
Source-receptor tables for 2020

The source-receptor tables are calculated for the meteorological and chemical conditions of 2020, using the EMEP MSC-W model version rv4.45. The tables are calculated for the EMEP domain covering the geographic area between 30° N–82° N latitude and 30° W–90° E longitude, and are based on model runs driven by ECMWF-IFS(cy46r1) meteorology in $0.3^\circ \times 0.2^\circ$ longitude-latitude projection.

The source-receptor (SR) relationships give the change in air concentrations or depositions resulting from a change in emissions from each emitter country.

All tables except one in this appendix are based on source-receptor calculations with the 15% perturbation method using the EMEPwREF2_v2.1C emission data set as described in Chapter 3 and summarized in Appendix A, EMEP Status Report 1/2022.

The perturbation method means that for each country, reductions in five different pollutants have been calculated separately, with an emission reduction of 15% for SO_x, NO_x, NH₃, NMVOC or PPM, respectively. Here, a reduction in PPM means that PPM_{2.5} and PPM_{coarse} are reduced together in one simulation.

For year 2020, reductions in volcanic emissions are done for passive SO₂ degassing of Italian volcanoes (Etna, Stromboli and Vulcano).

For EC emissions, two different emission data sets have been used: 1) EC derived from the EMEPwREF2.1C emission data, using a set of PM-split files consistent with the TNO *REF2.1* data set and 2) Official EMEP gridded EC emissions. Source-receptor calculations with the 15% *Perturbation Method* used EC derived from the EMEPwREF2.1C emission data set. Additional source-receptor calculations for EC, using the official EMEP gridded emissions for EC (BC), were done with the *Local Fraction* method described in Chapter ???. Since the *Local Fraction* method tracks all emissions, results have been scaled by a factor of 0.15 to give comparable results for concentrations and indicator tables.

The boundary conditions for all gaseous and aerosol species were given as 5-year monthly average concentrations, derived from EMEP MSC-W global runs, kept invariable over the calculation period.

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 2020.

The SR tables in the following aim to respond to two fundamental questions about trans-boundary 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.

A list of abbreviations of countries and regions is given in Table 1.

More information on aerosol components and SR tables in electronic format are available from the EMEP website www.emep.int.

Acidification and eutrophication

- Deposition of OXS (oxidised sulphur). The contribution from SO_x, NO_x, NH₃, PPM and VOC emissions have been summed up and scaled to a 100% reduction. Units: 100 Mg of S.
- Deposition of OXN (oxidised nitrogen). The contribution from SO_x, NO_x, NH₃, PPM and VOC emissions have been summed up and scaled to a 100% reduction. Units: 100 Mg of N.
- Deposition of RDN (reduced nitrogen). The contribution from SO_x, NO_x, NH₃, PPM and VOC emissions have been summed up and scaled to a 100% reduction. Units: 100 Mg of N.

Ground Level Ozone

- MM-AOT40f. Effect of a 15% reduction in NO_x emissions. Units: ppb.h
- MM-AOT40f. Effect of a 15% reduction in VOC emissions. Units: ppb.h
- SOMO35. Effect of a 15% reduction in NO_x emissions. Units: ppb.d
- SOMO35. Effect of a 15% reduction in VOC emissions. Units: ppb.d

For ozone, we do not include the contributions from areas that are outside the EMEP domain. Until last year these had been included in the tables as BIC (Boundary and Initial Conditions) and were calculated by reducing NO_x and NMVOC at the model boundary. However, the most important contributor to ozone from areas outside the EMEP domain is ozone itself, transported hemispherically across the model boundary. Including the BIC contribution that is due (only) to NO_x and NMVOC only would be misleading.

Particulate Matter

- PM_{2.5}. Effect of a 15% reduction in PPM emissions. Units: ng/m³
- PM_{2.5}. Effect of a 15% reduction in SO_x emissions. Units: ng/m³
- PM_{2.5}. Effect of a 15% reduction in NO_x emissions. Units: ng/m³
- PM_{2.5}. Effect of a 15% reduction in NH₃ emissions. Units: ng/m³
- PM_{2.5}. Effect of a 15% reduction in VOC emissions. Units: ng/m³
- PM_{2.5}. Effect of a 15% reduction in all emissions. The contribution from a 15% reduction in PPM, SO_x, NO_x, NH₃ and VOC emissions have been summed up. Units: ng/m³

Fine Elemental Carbon

- Fine EC. Effect of a 15% reduction in PPM emissions. Units: 0.1 ng/m³

Fine Elemental Carbon

- Fine EC. Effect of a 15% reduction in primary EC emissions (using official gridded EMEP EC emissions) calculated with the Local Fractions method. Units: 0.1 ng/m³

Coarse Elemental Carbon

- Coarse EC. Effect of a 15% reduction in PPM emissions. Units: 0.1 ng/m³

Primary Particulate Matter

- PPM_{2.5}. Effect of a 15% reduction in PPM emissions. Units: ng/m³

Table 1: Country/region codes used throughout this report.

Code	Country/Region/Source	Code	Country/Region/Source
AL	Albania	IS	Iceland
AM	Armenia	IT	Italy
AST	Asian areas	KG	Kyrgyzstan
AT	Austria	KZ	Kazakhstan
ATL	N.-E. Atlantic Ocean	LI	Liechtenstein
AZ	Azerbaijan	LT	Lithuania
BA	Bosnia and Herzegovina	LU	Luxembourg
BAS	Baltic Sea	LV	Latvia
BE	Belgium	MC	Monaco
BG	Bulgaria	MD	Moldova
BIC	Boundary/Initial Conditions	ME	Montenegro
BLS	Black Sea	MED	Mediterranean Sea
BY	Belarus	MK	North Macedonia
CH	Switzerland	MT	Malta
CY	Cyprus	NL	Netherlands
CZ	Czechia	NO	Norway
DE	Germany	NOA	North Africa
DK	Denmark	NOS	North Sea
DMS	Dimethyl sulfate (marine)	PL	Poland
EE	Estonia	PT	Portugal
ES	Spain	RO	Romania
EU	European Union (EU27)	RS	Serbia
EXC	EMEP land areas	RU	Russian Federation
FI	Finland	SE	Sweden
FR	France	SI	Slovenia
GB	United Kingdom	SK	Slovakia
GE	Georgia	TJ	Tajikistan
GL	Greenland	TM	Turkmenistan
GR	Greece	TR	Turkey
HR	Croatia	UA	Ukraine
HU	Hungary	UZ	Uzbekistan
IE	Ireland	VOL	Volcanic emissions