Forecast Report Generator Tool

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Introduction:

This Forecast Report Generator Tool analyze atmospheric pollutant data from CAMS (Copernicus Atmosphere Monitoring Service) Atmospheric Data Store forecast datasets in NetCDF format. , It allows quick selection of variables, input of geographic coordinates (including multi-point analysis), and generation of visual reports at daily, weekly, or hourly time frames. Users can filter data over custom time frames and export plots as PDFs Report.The report is generated for surface-level pollution by default, but it can be easily adapted to other atmospheric levels with minor modifications to the code.

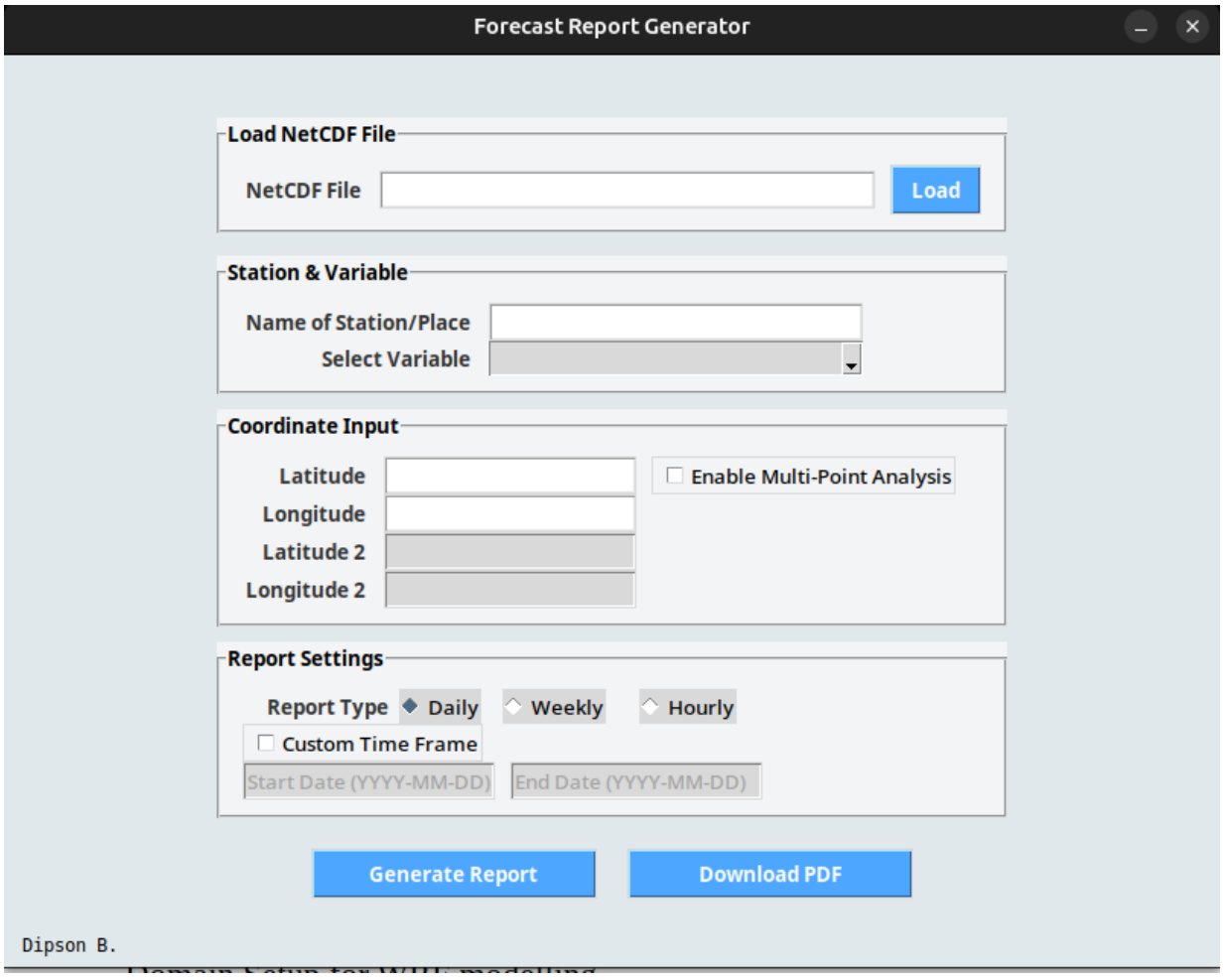
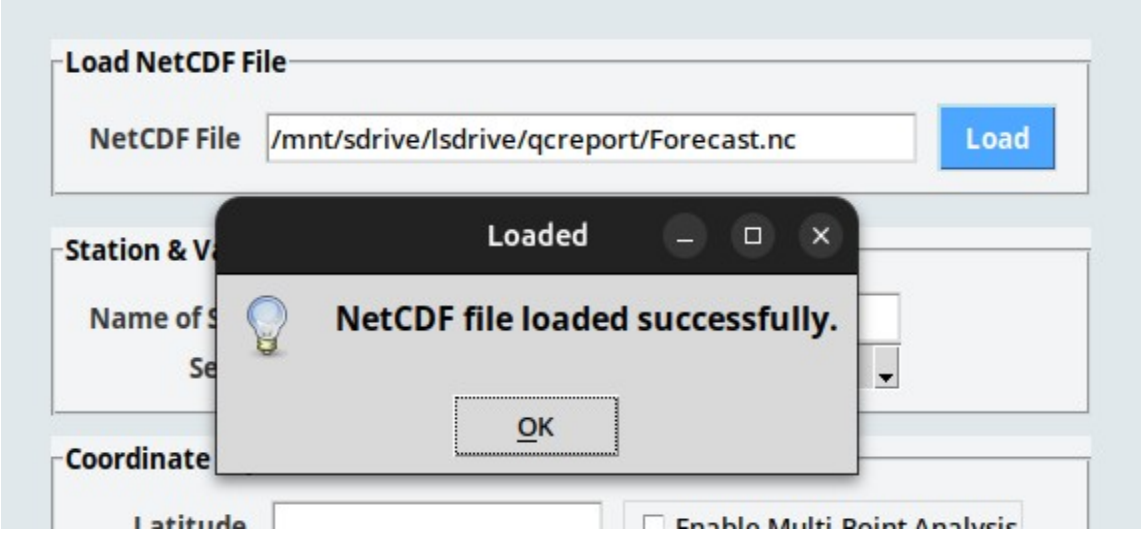


Fig 1 : Graphical User Interface of the tool

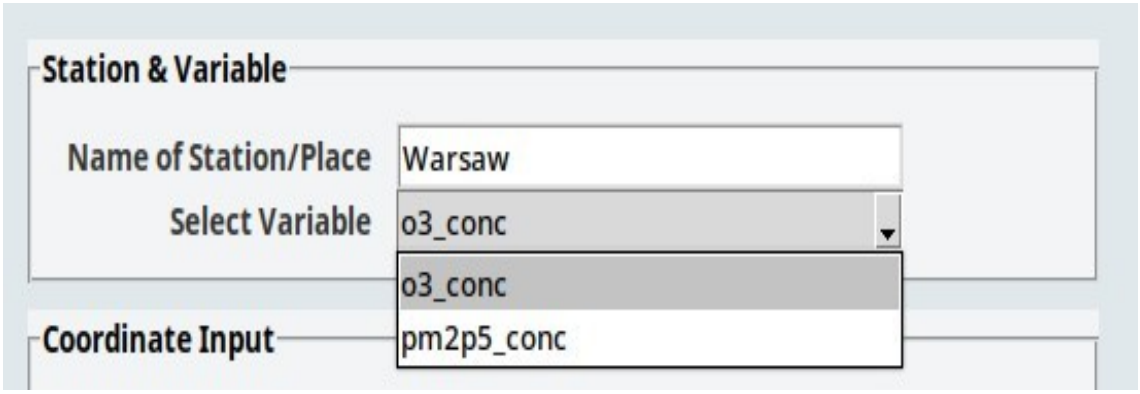
Configuration

1. Loading the File



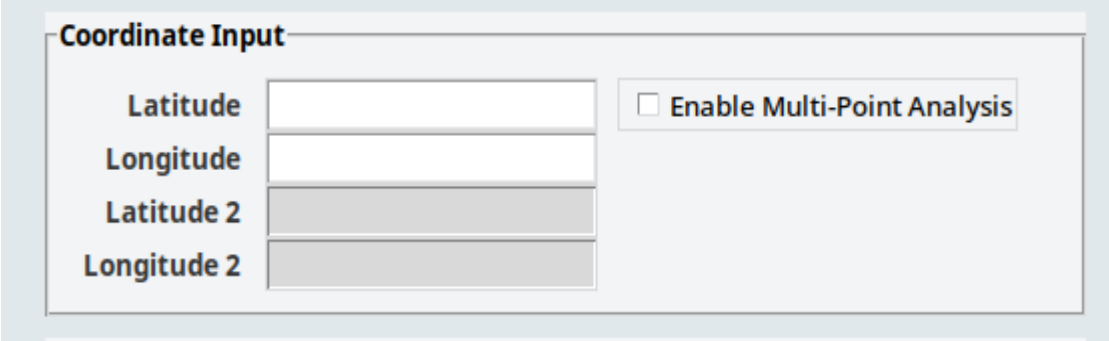
Only one NetCDF file can be loaded at a time for the analysis.

2. Stations and Variable



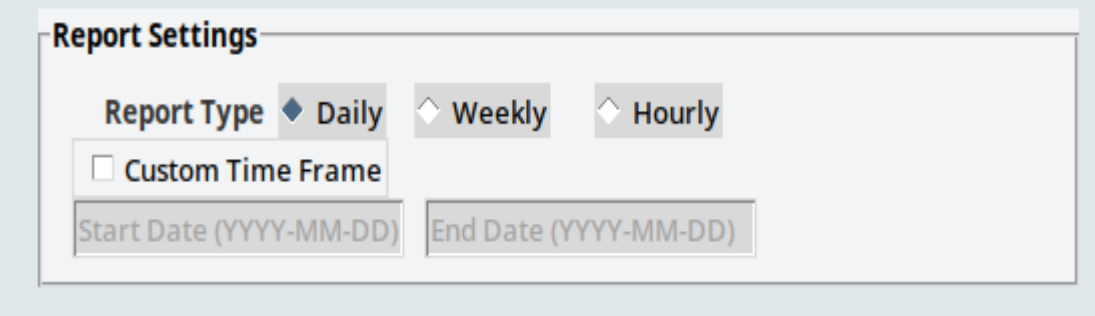
Once the NetCDF file is loaded, the available variables within the (.nc) file are displayed. The name of the station or location can then be entered manually.

3. Coordinate Input



The **latitude and longitude** of the station to be analyzed must be entered. For **multi-point analysis**, a specific option should be selected, allowing the user to input a second set of coordinates. This feature enables comparison of data values between two different locations.

4. Report Setting



The "Report Settings" interface allows users to choose options for daily, weekly, or hourly reports.If the user decides to enable the custom time frame by checking the box, these date fields would become active, allowing them to manually specify the start and end dates for the report period.

5. Generate and Download Report as PDF

The set of examples represents the results for the Warsaw configuration, with ozone selected as the variable, include data for the coordinate over Warsaw at 52.22 and 22.01. When multi-point analysis is enabled, an additional coordinate at 49.29 and 19.94 is included. The options for Daily and Hourly reports are available, and once the report is generated, a PDF file can be downloaded.

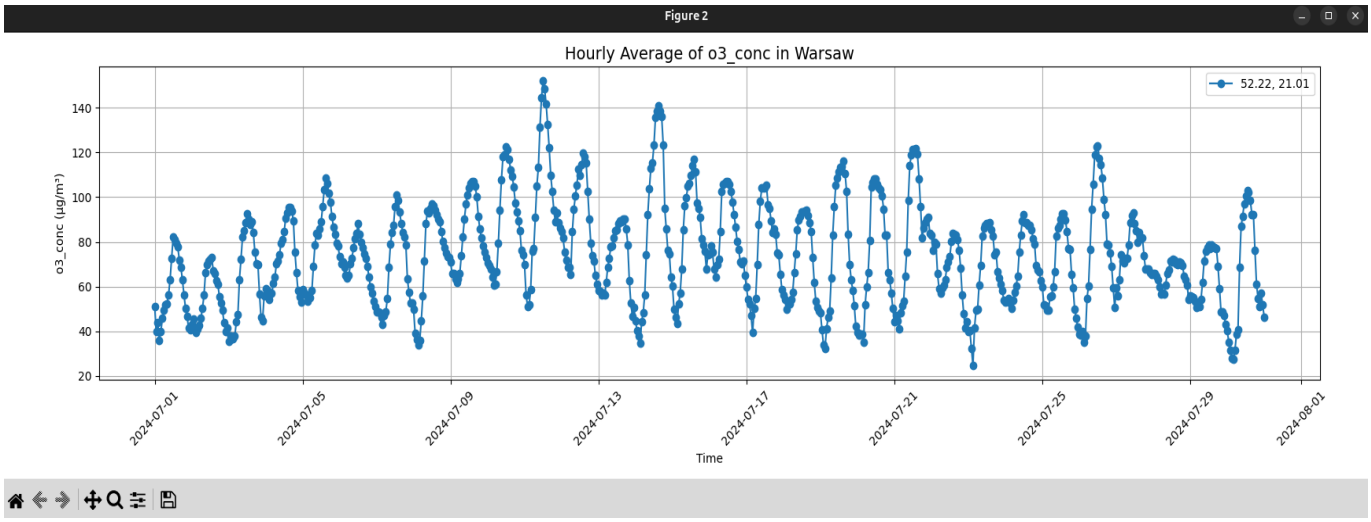


Fig 1 : Hourly Average Surface Level Ozone over the coordinates of Warsaw.

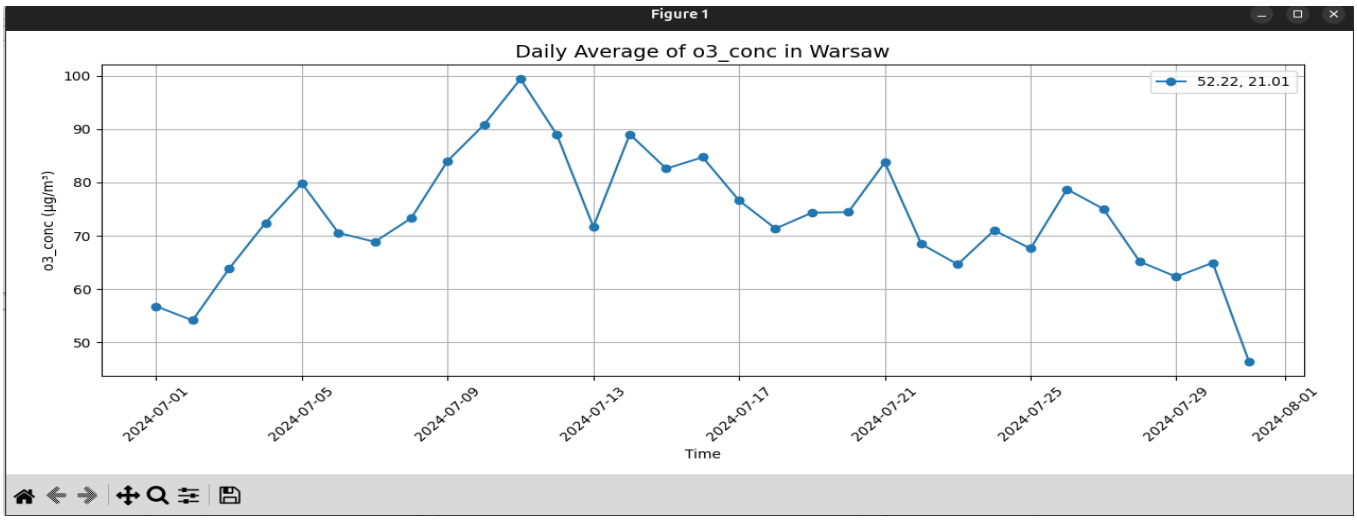


Fig 2 : Daily Average Surface Level Ozone over the coordinates of Warsaw

6. Results of Enabling Multi-Point Analysis

When Multi-Point Analysis is activated in the GUI, this feature provides a quick comparison of pollutant levels across two selected coordinate locations.

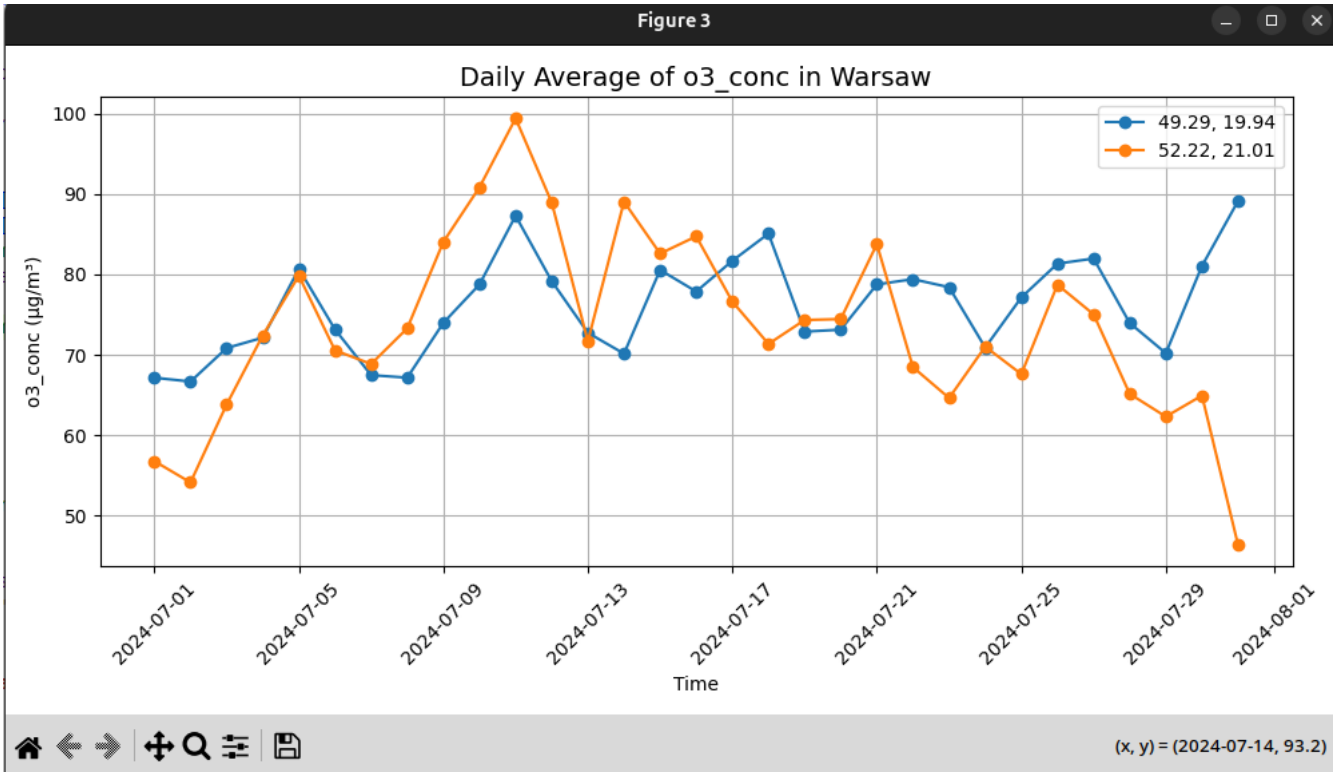


Fig 3 : Results for Average Daily Time Series done over two different coordinates in Poland

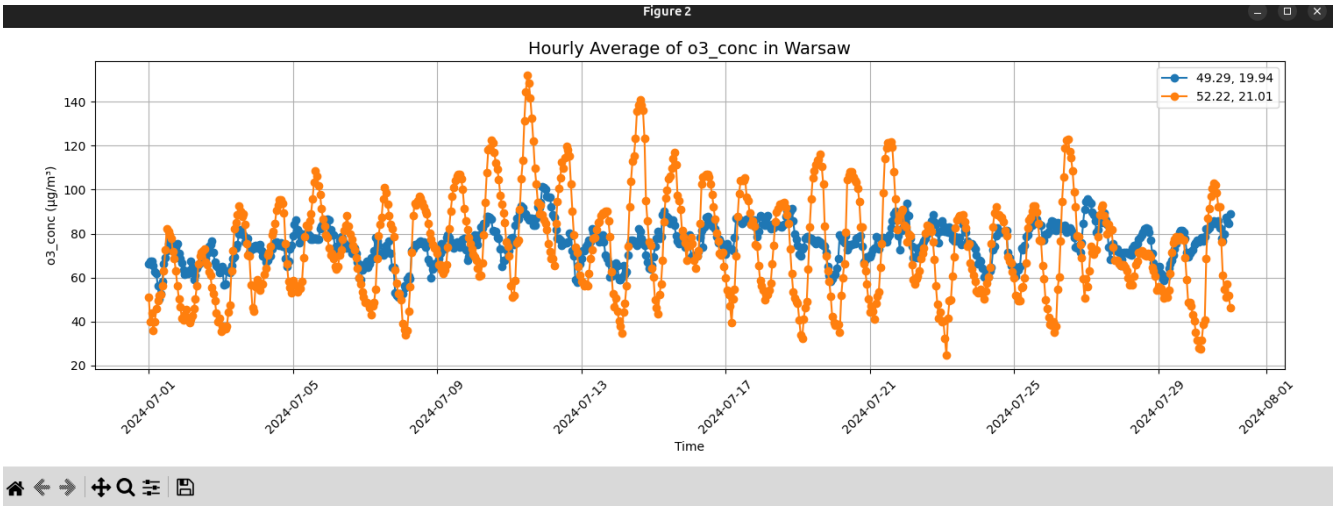


Fig 4 : Results for Average Hourly Time Series done over two different coordinates in Poland

7. Download Report as PDF

This option allows you to save the generated report as a PDF file. It includes additional statistical visualizations such as boxplots, along with time series plots, histograms, and a detailed statistical summary.

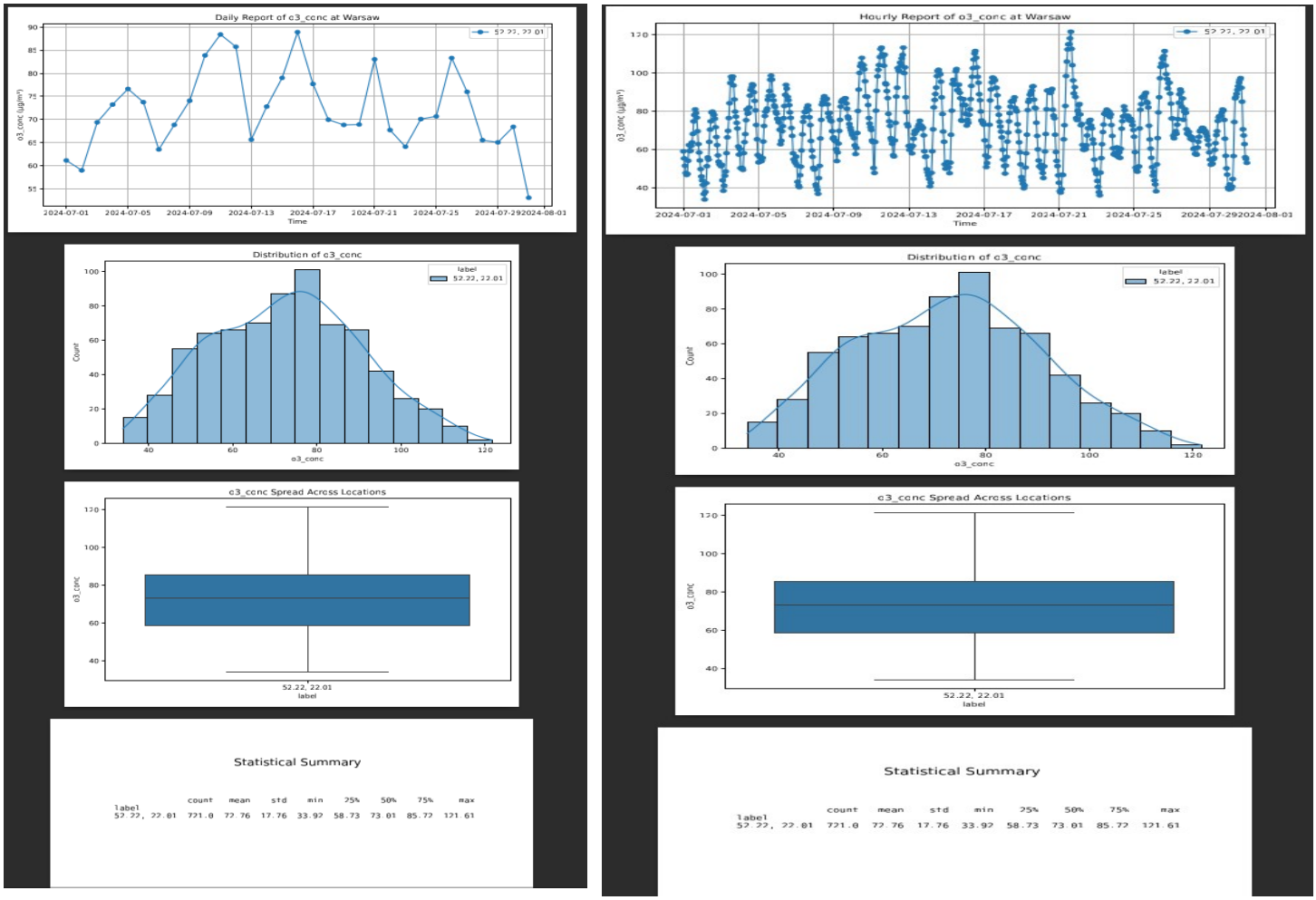


Fig 5 : Sample Reports generated with “Download PDF” option.

References

1. Copernicus Atmosphere Monitoring Service (CAMS). Atmosphere Data Store. (https://ads.atmosphere.copernicus.eu/)