

Air Quality e-Reporting: processing of data from models at the EEA, status and perspectives

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*AQ modelling data
processing overview*



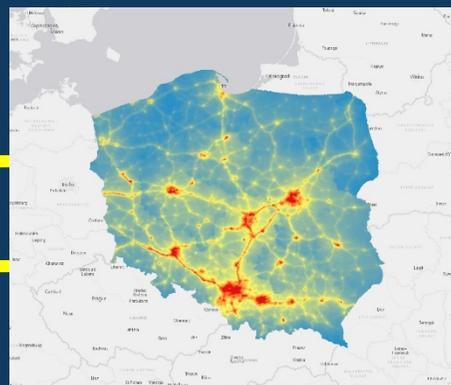
AQ modelling data: processing overview

The screenshot shows the EIONET Central Data Repository interface. The main content area displays a list of files in an envelope named 'Etb_2019_version_1'. The files are listed with their names, descriptions, and sizes. The interface includes navigation tabs for Overview, Edit properties, Manage workflow history, History, and Data quality. A sidebar on the left contains various service and account options.

File Name	Description	Size
mod_pl_nox_19h_2019.zip	mod_pl_nox_19h_2019.zip	23 Sep 2020 10.8 MB
mod_pl_nox_a_2019.zip	mod_pl_nox_a_2019.zip	23 Sep 2020 4.76 MB
mod_pl_nox_s_2019.zip	mod_pl_nox_s_2019.zip	23 Sep 2020 4.23 MB
mod_pl_o3_aot40_2019.zip	mod_pl_o3_aot40_2019.zip	23 Sep 2020 6.98 MB
mod_pl_o3_aot40y5_2019.zip	mod_pl_o3_aot40y5_2019.zip	23 Sep 2020 3.95 MB
mod_pl_o3_nbst19p_2019.zip	mod_pl_o3_nbst19p_2019.zip	23 Sep 2020 10.4 MB
mod_pl_o3_nbst19p_2019.zip	mod_pl_o3_nbst19p_2019.zip	23 Sep 2020 9.21 MB
mod_pl_pm10_36d_2019.zip	mod_pl_pm10_36d_2019.zip	23 Sep 2020 847 KB
mod_pl_pm10_a_2019.zip	mod_pl_pm10_a_2019.zip	23 Sep 2020 2.34 MB
mod_pl_pm25_a_2019.zip	mod_pl_pm25_a_2019.zip	23 Sep 2020 81.7 KB
mod_pl_so2_2019.zip	mod_pl_so2_2019.zip	23 Sep 2020 11.5 MB
mod_pl_so2_4d_2019.zip	mod_pl_so2_4d_2019.zip	23 Sep 2020 11.5 MB
mod_pl_so2_a_2019.zip	mod_pl_so2_a_2019.zip	23 Sep 2020 4.22 MB
mod_pl_so2_w_2019.zip	mod_pl_so2_w_2019.zip	23 Sep 2020 7.86 MB
obe_pl_bsp_a_2019.zip	obe_pl_bsp_a_2019.zip	23 Sep 2020 11.1 MB
obe_pl_nox_19h_2019.zip	obe_pl_nox_19h_2019.zip	23 Sep 2020 1.27 MB
obe_pl_nox_s_2019.zip	obe_pl_nox_s_2019.zip	23 Sep 2020 7.13 MB
obe_pl_nox_a_2019.zip	obe_pl_nox_a_2019.zip	23 Sep 2020 4.42 MB
obe_pl_o3_aot40_2019.zip	obe_pl_o3_aot40_2019.zip	23 Sep 2020 1.12 MB
obe_pl_o3_aot40y5_2019.zip	obe_pl_o3_aot40y5_2019.zip	23 Sep 2020 4.13 MB

AQ modelling data:
reporting and automated
QC in ReportNet2.

AQ modelling meta data:
processed and stored
in SQL DB.

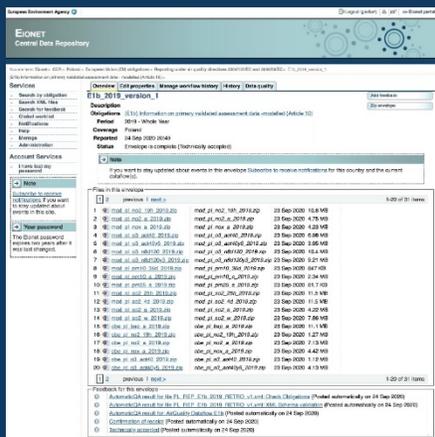


Two screenshots from the EIONET interface. The top screenshot shows a map of Poland with a color-coded AQ quality assessment overlay. The bottom screenshot shows a detailed view of the AQ quality assessment data, including a map and a table of results.

AQ modelling results:
processed to **GeoTIFFs** on EEA grid before being
used in maps, tables and assessments.



AQ modelling data: processing to common format



Inline
(swe
-array)

External (zip, tgz)

geometryLink /
ModelArea.localFile
(shp)

ModelArea.GML

GeoTiff

shp

ASCII

GeoTiffs
on EEA grid
(3035)

find files,
fetch aggregation,
read/match value
attributes

read projection
(re-project), match
resolution

MQI,
attainment,
selection for
viewer

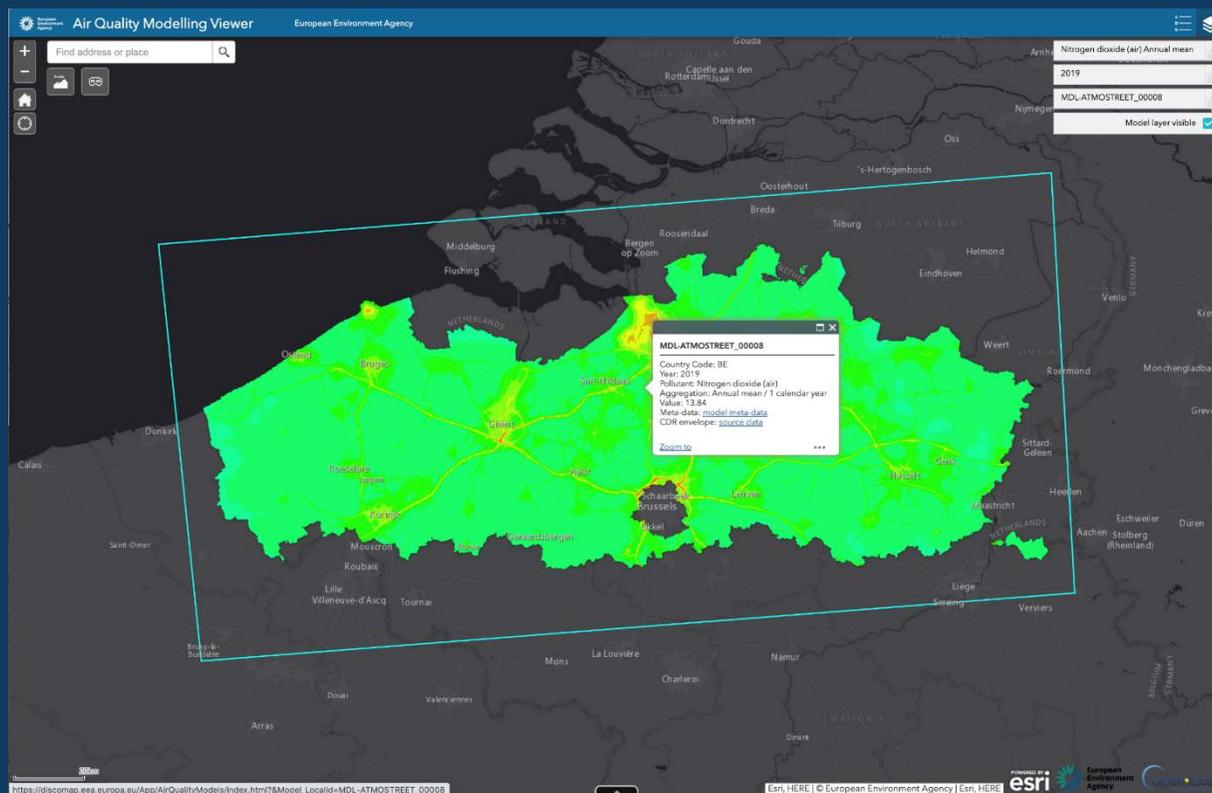
***AQ modelling data
maps and tables***



AQ modelling data: maps and tables

AQ modelling map viewer

- AQ profiles,
- Mask functions,
- Pop-ups with links to CDR envelopes and meta-data.



Work in progress: improving automated updates, symbology missing for some pollutant/aggregations.



*AQ modelling data
in EEA's assessments*



AQ modelling data: EEA's assessments

Attainment analysis



Attainment analysis includes reported *modelling results* in attainment status calculations.



*AQ modelling data
in EEA's assessments - future*



Machine learning: air quality maps

*Air Quality spatial predictions
(downscaling to 1 km for Europe, 100 m for cities)*

Feature selection
(VIF & corr. vs target)

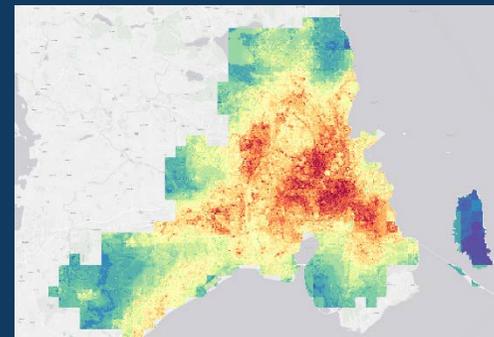
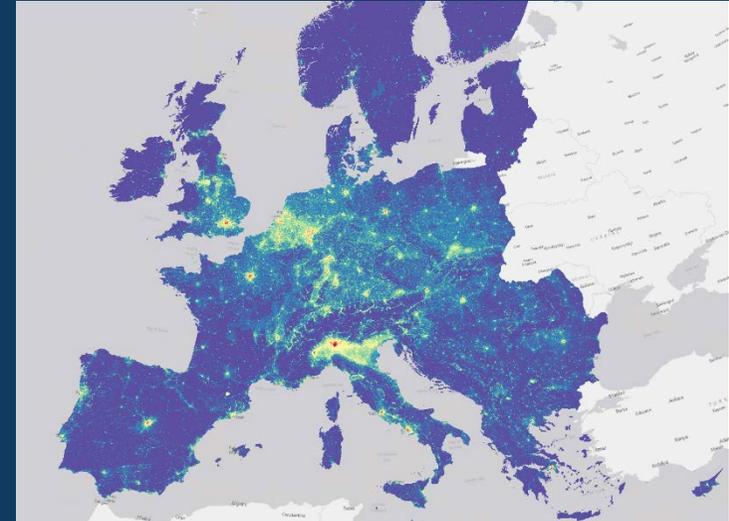
not automated,
Databricks
notebooks

ML algorithm
(XGBoost)

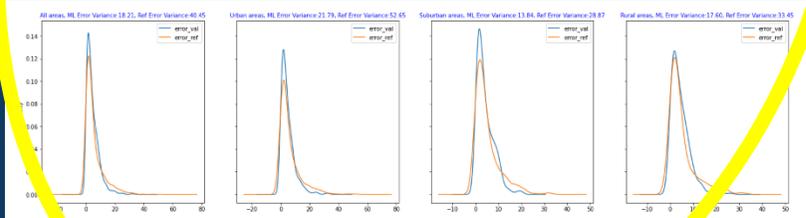
Hyperparameter
tuning (cv)

Error analysis (test data set);
example below using 2014 – 2020 data

predictions



*NO2, 2020, annual mean,
Europe on 1km,
Copenhagen on 100m*



NO2 MQI, ML: 1.00 , Ref: 1.27
NO2 Correlation with AQ data, ML: 0.86 , Ref: 0.78
NO2 RMSE, ML: 6.21 , Ref: 8.34

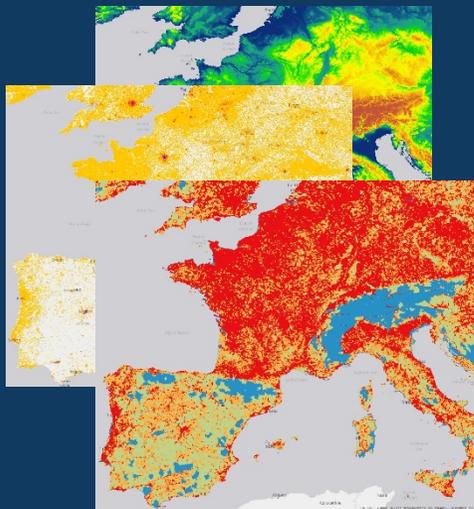


Machine learning: air quality maps

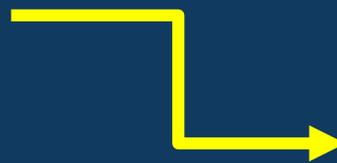
Copernicus Atmospheric Monitoring Service



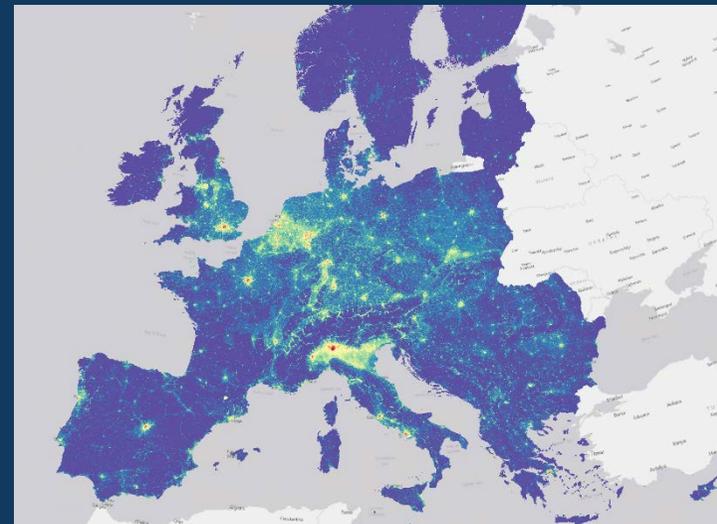
Copernicus Land Monitoring Service



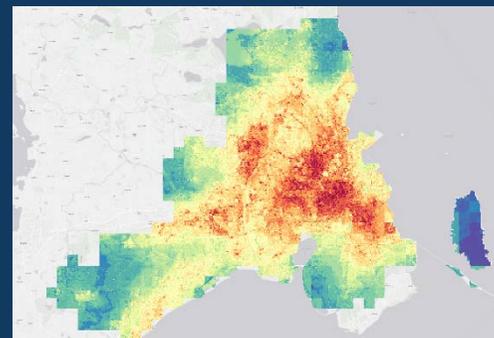
ML product of CAMS trained on reported AQ modelling results



Air Quality spatial predictions
(downscaling to 1 km for Europe, 100 m for cities)



Air Quality e-Reporting



NO₂, 2020, annual mean, Europe on 1km, Copenhagen on 100m



Thank you for your attention!

