Source-receptor tables for 2011

The downloaded files include all source-receptor tables shown in Appendix C in EMEP Status Report 1/2013 (EMEP MSC-W & CCC & CEIP 2013) along with addditional tables for particulate matter components. The data files are given in a semicolon separated CSV format.

The source receptor tables are calculated for the meteorological and chemical conditions of 2011 for the extended EMEP domain and are based on model runs driven by ECMWF meteorology. The source-receptor (SR) relationships give the change in air concentrations or depositions resulting from a change in emissions from each emitter country.

For each country, reductions in five different pollutants have been calculated separately, with an emission reduction of 15% for SO_x, NO_x, NH_3, NMVOC or PPM, respectively. Here reduction in PPM means that PPM_{fine} and PPM_{coarse} are reduced together in one simulation.

For year 2011, reductions in volcanic emissions are done only for passive SO_2 degassing of Italian volcanoes (Etna and Stromboli). Although there was an eruption episode at Grímsvötn volcano in Iceland in May 2011, this eruption event has not been included in the EMEP model simulations. The eruption plume reached heights up to 16 km, which is beyond the top boundary layer of the EMEP model. Therefore, the plume and its transport can not be simulated by the current version of the model. As described in Simpson et al. (2013), extension of the model's vertical domain is currently under development.

The deposition tables show the contribution from one country to another. They have been calculated adding the differences obtained by a 15% reduction for all emissions in one country multiplied by a factor of 100/15, in order to arrive at total estimates.

For the concentrations and indicator tables, the differences obtained by the 15% emission reduction of the relevant pollutants are given directly. Thus, the tables should be interpreted as estimates of this reduction scenario from the chemical conditions in 2011.

The SR tables aim to respond to two fundamental questions about transboundary air pollution:

1. Where do the pollutants emitted by a country or region end up?

2. Where do the pollutants in a given country or region come from?

Each column answers the first question. The numbers within a column give the change in the value of each pollutant (or indicator) for each receiver country caused by the emissions in the country given at the top of the column.

Each row answers the second question. The numbers given in each row show which emitter countries were responsible for the change in pollutants in the country given at the beginning of each row.

The following SR tables are included, all in the extended EMEP domain, including new EECCA countries, and using 2011 ECMWF meteorology:

Acidification and eutrophication

- Deposition of OXS (oxidised sulphur). The contribution from SO_x, NO_x, NH_3, PPM and VOC emissions have been summed up and scaled to a 100% reduction. Unit: 100 Mg of S.
- Deposition of OXN (oxidised nitrogen). The contribution from SO_x, NO_x, NH_3, PPM and VOC emissions have been summed up and scaled to a 100% reduction. Unit: 100 Mg of N.
- Deposition of RDN (reduced nitrogen). The contribution from SO_x, NO_x, NH_3, PPM and VOC emissions have been summed up and scaled to a 100% reduction. Unit: 100 Mg of N.

Ground Level Ozone

- $AOT40_f^{uc}$. Effect of a 15% reduction in NO_x emissions. Unit: ppb.h per 15% emis.red. of NO_x.
- $AOT40_f^{uc}$. Effect of a 15% reduction in VOC emissions. Unit: ppb.h per 15% emis.red. of VOC.
- SOMO35. Effect of a 15% reduction in NO_x emissions. Unit: ppb.d per 15% emis.red. of NO_x.
- SOMO35. Effect of a 15% reduction in VOC emissions. Unit: ppb.d per 15% emis.red. of VOC.

Particulate Matter

- $PM_{2.5}$. Effect of a 15% reduction in PPM emissions. Unit: ng/m^3.
- $PM_{2.5}$. Effect of a 15% reduction in SO_x emissions. Unit: ng/m^3.
- $PM_{2.5}$. Effect of a 15% reduction in NO_x emissions. Unit: ng/m^3.
- $PM_{2.5}$. Effect of a 15% reduction in NH_3 emissions. Unit: ng/m^3.

- $PM_{2.5}$. Effect of a 15% reduction in VOC emissions. Unit: ng/m^3.
- $PM_{2.5}$. Effect of a 15% reduction in all emissions. The contribution from a 15% reduction in PPM, SO_x, NO_x, NH_3 and VOC emissions have been summed up. Unit: ng/m^3.

Additional particulate matter components not shown in Appendix C in EMEP Status Report 1/2013:

Fine Sulphate

- SO_4. Effect of a 15% reduction in SO_x emissions. Unit: ng/m^3.
- SO_4. Effect of a 15% reduction in NO_x emissions. Unit: ng/m^3.
- SO_4. Effect of a 15% reduction in NH_3 emissions. Unit: ng/m^3.
- SO_4. Effect of a 15% reduction in VOC emissions. Unit: ng/m^3.

Fine Ammonium

- NH_4. Effect of a 15% reduction in SO_x emissions. Unit: ng/m^3.
- NH_4. Effect of a 15% reduction in NO_x emissions. Unit: ng/m^3.
- NH_4. Effect of a 15% reduction in NH_3 emissions. Unit: ng/m^3.
- NH_4. Effect of a 15% reduction in VOC emissions. Unit: ng/m^3.

Fine Nitrate

- Fine NO_3. Effect of a 15% reduction in SO_x emissions. Unit: ng/m^3.
- Fine NO_3. Effect of a 15% reduction in NO_x emissions. Unit: ng/m^3.
- Fine NO_3. Effect of a 15% reduction in NH_3 emissions. Unit: ng/m^3.
- Fine NO_3. Effect of a 15% reduction in VOC emissions. Unit: ng/m^3.

Coarse Nitrate

- Coarse NO_3. Effect of a 15% reduction in SO_x emissions. Unit: ng/m^3.
- Coarse NO_3. Effect of a 15% reduction in NO_x emissions. Unit: ng/m^3.
- Coarse NO_3. Effect of a 15% reduction in NH_3 emissions. Unit: ng/m^3.
- Coarse NO_3. Effect of a 15% reduction in VOC emissions. Unit: ng/m^3.

Fine Elemental Carbon

- Fine EC. Effect of a 15% reduction in PPM emissions. Unit: ng/m^3.

Coarse Elemental Carbon

- Coarse EC. Effect of a 15% reduction in PPM emissions. Unit: ng/m^3.

The country/region codes used in the source-receptor tables can be found in Table 1.

Code	Country/Region
AL	Albania
AM	Armenia
ASI	Remaining Asian areas (official)
AST	Remaining Asian areas (extended)
AT	Austria
ATL	Remaining N.-E. Atlantic Ocean
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BAS	Baltic Sea
BLS	Black Sea
BE	Belgium
BG	Bulgaria
BIC	Boundary and Initial Conditions
BY	Belarus
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EMC	EMEP land areas (official)
EXC	EMEP land areas (extended)
ES	Spain
EU	European Union (EU27)
FI	Finland
FR	France
GB	United Kingdom
GE	Georgia
GL	Greenland
GR	Greece
HR	Croatia
HU	Hungary

Code	Country/Region
IE	Ireland
IS	Iceland
IT	Italy
KG	Kyrgyzstan
KZ	Kazakhstan (official)
KZT	Kazakhstan (extended)
LT	Lithuania
LU	Luxembourg
LV	Latvia
MD	Republic of Moldova
ME	Montenegro
MED	Mediterranean Sea
MK	The FYR of Macedonia
MT	Malta
NL	Netherlands
NO	Norway
NOA	North Africa
NOS	North Sea
PL	Poland
PT	Portugal
RO	Romania
RS	Serbia
RU	Russian Federation (official)
RUE	Russian Federation (extended)
SE	Sweden
SI	Slovenia
SK	Slovakia
TJ	Tajikistan
TM	Turkmenistan
TR	Turkey
UA	Ukraine
UZ	Uzbekistan

Table 1: Country/region codes used in the SR tables:‘official’ refers to the area of the country/region which is inside the official EMEP grid domain, while ‘extended’ refers to the area of the country/region inside the extended EMEP grid domain.

References

EMEP MSC-W & CCC & CEIP: Transboundary acidification, eutrophication and ground level ozone in Europe in 2010., EMEP Status Report 1/2013, The Norwegian Meteorological Institute, Oslo, Norway, 2013.

Simpson, D., Tsyro, S., Wind, P., and Steensen, B. M.: EMEP model development, in: Transboundary acidification, eutrophication and ground level ozone in Europe in 2011. EMEP Status Report 1/2013, The Norwegian Meteorological Institute, Oslo, Norway, 2013.