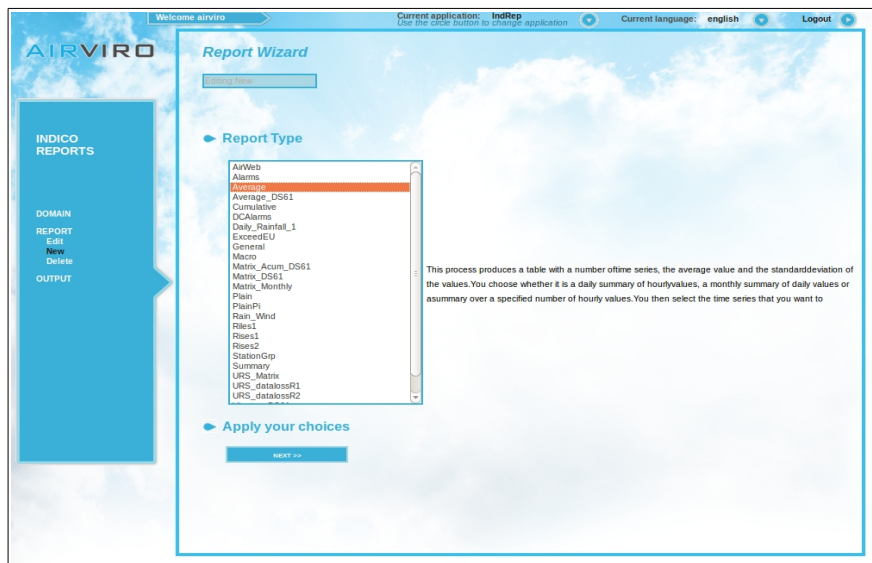


Apertum

Volume 4

Airviro User's Reference



Working with the Indico Report

How to get the most out of your data stored in the Time Series Database of the AIRVIRO system

Working with Indico Report

How to get the most out of your data stored in the Time Series Database of the AIRVIRO system

Amendments

Version	Date changed	Cause of change	Signature
3.00.11	May 2004	New module	GS
3.11.20	Oct2007	Upgrade	GS
3.12	January 2009	Upgrade	GS
3.20	June 2010	Upgrade	GS
3.21	December 2010	Upgrade	GS
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3.22	April 2013	Upgrade	GS
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4.1 Introduction to Indico Report

Indico Report is - together with Indico Administration and Indico Validation - one of the three main tools in Airviro Air Quality Management, intended for acquiring, storing, editing, presenting, analyzing, reporting and exporting time series data.

4.1.1 What is Indico Report?

Indico Report is a powerful tool for reporting data stored in the time series database.

With Indico Report is possible to create reports that can be automatically executed at a specified interval such as at the end of every day. Typically this would be a summary table of some kind that is automatically sent as email or printed. There are many different types of reports to be used.

A set of five standard output formats (called process types) is provided.

With Indico Report, you can:

- Create different kind of reports.
- Assess capture
- Automatically run reports at specified intervals.
- Reports can be sent to a mailbox, printer, screen or file.
- Use Indico Macros to create reports.

An experienced user will be able to use the Airviro system as an integrated monitoring system, i.e. extract valuable information from the measured data and use it to evaluate dispersion calculations.

4.1.2 How does Indico Report client work?

Airviro has is a web based user interface. Airviro can be used from a PC or any other device running Internet Explorer 6 or later and Firefox.

After logging in on Airviro the Indico Report module can be selected. All data processing is made on the Airviro server and the results are transferred to the web browser.

Please note that JAVA JRE (run time plugin) must be installed and enabled in the web browser.

4.2 Getting started

After logging in the application by entering a user name and password, the user is presented with a list of all available Domains (if none has being previously selected and stored), By selecting a Domain the top menu list will be refreshed to show all available Airviro Modules. After you have selected a module to work with, you can change the domain selecting the Domain menu (*Figure 4.2.1.1*)

All the examples explained here are based on the Airviro (Göteborg) Reference System, included in all Airviro systems delivered. Here you will find two years of hourly data, meteorological and ambient air measurement.

4.2.1 Overview of the Indico Report main window

After Indico Report has been selected, the user will see a list of menus on the left side of the window. To successfully complete the set up for a report, it is advisable to work through the menus sequentially, from **DOMAIN** down to **OUTPUT**, because some settings may depend on previous choices.

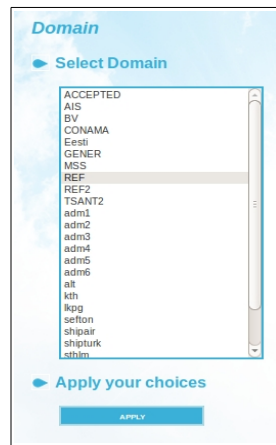


Figure 4.1. Domain

4.3. The Main Menu of the Indico Report module

The main window contains different menus:

DOMAIN Select the domain to work with.

REPORT Includes three different sub-menus, Edit, New and Delete.

Allows the user to edit, define or delete Reports.

OUTPUT Allows the user to display the report choosing from different available output options (mail, files, printer, screen)

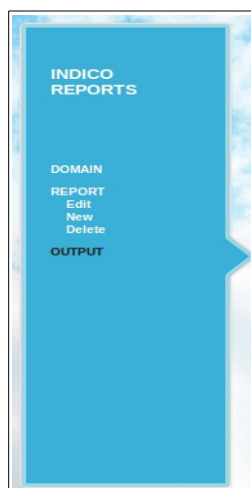


Figure 4.2 Menu.

4.3.1. General Concepts

DOMAIN... is the first menu, which takes you to a subwindow where you can select the domain for which the report will be made.

The next menu is **REPORT...** which is divided in three submenus **Edit New** and **Delete**, each one of them takes you to different subwindows where you can Define New Reports, Edit or Delete existing ones.

In the **OUTPUT...** sub window you can preview or run an existing report.

4.3.2. Database Concepts

When working with Indico Report from Airviro you are accessing the time series database, so it is important to understand how a time series is defined.

A time series contains measurement observations. The following components must be defined in order to define a time series:

- **station** : It defines from which measurement site the data is being collected
- **parameter**: It defines which parameter is being measured, e.g. gas concentration, air temperature, wind direction, etc.
- **instance**: this is used to differentiate among several measurements of the same parameter at the same site. In the case of DOAS measurements, the instance indicates which path (light beam) has been used for the measurements. In the case of meteorological mast measurements, the instance should indicate the height at which the measurement has been made. This component can also be used to differentiate between measured values and calculated values for a parameter (in which case the instance might instead be named CAL).
- **attributes**: this component describes the available properties of the measurement. Value and Status are generally stored. In the case of DOAS measurements, this could be value, standard deviation, light.

- Output

Reports can either be scheduled to be made automatically or they can be made on demand. Use **Report output** to make the reports on demand. With **Preview** the report is shown in a new window. With **Execute** the report is sent to the destination specified in the report instance. The Time period text box is used to specify the end of the period used for the report.

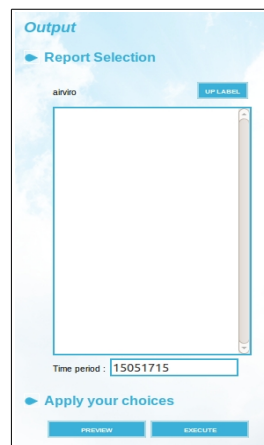


Figure 4.4. Output.

HINT: When you press the **PREVIEW** button, the output configuration is NOT used, instead a preview is shown on your screen. The **Execute** button will generate the output using the output destination that has been specified in the report setting.

Destination

The final report may have different destinations. See *Figure 4.6*

The available destinations are:

- ◆ None: Use this if the report is for pre viewing only.
- ◆ To printer: Send the report to a printer attached to the server..
- ◆ To file: Save the report in a file on the server. The whole path should be specified..

- ◆ To email: Input the email address. If the email should be sent to more than one recipient use space as a separator between the email addresses.
- ◆ To email group: Select the email group in the combo. Email groups are administrated in IADM.
- ◆ To SFTP: Select this if the report is to be sent with SFTP. Host, user name, password, remote directory and remote file name must be specified.

The screenshot shows the 'Report Wizard' interface. Under the 'Destination' section, the 'To email group' radio button is selected. A dropdown menu is open, displaying 'MET: leo@apertum.se pi@apertum.se'. Other radio buttons for 'None', 'To printer', 'To file', 'To email', and 'To SFTP' are present. Below this, the 'Schedule' section shows 'None' as the selected option, with other options for 5 min, 15 min, Hourly, Daily, Weekly, Monthly, Yearly, and Event. An 'Apply your choices' button is at the bottom.

Figure 4.6. Destination.

Schedule

The default is **None** which means that no automatic report will be made. To make a report **Output** must be used.

You can also select to automatically run the instance at certain intervals or events.

The available intervals are: 5 minutes, 15minutes, hourly, daily , weekly, monthly, yearly and event.

This is a close-up of the 'Schedule' section from the previous screenshot. It shows a row of radio buttons: 'None' (selected), '5 min', '15 min', 'Hourly', 'Daily', 'Weekly', 'Monthly', 'Yearly', and 'Event'. To the right of these options is an empty text input field.

Figure 4.5 Schedule.

Execution

Execution can basically take place in three slightly different ways:

- ◆ When you press the **PREVIEW** button in the Output window a new window opens, showing some status information on the progress while the report is generated, when this is finished, the data produced will be shown on screen.
- ◆ When you press the **EXECUTE** button, as in the previous case, a new window opens to show the progress while the report is generated, then the report will be sent to the Output destination specified in the configuration (screen, file, or email).
- ◆ Instances that are saved with a schedule (for automatic execution) will be executed on the server, without showing the progress information window.

Note: logging out or closing the progress window will abort the execution.

4.4. Default Report Types

4.4.1 Alarms

This report produces a table with the alarms state (warning, alarm and alert).

You can also add a title, description and select a report type. For example: General, Alarms days v/s level, Alarm hourly v/s level, Monthly alarm v/s level , Time v/s level and User v/s alarm.

Output can be shown as pdf, text or excel.

4.4.2 Average

Displays the selected time series data together with the average value and the standard deviation. Up to eight time series can be selected. You also write a title and select a format. If you have specified hourly values then the instance will be for the previous day, if

you have specified daily values then the instance will be for the previous month. It is also possible just to indicate a specific number of hours back in time.

The report type can be shown as plain text, pdf, csv or excel.

4.4.3. Average_DS61

This process is similar to the Average report, but includes the reason why data has been deleted.

The user can input two comment with 100 characters.

The report type can be shown as plain text, postscript or excel.

4.4.4. Cumulative

Produces a more complex output of cumulative ratios, data capture and maximum and average values. You set up the cumulative ratios by first choosing a number of levels, the distance between each level and the value for the first level. Alternatively you can specify 8 levels. The percentage of data that is below that level is calculated for each level. The result is a table showing percentile values. Again, if you have specified hourly values then the instance will be for the last day, if you have specified daily values then the instance will be for the previous month. It is also possible just to indicate a specific number of hours back in time.

The report type can be shown as PS percent values, PS Gray levels and Plain text.

4.4.5. Exceed EU

This process produces different tables for exceedance, for an specific substance a Report period (annual, quarterly and monthly), a Report Language and Report Type (pdf or Excel). Different Destinations and Schedules are available for this report type,

Finally the defined report can be saved as a macro for future usage.

4.4.6. General

It uses a saved Indico macro and produces a listing of data in a tabular format. You can choose a day, week, month, quarter or year. The instance will then be for the day, week, etc. previous to the specified date. When specifying a macro; title, restrictions and time series will be used to generate the output. The unit slot in the variable selection will be used for heading each one of the columns. When specifying the setup you can select the time period and resolution to be used. The higher resolution depends on which database you have available, e.g, it could be 5 minute, quarter hourly, etc.

The resolution or the time period is used for computing the total averages, maximum, minimum and standard deviation values that appear at the bottom of the table. An additional summary is also given for the resolution of the table.

4.4.7. Macro

It uses a saved Indico macro, keeping all the same information except the time period, which can be specified by the number of hours worth of data that you want to include in the graph. In this case the printout is graphical, and you can select output format. The stop time of the graph will be the end of the specified time period unless a number of hours forward has been specified.

4.4.8. Plain

This report produces a nice and simple list of the selected data.

It lists the data that you have selected for a specified number of hours. The stop time will be the specified time. Output can be plain ASCII text, SKV format (e.g. for importing to certain spreadsheet programs) or Airviro format.

4.4.9. Matrix_Monthly

This process produce a matrix, containing the Days in the columns and the hours in the rows.

You must specify a title, station and parameter name.

This report displays the selected time series data together in the rows, showing the average, the standard deviation, maximum and minimum values.

4.4.10. Summary

This report allows the creation of up to 8 column of processed time series data. (Average, Maximun, Minimun, etc)

You must add a title and select the report period: day, month, quarter and year.

Then you can select the output format. Finally the defined report can be scheduled or sent to different outputs and saved as a macro for future usage.

4.5. Examples

4.5.1. Example 1: Producing Daily Summaries

Suppose that some of your real time data comes from an open path-measuring site (such as an Opsis analyzer). With this data you do not only need to keep an eye on the data values but also the standard deviations, light levels and status values associated to the data. It is possible to print a daily summary for each one of the substances measured at the site, and in this example a table for NO₂ data will be created.

First select **REPORT** and then **New**.

Now, in the **Report Type** subwindow..., select **Average** from the list and click on **NEXT**.

A new window appears, where you have to choose a time period for your report: daily, monthly, or specified if you want to set the number of hours back for your report. Then press **NEXT >>** to continue. Select the time series you are interested in, time period could be requested in some cases depending on whether your selected data consists of hourly, daily values, etc.

Choose an Opsis **Station** (in this case Jarntorget), the **Parameter** (NO2), the **Instance** (001) and the **Attribute** (value). Then select the other **Attributes** (Std dev, light and status). Now the four relevant time series for path 1 have been selected. Click on **Next** to continue through the wizard entering Report title, data capture limit and exceedance.

In next step you select the output format: plain text or PostScript. Click on **NEXT** , now you have to set up an instance. Under **Destination** choose **Mail** and specify your email address so that the report output will be sent to you when it is executed. Finally click **NEXT** and save the report entering a name for your instance.

It is quite important to give it a meaningful name especially if you intend to create a lot of other instances. This one will be called **opsis_daily_no2**.

Preview.

The data used for this example had information with bad status values. The table ignores missing data and calculates the standard deviation and average value of the data that is present, however data with bad status is included unless otherwise is specified in a special resource file (ask your system administrator). These values are only relevant for the actual data values, as the standard deviation of the standard deviation is not too meaningful.

Once you are satisfied with your instance you might decide that you want a similar table to be made every day. To print it automatically once a day, choose Daily.

Schedule

The report output will be automatically sent out at a specified time every night. The default time for daily instances is at fifty minutes past midnight, but this can be modified.

Title: Järntorget NO2 analysis

Period: 91051201 - 91051224

Date: 940420

Järntorget				
	NO2 /001 µg/m ³ Value	NO2 /001 µg/m ³ Std dev	NO2 /001 µg/m ³ Light	NO2 /001 µg/m ³ Status
910512 01	22.4	0.7	42.0	14.0
910512 02	25.9	0.7	42.0	14.0
910512 03	23.6	0.7	42.0	14.0
910512 04	59.8	0.8	42.0	14.0
910512 05	35.8	0.7	42.0	14.0
910512 06	5.6	0.7	42.0	14.0
910512 07	5.4	0.6	42.0	14.0
910512 08	6.7	0.6	42.0	14.0
910512 09	7.7	0.6	42.0	14.0
910512 10	8.3	0.7	42.0	14.0
910512 11	10.0	0.6	49.0	14.0
910512 12	10.5	0.7	42.0	14.0
910512 13	13.5	1.5	35.0	14.0
910512 14	16.0	0.8	35.0	14.0
910512 15	-0.6	3.6	14.0	4.0
910512 16	0.6	3.8	21.0	8.0
910512 17	1.9	3.5	14.0	8.0
910512 18	23.9	2.5	21.0	14.0
910512 19	23.4	1.2	28.0	14.0
910512 20	19.7	0.7	42.0	14.0
910512 21	30.7	0.7	42.0	14.0
910512 22	44.3	0.7	42.0	14.0
910512 23	38.1	0.7	42.0	14.0
910513 00	18.1	0.6	49.0	14.0
Std.dev.	15.0	1.0	10.0	2.6
Average	18.8	1.2	37.3	13.1

4.5.2. Example 2: Making Cumulative Reports

Create a new instance called **cumulative_so2**. Select the cumulative report type. Select one of the available Reports (daily, monthly or specified) and Click on **NEXT >>** to start defining the report. The **Time Series** subwindow appears where you can select the time series that you are interested in.

Choose some SO₂ time series. In this example the SO₂ levels from Mölndal's three Opsis paths are used. Next you are asked to specify how many limits to use. In order to appreciate the cumulative approach it is best that the distance between limits is not too large so you will need quite a few - say 15. Now you must specify the distance between limits. This depends on the range of your data but you can choose a size of 10 for now and change it later if you need to. Next you must specify the start limit, i.e. the level that you would like for the first limit. Enter 0. Finally you will be asked for a table title and you must also select an output format - those beginning with PS are PostScript formats, in particular the PostScript grey scale format looks very good.

Title: SO2 levels at Mölndal

Period: 89031301 - 89031324

Date: 940110

	Molndal SO2 /001 ug/m3 Value	Molndal SO2 /002 ug/m3 Value	Molndal SO2 /003 ug/m3 Value
0.00 ug/m3	100%	100%	100%
10.00 ug/m3	62%	58%	88%
20.00 ug/m3	42%	42%	58%
30.00 ug/m3	25%	25%	46%
40.00 ug/m3	8%	21%	29%
50.00 ug/m3	4%	21%	25%
60.00 ug/m3	0%	17%	21%
70.00 ug/m3	0%	8%	21%
80.00 ug/m3	0%	4%	8%
100.00 ug/m3	0%	0%	8%
110.00 ug/m3	0%	0%	4%
120.00 ug/m3	0%	0%	4%
130.00 ug/m3	0%	0%	0%
140.00 ug/m3	0%	0%	0%
Data capture	100%	100%	100%
Highest	55.30	88.90	130.00
Average	20.32	25.91	37.78

If you are using the reference database then you can look at the days with data for Molndal station.

Choose **NONE:** under **Schedule** and press the **NEXT** button. Save the report.

To visualize the report go to the **Output** menu, enter the date 890314 in the Time Period textbox and click on **PREVIEW**, your instance will be run as if today's date were 14 March 1989 so it will use data from 13 March 1989. The data on that day had significantly higher values than usual and it is also interesting to see the big difference between the three different Opsis paths even though they are relatively close to each other.

Although this cumulative option might sound a bit complicated it is really quite simple. If you look at the results for path 1 you will see that:

All values are greater than 0 µg/m3

62% of values are greater than 10 µg/m3

42% of values are greater than 20 µg/m3

4% of values (i.e. one value) are greater than 50 µg/m3.

None of the values are greater than 60 µg/m³.

For path 3 the values are much higher and there is a maximum value of 130 µg/m³.

Title: SO₂ levels at Mölndal

Period: 89031301 - 89031324

Date: 940420

	Möln dal		
	SO ₂ /001 µg/m ³ Value	SO ₂ /002 µg/m ³ Value	SO ₂ /003 µg/m ³ Value
0.0 µg/m ³			
10.0 µg/m ³			
20.0 µg/m ³			
30.0 µg/m ³			
40.0 µg/m ³			
50.0 µg/m ³			
60.0 µg/m ³			
70.0 µg/m ³			
80.0 µg/m ³			
90.0 µg/m ³			
100.0 µg/m ³			
110.0 µg/m ³			
120.0 µg/m ³			
130.0 µg/m ³			
140.0 µg/m ³			
Data capture	100%	100%	100%
Highest	55.3	88.9	130.0
Average	20.3	25.9	37.8

Gray levels: Here you can see two different examples of outputs. The first one is a plain output - it is made up of ASCII texts and symbols and can be printed out to any printer. The second is a PostScript output, which has a much better quality. In this particular case it is possible to show the percentages as a grey scale.

4.5.3. Example 3: Using the General Processor

First use Indico Presentation to define a new macro, such as a time series with 2 plot variables, x1 and x1+5. Put a title on the graph, as this will then be used as a title for the instance. Save the macro as **general_macro** Now go back to the Report Module.

Click on **NEW...** and choose the **General** report type, then, click on the **NEXT** button, which enables you to choose different options for the content and format. First select the macro on which the instance is going to be based on (look for the macro **general_macro** in the macro list).

Next you select the time period - in this example choose **Week**. Next you select the time resolution for the calculations, so choose **hour**. Click **NEXT >>** (in a weekly table daily values are displayed but you could use another resolution such as hourly or five minute values to calculate the mean, standard deviation, max. and min. values).

In the next step you select an output format - select **PostScript** if your system can handle it, otherwise select **plain**. This example shows calculated NO₂ levels compared with the actual levels.

Finally you are prompted to enter the destination and schedule and then to enter a name. Write **example_general** and click on **APPLY**.

Comparison of calculated and actual NO2 levels

		µg/m³	µg/m³
	891120	50.1	33.9
	891121	33.1	21.9
	891122	46.3	40.1
	891123	85.3	84.0
	891124	55.9	45.9
	891125	38.8	30.0
	891126	36.5	31.1
Hour	Average	49.4	41.0
	Std Dev	25.8	28.8
	Minimum	15.4	12.6
	Maximum	183.9	205.0
	Samples	70.0	70.0
Day	Average	49.4	41.0
	Std Dev	17.7	20.4
	Minimum	33.1	21.9
	Maximum	85.3	84.0
	Samples	7.0	7.0

Column 1 : $94+.0698*x1-0.117*x3+1030/(1+x1*x1)-222/\ln(1+x1)$

Column 2 : x5

Computation: Average, 0% data capture