overestimation of modelled $PM_{2.5}$ concentrations during winter months, especially in the North of China (Beijing area), reflecting that the aerosol emission inversion is more complicated than the NO_2- and SO_2-inversions.

High resolution inventory (0.01 x 0.01 degree)

Apart from the standard resolution inventory (0.25 by 0.25 degree), a high resolution inventory (0.01 x 0.01 degree resolution) has been compiled for three selected regions: the Beijing-Tianjin area, the Yangtze river delta and the Pearl River delta. The high resolution inventory is obtained by downscaling the standard resolution inventory using open source proxy data containing road maps (Open Street Maps[1]), location of power plants (Enipedia[2], with a visual inspection for the power plants in the high resolution domain), population density (WorldPop[3]) and land use / land cover data (GlobCover[4]).

Data format

The standard resolution inventory and the three high resolution inventories are provided in NetCDF-format. The file size is approximately 80 MB for the low resolution inventory, 210 MB for the high resolution inventory for Beijing and the Pearl River Delta and 630 MB for the inventory for the Yangtze River Delta. The file contains three dimensions: longitude (in degrees east), latitude (in degrees north), and time (in days since January 1st, 2014). The emissions are stored as distinct variables (in Mg/cell/month), with each variable containing the emissions for one pollutant and one sector.

[1] www.openstreetmap.org
[2] http://enipedia.tudelft.nl
[3] http://www.worldpop.org.uk/
[4] http://www.copernicus.eu/projects/globcover

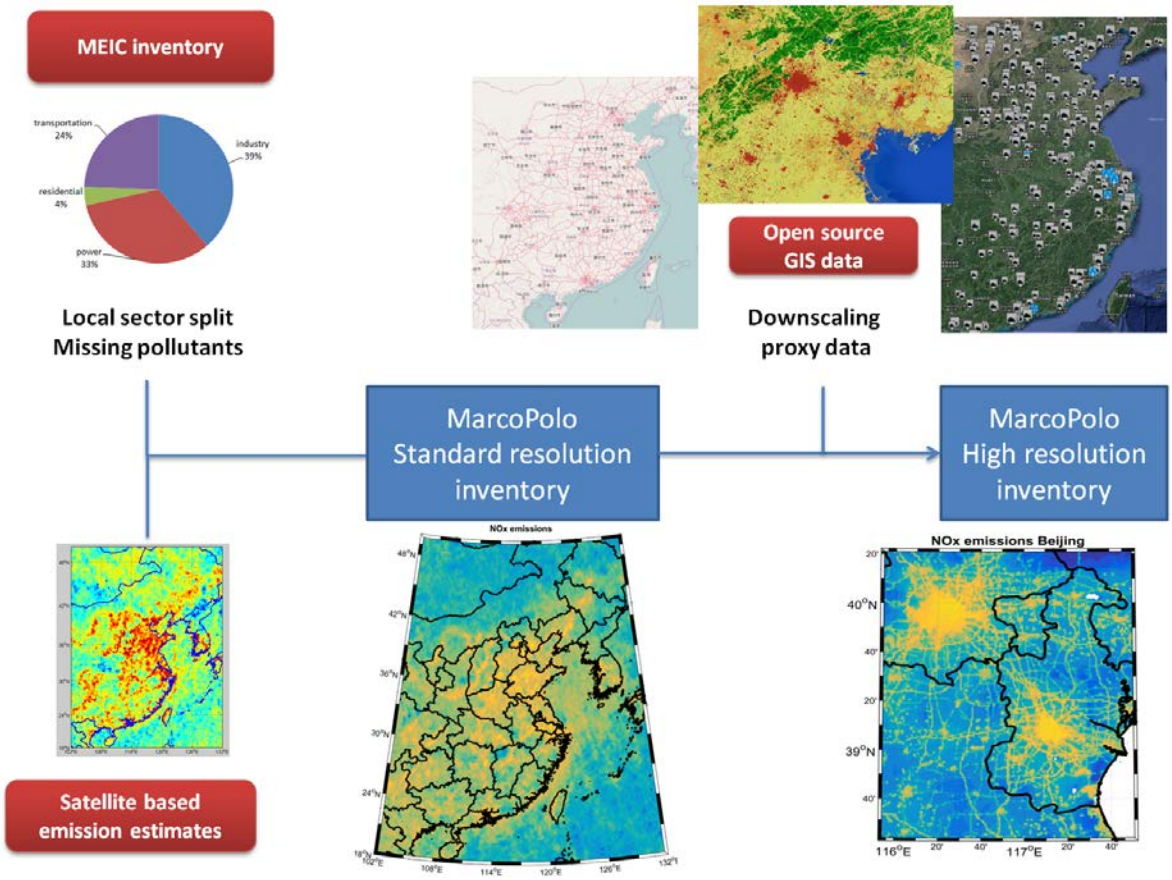

Figure 1: Schematic overview of the methodology.

References

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