

The goal of the work is to assess the main flows of Nitrogen for the Atmosphere pool for Belarus. The results could be used for the future work on Nitrogen budget.

Relevance:

- Reactive nitrogen (Nr) emissions cause a wide range of environmental problems.
- Nitrogen is critical as a major nutrient for food, fiber and biofuel production
- Nitrogen budget provides policymakers with information for development of efficient emission reduction measures.
- There isn't any works on Nitrogen budget for Belarus.

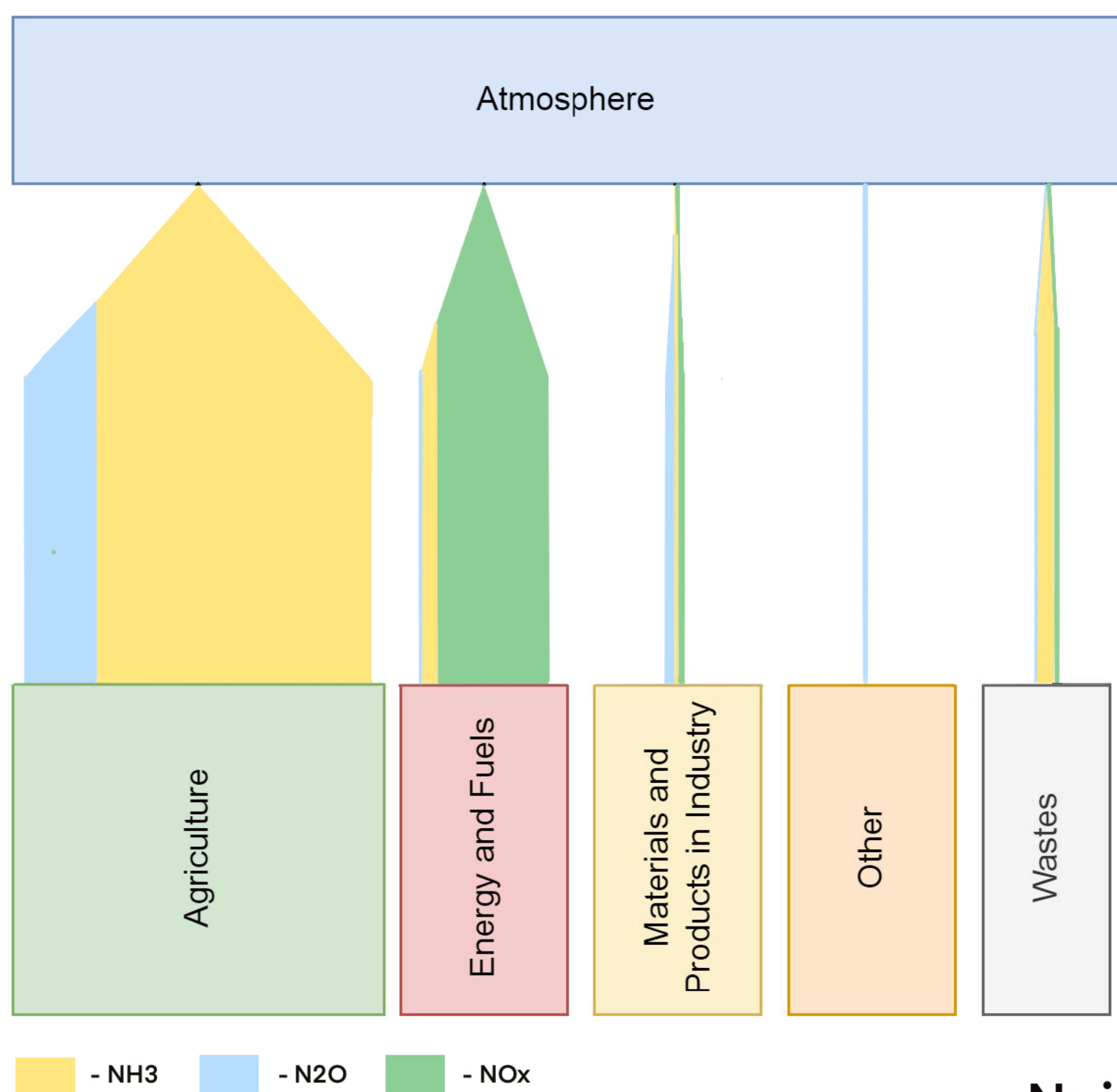
Methodology

Combination of different methods:

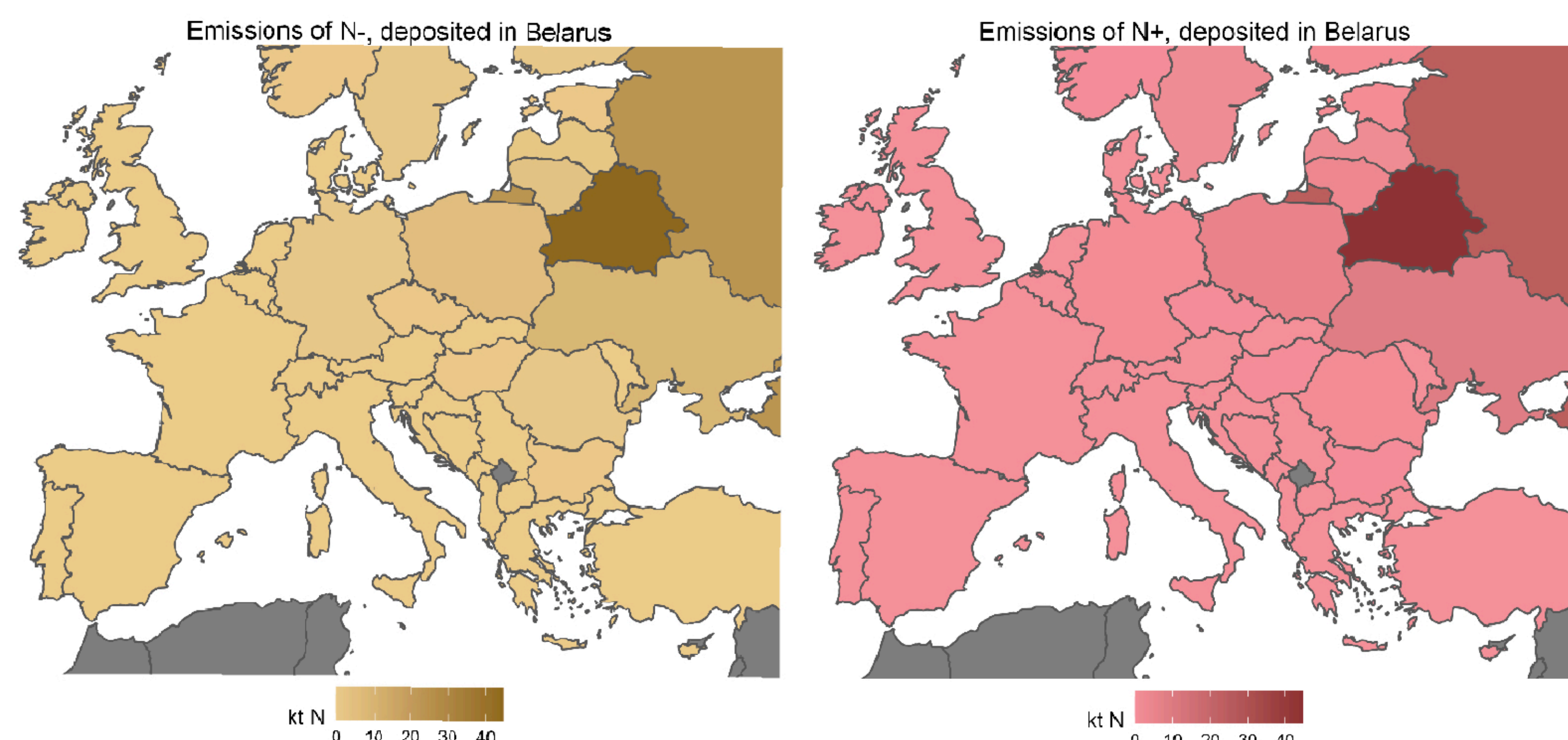
- Nitrogen emissions were taken from the National Reports under CLRTAP and UNFCCC
- Nitrogen deposition and transboundary transport were given by EMEP Source-Receptor tables

Emissions

The main contributor to Nr inflow is emissions of NH₃, NO_x and N₂O: 180.6 ktNr (64.5 % of total inflow). Almost 60% of Nr emissions are comprised of NH₃, 24% of NO_x, and the rest of N₂O. Emitted Nr in form of NO_x mainly results from Energy and Fuels pool (about 95.2% of total NO_x-N), in form of N₂O and NH₃ mainly results from Agriculture Pool (85.7% of total N₂O-N and 91.7% of total NH₃-N).

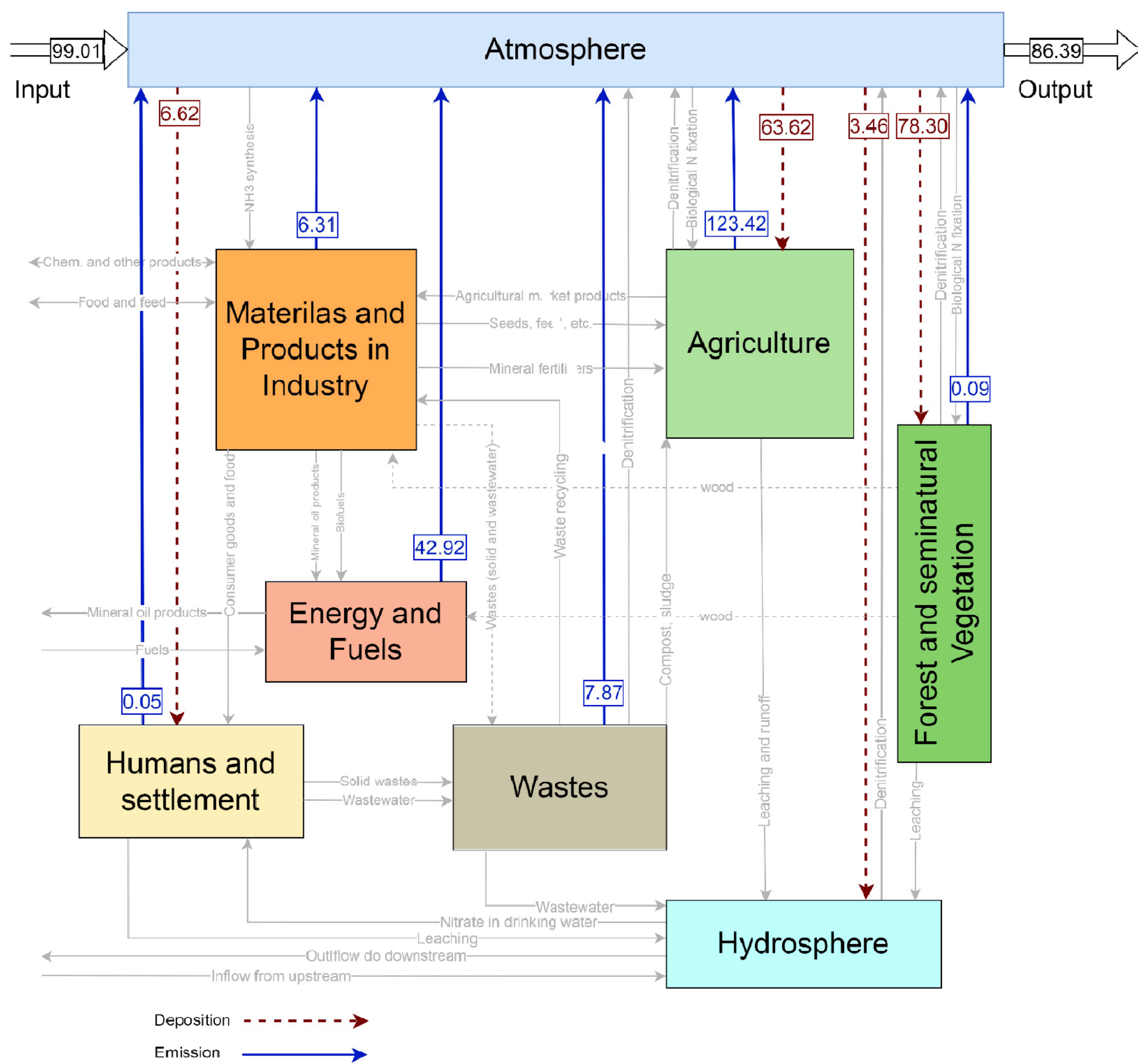


Nr inflow



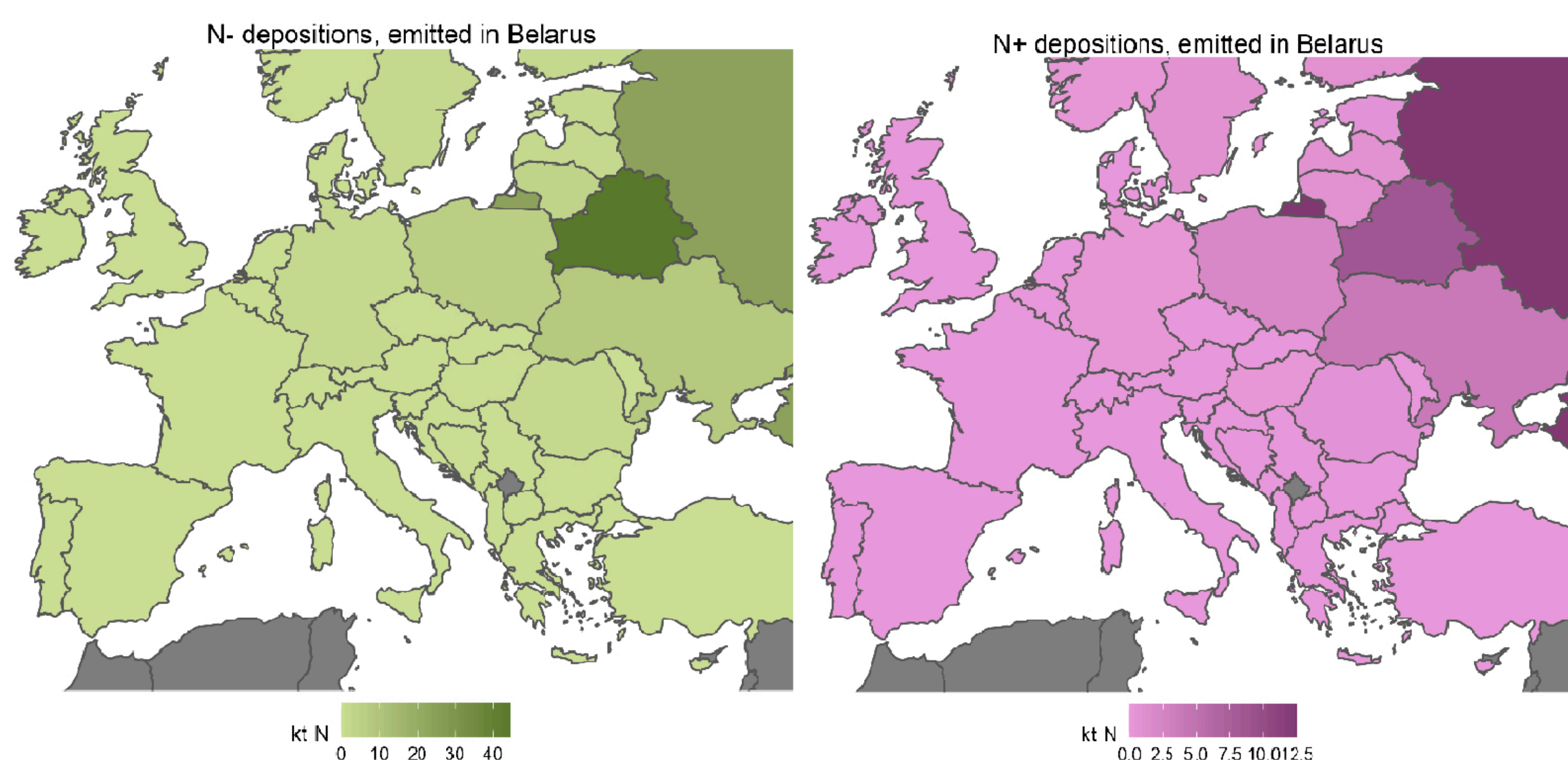
Inflow from other countries

The main suppliers of Nr to Belarus are Russia, Poland, Ukraine, and Germany. The N₊ (NO_x) inflow from these countries was 33.5 kt (or 66 % of total N₊ inflow). The amount of N- deposition from these countries was 31.4 kt (or 65.6 % of total+ inflow). These data don't include emissions from Belarus.



Depositions in Belarus

Total outflow from AT pool, according to assessment, includes 152.0 ktNr of Nr deposited and 86.4 ktNr of Nr transported. 60% of nitrogen are deposited in NH₃ form and 40 % in form of NO_x. According to assessment 63.6 kt of Nr deposited on agricultural lands, 78.3 kt on forest and semi natural ecosystems.



Deposition outside the Belarus

According to EMEP data, significant part of N- (NH₃) emitted in Belarus deposited on its territory (44.6 kt or 41.8%) in 2018. Remaining volume deposited on the territories of the neighbor countries: Russian Federation 24.2 kt (or 22.7%); Ukraine 8.6 kt (or 8.1%), Poland 5.3 kt (or 5.0%), Lithuania 3.2 kt (or 3.0 %) and Latvia 1.9 kt (or 1.8%). Deposition in such countries as Sweden, Kazakhstan, and Finland was around 1.2 kt/country. In contrary to N- deposition, only 8.4 kt (or 19.4%) of N+ (NO_x) emitted in Belarus re-deposited in its own territory. Thus neighbor countries were main recipients for this pollutant. About 30 % of N+ deposited in Russian Federation: 3.9 kt (or 9.0%) in Ukraine, 2.1 kt (4.8%) in Poland, 1.0 kt (2.3%) in Lithuania and 0.9 kt (2.1%) in Latvia. Beside this, 1.0 kt (2.3%) of N+ deposited in Finland.

Results

According to assessment using mass balance approach, about 42% of the national NH₃ and 19% of the NO_x emissions are redeposited in Belarus. Overall, Belarus NNB for AT pool has a close to equilibrium ratio of exports and imports of the total Nr with slide shift to import (transport inflow is 115% of transport outflow), while for the oxidized Nr imports significantly exceeds exports (transport inflow is 196% of transport outflow) and for the reduced N transport inflow is 79% of its transport outflow.