

## **D5-2 Delivery of quality-controlled HAQT data with open access**

The ENFUSER model data of hourly pollutant concentrations was released through the FMI open data download service (<http://opendata.fmi.fi/wfs>) on 2 October, 2018. This service can be used without registration.

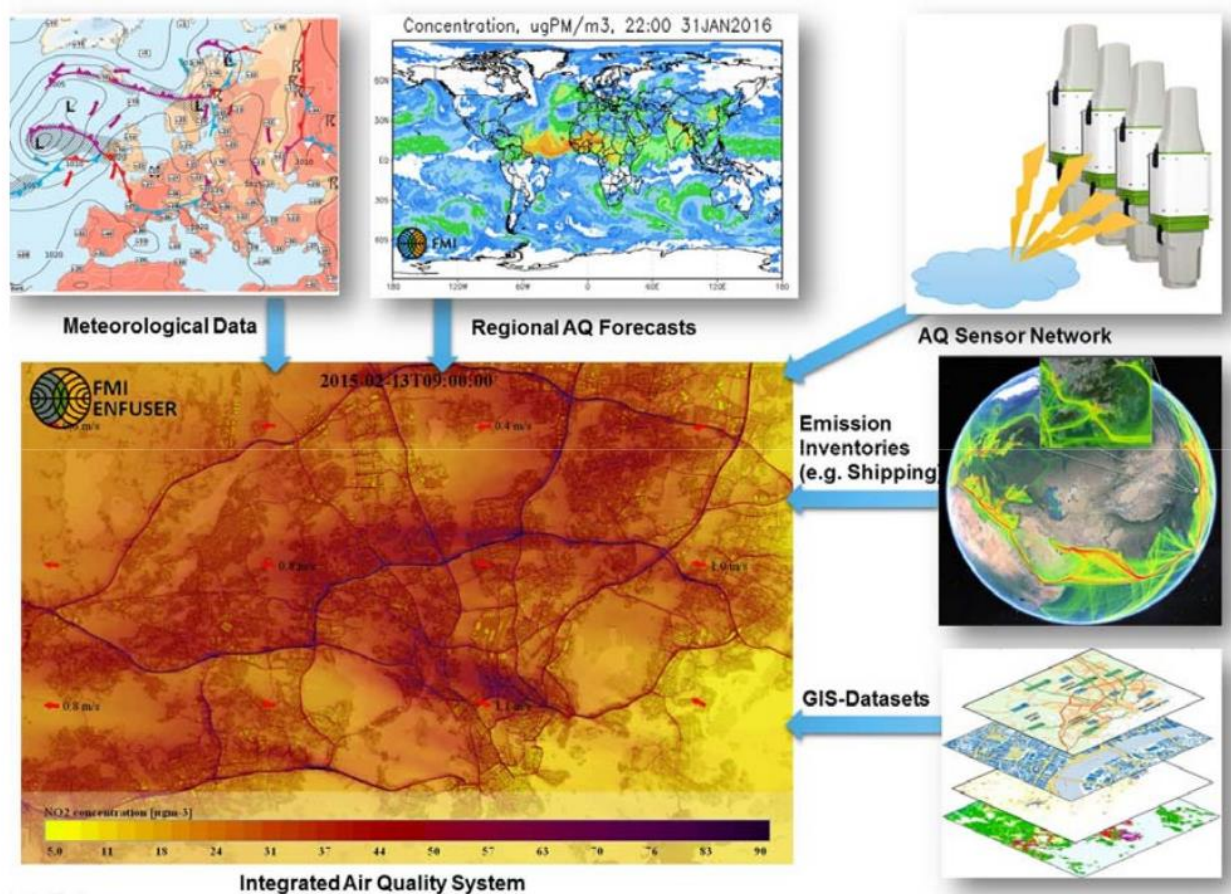


Figure 1. Core components of the ENFUSER model.

ENFUSER (Figure 1) is developed by the Finnish Meteorological Institute. In the model, air quality information produced by the measurement network is combined to the factors influencing the local air quality situation, such factors being, among others, weather conditions, geographical features, land use, traffic volume, long-range transportation and emission estimates for wood burning.

The downloadable data contains hourly concentrations of PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>2</sub> and O<sub>3</sub> as well as the Air Quality Index (in a scale of 1 to 5). A new gridded dataset is added to the downloading service once an hour in near real-time. The spatial resolution is around 20 m, and the file format is NetCDF4 (.nc).

The download service requires the use of stored queries. A stored query for the ENFUSER data is as follows:

[https://opendata.fmi.fi/wfs?request=getFeature&storedquery\\_id=fmi::forecast::enfuser::airquality::helsinki-metropolitan::grid](https://opendata.fmi.fi/wfs?request=getFeature&storedquery_id=fmi::forecast::enfuser::airquality::helsinki-metropolitan::grid)

As query parameters, the user can give "starttime", "endtime", "bbox" and "parameters".

The start and the end of the time interval to return data are given in ISO 8601 format (for example 2017-01-25T00:00:00Z).

"Bbox" is the bounding box of the wanted grid. It must be given in lon/lat coordinates in the following order: minimum longitude, minimum latitude, maximum longitude, maximum latitude.

"Parameters" are AQIndex, NO2Concentration, O3Concentration, PM10Concentration, and PM25Concentration.

With the following query the user can download the respective concentrations of all mentioned pollutants as well as the Air Quality Index for the whole Helsinki metropolitan area from 30 October 2018, 21 UTC to 30 October 2018, 23 UTC:

[https://opendata.fmi.fi/download?producer=enfuser\\_helsinki\\_metropolitan&param=AQIndex,NO2Concentration,O3Concentration,PM10Concentration,PM25Concentration&bbox=24.58,60.1321,25.1998,60.368&levels=0&origintime=2018-10-30T21:00:00Z&starttime=2018-10-30T21:00:00Z&endtime=2018-10-30T23:00:00Z&format=netcdf&projection=EPSG:4326](https://opendata.fmi.fi/download?producer=enfuser_helsinki_metropolitan&param=AQIndex,NO2Concentration,O3Concentration,PM10Concentration,PM25Concentration&bbox=24.58,60.1321,25.1998,60.368&levels=0&origintime=2018-10-30T21:00:00Z&starttime=2018-10-30T21:00:00Z&endtime=2018-10-30T23:00:00Z&format=netcdf&projection=EPSG:4326)

For a query like above, the data will be downloaded as a single .nc file. Each dataset is a three-dimensional array where one of the dimensions represents time (see Figure 2).

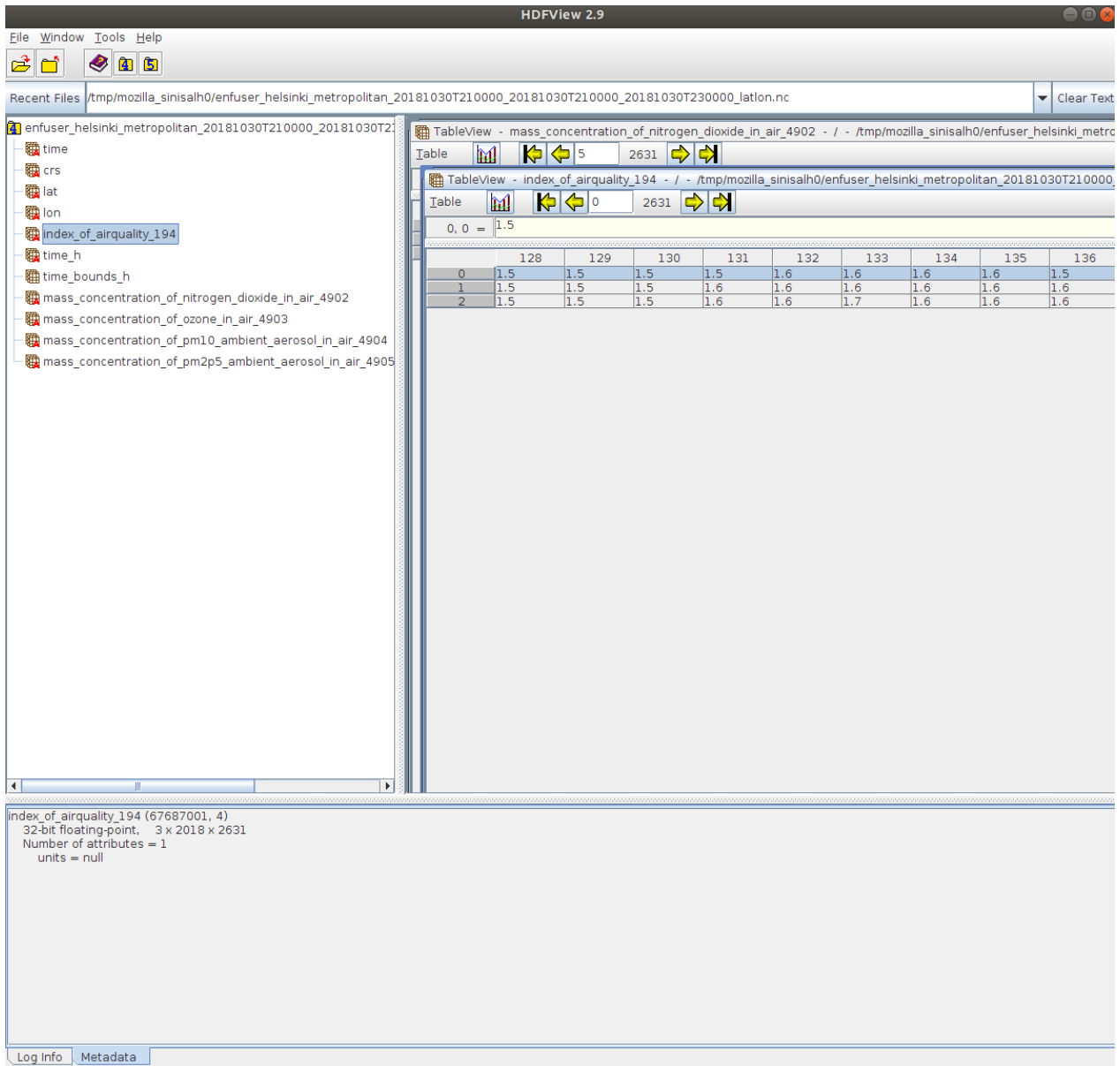


Figure 2. An example of downloaded ENFUSER data being viewed in HDFView 2.9. The desired dataset can be selected from the menu at the left side. In this view, each horizontal row in the data represent a moment in time ( $index = starttime + X \text{ hours}$ ).