
Source-receptor tables for 2021

The source-receptor tables are calculated for the meteorological and chemical conditions of 2021, using the EMEP MSC-W model version rv5.0. 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 are based on source-receptor calculations with the 15% perturbation method using the EMEPwRef2_v2.1C emission data set. 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 2021, reductions in volcanic emissions are done both for passive SO₂ degassing of Italian volcanoes (Etna, Stromboli and Vulcano) and for SO₂ emissions from the Mt. Fagradalsfjall eruption in Iceland.

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 2021.

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
- MDA8_{AS}. Effect of a 15% reduction in NO_x emissions. Units: ng/m³
- MDA8_{AS}. Effect of a 15% reduction in VOC emissions. Units: ng/m³

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

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 | Cod e | 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 | Türkiye |
| HR | Croatia | UA | Ukraine |
| HU | Hungary | UZ | Uzbekistan |
| IE | Ireland | VOL | Volcanic emissions |