ECOMAWARU

ECO-sustainable MAnagement of WAter and wastewater in RURal communities

D5 – A5
Technical Report on the collected data during the monitoring campaign

30th September 2013

Technical report on the collected data during the monitoring campaign

ACTION 5: Monitoring campaign

*Action 5 aims at the acquisition and storage of field data recorded at the experimental sites installed within the project Action 4.1 – Sites selection for micro phytodepuration systems installations. The final object of the task is to provide two data bases concerning the characterization of the waste water effluent and storm water runoff quality respectively. In particular, as for wastewater effluent, a data base containing quality data of the wastewater effluent treated by prototypal phytodepuration with micro algae palnts observed during the monitoring campaign has been compiled. As for the stormwater runoff, a data base containing quality data of both the untreated (inlet) and treated (outlet) runoff observed at the on-line tank has been compiled. This report is organized in two sections named wastewater effluent and stormwater runoff. In the wastewater effluent section, the monitoring campaigns have been illustrated in two sub-section relating to the installed "green" prototypal treatment plants: the closed photobioreactor with microalgae (**photobioreactor**, San Pietro Vara wastewater treatment plant) and the open photobioreactor with microalgae (**pond**, Le Pezze). In the stormwater runoff section, the monitoring campaign carried out at the Municipal Waste depot pilot site has been described. This action has been implemented by DICHEP (now DICCA- Department of Civil, Chemical and Environmental Engineering).*

WASTEWATER EFFLUENT

Phytodepuration plants

The action started in June 2011 and finished in September 2013 according to the new timetable presented in the request for postponement (November 2012) and approved by the European Union. In this period the prototypal phytodepuration plants have been monitored as it is described in the summary about “the system design” and “the monitoring campaign” of two plants (Table 1 and Table 2).

Two samples, inlet and outlet, from open system (photobioreactor) and closed system (pond) were collected weekly and analysed.

Closed system -photobioreactor	
System design	***Monitoring campaign***
1) <u>first horizontal module plant</u> placed on the footbridge near the oxidation tank of the wastewater treatment plant in San Pietro Vara. This plant was operating from June 2011 to February 2012	**<u>From June 2011 to October 2011</u>** the monitoring campaign was stopped in the period October 2011- February 2012 because of the catastrophic events that hit the provinces of La Spezia and Genoa.
2) <u>plant in the final placement</u> composed by a first vertical module and by a second horizontal one. This plant was operating in this configuration from February 2012 to 1 th August 2012	**<u>From March 2012 to 1 th August 2012</u>**
<u>3) the definitive plant</u> installed on 1 th August 2012	**<u>From August 2012 to September 2013</u>** In August hydraulic testing In September start up In October monitoring activity

Table 1 The short summary of the photobioreactor and time table of monitoring campaign

Open system - Pond	
System	***Monitoring campaign***
1) **pond placement on June 2011**	
2) **plant completion** with the installation of both the solar panels to power the circulation pump and the placement of the Imhoff tank on September 2011	**start in March 2012** hydraulic testing, evaluation of algal growth and nutrients removal efficiency reached in synthetic wastewater and biomass of autochtonous algae
3) **system connected to hamlet:** end of September 2012	**from October 2012 to September 2013**

Table 2 The short summary of the pond and time table of monitoring campaign

SAN PIETRO VARA WASTEWATER TREATMENT PLANT

As shown in Table 1 the first phytodepuration plant, **nicknamed first horizontal module plant**, was the photobioreactor placed on the footbridge near the oxidation tank of the wastewater treatment plant in San Pietro Vara (Figure 1). The installation of the photobioreactor and its monitoring campaign started on schedule by the action 4.4 and action 5 of the project. The technical detail of this plant have been descripted in the Deliverable D4 .

Figure 1 The first plant: "*horizontal module plant*"

The monitoring campaign has been carried on this plant from June 2011 to February 2012 and the samples (inlet and outlet water) were collected once a week. The data of the monitoring campaign was already presented to the EU desk officers during their visit on 08/03/2012 (Table 3).

parameters											
		June-11		July-11		Agu-11		sept-11		octo-11	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
pH		***7***	***8,75***	***7,29***	***7,72***	***7,50***	***7,96***	***7,98***	***9,47***	***7,2***	***8,7***
COD	mg/l	***47***	***7***	***50,00***	***15***	***94,00***	***19***	***38,85***	***10***	***38,85***	***8,5***
$N\text{-}NO_3$	mg/l	***0,14***	***0,2***	***0,60***	***0,145***	***0,70***	***0,1***	***1,61***	***0,4***	***0,8***	***0,2***
$N\text{-}NO_2$	mg/l	***0,05***	***0,1***	***0,10***	***0,1***	***0,10***	***0,1***	***0,10***	***0,1***	***0,10***	***0,1***
$N\text{-}NH_4$	mg/l	***10,6***	***3,9***	***3,61***	***1,4***	***9,80***	***0,9***	***6,9***	***1***	***5,9***	***1,2***
$P\text{-}PO_4$	mg/l	***1,05***	***0,5***	***0,50***	***0,1***	***1,20***	***0,2***	***0,9***	***0,36***	***0,62***	***0,1***

Table 3 The collected results (average values) of the photobioreactor system, nicknamed first horizontal module plant from June 2011 to October 2011

month	**$N\text{-}NH_4$**		**removal**
	mg/l		%
	IN	OUT	
june-11	***10,6***	***3,9***	63
july-11	***3,61***	***1,4***	61
agu-11	***9,80***	***0,9***	91
sept-11	***6,9***	***1***	86
octo-11	***5,9***	***1,2***	80

Table 4 The removal of N-NH4 (average values) of the photobioreactor system from June 2011 to October 2011

month	$N\text{-}NO_3$		removal
	mg/l		%
	IN	OUT	
june-11	***0,14***	***0,2***	--
july-11	***0,60***	***0,15***	76
agu-11	***0,70***	***0,1***	86
sept-11	***1,61***	***0,4***	75
octo-11	***0,8***	***0,2***	75

Table 5 The removal of $N\text{-}NO_3$ (average values) of the photobioreactor system from June 2011 to October 2011

month	$P\text{-}PO_4$		removal
	mg/l		%
	IN	OUT	
june-11	***1,05***	***0,5***	52
july-11	***0,50***	***0,1***	80
agu-11	***1,20***	***0,2***	83
sept-11	***0,9***	***0,36***	60
octo-11	***0,62***	***0,1***	84

Table 6 The removal of $P\text{-}PO_4$ (average values) of the photobioreactor system from June 2011 to October 2011

In summer and autumn the yields of nutrient purification of about 70% as shown the Tables 4, 5 and 6.

In February 2012 a new plant, **nicknamed plant in the final placement**, was set up in the final location. The second photobioreactor configuration was installed in the final location nearby the wastewater treatment plant, such as it is shown in the Figure 2.

It consisted of 2 modules, the first composed by 10 Plexiglas vertical tubes fed in parallel (internal diameter 60 mm, external diameter 70 mm and height 85 cm), the second, connected in series to above module, composed by 12 Plexiglas horizontal tubes fed in series (internal diameter 41 mm, external diameter 50 mm and height 2 m), a recycling vessel with a volume of 500 l and a recycling centrifugal pump GRUNDFOS CR32 (1.5 KW, Q = 32 m3/h, H = 25 bar). This configuration has been chosen in order to evaluate the performance of the different horizontal or vertical systems, in the same operating conditions: fed and recycling flow rate, solar radiation, air and water temperature.

Figure 2 The second plant: "*plant in the final placement*"

The monitoring was carried out regularly from March to August 2012 highlighting good average reduction of nutrients.

The biomass produced was mixotrophyc with good sedimentation characteristics although largely filamentous.

parameters											
		March-12		**apr-12**		**May-12**		**June-12**		**July-12**	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
pH		8.34	8.9	7.68	8.09	7,39	7,85	7,75	8.02	7,5	8,3
COD	mg/l	42	20	45	15	51	16	59	11	62	10
$N\text{-}NO_3$	mg/l	0,15	0.5	0.69	0,15	0,52	0,2	1.5	0,2	0.9	0,4
$N\text{-}NO_2$	mg/l	0,03	0.1	0,05	0,1	0,07	0,1	0,08	0,1	0,10	0,1
$N\text{-}NH_4$	mg/l	10.9	1.5	5.4	1,1	8.69	1.2	9.6	0.9	7.3	0.8
$P\text{-}PO_4$	mg/l	1,1	0.2	0,53	0,09	1,15	0,5	0.7	0,1	0.6	0,07

Table 7 Results (average values) of the photobioreactor system, nicknamed plant in the final placement from March 2012 to July 2012

The data of the monitoring campaign, reported in Table 7, were already presented to the EU desk officer Dott. Agnese Roccato during the visit on 10/06/2013.

From March 2012 to July 2012		
	min	max
	%	%
COD	30	50
Total nitrogen	60	90
Total posphorous	50	80

Table 8 The removal of nutrients of the photobioreactor system from March 2012 to July 2012

As shown in Table 8 In the spring and the summer we obtained the nutrient abatement about 30% - 60% in the spring and 50% -90% in the summer.

The results of the first two photobioreactors are reported in this deliverable because they were not considered for further processing of the results of action 6.1.

In August 2012 **the definitive plant** was installed the plant consisted of:

- a two vertical module composed by 20 Plexiglas vertical tubes each;
- a recycling vessel with a volume of 500 l
- a discharge vessel 300 l
- a recycling centrifugal pump GRUNDFOS CR32, (flow 32 m^3/h, 25 bar and 1.5 KW)
- a submerged centrifugal feed pump RENA FLOW6000S, (4750 l/h H= 3.7 m).

The system is shown in the Figure 3.

Figure 3 The third plant: "*the definitive plant*"

The area occupied by the definitive photobioreactor configuration is 5.4 m^2, the total capacity is 0.952 m^3. The photobioreactor is fed with the final effluent of S. Pietro Vara wastewater treatment plant, the effluent from the photobioreactor is piped in the no longer used sludge draining bed, and from here in the feed sump.

The plant was monitored from October 2012 to September 2013, during the month of August and September 2012 we made the hydraulic testing of the system.

The collected data are shown in the Table 9. In particular in this type of photobioreactor the collected data have been:

- biomass data: concentration, classes, elemental composition;
- quality data of phytodepuration plants (inlet and outlet): $N\text{-}NH_4$,$N\text{-}NO_3$, $N\text{-}NO_2$,$P\text{-}PO_4$, COD, SST, pH, temperature (T), chl-a (traditional way);
- the CO2 concentration in gaseous emission from the biological oxidation tank (S. Pietro Vara plant), in the event of having to dose carbon dioxide to photobioreactor;
- pH, OD, NO_3, NH_4, Chl-a, temperature (T) and turbidity using two multiparameters probes (the first one for photobioreactor and the other for pond) that transmitted the parameters via sms (remote way) at DICCA laboratory

Photobioreactor (inlet and outlet)		Parameters				
Time	Sampling	pH/T	TSS/chla	COD	$P\text{-}PO_4$	$N\text{-}NH_4/NO_3/NO_2$
September 2012	4	X	X	X	X	X
October 2012	4	X	X	X	X	X
November 2012	4	X	X	X	X	X
December 2012	3	X	X	X	X	X
January 2013	4	X	X	X	X	X
February 2013	4	X	X	X	X	X
March 2013	4	X	X	X	X	X
April 2013	4	X	X	X	X	X
May 2013	5	X	X	X	X	X
June 2013	4	X	X	X	X	X
July 2013	4	X	X	X	X	X
August 2013	5	X	X	X	X	X
September 2013	4	X	X	X	X	X

Table 9 The samples of the photobioreactor from October 2012 to September 2013

Starting from April 2012 a monitoring campaign was carried out of gaseous emission from the biological oxidation tank of the wastewater treatment plant in order to assess the gas CO_2 concentration. As is known the availability of CO_2 is one of the limiting for the growth of algae. The method used to perform the above is described in the flowing:

1 two floating hoods in polystyrene, each with a square sole 0.25 mq with sides forming a truncated pyramid whose apex is 50 cm from the free surface, were placed one at the almost center of the tank , the other on the long side of the tank over the submerged aerators .

2 - the top of each hood is connected by a teflon pipe (inner diameter :5 mm) to a stainless steel canister (16 liters capacity) on which previously has been carried out the vacuum. Each canister is equipped with a calibrated nozzle driven by a battery powered timer for sampling.

3 - once filled the canister is transported to the laboratory and analysed by gas chromatograph equipped with TCD detector, column Poraplot U suitable for the determination of carbon dioxide.

This has been done because for the growth of the biomass is necessary to provide an adequate amount of carbon dioxide, compound essential for chlorophyll synthesis.

Time	CO_2	Sampling
02/04/2012	X	
18/04/2012	X	
27/04/2012	X	
04/05/2012	X	
11/05/2012	X	
16/05/2012	X	
24/05/2012	X	
20/06/2012	X	9
27/06/2012	X	
12/07/2012	X	
18/07/2012	X	
26/07/2012	X	
01/08/2012	X	
08/08/2012	X	
22/08/2012	X	
25/09/2012	X	7
11/10/2012	X	
18/10/2012	X	
25/10/2012	X	
15/11/2012	X	
22/11/2012	X	

29/11/2012	X	
13/12/2012	X	
20/12/2012	X	8
23/01/2013	X	
30/01/2013	X	
14/02/2013	X	
21/02/2013	X	
08/03/2013	X	
15/03/2013	X	
28/03/2013	X	7
24/04/2013	X	
24/05/2013	X	
20/06/2013	X	3
18/07/2013	X	
13/08/2013	X	
04/09/2013	X	3

Table 10 The CO_2 samples from April 2012 to September 2013

From April 2012 to September 2013, it has been collected 36 samples of gas emission in order to detect the CO_2 concentration.

"LE PEZZE" WASTEWATER TREATMENT PLANT

The summary about "the system design" and "the monitoring campaign" for the open photobioreactor (pond) is shown in Table 2.

The pond was connected to the hamlet of Le Pezze in September 2012. The delay as shown in the postponement request was due to the catastrophic events that have struck the province of La Spezia that led to a delay in issuing the necessary authorizations by Province Authority engaged in the emergency.

The monitoring activity began in October 2012 and ended in September 2013.

The collected data are shown in the Table 11. In particular the collected data have been:

- biomass data: concentration, classes, elemental composition;
- quality data of phytodepuration plants (inlet and outlet): $N\text{-}NH_4$,$N\text{-}NO_3$, $N\text{-}NO_2$,$P\text{-}PO_4$, COD, SST, pH, temperature (T), chl-a (traditional way);
- pH, OD, NO_3, NH_4, Chl-a, temperature (T) and turbidity using two multiparameters probes (the first one for photobioreactor and the other for pond) that transmitted the parameters via sms (remote way) at DICCA laboratory

Pond (inlet and outlet)		Parameters				
Time	Sampling	pH/T	TSS/chla	COD	$P\text{-}PO_4$	$N\text{-}NH_4/NO_3/NO_2$
September 2012	4	X	X	X	X	X
October 2012	4	X	X	X	X	X
November 2012	4	X	X	X	X	X
December 2012	3	X	X	X	X	X
January 2013	4	X	X	X	X	X
February 2013	4	X	X	X	X	X
March 2013	4	X	X	X	X	X
April 2013	4	X	X	X	X	X
May 2013	5	X	X	X	X	X
June 2013	4	X	X	X	X	X
July 2013	4	X	X	X	X	X
August 2013	5	X	X	X	X	X
September 2013	4	X	X	X	X	X

Table 11 The open photobioreactor (pond) from October 2012 to September 2013

Figure 10 Phytodepuration pond placed at Le Pezze

Synthetically the pond system consists of the following parts:

- a grease and oil interceptor tank, and a Imhoff tank where the sewage coming from the small hamlet (10 IE) of Le Pezze is pre-treated.
- two rectangular tanks in PRFV (each with the following size: width 1 m, length 4.2 m, height 0.5 m, capacity 2100 l) connected in series
- a recycling pump (Q= 13.2l/min; 24V; 4.05 AM)
- two photovoltaic panels to supply electrical power to the pump

The meteorological data about the territory of Varese Ligure during the period from August 2012 to August 2013 was collected with the aim to control the different conditions of the weather in the four seasons and their influence in the process. The weather data of Municipality of Varese Ligure (source: http://www.meteovareseligure.it/index.php) are reported in the following tables.

The data shows that during the year there have been 168 days of rain and temperatures as up to more than six degrees below zero.

month	*T max* °C	*T min* °C	rain days
August 2012	35.6	10	3
September 2012	28.9	8.2	13
October 2012	25.1	3.5	15
November 2012	17.2	2	17
December 2012	15.6	-3.4	16
January 2013	18.8	-4.5	20
February 2013	11.7	-6.5	8
March 2013	16.4	-4.1	20
April 2013	26	2.9	17
May2013	24.8	3.4	20
June 2013	33.5	7.4	7
July 2013	32.2	9.1	4
August 2013	33.1	12.2	8

Table 12 The results of monitoring weather station http://www.meteovareseligure.it/index.php

In August 2013 in the two prototypal phytodepuration plants the remote control and monitoring system was installed. The monitoring program is active based on the sampling frequency is equal to 30 minutes.

The samples number (outlet) and types of analysis of the two prototypal plants are shown in The Table 13 and Table 14.

Pond (outlet)		Parameters (remote method)				
Time	Sampling	pH/T	turbidity	OD	chla	N- NH_4/N-NO_3
August 2013	294	X	X	X	X	X
September 2013	552	X	X	X	X	X

Table 13 The parameters transmitted by telemetry unit

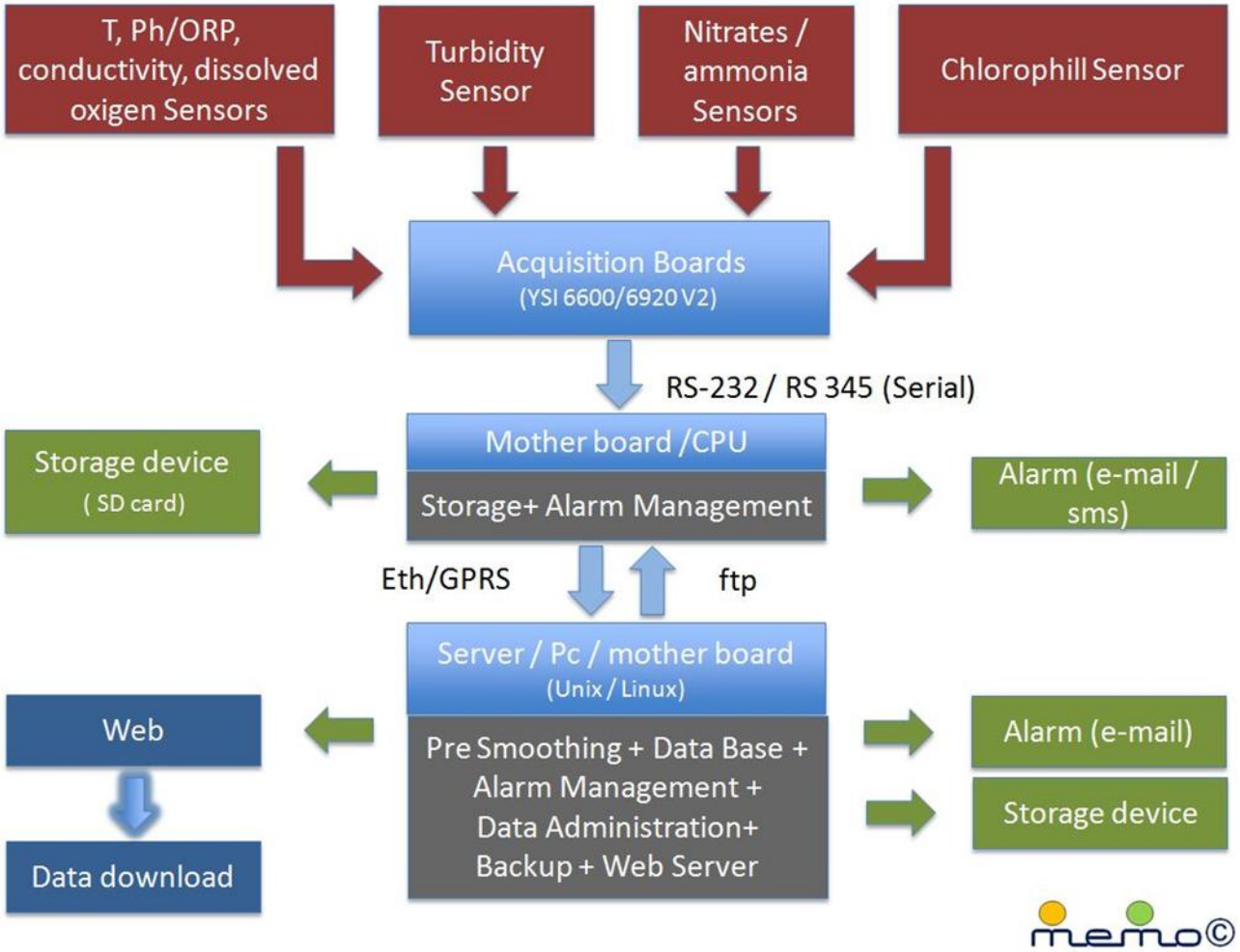
Photobioreactor (outlet)		Parameters (remote method)				
Time	Sampling	pH/T	turbidity	OD	chla	N- NH_4/N-NO_3
[(1)]August 2013	476	X	X	X	X	X
September 2013	667	X	X	X	X	X

Table 14 The parameters transmitted by telemetry unit

These systems are composed as following: the photobioreactor had two multiparameter probes (YSI – 6920-V1 and 6920-V2 YSI) with telemetry and sensors for temperature, pH, conductivity, dissolved oxygen (measured electrochemically), nitrates, ammonia, turbidity, chlorophyll; and an integrated telemetry unit with internal battery power and solar panel integrated (TUBE 300 ANT- Advance Networw Telemetry Watec Technology) with reporting functions via sms, email, ftp with programmable alarms. The pond had one multiparameter probe (YSI – 6600-V2 YSI) with telemetry and sensors for temperature, pH, conductivity, dissolved oxygen, nitrates, ammonia, turbidity, chlorophyll; and an integrated telemetry unit with internal battery power and solar panel integrated (TUBE 300 ANT- Advance Networw Telemetry Watec Technology)

with reporting functions via sms, email, ftp with programmable alarms. The probes have been only installed in outlet of phytodepuration systems.

The system architecture is reported in the following scheme:



The principal components are:

1) **Multi-parametric probes YSI 6600 and YSI 6920 V2** with simultaneous measurement of plant parameters. Sensors of T, Ph /ORP, Conductivity, Dissolved Oxygen, nitrates, ammonia, turbidity and chlorophill and the relative acquisition boards are integrated in a global system.

2) **Tube 300S** Stand-alone self powered data logger and automation system with rechargeable battery and built-in Solar Panel. It allows data storage and data sending + some alarm management. Acquired data are sent to an ftp

server. Since the original system was designed to send data at some time intervals, the system has been modified by Dichep researchers in order to support a continuous communication with the server.

3) memo© **micro-SCADA system**. It is a real time web-based monitoring tool that acquires, manages, treats, aggregates, historicizes and shows process and plant data or events. It is also an operating database and an alert tool. It can manage thresholds and alarms and can run also on open hardware platforms using open source libraries. It was developed and tested by DICCA on lab-scale reactors and tested on ECOMAWARU plants.

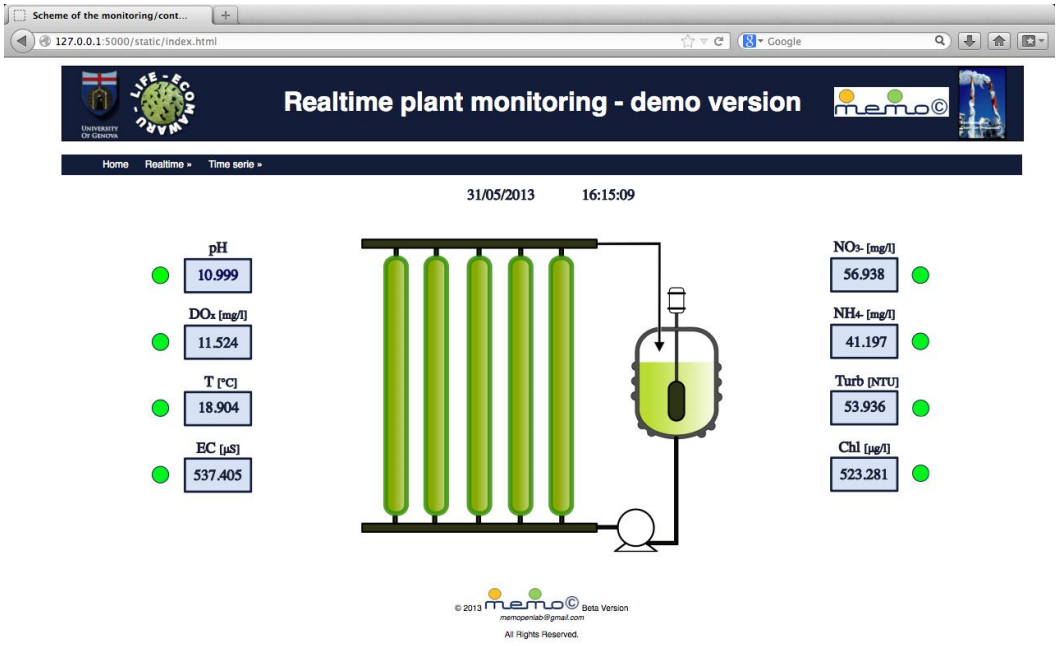
For the ECOMAWARU project we preferred to use commercial hardware in order to guarantee stability, and, in particular:

- 1 SERVER Dell Precision R5500, used as mirror server and development system;

- 1 SERVER IBM Express 3650M4 7915E1G, used as server with the current memo© version

memo© runs under linux/unix OSs (tested on Debian, Ubuntu, RedHat). Data smoothing and management are developed in Phyton, Flask, MySQL. The web-server is developed in html, using javascript, css, jquery. Open source graphic libraries are used to show data time-series.

In the following some screenshots of the system web-interface:



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Report August 2012

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2012 Agosto

Monthly Climatological Summary for ago 2012

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	24,4	32,8	14.07	16,9	06.34	0,2	6,3	0,0	4,7	22,0	15.20	NNE
2	23,4	32,6	15.24	15,8	06.35	0,5	5,6	0,0	3,5	27,0	14.36	S
3	22,4	30,7	15.41	14,9	03.51	1,0	5,1	0,0	3,6	27,0	15.14	S
4	22,8	31,6	15.59	13,7	06.37	1,1	5,6	0,0	4,0	27,0	14.31	S
5	22,6	30,6	15.27	13,7	05.39	1,2	5,5	0,0	4,3	30,0	13.55	SSO
6	23,8	29,3	08.23	19,7	00.55	0,0	5,5	0,0	6,9	39,0	13.05	S
7	22,8	30,2	15.17	14,3	23.56	0,2	4,8	0,0	4,4	32,0	14.25	SSO
8	21,1	32,0	14.43	10,0	05.57	2,5	5,4	0,0	3,9	26,0	15.55	S
9	24,3	32,0	12.50	16,3	06.27	0,3	6,4	0,0	4,5	31,0	14.23	SSE
10	25,0	31,2	16.19	19,7	06.46	0,0	6,7	0,0	8,1	37,0	12.18	NNO
11	23,0	30,2	13.19	15,8	06.37	0,4	5,1	0,0	4,4	28,0	13.39	SSE
12	21,7	29,4	16.05	14,7	06.46	0,9	4,3	0,0	3,5	23,0	12.49	S
13	21,9	29,6	13.59	15,6	04.38	0,6	4,3	0,0	5,8	28,0	09.48	N
14	21,5	30,5	13.23	15,2	06.49	0,7	3,1	17,7	3,4	32,0	15.05	ENE
15	26,7	32,0	14.00	15,3	06.50	0,0	4,9	0,0	5,2	31,0	15.39	S
16	21,2	28,5	15.00	13,8	06.46	1,1	4,0	0,0	3,6	27,0	15.24	S
17	24,3	33,4	16.22	16,2	06.10	0,4	6,4	0,0	4,0	26,0	16.37	NNO
18	26,0	34,1	13.43	18,8	06.28	0,0	7,7	0,0	5,6	24,0	12.15	NNE
19	26,9	35,6	16.03	18,9	06.43	0,0	8,7	0,0	4,9	26,0	13.27	NNE
20	26,7	35,4	15.11	19,4	07.25	0,0	8,4	0,0	4,6	23,0	14.16	ESE
21	24,8	34,0	13.27	17,0	06.50	0,2	6,7	0,0	2,7	24,0	13.51	SSE
22	25,1	33,4	15.05	18,4	04.33	0,0	6,8	0,0	3,6	26,0	12.59	S
23	23,9	33,0	14.17	16,2	06.40	0,3	5,9	0,0	3,7	26,0	12.22	S
24	23,2	31,1	14.45	15,1	06.37	0,7	5,5	0,0	4,4	30,0	14.46	S
25	24,1	29,4	14.21	18,1	03.47	0,0	5,8	0,0	6,5	33,0	10.58	SSO
26	22,0	27,4	15.46	-19,1	06.06	0,4	4,1	84,9	5,7	34,0	12.59	SSE
27	19,8	28,8	14.09	12,1	07.08	2,0	3,5	0,0	5,0	28,0	14.29	N
28	20,4	29,6	16.00	13,2	06.40	1,7	3,8	0,0	3,9	22,0	13.33	ESE
29	20,3	29,9	15.05	11,3	06.21	2,2	4,2	0,0	3,1	23,0	16.21	SSE
30	20,4	26,6	15.53	14,5	06.13	0,9	3,0	0,0	2,6	19,0	15.57	S
31	19,8	24,7	12.20	15,9	23.13	0,4	1,9	0,9	6,2	42,0	14.20	SO
	23,1	35,6	19	-19,1	26	19,9	165,0	103,5	4,5	42,0	31	SSE

Max >= 27,0: 29
Max <= 0,0: 0
Min <= 0,0: 1
Min <= -18,0: 1
Max Rain: 84,9 on day 26
Days of Rain: 3 (>= 0,2 mm) 2 (>= 2,0 mm) 1 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report September 2012

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2012 Settembre

Monthly Climatological Summary for set 2012

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	16,4	22,9	14.40	13,3	04.18	2,4	0,5	6,6	6,5	39,0	15.54	N
2	17,5	20,8	14.40	14,2	00.31	1,2	0,4	0,0	7,6	42,0	22.07	N
3	18,8	23,1	15.15	16,0	10.55	0,5	1,1	24,6	8,6	51,0	01.31	N
4	18,9	21,4	17.33	17,3	21.05	0,1	0,7	3,3	10,2	39,0	19.56	NNO
5	20,5	22,6	16.49	18,0	23.58	0,0	2,2	0,3	7,7	42,0	00.27	NNO
6	20,7	27,7	16.52	15,4	07.15	0,7	3,2	0,0	4,3	26,0	15.35	N
7	20,0	28,8	14.31	12,7	06.52	1,7	3,3	0,0	3,4	21,0	15.15	ENE
8	20,7	28,9	14.05	15,1	06.34	1,1	3,5	0,0	4,9	28,0	10.36	N
9	19,8	28,3	12.55	14,2	07.10	1,4	2,9	1,8	4,1	22,0	13.48	NNE
10	18,7	26,8	14.31	12,3	06.40	1,9	2,4	0,0	2,3	21,0	13.47	SSE
11	19,3	26,3	13.56	13,7	07.06	1,3	2,4	0,0	2,5	21,0	16.00	SSE
12	19,1	21,1	17.16	15,5	22.35	0,3	1,2	4,2	3,4	33,0	18.28	S
13	16,1	19,9	14.59	12,3	03.38	2,4	0,2	0,0	9,4	44,0	21.40	N
14	17,3	22,1	16.10	13,2	03.11	2,0	1,0	0,0	8,6	53,0	14.28	N
15	18,3	24,8	15.51	11,6	07.11	2,0	2,0	0,0	6,7	37,0	10.38	N
16	17,1	27,0	14.46	11,6	07.30	2,7	1,6	0,0	4,5	31,0	13.07	N
17	16,8	24,5	13.22	10,2	07.07	3,0	1,5	0,0	2,7	22,0	14.18	SE
18	17,7	25,0	14.26	11,8	07.54	2,3	1,6	0,0	2,4	19,0	14.53	SE
19	17,2	21,5	16.32	13,7	06.57	1,8	0,7	0,3	1,6	18,0	16.56	SSO
20	17,3	22,0	17.05	12,2	23.42	1,8	0,8	0,0	6,7	32,0	07.54	N
21	15,0	22,7	16.23	9,3	06.40	4,3	1,0	0,0	2,8	22,0	14.55	ENE
22	15,6	22,2	15.46	8,2	04.59	3,7	1,0	0,0	2,7	24,0	14.46	SSO
23	19,5	23,5	14.28	16,4	07.21	0,4	1,6	0,0	1,4	15,0	13.27	N
24	19,1	21,0	12.50	16,9	21.12	0,2	1,0	5,1	2,8	28,0	11.00	S
25	17,7	21,8	16.24	15,2	04.35	1,3	0,7	9,0	3,4	28,0	13.32	ESE
26	19,1	21,1	12.56	15,7	04.19	0,4	1,2	16,2	3,9	30,0	02.48	S
27	17,8	20,7	12.40	13,5	23.08	1,1	0,6	0,9	6,5	38,0	00.41	S
28	16,7	23,9	14.35	9,6	07.10	3,1	1,5	0,0	4,4	30,0	23.23	N
29	17,7	19,6	14.56	15,6	23.54	0,7	0,1	27,3	6,6	37,0	14.11	NNO
30	18,1	24,6	14.40	14,1	07.15	1,6	1,3	0,3	3,4	26,0	18.07	NNO
	18,2	28,9	8	8,2	22	47,4	43,2	99,9	4,9	53,0	14	N

Max >= 27,0: 5
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 27,3 on day 29
Days of Rain: 13 (>= 0,2 mm) 8 (>= 2,0 mm) 2 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report October 2012

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2012 Ottobre

Monthly Climatological Summary for ott 2012

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	15,5	17,3	12.07	13,4	23.48	2,8	0,0	7,5	1,3	7,0	02.14	N
2	14,7	21,2	16.55	9,6	07.14	4,0	0,4	0,0	2,1	19,0	13.50	S
3	14,9	18,7	16.03	10,9	05.27	3,4	0,0	0,0	2,0	17,0	11.55	S
4	17,0	20,3	12.45	14,8	06.09	1,6	0,3	0,0	3,1	26,0	14.07	S
5	17,0	22,0	15.08	11,5	23.48	1,9	0,5	0,3	1,6	19,0	15.21	SSE
6	14,6	21,9	13.49	8,6	07.24	4,4	0,7	0,0	2,1	19,0	12.57	SSO
7	16,6	20,9	15.24	13,3	23.50	2,2	0,5	0,0	2,4	22,0	13.34	S
8	16,8	23,9	14.35	11,8	02.50	2,8	1,3	0,0	2,5	19,0	11.29	NNE
9	18,1	24,2	15.19	14,7	00.40	1,5	1,3	0,3	1,9	32,0	12.23	NNE
10	16,5	21,3	15.11	12,9	23.53	2,4	0,5	0,3	2,2	13,0	14.17	N
11	14,5	18,6	12.41	11,2	05.31	3,8	0,0	16,5	1,5	13,0	12.44	NNE
12	15,8	20,0	13.35	11,5	23.53	2,7	0,2	1,8	2,1	16,0	17.20	NO
13	13,5	18,5	11.44	10,6	23.38	4,8	0,0	2,4	2,6	21,0	11.30	NNE
14	13,4	18,0	13.08	9,6	05.19	4,9	0,0	19,8	3,1	28,0	16.22	S
15	12,8	13,9	16.44	10,3	23.58	5,5	0,0	78,6	2,4	37,0	10.28	SSE
16	11,2	17,2	14.51	6,5	06.57	7,1	0,0	0,0	3,3	27,0	15.08	SE
17	12,2	14,3	16.45	10,5	00.09	6,1	0,0	4,2	1,7	13,0	10.51	N
18	13,8	20,9	13.17	8,9	06.43	4,8	0,2	0,0	3,9	23,0	21.20	N
19	14,5	20,8	13.07	9,6	02.05	4,2	0,4	0,0	4,7	21,0	19.16	N
20	16,9	23,8	15.24	13,1	02.20	2,4	1,0	0,0	3,5	17,0	10.00	NNE
21	16,9	25,1	15.05	12,2	05.47	3,0	1,5	0,0	2,6	16,0	16.55	NNE
22	17,6	23,7	16.13	13,2	07.29	1,9	1,1	0,0	3,8	24,0	22.15	NNO
23	16,9	21,9	15.09	10,6	23.43	2,2	0,8	0,0	8,8	39,0	07.25	NNO
24	13,9	21,2	16.26	7,7	23.59	4,9	0,5	0,0	5,9	32,0	06.31	NNO
25	12,8	19,4	13.18	7,5	00.31	5,7	0,1	0,0	1,3	19,0	14.56	S
26	13,5	14,5	15.05	12,2	00.00	4,8	0,0	74,4	1,4	12,0	14.52	N
27	13,6	15,0	13.57	11,9	23.59	4,7	0,0	39,9	1,9	23,0	23.43	SSE
28	6,0	11,9	00.00	3,5	14.14	12,8	0,0	12,3	4,9	38,0	03.08	NNE
29	5,3	10,3	15.53	0,3	23.44	13,0	0,0	0,0	6,8	50,0	03.52	N
30	5,6	12,3	14.15	-0,7	03.59	12,7	0,0	0,9	2,3	21,0	12.39	S
31	7,7	9,0	23.08	6,5	06.26	10,6	0,0	30,3	10,7	54,0	15.51	NNO
	13,9	25,1	21	-0,7	30	149,6	11,3	289,5	3,2	54,0	31	N

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 1
Min <= -18,0: 0
Max Rain: 78,6 on day 15
Days of Rain: 15 (>= 0,2 mm) 10 (>= 2,0 mm) 4 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report November 2012

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2012 Novembre

Monthly Climatological Summary for nov 2012

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	10,1	12,8	14.14	7,2	06.42	8,2	0,0	8,4	2,9	30,0	03.10	ONO
2	11,6	15,5	11.58	8,5	00.00	6,7	0,0	0,0	3,4	27,0	13.54	S
3	12,4	13,1	07.09	11,3	01.37	5,9	0,0	42,0	1,6	23,0	14.32	SE
4	14,2	17,2	23.37	12,4	02.57	4,1	0,0	84,9	2,7	45,0	23.35	SSO
5	13,8	17,2	00.00	9,4	23.58	4,6	0,0	11,4	6,2	51,0	01.22	S
6	9,9	15,4	11.41	5,4	23.53	8,4	0,0	0,3	3,2	26,0	15.35	SSO
7	8,2	16,3	15.23	3,4	23.48	10,0	0,0	0,3	3,8	24,0	09.49	N
8	7,2	15,9	13.13	2,0	07.23	11,1	0,0	0,0	1,4	21,0	13.19	S
9	9,4	13,2	13.15	5,3	06.27	8,9	0,0	0,0	0,9	13,0	11.12	S
10	11,7	13,8	23.28	10,5	01.42	6,7	0,0	57,3	2,3	30,0	20.33	SSO
11	12,3	14,3	12.20	7,5	23.53	6,0	0,0	34,5	2,1	19,0	12.28	NE
12	12,1	15,4	12.22	7,5	00.00	6,2	0,0	0,0	5,4	32,0	11.57	NNO
13	13,7	16,1	13.58	10,7	02.00	4,6	0,0	0,0	8,3	43,0	23.49	NNO
14	12,8	15,2	14.07	10,8	23.59	5,5	0,0	0,0	10,6	43,0	14.58	N
15	10,0	13,4	14.15	6,4	23.27	8,3	0,0	0,0	10,0	51,0	23.52	NNE
16	8,4	12,4	14.52	3,6	23.57	10,0	0,0	0,0	11,8	48,0	05.25	N
17	6,4	13,1	13.42	2,0	04.32	11,9	0,0	0,0	4,2	21,0	21.14	N
18	7,7	10,2	14.33	4,9	00.29	10,5	0,0	0,0	8,5	45,0	21.50	NNO
19	10,3	11,6	22.55	8,4	03.14	8,0	0,0	0,0	12,6	59,0	15.49	N
20	13,1	16,7	14.52	10,8	22.41	5,2	0,0	0,0	11,2	53,0	03.15	NNO
21	10,6	15,6	15.14	5,8	23.13	7,7	0,0	0,0	8,3	40,0	08.32	N
22	9,5	13,7	14.25	5,3	01.47	8,8	0,0	0,6	0,7	9,0	00.10	NNE
23	10,3	14,7	11.45	7,6	08.08	8,0	0,0	1,5	1,1	17,0	15.00	S
24	9,8	12,1	08.11	7,8	07.43	8,5	0,0	2,4	0,4	10,0	08.11	SSE
25	11,8	12,9	11.15	10,6	00.00	6,5	0,0	7,5	0,7	16,0	13.50	SSE
26	12,2	13,3	14.33	11,5	02.37	6,1	0,0	10,8	2,0	18,0	10.38	S
27	12,3	14,0	13.26	10,5	23.50	6,0	0,0	7,8	3,1	28,0	08.26	S
28	10,3	12,5	15.18	6,1	22.15	8,0	0,0	46,5	3,3	40,0	18.54	NE
29	8,2	13,2	13.55	6,0	21.46	10,1	0,0	4,2	3,5	27,0	14.50	N
30	6,6	8,4	00.16	4,7	21.29	11,7	0,0	0,9	11,8	67,0	10.58	N
	10,6	17,2	4	2,0	8	232,2	0,0	321,3	4,9	67,0	30	N

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 84,9 on day 4
Days of Rain: 17 (>= 0,2 mm) 12 (>= 2,0 mm) 5 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report December 2012

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2012 Dicembre

Monthly Climatological Summary for dic 2012

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	5,1	5,5	04.07	4,4	17.16	13,2	0,0	0,6	6,7	37,0	11.15	N
2	6,3	11,7	14.52	2,0	22.36	12,0	0,0	0,3	6,0	50,0	21.20	NNO
3	2,6	10,3	13.46	-2,3	07.17	15,7	0,0	0,0	2,2	28,0	00.19	NNO
4	6,0	11,4	13.58	0,3	00.00	12,3	0,0	0,0	2,4	28,0	05.27	N
5	1,7	11,0	13.31	-2,5	23.53	16,6	0,0	0,0	1,6	21,0	13.42	NNE
6	1,2	10,0	12.58	-3,1	04.08	17,1	0,0	0,0	2,7	23,0	13.24	NNE
7	1,6	5,1	11.35	-0,7	00.53	16,7	0,0	3,9	3,7	44,0	22.37	N
8	1,9	6,3	15.12	-3,4	07.44	16,4	0,0	2,1	9,1	42,0	23.18	N
9	2,5	9,7	12.53	-2,6	08.29	15,8	0,0	0,3	5,1	44,0	00.21	NNO
10	4,5	10,7	14.17	1,1	00.00	13,8	0,0	0,3	2,7	38,0	20.35	N
11	2,0	9,7	12.50	-2,7	07.59	16,3	0,0	0,0	3,9	42,0	11.08	N
12	2,0	8,1	13.34	-2,5	22.15	16,4	0,0	0,0	4,3	32,0	00.16	NNO
13	1,2	3,1	13.14	-1,6	00.00	17,1	0,0	0,0	1,3	17,0	18.42	NNE
14	0,8	3,5	23.59	-0,3	02.24	17,5	0,0	51,6	1,2	17,0	15.15	N
15	9,4	11,8	10.32	3,5	00.00	8,9	0,0	63,0	4,9	49,0	09.30	S
16	8,2	12,0	12.10	-0,4	09.36	10,1	0,0	0,0	1,4	24,0	12.30	SSO
17	6,4	10,6	14.16	1,1	23.30	11,9	0,0	0,3	3,6	33,0	10.43	N
18	3,5	14,2	14.13	-0,8	07.38	14,8	0,0	0,0	1,7	21,0	13.16	NE
19	3,1	12,5	13.57	-1,1	23.54	15,2	0,0	0,0	2,6	26,0	10.43	N
20	1,3	5,2	15.19	-2,4	06.51	17,0	0,0	0,3	0,5	17,0	22.24	NNE
21	3,8	9,6	15.16	0,6	20.33	14,5	0,0	0,6	2,9	28,0	12.08	NNO
22	4,9	11,4	13.39	0,3	08.10	13,4	0,0	1,2	3,2	28,0	02.23	N
23	5,7	8,8	15.12	1,3	00.22	12,6	0,0	0,3	0,3	10,0	13.49	NNE
24	8,7	10,1	17.20	7,1	00.07	9,6	0,0	0,9	1,5	24,0	17.10	SSO
25	10,8	11,5	15.53	9,2	00.00	7,5	0,0	0,0	4,3	26,0	12.42	S
26	9,2	11,8	15.15	1,6	23.58	9,1	0,0	8,1	1,5	15,0	06.58	NNE
27	5,9	10,1	13.40	0,7	02.57	12,4	0,0	0,3	3,0	31,0	12.46	SSO
28	8,5	15,6	13.02	2,1	05.25	9,8	0,0	0,0	5,9	45,0	12.38	N
29	5,2	14,0	14.16	0,3	08.26	13,1	0,0	0,0	2,5	28,0	14.25	NNO
30	2,8	11,7	14.42	-1,7	08.17	15,5	0,0	0,0	0,9	15,0	13.13	S
31	4,8	12,5	13.07	-0,7	23.59	13,5	0,0	0,0	4,4	33,0	13.53	NNO
	4,6	15,6	28	-3,4	8	425,8	0,0	134,1	3,2	50,0	2	N

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 16
Min <= -18,0: 0
Max Rain: 63,0 on day 15
Days of Rain: 16 (>= 0,2 mm) 5 (>= 2,0 mm) 2 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report January 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Gennaio

Monthly Climatological Summary for gen 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	2,5	5,9	23.38	-2,0	04.30	15,8	0,0	11,7	0,8	10,0	23.30	NNE
2	4,7	9,8	10.58	3,3	14.13	13,6	0,0	29,4	6,6	40,0	22.59	NNO
3	6,7	13,6	14.12	1,1	23.49	11,6	0,0	0,0	4,3	38,0	00.00	NNO
4	4,3	13,2	14.07	-0,3	06.55	14,0	0,0	0,0	0,8	10,0	13.23	ESE
5	5,3	7,9	14.56	2,5	23.53	13,1	0,0	5,4	1,5	13,0	02.08	NO
6	5,0	10,2	14.51	1,3	08.08	13,3	0,0	0,0	1,9	13,0	13.22	NNE
7	5,1	15,8	14.13	-0,1	08.22	13,2	0,0	0,0	0,8	11,0	00.32	NO
8	5,2	12,1	14.57	-0,1	08.20	13,1	0,0	0,3	1,1	15,0	13.26	SSE
9	7,6	9,8	15.12	6,2	06.08	10,8	0,0	0,3	0,4	7,0	12.51	NO
10	7,3	10,1	14.31	5,7	23.58	11,0	0,0	2,1	1,0	12,0	14.19	S
11	5,8	11,1	12.09	0,3	23.52	12,5	0,0	0,0	2,7	28,0	14.37	NNO
12	3,3	8,7	15.11	-1,8	05.37	15,0	0,0	1,8	1,5	17,0	15.09	NE
13	3,8	7,9	09.44	2,4	23.42	14,5	0,0	9,0	5,9	39,0	21.34	NNO
14	3,5	5,8	14.07	1,4	20.55	14,8	0,0	9,3	8,0	36,0	01.51	NNO
15	1,4	2,6	12.14	0,2	22.20	16,9	0,0	12,0	0,8	15,0	00.17	N
16	1,3	4,1	15.55	-2,0	22.26	17,1	0,0	24,3	3,0	24,0	10.27	N
17	0,7	2,2	13.26	-2,1	00.47	17,7	0,0	0,6	10,7	54,0	17.41	N
18	0,7	6,8	15.22	-2,8	23.07	17,6	0,0	0,0	4,5	37,0	00.49	N
19	1,1	2,9	12.26	-2,4	00.00	17,2	0,0	26,4	3,3	40,0	22.51	NNO
20	4,1	5,9	15.49	2,5	00.00	14,2	0,0	75,6	6,1	40,0	03.29	N
21	5,1	8,6	15.07	2,6	23.43	13,2	0,0	9,6	1,2	12,0	03.51	N
22	3,9	10,2	14.57	0,7	22.08	14,4	0,0	0,0	1,6	21,0	11.39	N
23	3,2	6,5	11.08	0,3	07.08	15,1	0,0	5,1	3,0	27,0	23.19	NNO
24	5,4	6,8	15.58	4,1	02.49	12,9	0,0	0,3	9,9	43,0	11.46	NNO
25	5,4	7,7	15.33	0,5	23.57	12,9	0,0	0,0	8,5	36,0	02.26	N
26	2,6	6,1	14.35	-1,0	01.36	15,7	0,0	0,0	7,8	40,0	19.19	N
27	2,0	8,9	14.17	-4,5	07.35	16,3	0,0	0,0	2,5	21,0	14.11	ESE
28	3,7	6,8	23.28	2,6	13.48	14,6	0,0	13,2	7,7	48,0	16.32	NNO
29	5,4	11,4	13.32	0,1	05.20	12,9	0,0	0,0	4,3	49,0	01.15	N
30	6,0	8,4	15.52	2,1	01.29	12,3	0,0	0,3	0,5	13,0	16.24	NNE
31	7,3	15,0	13.07	2,4	08.50	11,0	0,0	0,3	2,4	31,0	14.22	SE
	4,2	15,8	7	-4,5	27	438,3	0,0	237,0	3,7	54,0	17	N

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 11
Min <= -18,0: 0
Max Rain: 75,6 on day 20
Days of Rain: 20 (>= 0,2 mm) 13 (>= 2,0 mm) 4 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report February 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Febbraio

Monthly Climatological Summary for feb 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	8,0	11,7	14.14	1,1	07.54	10,3	0,0	2,1	5,4	37,0	21.15	S
2	7,3	10,6	00.00	3,9	18.20	11,1	0,0	48,0	10,8	64,0	20.20	N
3	4,9	9,3	13.33	-0,6	23.56	13,5	0,0	0,3	9,5	54,0	01.29	N
4	3,3	11,1	13.47	-2,9	07.43	15,0	0,0	0,0	1,8	24,0	12.14	SSE
5	5,6	8,6	15.08	1,7	07.07	12,7	0,0	0,0	1,6	23,0	13.56	SSO
6	5,0	11,0	12.36	-0,1	23.29	13,3	0,0	0,0	2,9	36,0	13.14	SE
7	3,3	8,6	16.05	-0,3	01.38	15,0	0,0	0,0	7,9	54,0	06.46	NNO
8	2,9	7,2	13.58	-2,8	23.57	15,4	0,0	0,0	6,7	39,0	11.30	NNO
9	-0,5	6,2	12.43	-4,5	23.56	18,8	0,0	0,0	3,7	30,0	16.08	N
10	-1,4	5,5	12.45	-6,5	06.14	19,7	0,0	0,0	1,6	17,0	13.20	SE
11	-0,9	0,6	23.54	-2,0	12.09	19,1	0,0	0,0	5,7	42,0	19.24	N
12	2,2	6,3	14.26	-0,9	23.39	16,1	0,0	6,0	3,5	32,0	19.49	NNO
13	2,9	7,1	15.14	-1,8	00.23	15,5	0,0	0,0	8,0	42,0	23.07	N
14	5,0	9,3	14.28	0,9	23.20	13,3	0,0	0,0	8,6	42,0	10.53	N
15	4,8	11,3	14.44	-0,5	02.45	13,5	0,0	0,0	2,7	23,0	12.17	N
16	6,2	10,4	14.47	2,0	04.25	12,1	0,0	0,0	7,2	37,0	14.37	NNO
17	4,1	9,0	13.57	-0,7	06.55	14,2	0,0	0,0	6,9	37,0	16.14	N
18	4,0	8,0	15.38	-1,4	23.55	14,3	0,0	0,0	8,1	36,0	08.09	N
19	2,6	9,5	13.05	-2,3	05.53	15,7	0,0	0,0	3,4	26,0	14.23	SE
20	3,7	5,0	11.07	1,7	00.00	14,7	0,0	19,2	0,7	10,0	04.19	NNO
21	2,0	3,7	00.00	0,0	21.49	16,3	0,0	4,8	9,0	42,0	21.38	NNO
22	-0,1	1,5	13.42	-0,8	20.08	18,4	0,0	0,0	11,6	42,0	13.04	N
23	-0,8	0,4	11.56	-1,7	16.45	19,1	0,0	0,0	11,8	51,0	18.49	NNO
24	0,2	1,9	17.05	-0,7	00.00	18,1	0,0	8,4	1,8	28,0	01.25	N
25	1,7	4,8	12.21	-1,5	06.07	16,6	0,0	4,2	3,8	39,0	19.49	NNE
26	4,1	9,5	16.12	-0,4	04.07	14,2	0,0	0,0	6,6	39,0	08.44	NNO
27	2,5	8,6	11.25	-2,7	06.08	15,8	0,0	0,0	3,7	28,0	19.36	N
28	5,5	9,7	14.58	0,8	07.11	12,8	0,0	0,0	7,2	34,0	12.09	N
	3,1	11,7	1	-6,5	10	424,6	0,0	93,0	5,8	64,0	2	N

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 21
Min <= -18,0: 0
Max Rain: 48,0 on day 2
Days of Rain: 8 (>= 0,2 mm) 7 (>= 2,0 mm) 1 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report March 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Marzo

Monthly Climatological Summary for mar 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	6,8	10,4	16.14	1,3	01.14	11,5	0,0	0,0	7,7	34,0	15.10	NNO
2	7,4	10,1	13.25	3,4	22.29	11,0	0,0	0,0	11,7	56,0	10.14	NNO
3	5,5	15,2	13.41	-1,9	07.54	12,8	0,0	0,0	2,6	19,0	00.00	S
4	6,8	16,4	14.48	-0,7	06.43	11,5	0,0	0,0	2,8	23,0	15.10	SSO
5	4,6	9,9	12.36	0,1	04.51	13,7	0,0	7,8	2,3	27,0	23.14	NNO
6	6,0	8,2	23.38	4,9	10.38	12,3	0,0	37,8	7,5	34,0	14.56	N
7	9,0	10,7	16.42	7,0	06.39	9,3	0,0	26,7	2,0	21,0	00.11	N
8	9,3	11,1	13.31	7,8	23.42	9,0	0,0	38,1	1,6	21,0	15.34	N
9	8,0	10,7	12.50	5,4	05.48	10,3	0,0	23,4	2,2	28,0	20.29	N
10	7,6	10,5	12.49	5,8	01.41	10,7	0,0	23,4	1,5	21,0	10.45	SE
11	6,6	11,1	16.48	3,2	23.56	11,7	0,0	0,0	1,2	13,0	14.07	NNE
12	7,4	11,7	14.00	2,9	00.50	10,9	0,0	0,3	2,6	26,0	12.52	S
13	6,3	9,7	16.19	3,0	23.51	12,0	0,0	9,9	1,8	18,0	04.31	E
14	5,7	7,5	15.56	2,8	01.37	12,6	0,0	0,0	6,9	45,0	12.09	NNO
15	3,6	7,5	14.36	-2,0	23.53	14,7	0,0	0,0	6,5	38,0	00.39	N
16	2,2	8,3	16.00	-4,1	05.58	16,2	0,0	0,0	2,5	21,0	11.30	SSE
17	2,5	7,2	11.31	0,8	17.52	15,8	0,0	39,3	3,3	31,0	23.26	N
18	3,7	6,8	15.22	0,9	23.42	14,6	0,0	67,5	4,7	31,0	03.52	N
19	5,6	12,6	13.12	-0,5	02.58	12,8	0,0	0,3	3,0	30,0	14.58	S
20	5,7	8,2	12.18	2,0	23.57	12,6	0,0	15,9	2,5	27,0	19.47	NNO
21	6,8	16,4	14.09	0,2	04.12	11,5	0,0	0,0	3,5	34,0	14.26	NNE
22	7,5	13,3	12.13	0,5	02.20	10,8	0,0	0,0	2,3	23,0	11.35	S
23	8,7	13,6	12.15	3,3	06.25	9,6	0,0	3,6	2,8	23,0	11.17	SSO
24	6,8	8,6	02.19	4,9	23.49	11,5	0,0	12,6	7,4	49,0	17.33	N
25	5,4	7,1	20.26	3,9	06.41	12,9	0,0	0,6	14,3	64,0	10.14	NNO
26	5,2	6,8	16.55	4,0	21.53	13,1	0,0	0,6	9,3	42,0	10.23	NNO
27	6,1	8,8	12.35	4,1	04.50	12,2	0,0	0,0	7,3	28,0	00.34	NNO
28	5,7	6,5	05.33	1,8	19.32	12,6	0,0	37,8	5,7	26,0	19.37	N
29	8,3	10,9	21.53	5,1	00.00	9,9	0,0	13,2	2,6	30,0	15.34	SSE
30	8,4	10,4	00.00	4,2	23.58	9,9	0,0	26,4	3,8	42,0	19.14	NNO
31	6,9	13,9	13.31	0,9	07.21	10,9	0,0	1,2	3,1	34,0	14.33	SSO
	6,3	16,4	4	-4,1	16	370,9	0,0	386,4	4,5	64,0	25	NNO

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 5
Min <= -18,0: 0
Max Rain: 67,5 on day 18
Days of Rain: 20 (>= 0,2 mm) 15 (>= 2,0 mm) 9 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report April 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Aprile

Monthly Climatological Summary for apr 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	7,4	11,0	16.07	4,6	00.43	10,9	0,0	7,2	3,2	32,0	19.17	N
2	7,2	9,6	17.12	5,4	07.51	11,1	0,0	8,1	10,4	46,0	01.43	NNO
3	9,1	15,2	16.55	2,9	07.39	9,1	0,0	0,0	3,6	24,0	12.39	S
4	8,2	12,2	13.07	5,7	05.15	10,1	0,0	9,6	2,6	27,0	20.57	NNE
5	7,3	10,0	18.38	5,4	07.34	11,0	0,0	22,8	7,3	50,0	08.53	N
6	9,9	15,7	15.49	5,4	01.50	8,4	0,0	6,0	2,9	33,0	22.47	N
7	11,3	14,3	16.41	8,5	23.35	7,0	0,0	0,0	10,7	48,0	14.11	NNO
8	7,1	9,9	13.59	5,4	04.19	11,2	0,0	39,0	2,0	30,0	14.33	ENE
9	9,1	11,7	12.52	6,7	02.18	9,2	0,0	6,6	3,2	34,0	13.21	S
10	11,1	15,7	13.58	7,4	07.43	7,2	0,0	0,0	5,6	36,0	15.42	SSO
11	10,8	12,1	18.05	9,7	00.00	7,5	0,0	0,3	2,9	23,0	23.46	SSO
12	12,1	15,9	17.29	8,1	22.34	6,2	0,0	11,4	6,0	34,0	14.26	S
13	11,9	17,2	16.12	7,4	07.33	6,4	0,0	0,0	4,5	31,0	13.38	S
14	13,0	22,5	15.41	4,6	06.47	6,2	0,9	0,0	3,7	28,0	12.27	S
15	14,7	23,7	15.04	6,5	06.56	5,1	1,5	0,0	3,0	22,0	12.22	S
16	15,3	24,7	15.21	7,3	03.48	4,6	1,6	0,0	3,3	31,0	11.39	NNE
17	17,9	26,0	14.09	11,7	04.16	2,6	2,2	0,0	4,8	32,0	12.36	NNO
18	16,7	25,5	14.15	8,9	06.59	3,7	2,1	0,0	2,7	23,0	16.43	S
19	15,6	23,5	14.01	8,3	06.37	4,0	1,2	0,0	3,4	27,0	11.56	S
20	11,1	14,0	00.00	7,0	08.56	7,2	0,0	17,1	1,8	16,0	01.47	SSE
21	9,2	15,6	12.26	5,3	07.32	9,1	0,0	10,8	2,2	19,0	13.49	ENE
22	9,6	14,9	14.57	6,1	02.28	8,7	0,0	4,8	2,4	21,0	15.56	N
23	11,4	17,7	13.40	5,7	04.12	6,9	0,0	0,0	5,3	36,0	12.42	N
24	14,4	22,1	16.54	6,4	07.21	4,7	0,8	0,0	6,4	37,0	10.27	N
25	18,3	23,5	19.00	11,1	03.21	1,7	1,7	0,0	6,7	33,0	09.18	NNO
26	16,9	22,6	15.05	13,1	23.59	2,1	0,7	0,3	3,9	32,0	11.59	NNE
27	12,8	13,4	10.55	12,2	23.22	5,5	0,0	60,6	1,9	23,0	15.07	S
28	13,8	16,6	15.13	12,1	02.40	4,5	0,0	1,2	2,6	23,0	13.43	S
29	16,0	20,8	13.40	12,0	01.29	2,7	0,4	9,0	5,4	37,0	13.57	N
30	17,8	23,2	17.25	13,8	06.42	1,5	1,0	1,8	3,7	36,0	16.16	NNO
	12,2	26,0	17	2,9	3	196,1	14,1	216,6	4,3	50,0	5	NNO

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 60,6 on day 27
Days of Rain: 17 (>= 0,2 mm) 13 (>= 2,0 mm) 3 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report May 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Maggio

Monthly Climatological Summary for mag 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	18,2	24,8	14.14	12,7	23.56	1,7	1,6	1,8	4,9	37,0	13.51	N
2	15,7	22,9	16.53	10,8	03.56	3,4	0,9	0,0	2,5	23,0	18.31	SSE
3	13,9	19,6	16.14	7,4	23.54	4,5	0,1	0,0	3,5	36,0	14.06	SSO
4	14,0	23,3	17.06	4,8	05.35	5,6	1,3	0,0	2,7	26,0	14.51	S
5	13,4	18,5	09.23	10,7	02.02	4,9	0,0	21,3	3,1	24,0	10.24	N
6	15,7	20,5	16.10	10,6	23.53	2,9	0,3	0,0	4,5	32,0	16.59	NNO
7	14,6	19,6	14.12	10,0	01.26	3,9	0,1	0,0	3,5	30,0	12.51	S
8	15,5	21,7	12.32	9,3	05.48	3,4	0,6	3,6	3,4	26,0	12.37	N
9	17,1	24,7	15.18	10,6	05.23	2,9	1,8	0,0	3,5	22,0	13.47	SSE
10	14,7	16,9	12.00	13,1	02.53	3,6	0,0	4,5	1,5	17,0	12.49	SSO
11	15,3	18,9	14.03	12,6	07.17	3,0	0,0	1,2	3,4	33,0	11.35	S
12	14,1	20,9	11.43	9,0	07.21	4,5	0,2	4,2	4,1	27,0	09.41	NE
13	14,0	22,0	13.37	6,2	05.14	4,9	0,6	0,3	4,1	27,0	13.51	NE
14	14,1	21,8	16.07	6,1	06.09	5,0	0,8	0,0	3,4	26,0	14.38	SSO
15	13,9	18,7	11.42	9,4	01.46	4,4	0,0	3,3	3,3	31,0	14.05	SSO
16	13,5	16,1	18.05	11,6	04.49	4,8	0,0	58,2	2,3	24,0	14.10	ONO
17	13,2	15,9	14.38	11,0	23.42	5,1	0,0	16,2	4,6	38,0	14.14	S
18	12,7	17,0	11.50	9,0	04.27	5,6	0,0	9,9	2,9	31,0	10.43	SSO
19	12,4	15,1	15.35	10,2	23.42	5,9	0,0	22,2	4,8	38,0	13.15	S
20	12,1	15,6	11.55	9,0	23.55	6,2	0,0	7,5	4,4	33,0	13.59	S
21	12,1	17,5	15.45	7,7	23.52	6,2	0,0	0,0	3,5	31,0	11.24	S
22	13,6	20,4	16.49	4,4	05.20	5,2	0,5	0,0	5,5	33,0	13.17	N
23	15,5	20,7	13.02	11,1	06.16	3,0	0,2	0,6	5,2	32,0	11.24	NNO
24	11,2	15,6	14.03	5,6	23.57	7,1	0,0	10,5	5,9	46,0	07.32	ENE
25	7,3	10,2	08.52	5,3	00.47	11,0	0,0	12,9	2,6	18,0	09.36	N
26	11,1	17,9	13.13	3,4	06.44	7,2	0,0	0,3	4,7	36,0	13.42	S
27	11,3	15,1	17.29	6,7	00.32	7,1	0,0	0,0	3,8	31,0	16.34	S
28	11,1	16,5	17.39	7,5	04.51	7,2	0,0	1,5	1,7	17,0	18.07	SSO
29	12,1	14,6	13.33	10,0	23.52	6,2	0,0	9,3	5,6	32,0	16.38	S
30	10,3	14,3	13.05	7,6	23.59	8,1	0,0	11,7	3,0	23,0	13.18	N
31	10,7	16,3	14.29	4,1	05.12	7,6	0,0	0,0	4,6	30,0	13.20	S
	13,4	24,8	1	3,4	26	162,1	9,0	201,0	3,8	46,0	24	S

Max >= 27,0: 0
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 58,2 on day 16
Days of Rain: 20 (>= 0,2 mm) 14 (>= 2,0 mm) 3 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report June 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Giugno

Monthly Climatological Summary for giu 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	14,0	20,5	15.45	7,5	03.35	4,7	0,5	0,0	3,0	24,0	13.13	SSE
2	16,1	23,4	13.16	10,2	01.28	3,4	1,1	0,3	3,3	23,0	13.55	S
3	16,3	22,7	16.48	11,3	23.48	2,3	0,4	0,3	4,8	28,0	11.25	N
4	14,4	22,1	13.56	8,1	06.24	4,4	0,5	0,3	3,3	24,0	14.02	N
5	15,4	22,9	13.51	8,5	05.41	4,0	1,0	0,0	3,3	24,0	13.03	S
6	15,2	24,4	13.58	8,4	05.36	4,0	0,9	6,6	2,8	23,0	14.11	NE
7	17,3	25,3	12.14	11,1	05.46	2,7	1,7	0,0	3,3	26,0	10.13	N
8	17,7	25,6	15.40	10,8	05.49	2,7	2,2	0,0	2,9	22,0	14.45	S
9	13,9	20,2	11.22	9,3	23.47	4,5	0,1	18,3	2,7	31,0	12.32	SSO
10	13,5	17,3	13.11	8,5	01.13	4,8	0,0	0,6	2,0	18,0	11.37	SSE
11	15,6	23,2	15.15	7,4	05.59	4,0	1,3	0,0	3,0	23,0	11.59	SSE
12	17,8	25,5	16.35	10,1	06.05	2,7	2,2	0,0	2,5	21,0	13.08	SE
13	19,4	27,2	15.44	11,2	05.59	2,2	3,3	0,0	3,0	23,0	14.45	SSE
14	19,3	26,9	14.40	11,6	06.08	1,9	3,0	0,0	3,6	24,0	13.49	S
15	19,6	23,7	14.46	16,0	23.54	0,6	1,8	0,0	2,8	21,0	19.50	S
16	20,1	26,8	17.13	13,2	06.11	1,5	3,3	0,0	3,8	27,0	13.17	S
17	21,9	30,7	16.51	12,5	05.46	1,5	5,1	0,0	3,4	21,0	16.20	SSO
18	23,8	33,5	15.13	14,8	04.38	0,8	6,4	0,0	3,0	19,0	16.10	S
19	23,9	31,7	13.05	16,8	06.09	0,3	5,9	0,0	3,4	26,0	14.04	S
20	21,7	29,5	13.19	13,9	06.06	1,1	4,4	0,0	4,3	28,0	16.41	S
21	19,7	24,6	12.54	13,3	07.16	1,1	2,4	0,0	4,6	28,0	13.23	S
22	17,6	25,0	15.39	10,7	06.20	2,6	1,9	0,0	4,1	27,0	12.26	S
23	18,2	22,5	14.56	14,6	01.47	1,1	1,0	0,0	5,6	30,0	17.22	SSO
24	16,9	24,2	14.36	10,8	23.52	2,2	0,8	7,2	4,0	30,0	14.21	NE
25	16,2	24,0	16.47	8,4	06.40	3,7	1,6	0,0	3,9	23,0	12.50	SE
26	17,7	22,7	16.10	11,5	02.22	2,0	1,4	0,0	7,5	36,0	14.48	NNO
27	16,0	22,5	16.57	10,1	03.17	3,3	1,1	0,0	3,8	23,0	15.12	OSO
28	14,5	18,1	19.14	11,1	23.57	3,8	0,0	0,0	8,2	39,0	12.11	NNO
29	15,5	22,1	12.19	8,7	05.30	3,5	0,8	0,0	3,9	23,0	09.38	N
30	17,5	26,5	16.12	9,0	05.56	3,4	2,7	0,0	3,7	21,0	13.19	S
	17,6	33,5	18	7,4	11	80,8	58,8	33,6	3,8	39,0	28	S

Max >= 27,0: 5
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 18,3 on day 9
Days of Rain: 7 (>= 0,2 mm) 3 (>= 2,0 mm) 0 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report July 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Luglio

Monthly Climatological Summary for lug 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	18,1	26,1	14.26	9,1	05.44	3,1	2,9	0,0	3,4	24,0	13.25	S
2	18,8	27,1	15.12	10,4	05.59	2,6	3,1	0,0	3,5	23,0	15.21	S
3	18,5	24,2	16.05	13,2	06.53	1,8	2,0	0,0	3,8	24,0	11.44	S
4	20,0	27,8	16.30	11,6	06.14	1,9	3,6	0,0	3,9	26,0	10.52	N
5	22,5	30,4	16.13	15,2	03.25	0,8	5,1	0,0	6,0	34,0	11.46	N
6	22,3	30,3	14.10	15,5	05.07	0,7	4,7	0,0	3,5	21,0	13.50	N
7	23,6	28,4	16.54	17,4	03.46	0,0	5,3	0,0	6,7	38,0	11.03	NNO
8	24,2	28,2	16.07	17,7	04.38	0,0	6,0	0,0	9,5	44,0	10.21	NNO
9	24,1	29,1	15.29	18,5	23.55	0,0	5,8	0,0	7,2	34,0	14.19	N
10	21,2	29,0	12.22	16,6	06.07	0,3	3,2	4,8	3,1	22,0	12.49	NNE
11	21,3	28,1	13.15	14,9	06.05	0,8	3,8	0,0	3,4	27,0	17.20	S
12	21,4	27,9	14.46	14,9	06.44	0,7	3,8	0,0	3,4	27,0	15.06	S
13	20,5	25,5	19.08	16,2	03.55	0,5	2,7	0,0	3,0	23,0	15.39	S
14	21,4	29,5	14.15	15,8	06.37	0,6	3,7	0,0	3,5	28,0	10.40	N
15	21,3	29,3	14.44	14,0	06.23	1,1	4,0	0,0	3,6	22,0	13.18	NE
16	21,5	30,3	14.40	13,5	04.07	1,3	4,5	0,0	3,2	23,0	16.53	SE
17	21,1	29,9	14.09	15,6	05.51	0,6	3,4	18,3	3,6	38,0	15.05	N
18	19,7	28,0	11.48	16,5	06.06	0,5	1,9	31,8	4,1	44,0	13.13	N
19	22,1	29,3	17.06	16,7	03.10	0,4	4,2	0,0	5,0	28,0	11.31	N
20	20,5	28,6	15.06	13,9	06.15	1,1	3,3	0,0	2,6	21,0	23.55	NE
21	22,7	30,9	15.08	15,3	06.21	0,7	5,1	0,0	4,3	24,0	12.16	N
22	23,3	31,7	14.54	16,8	06.15	0,2	5,2	0,0	4,3	21,0	15.08	NNE
23	23,4	31,2	12.52	17,2	06.05	0,2	5,3	0,0	3,8	23,0	14.11	SSE
24	21,4	28,5	14.55	15,4	05.58	0,7	3,8	0,0	4,1	27,0	15.24	S
25	22,9	29,4	15.27	16,4	06.28	0,4	5,0	0,0	3,2	21,0	14.58	SSO
26	24,0	30,6	13.58	17,5	06.16	0,1	5,8	0,0	3,1	24,0	14.05	SSE
27	24,0	31,4	15.21	16,9	05.53	0,2	5,9	0,0	3,5	22,0	14.41	S
28	23,8	32,2	15.04	15,2	05.57	0,6	6,1	0,0	4,8	32,0	15.44	SSO
29	21,2	24,6	15.08	16,1	23.57	0,1	3,0	5,7	4,3	37,0	13.52	S
30	20,5	30,2	17.24	11,7	06.40	1,9	4,1	0,0	4,6	26,0	12.04	NNE
31	22,5	31,2	16.14	14,2	05.37	1,1	5,3	0,0	6,0	28,0	09.52	N
	21,7	32,2	28	9,1	1	25,0	131,6	60,6	4,3	44,0	8	NNE

Max >= 27,0: 27
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 31,8 on day 18
Days of Rain: 4 (>= 0,2 mm) 4 (>= 2,0 mm) 1 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

Report August 2013

Selezionare Mese o Anno per visualizzare Report

2013: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

2012: Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic

Report per 2013 Agosto

Monthly Climatological Summary for ago 2013

Name: Meteo Varese Ligure City: Varese Ligure (SP) State: Italia
Elevation: 364 m Lat: N 44° 22' 38" Lon: E 009° 35' 42"

Temperature (°C), Rain (mm), Wind Speed (km/h)

Day	Mean Temp	High	Time	Low	Time	Heat Deg Days	Cool Deg Days	Rain	Avg Wind Speed	High	Time	Dom Dir
1	23,6	32,9	15.18	14,9	06.21	0,6	5,9	0,0	3,8	23,0	15.31	N
2	24,2	32,9	14.28	16,3	06.28	0,3	6,2	0,0	4,9	24,0	14.38	E
3	23,7	33,1	15.08	16,0	06.48	0,5	5,8	0,0	3,2	23,0	16.08	S
4	23,3	32,4	15.17	15,0	06.16	0,7	5,7	0,0	3,1	27,0	14.49	S
5	23,3	33,0	16.16	14,6	06.24	0,8	5,9	0,0	2,7	22,0	14.10	S
6	22,3	32,5	13.09	12,6	06.37	1,4	5,3	0,0	2,5	18,0	16.28	S
7	22,1	31,0	16.24	12,4	06.15	1,4	5,2	0,0	4,1	28,0	16.08	SSO
8	19,6	27,1	11.36	16,3	06.07	0,4	1,7	9,3	2,9	22,0	11.00	N
9	21,0	29,1	14.06	14,4	06.22	0,9	3,6	3,3	4,4	28,0	14.21	SSO
10	22,4	29,9	15.59	15,9	03.08	0,4	4,5	0,0	7,3	44,0	13.36	N
11	22,1	29,4	14.05	15,2	06.40	0,7	4,5	0,0	4,5	27,0	09.29	N
12	22,2	30,8	15.31	15,1	06.33	0,8	4,7	0,0	3,8	24,0	12.51	S
13	20,9	29,0	15.59	12,7	06.22	1,5	4,1	0,0	3,1	22,0	11.42	S
14	19,9	23,2	17.21	15,8	06.51	0,5	2,0	0,0	6,6	39,0	19.41	NNO
15	22,0	26,5	16.56	18,5	22.55	0,0	3,7	0,0	10,0	42,0	13.48	NNO
16	22,4	29,7	14.51	16,3	05.10	0,2	4,4	0,0	6,2	32,0	09.32	NO
17	22,4	30,5	16.15	15,5	06.32	0,7	4,8	0,0	3,8	24,0	16.53	SSE
18	21,2	29,9	15.29	13,7	06.30	1,3	4,2	0,0	3,5	28,0	13.50	S
19	19,8	27,1	14.43	13,1	06.17	1,5	3,0	0,3	3,5	28,0	12.30	S
20	21,5	25,9	15.22	17,0	23.57	0,1	3,3	0,0	9,4	48,0	02.56	N
21	22,0	27,0	16.42	16,3	00.38	0,1	3,8	0,0	10,5	50,0	02.43	NNO
22	21,7	29,3	14.23	15,6	05.58	0,7	4,1	0,0	5,5	33,0	11.36	NNO
23	21,4	28,9	14.48	15,4	06.34	0,8	3,9	0,0	3,8	26,0	13.55	SSE
24	19,8	26,9	15.24	13,8	07.10	1,2	2,8	31,5	3,8	28,0	17.11	S
25	17,8	24,5	14.43	13,3	06.06	1,8	1,2	106,2	4,2	36,0	01.05	SSO
26	18,0	24,2	15.37	14,1	04.25	1,7	1,4	21,6	4,1	33,0	15.57	S
27	17,9	23,8	15.19	13,6	06.21	1,9	1,5	1,8	3,8	24,0	12.27	S
28	18,2	26,5	14.09	12,2	06.52	2,1	2,0	0,0	2,6	21,0	14.53	SE
29	17,7	26,9	12.15	12,9	06.45	2,0	1,4	15,0	3,0	23,0	11.56	NNE
30	19,4	27,0	14.09	13,2	05.36	1,7	2,9	0,0	5,1	31,0	09.24	N
31	19,6	27,2	13.30	13,8	06.24	1,6	3,0	0,0	3,9	24,0	14.29	N
	21,1	33,1	3	12,2	28	30,3	116,5	189,0	4,6	50,0	21	NO

Max >= 27,0: 22
Max <= 0,0: 0
Min <= 0,0: 0
Min <= -18,0: 0
Max Rain: 106,2 on day 25
Days of Rain: 8 (>= 0,2 mm) 6 (>= 2,0 mm) 3 (>= 20,0 mm)
Heat Base: 18,3 Cool Base: 18,3 Method: Integration

STORMWATER RUNOFF

MUNICIPAL WASTE DEPOT

Data collected

The monitoring campaign has been started in July 2011 after the installation of the two gauge stations at the selected pilot site. The selected pilot site is the MUNICIPAL WASTE DEPOT located in Baghino within the Municipality of Varese Ligure. The area is employed to handle and storage recyclable and non-recyclable urban waste; the site consists of two different aprons respectively dedicated to the storage of different waste typologies. The instrumented catchment is the asphalt apron that has an extension of about 230 m^2. The drainage system consists of circular pipelines (D = 160 mm) and a rectilinear sequence of 3 inlets. The drainage system is equipped with a treatment system. In particular, the treatment system consists of an on-line tank with a capacity of 1500 litres directly discharging into a small stream tributary of the Vara River.

The first gauge station (named VARESE IN) is installed downstream just before the inlet in the tank while the second gauge station (named VARESE OUT) that measure the outflow from the tank, is located at the outlet section of the tank. The two gauge stations VARESE IN and VARESE OUT were activated on June 20th 2011. A first phase of testing has been carried on for about three months.

At VARESE IN and VARESE OUT gauge station the monitoring campaign was effectively activated later due to the problem occurred during the testing phase; in particular, for the rainfall events occurred between July and November 2011, quantity data were not validated due to the malfunction of the local power plant firstly and level probes secondly. Figure 1 and Figure 2 reports view of the output for the level data serie with the evidence of the error in the level measurement for VARESE IN and VARESE OUT gauge station respectively. The 18th of November 2011 the two level probes have been replaced thus allowing to successfully monitor the following rainfall events. Figure 3 illustrates the rainfall runoff events that have been monitored at the Municipal Waster Depot pilot site between July to December 2011: the events that have been validated are indicated with green bars on the contrary the ones that have not been validated with blu bars.

The monitoring campaign has been stopped between January and March 2012.During January 2012 the monitoring campaign has been stopped due to the heavy snowfalls. Furthermore drainage network of the area have been partially modified in order to isolate the apron areas and consequently monitor exclusively the runoff from impervious areas. The civil works on the network realized by the Municipality of Varese Ligure have blocked the monitoring activities in the months of February and March 2012. Figure 4 and

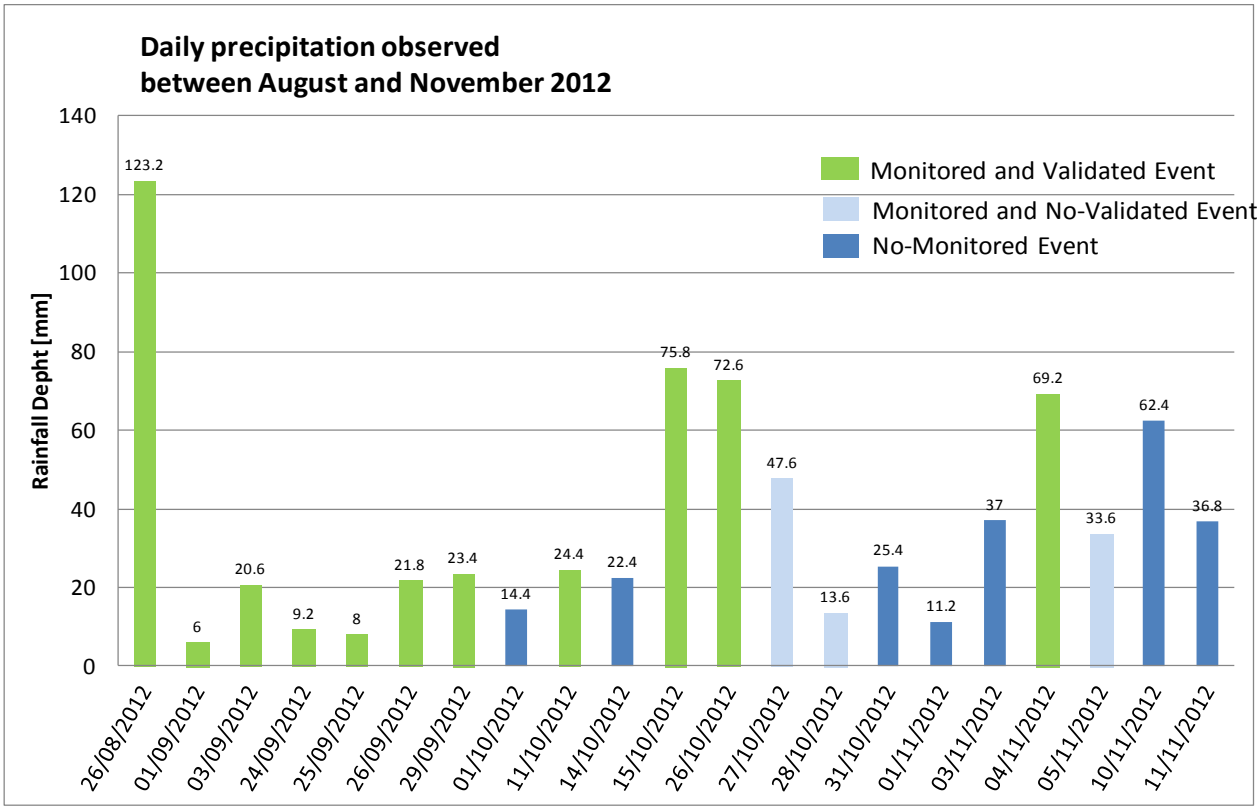

Figure 5 summarize the rainfall runoff events that have been monitored at the Municipal Waste Depot pilot site from April to July 2012 and from August to November 2012 respectively: the events that have been validated are indicated with green bars on the contrary the ones that have not been validated with blu bars.

Therefore the monitoring campaign has been carried out between December 2011 and November 2012 in order to characterise untreated (VARESE IN) and treated (VARESE OUT) storm water runoff quality by collecting a significant number of rainfall-runoff events. During the monitoring campaign that lasted a compete hydrologic year, 18 rainfall-runoff events characterized by different hydrologic conditions have been collected thus allowing to evaluate the treatment efficiency of the on-line tank at the site of concern.

In order to describe the hydrological characteristics of the rainfall runoff events monitored at the Municipal Waste Depot pilot site Figure 6 to Figure 40 aims at illustrating the hyetograph and hydrograph corresponding to each monitored rainfall event; in addition each graph reports the temporal profile of the level (blue line) and the sampling time (red dots).

Table 1and Table 2 summarize the rainfall runoff events that have been monitored at VARESE –IN and VARESE OUT pilot sites in order to characterize the untreated (INlet) and the treated storm water runoff (OUTlet) respectively. In addition the tables report the chemical-physical laboratory testing performed by DICHEP (now DICCA *Department of Civil, Chemical and Environmental Engineering*) with respect to the different rainfall events.

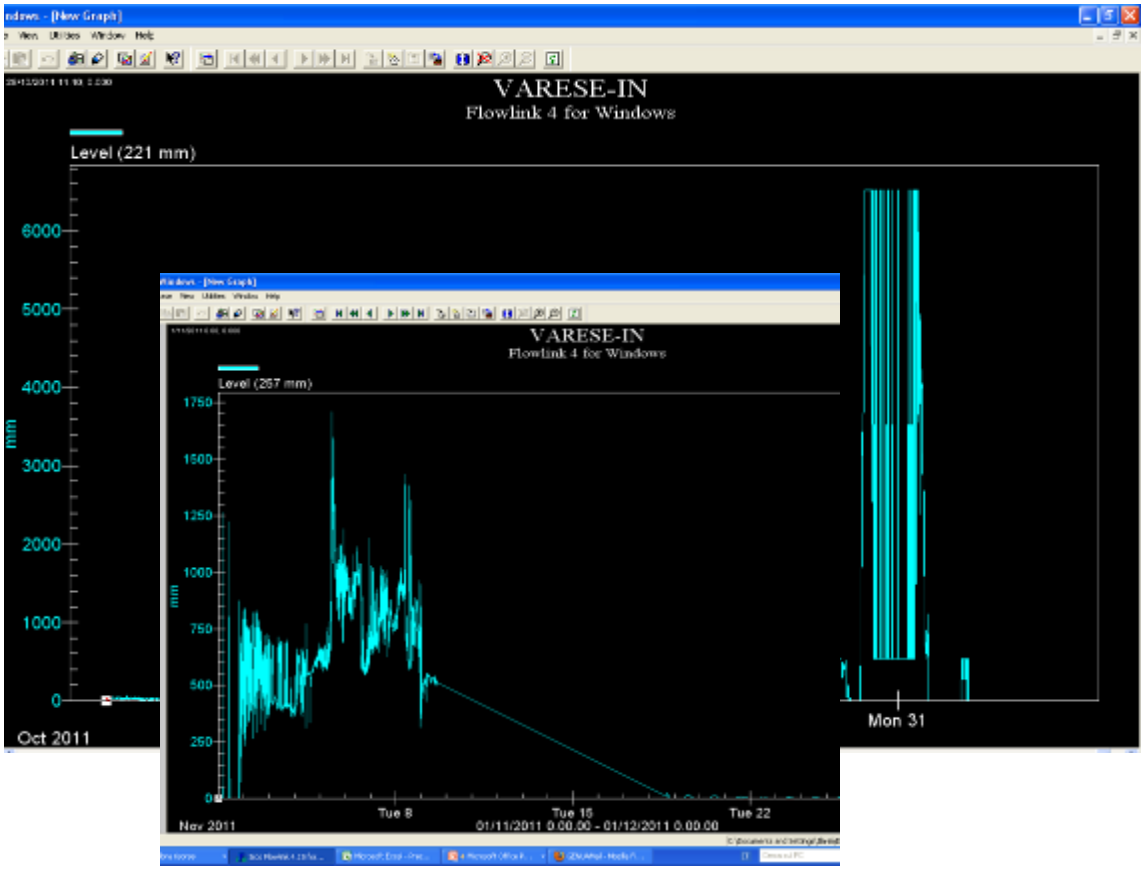

Figure 1 Varese-IN gauge station: view of the output for the level data serie with the evidence of the error in the level measurement

Figure 2 Varese-OUT gauge station: view of the output for the level data serie

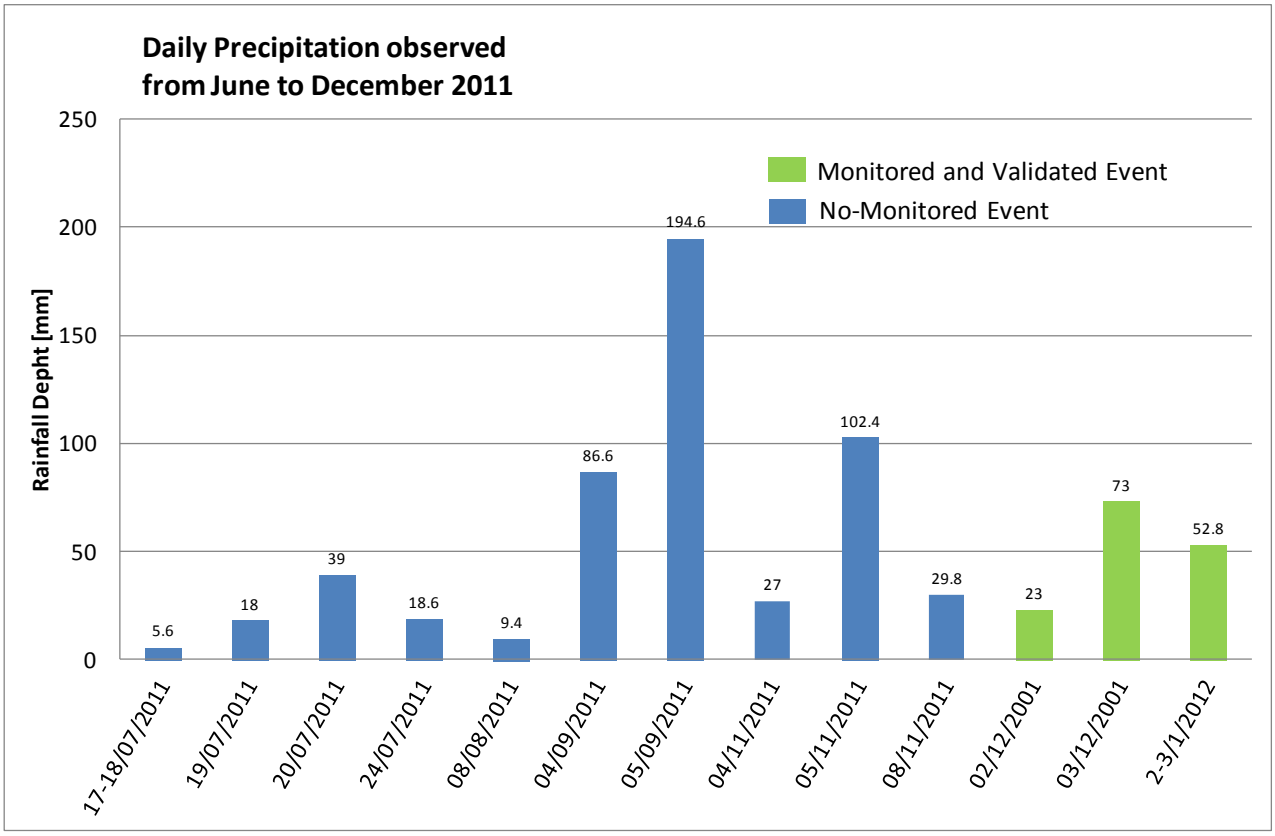

Figure 3 Daily precipitation observed from June to December 2011

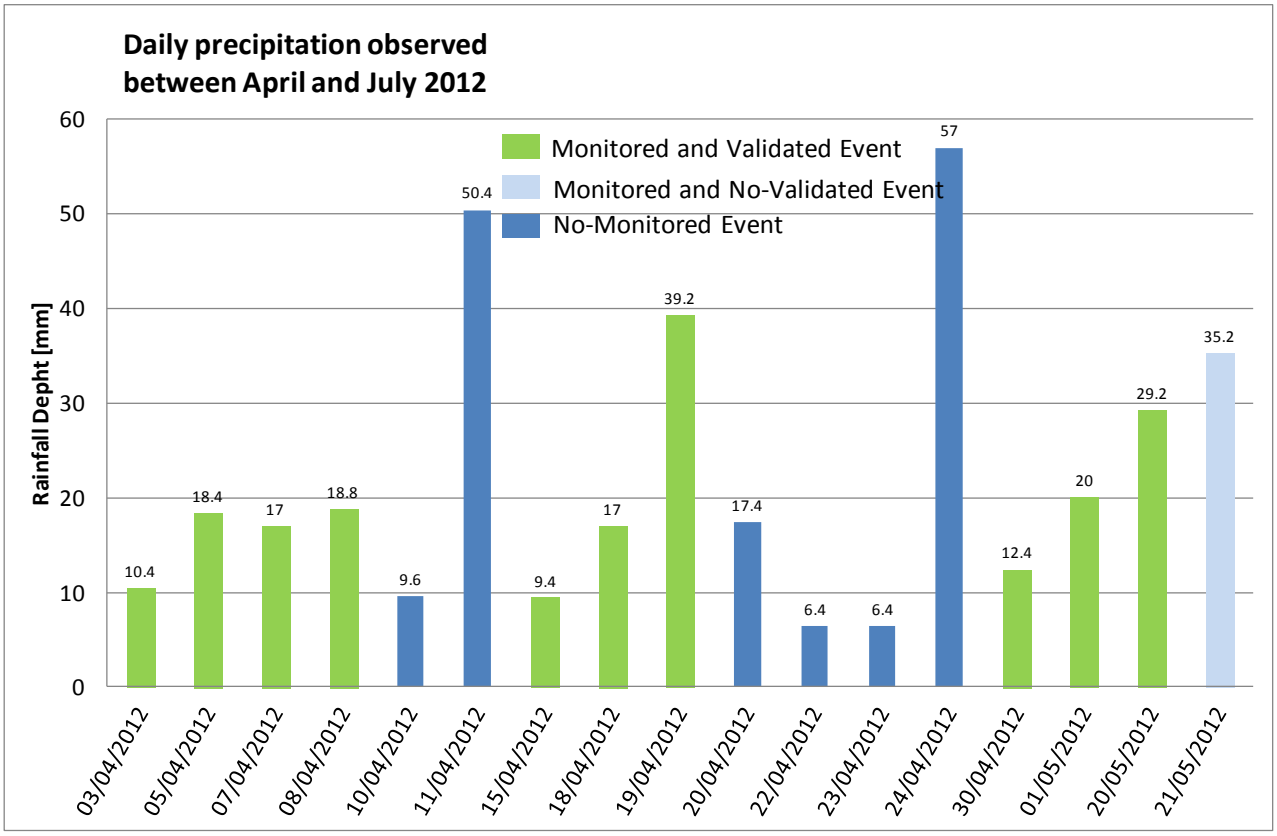

Figure 4 Daily precipitation observed from April to July 2012

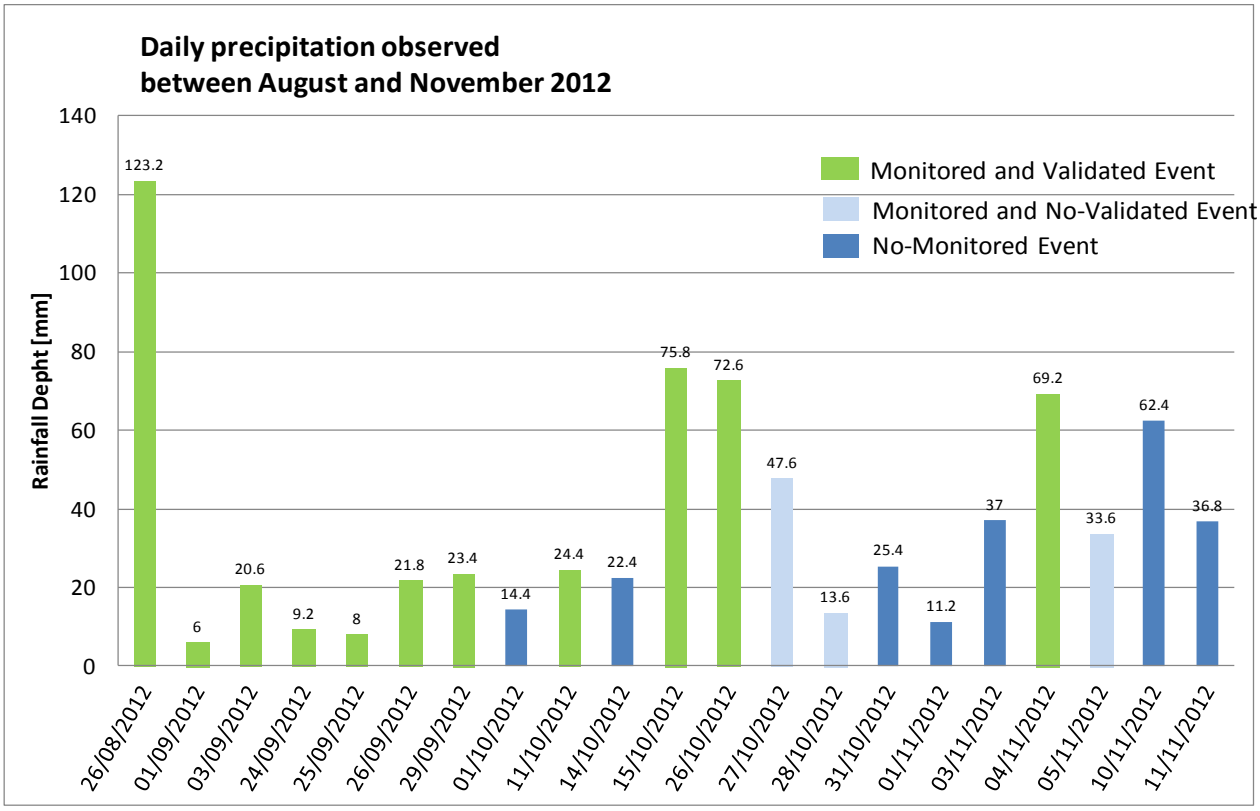

Figure 5 Daily precipitation observed from August to November 2012

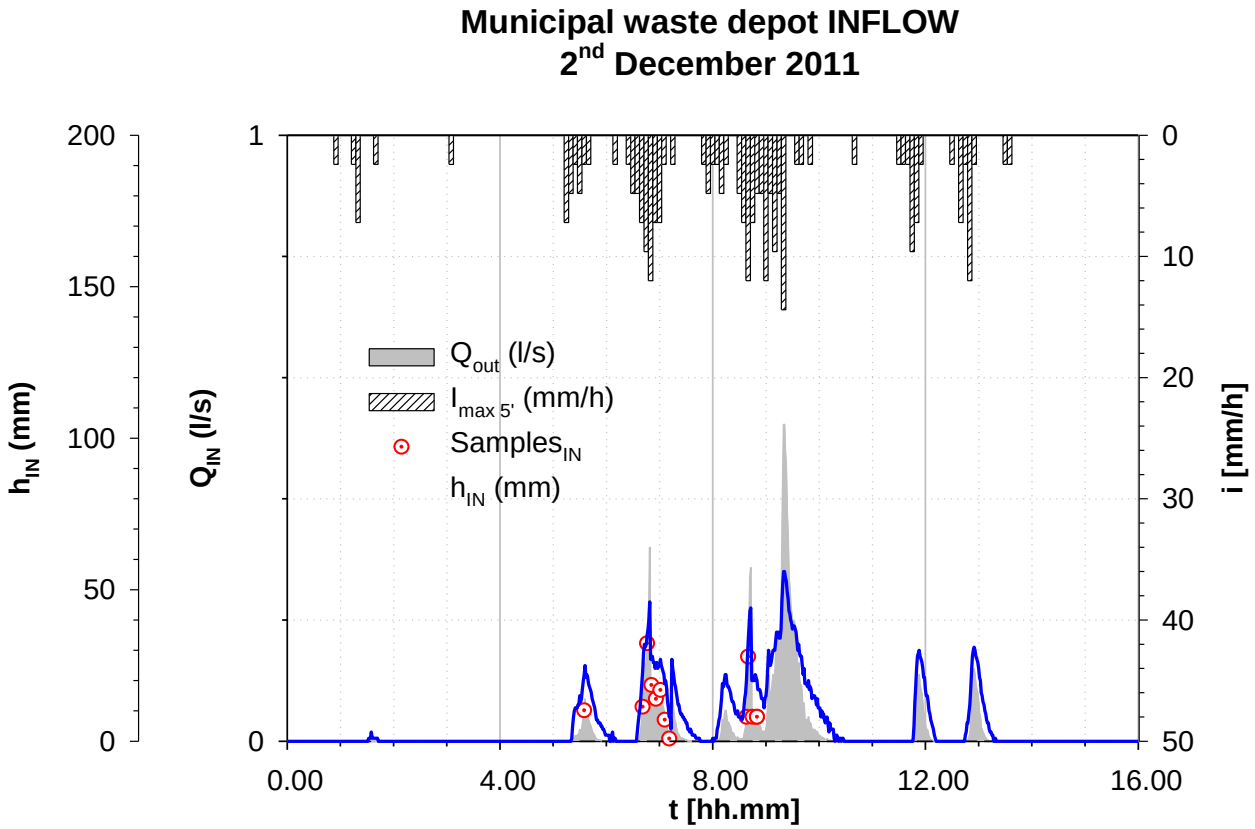

Figure 6 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{out}) and sampling time for the 2nd December 2011 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

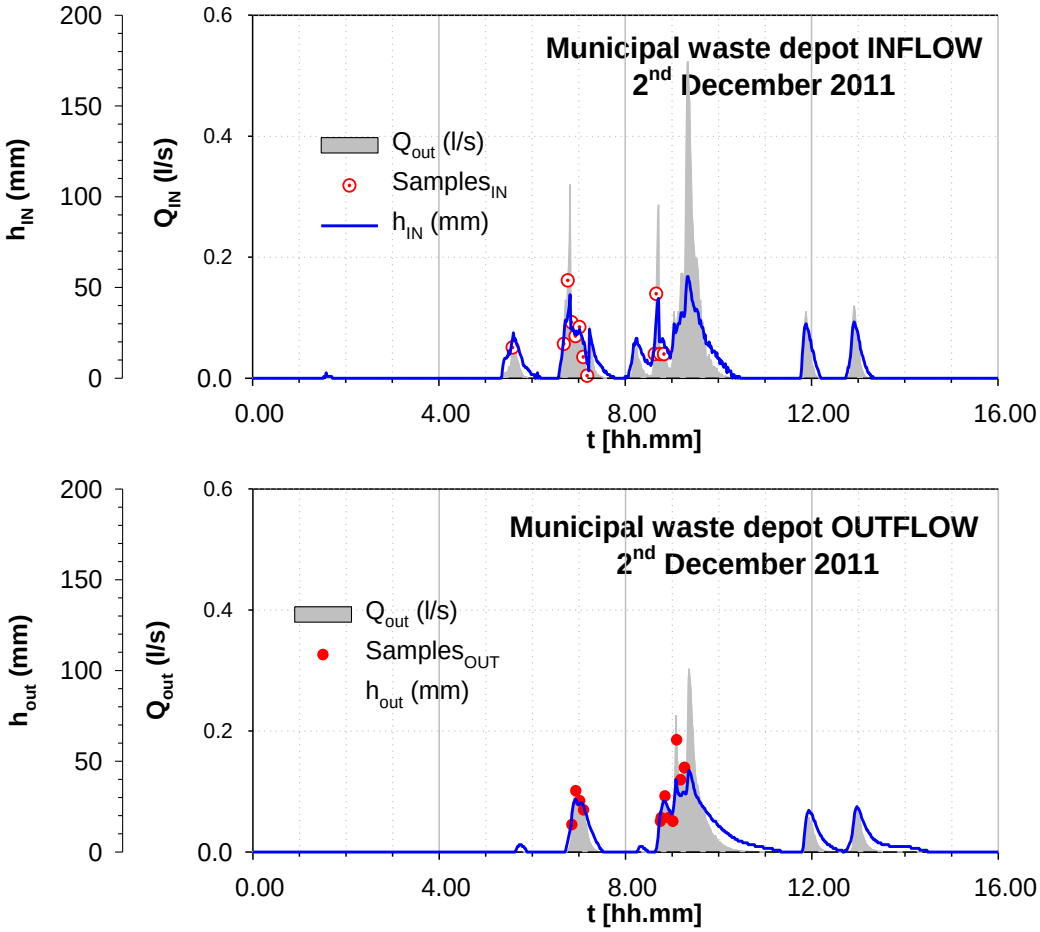

Figure 7 Hydrograph (Q_{out}) and sampling time for the 2nd December 2011 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

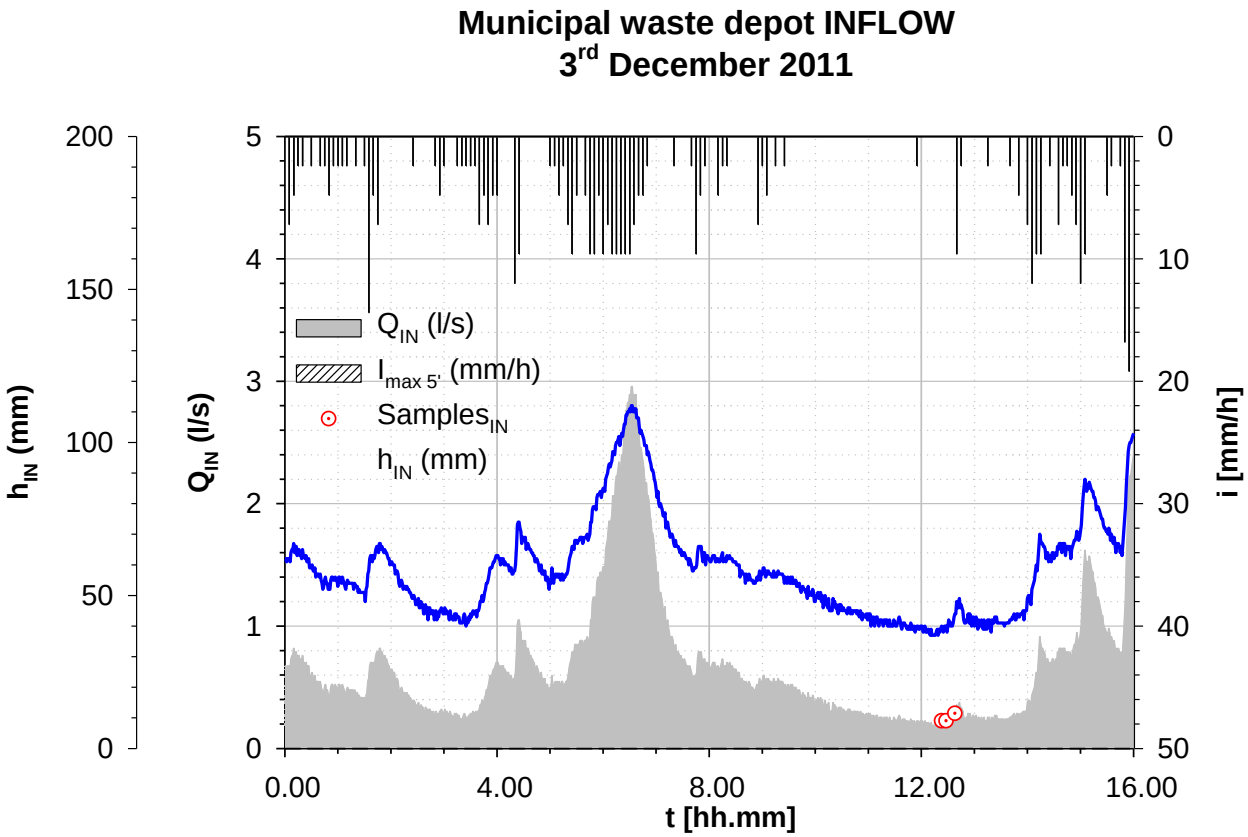

Figure 8 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{out}) and sampling time for the 3rd December 2011 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

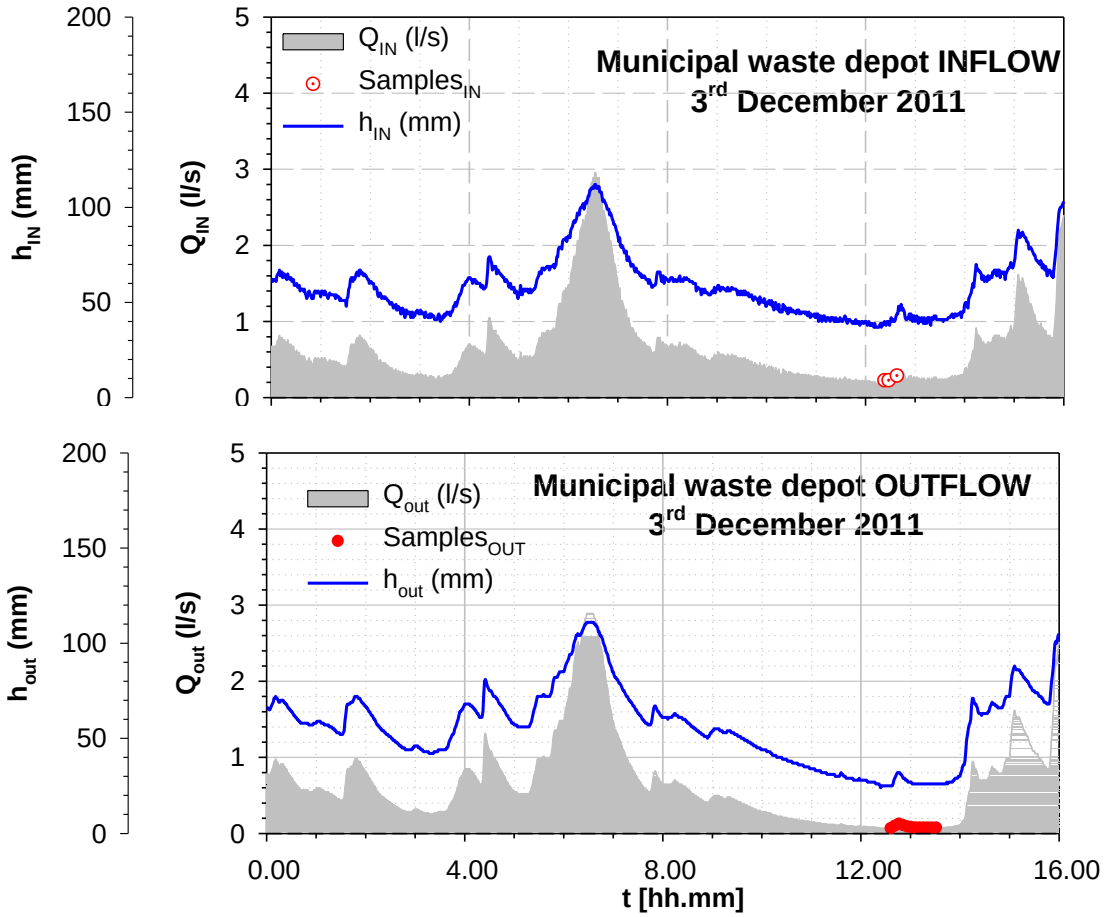

Figure 9 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 3rd December 2011 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

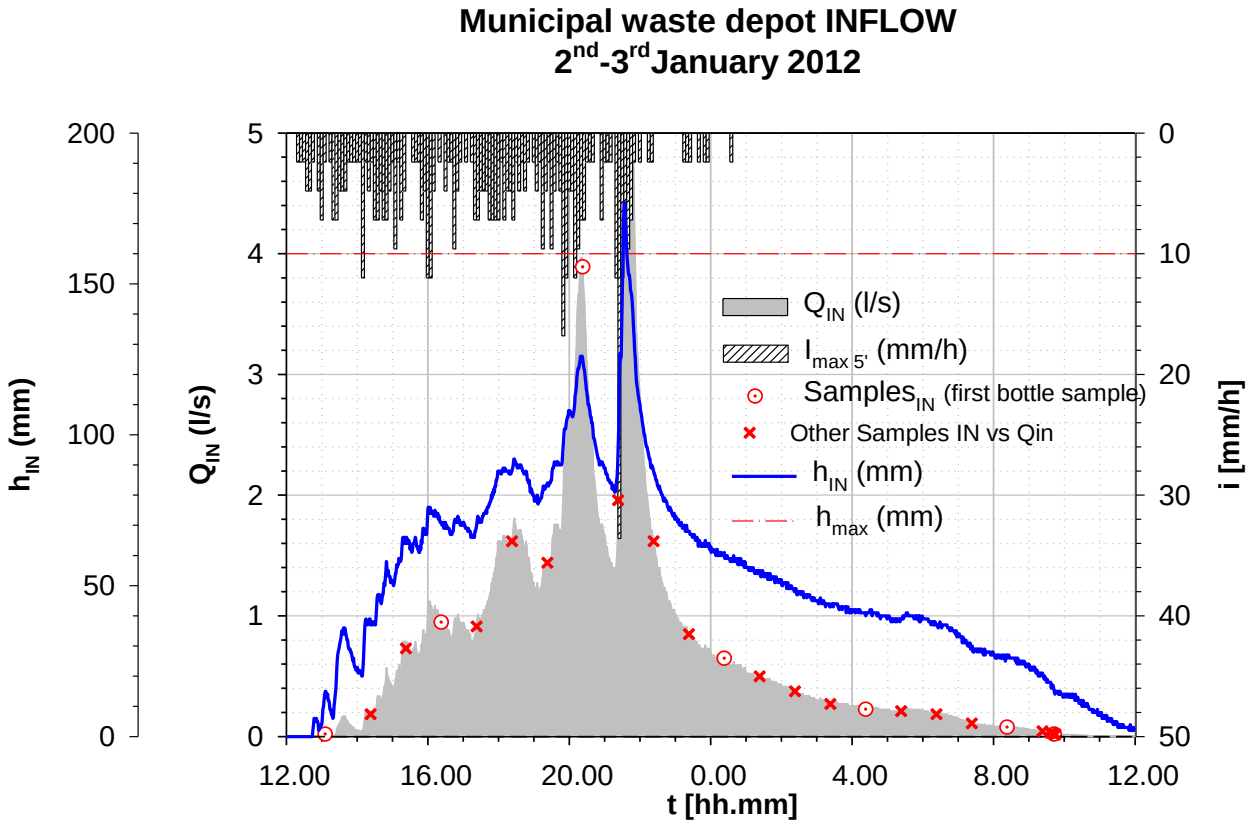

Figure 10 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 2-3 January 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

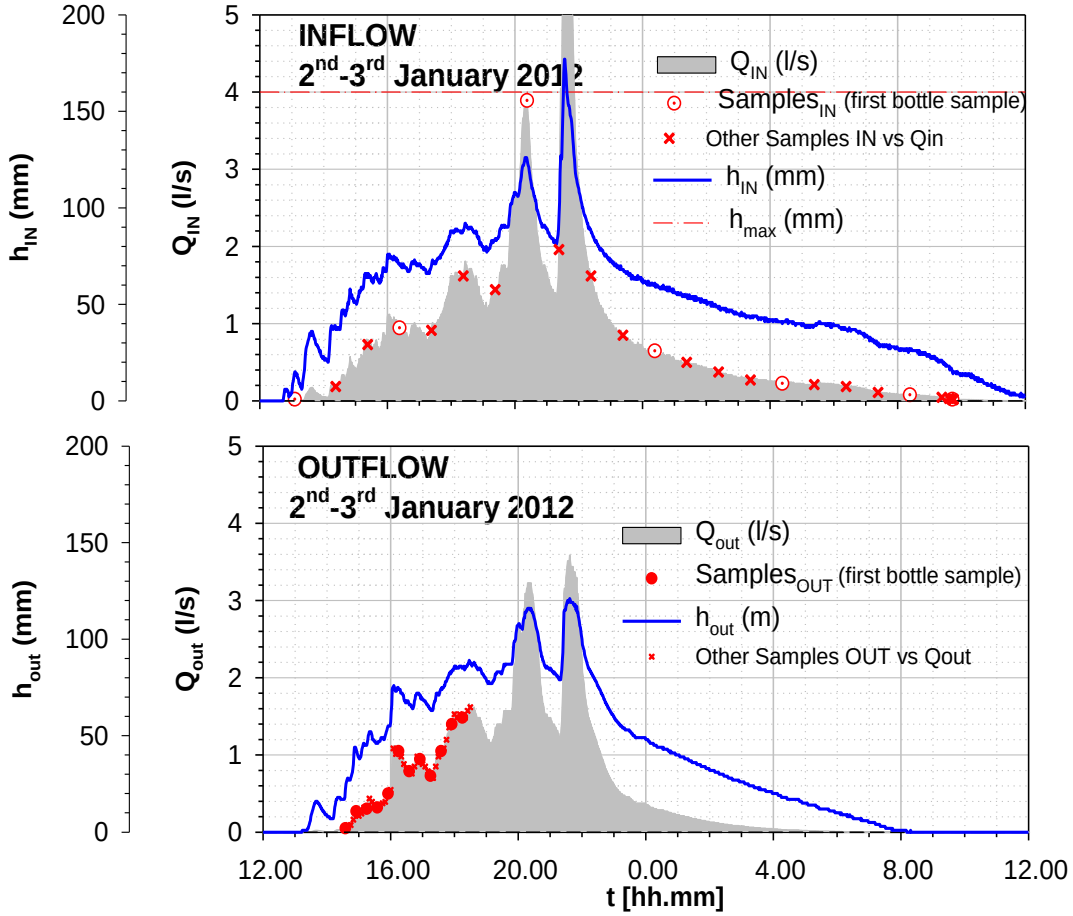

Figure 11 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 2-3 January 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

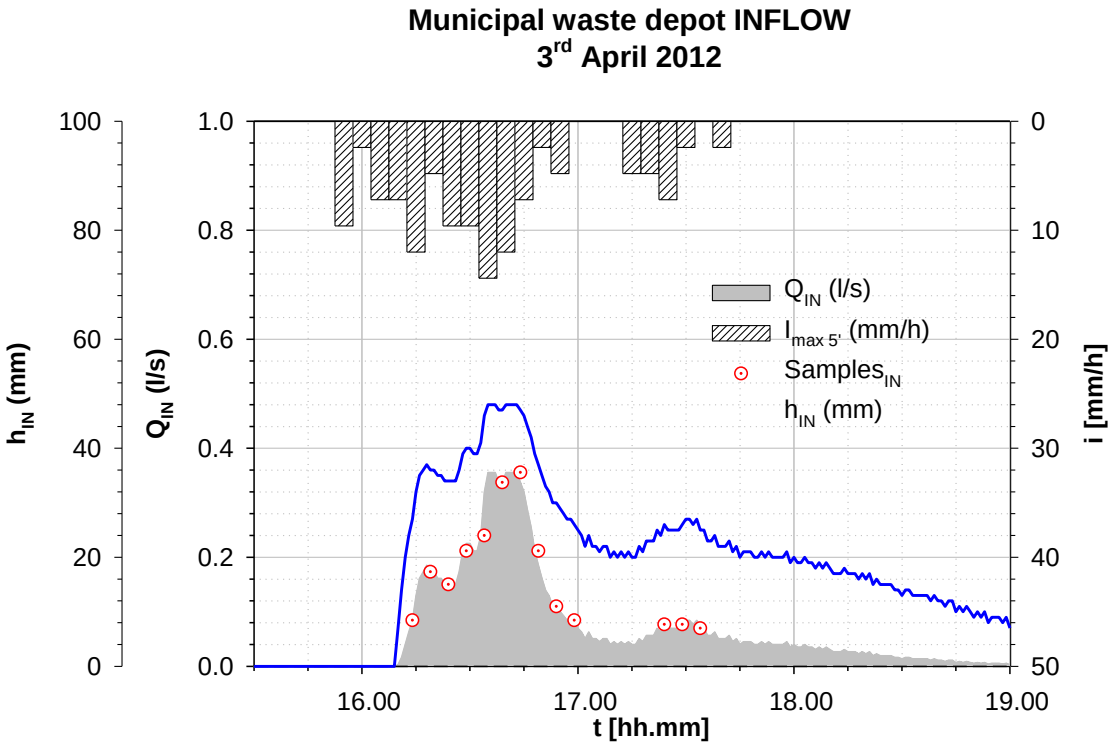

Figure 12 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 3rd April 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

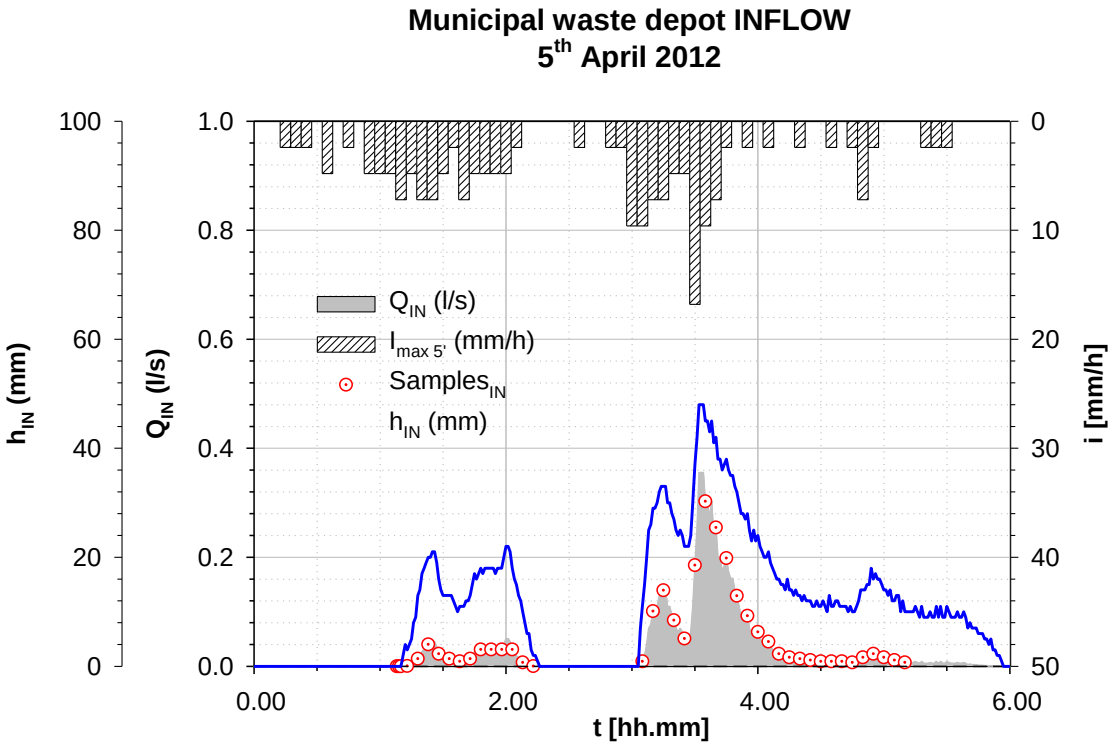

Figure 13 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 5th April 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

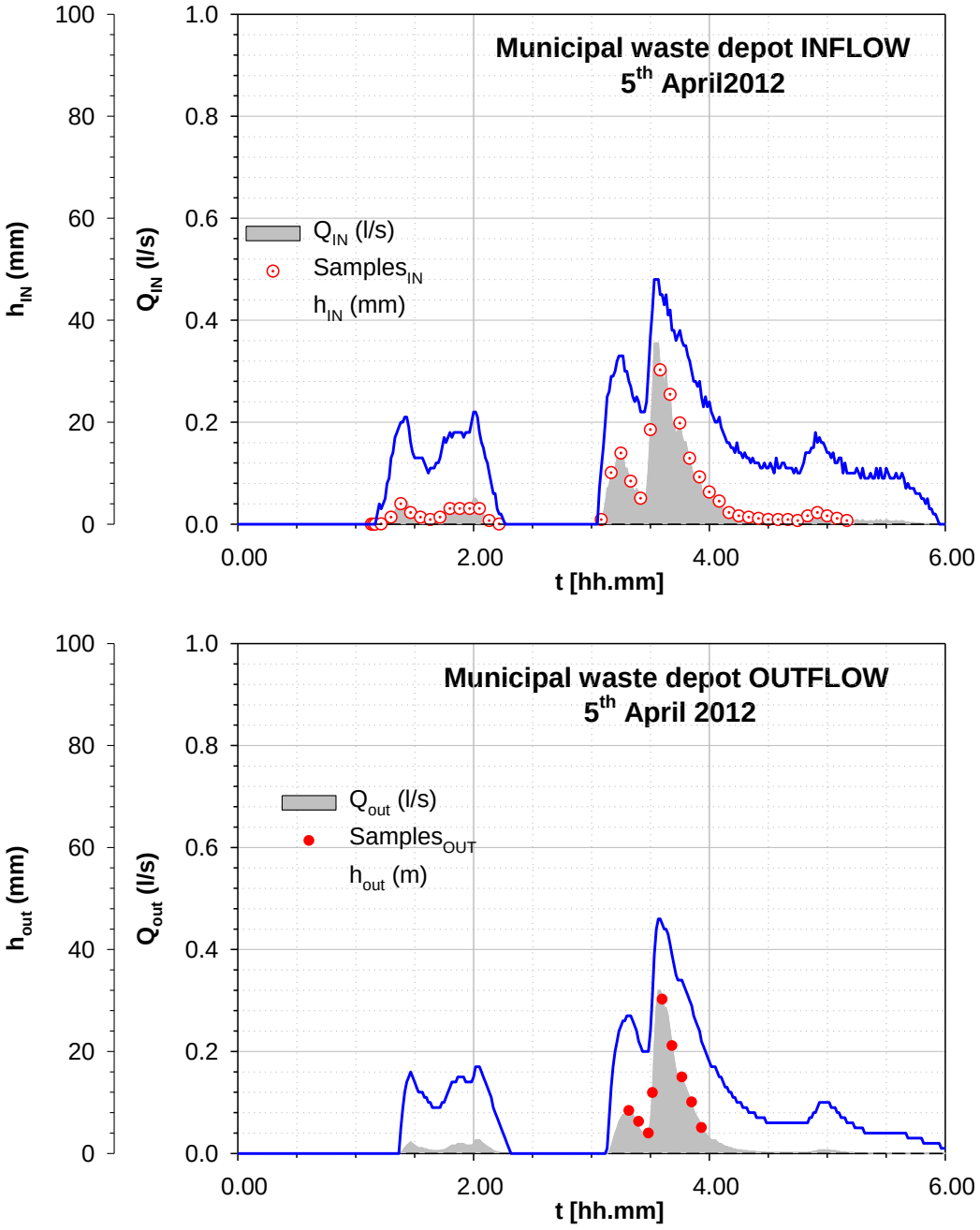

Figure 14 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 5th April 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

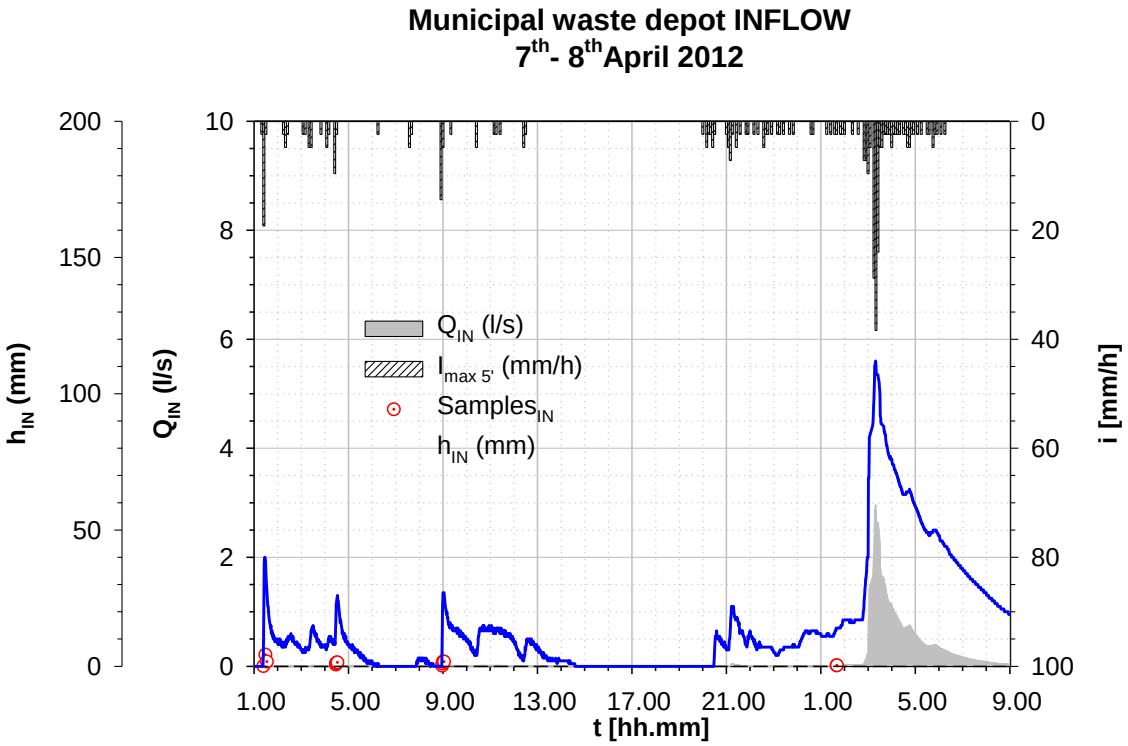

Figure 15 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 7-8 April 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

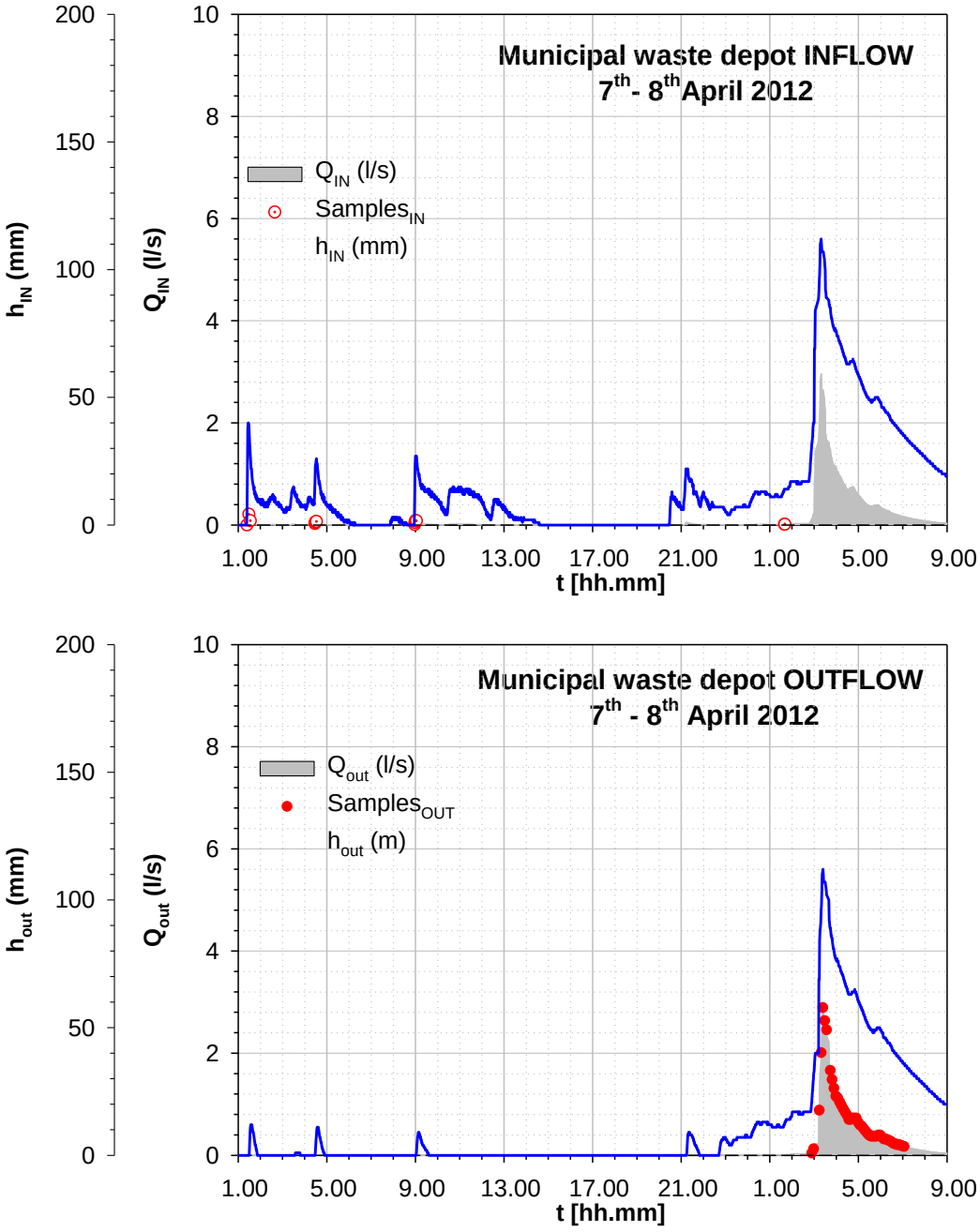

Figure 16 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 7-8 April 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

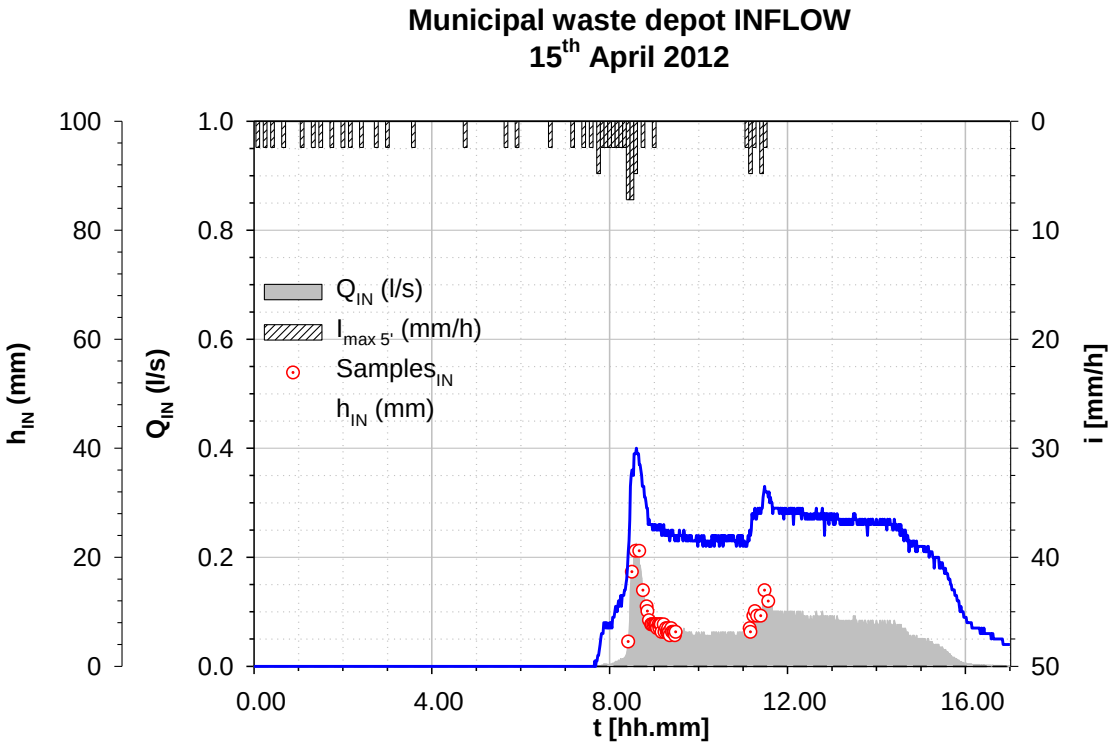

Figure 17 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 15th April 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

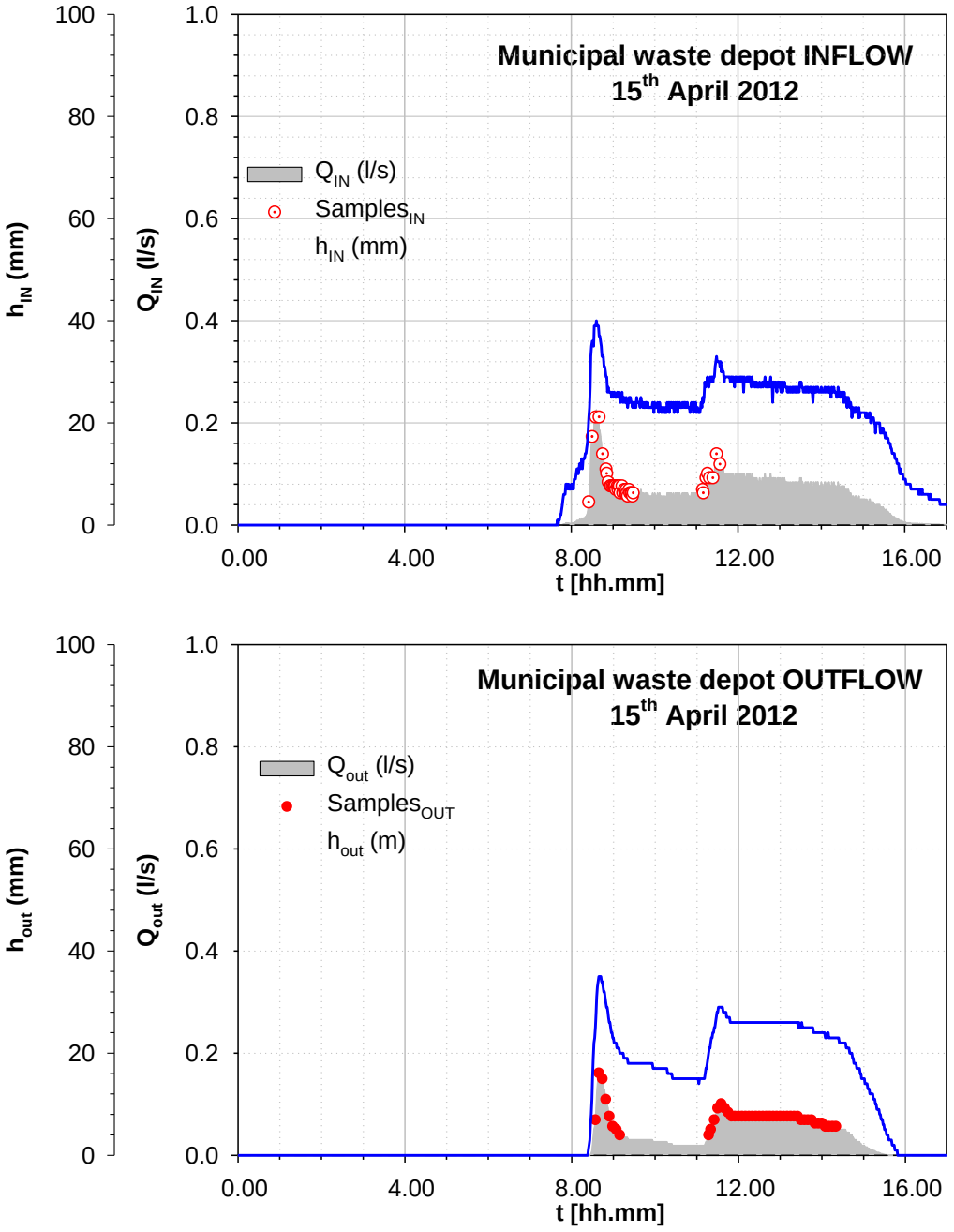

Figure 18 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 15th April 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

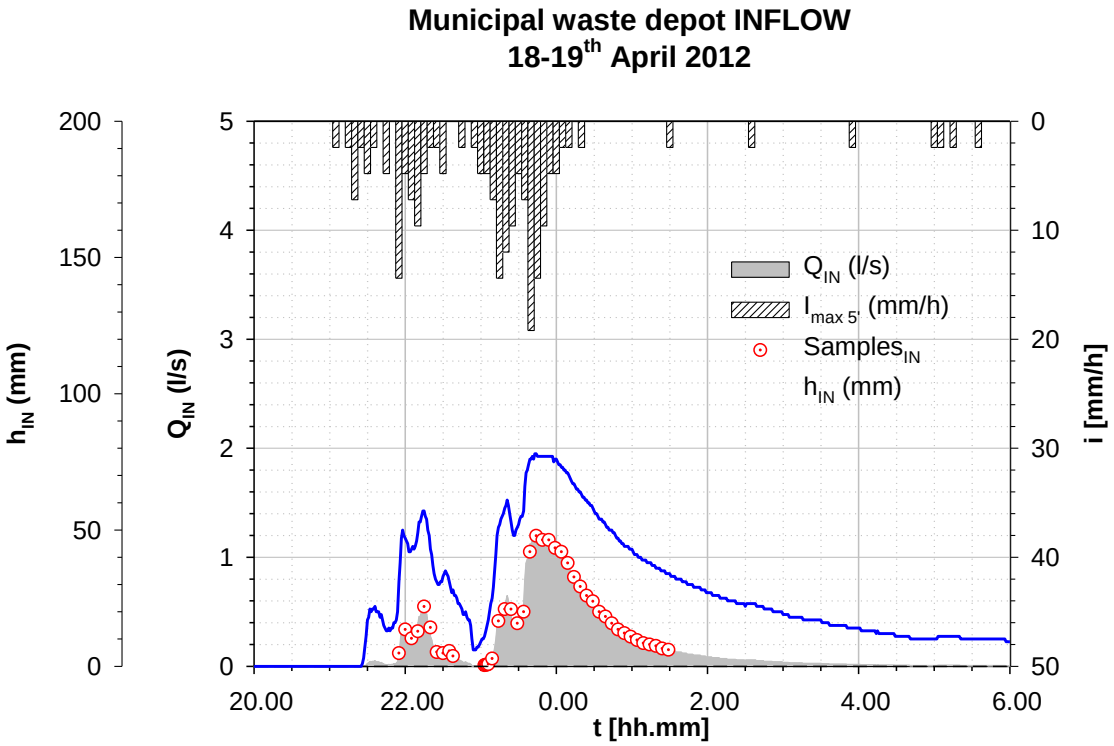

Figure 19 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 18-19 April 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

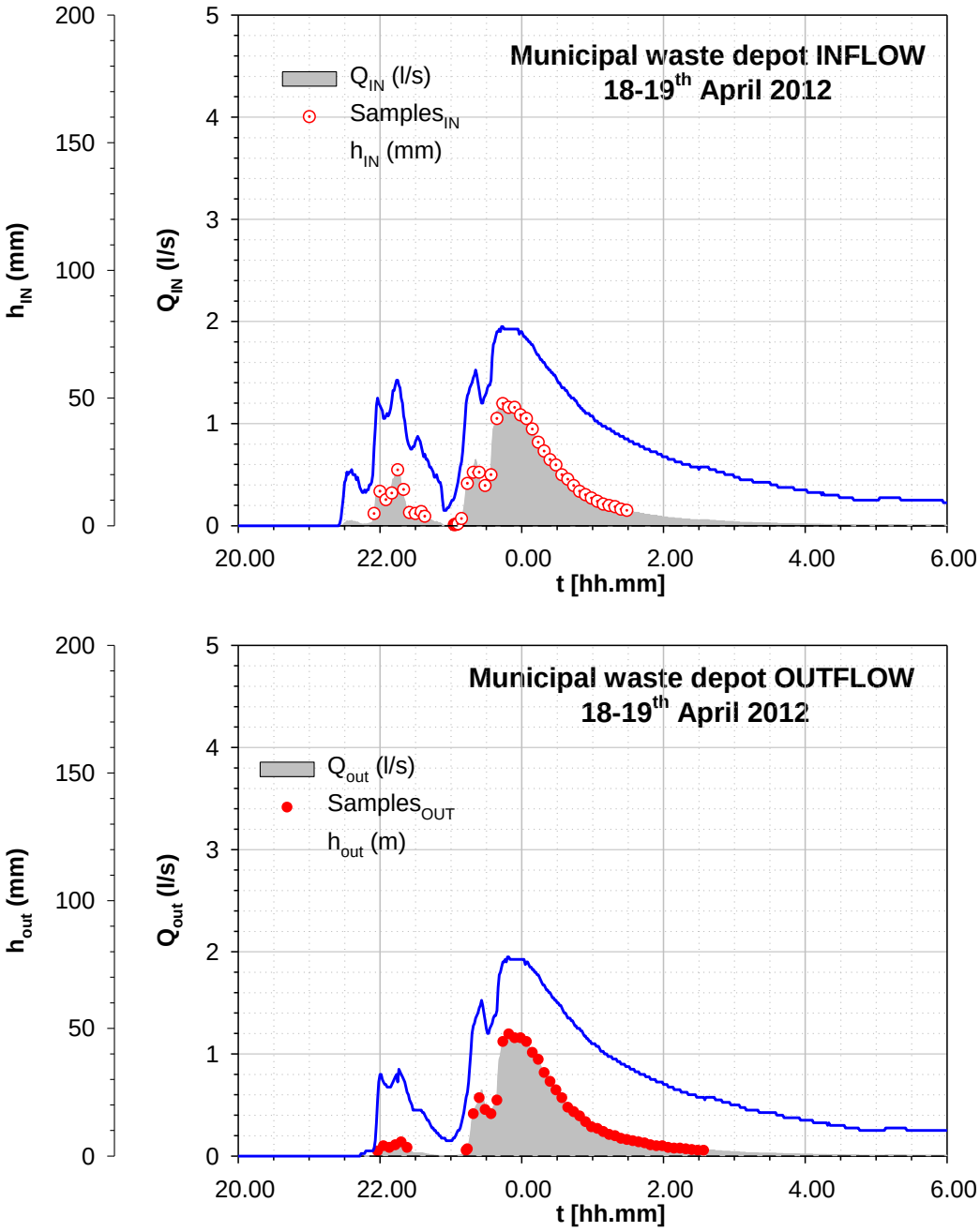

Figure 20 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 18-19 April 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

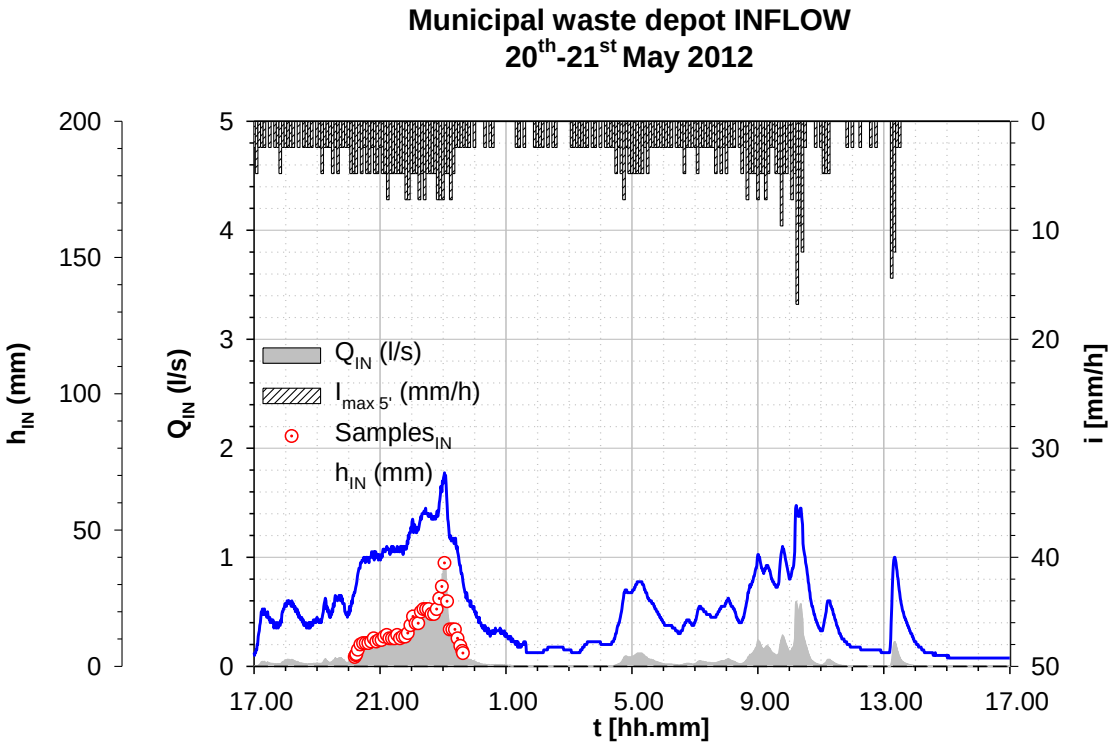

Figure 21 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 20th-21th May 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

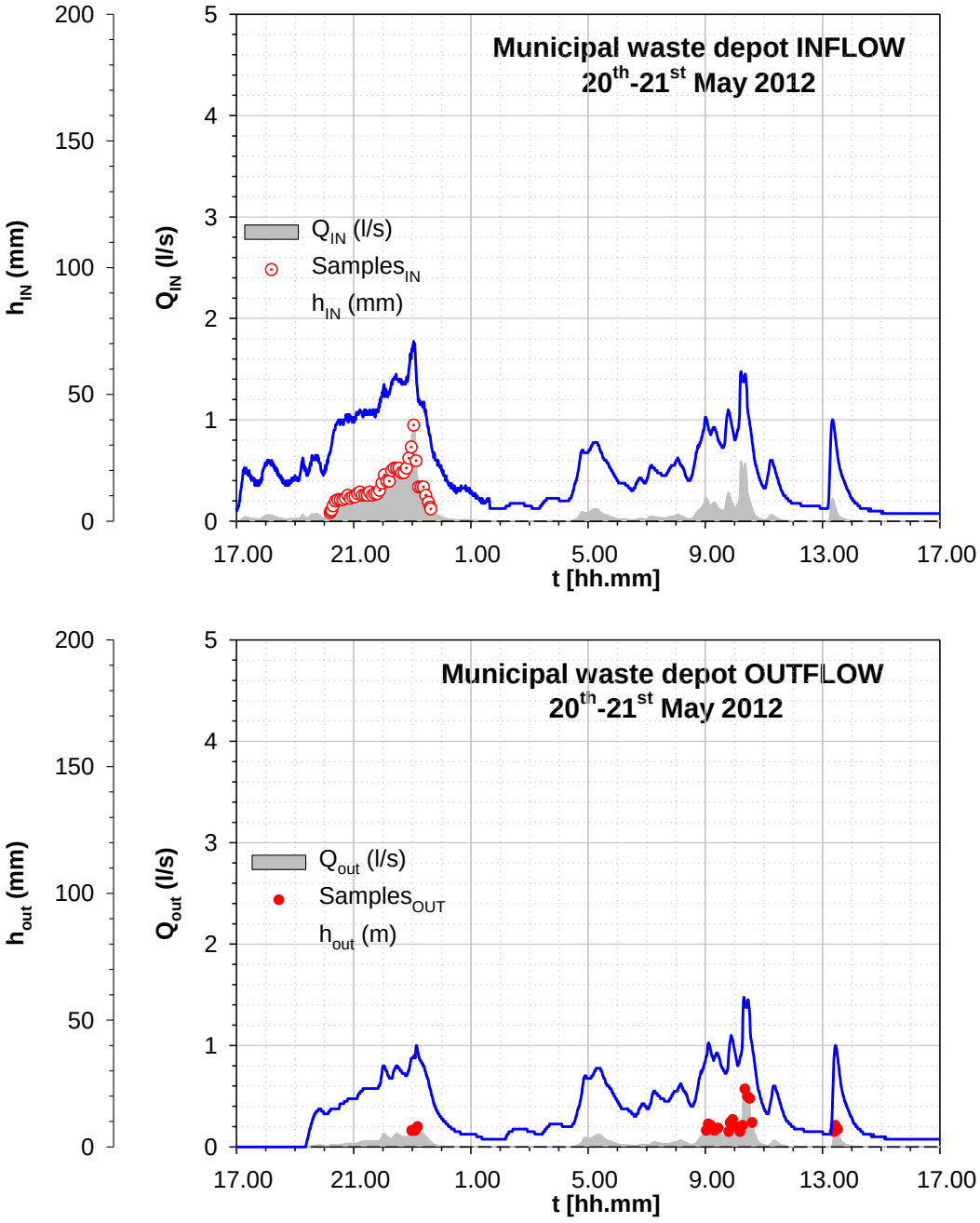

Figure 22 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 20th-21th May 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

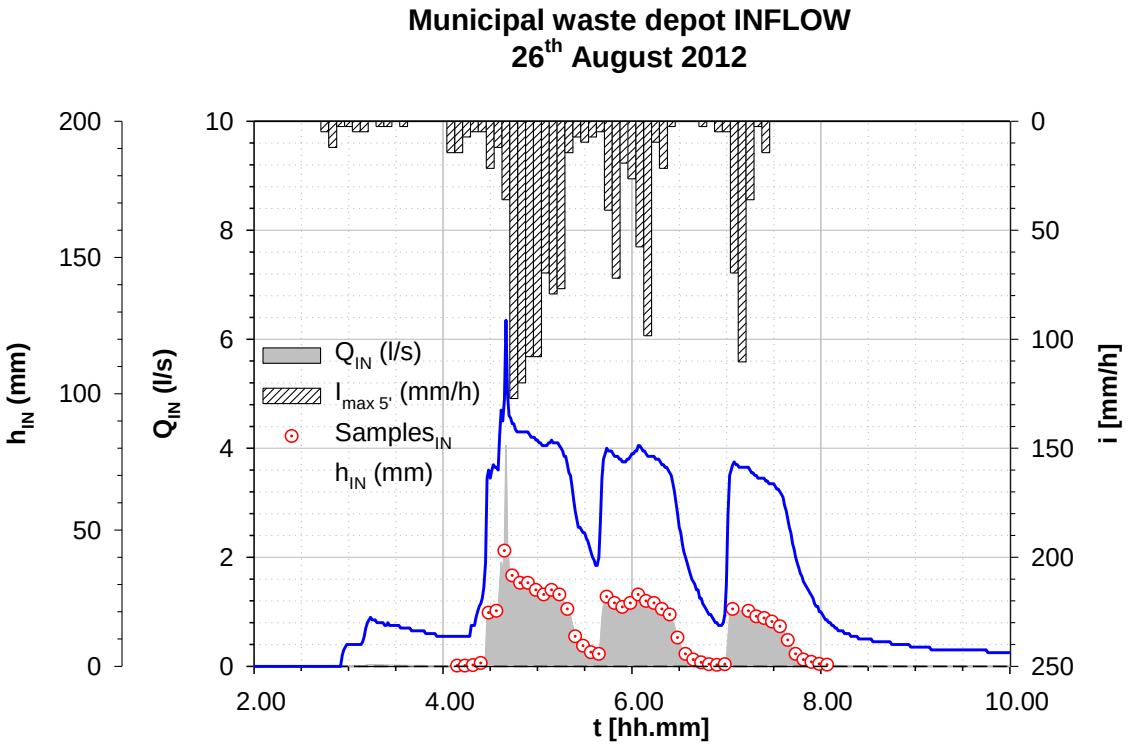

Figure 23 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 26th August 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

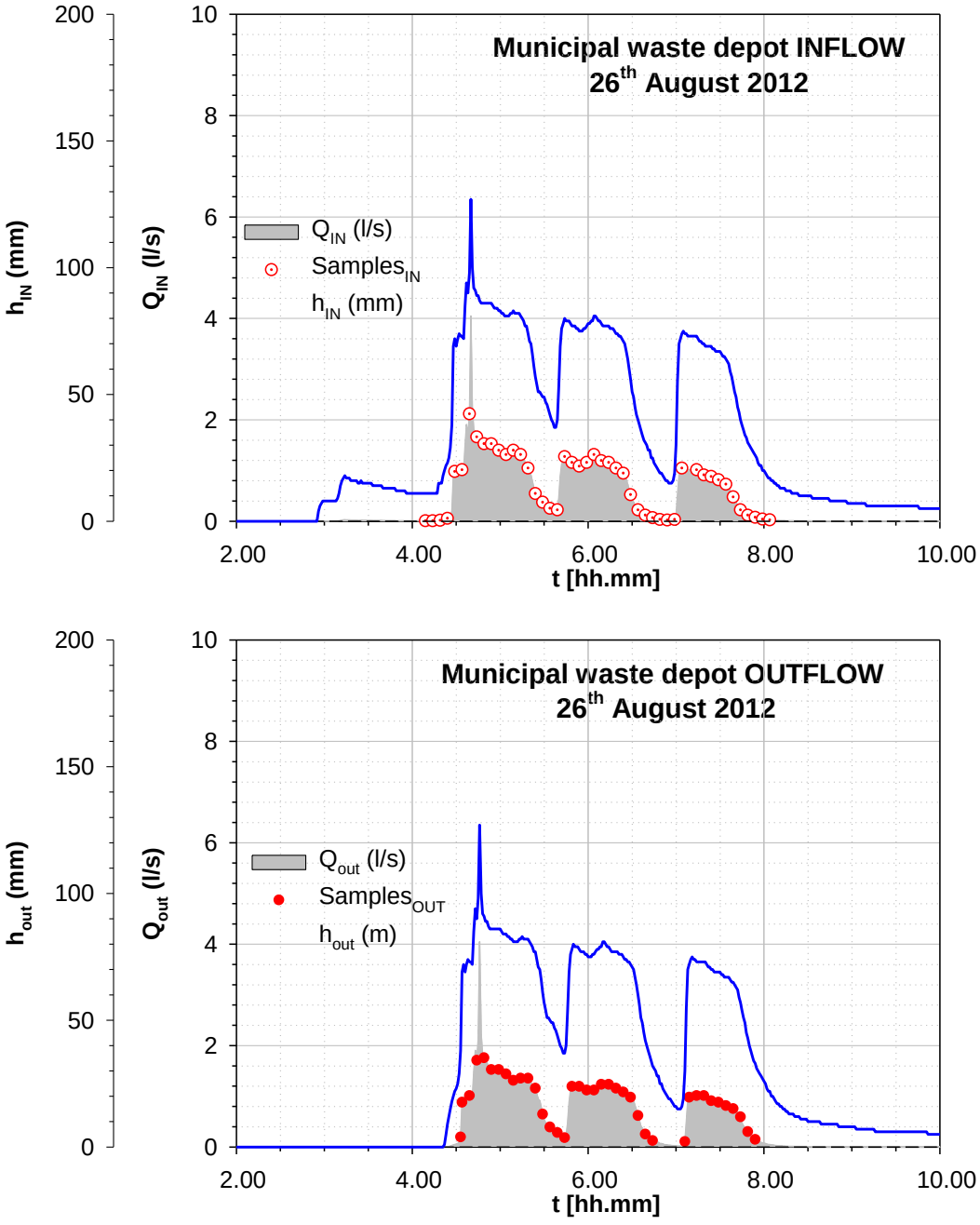

Figure 24 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 26th August 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

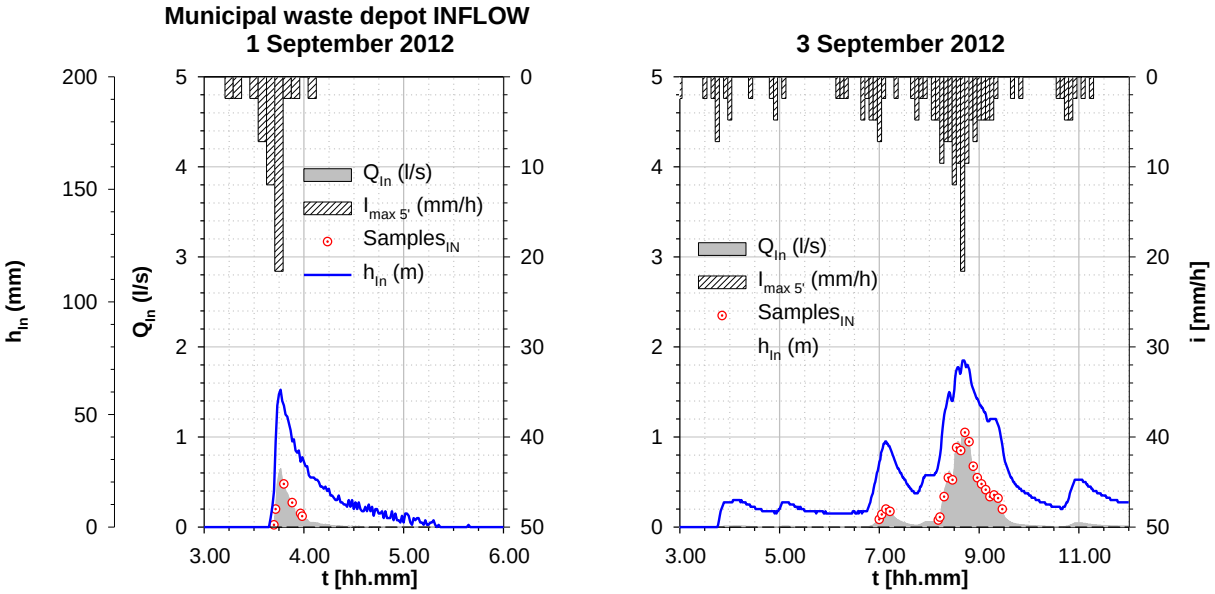

Figure 25 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 1-3 September 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

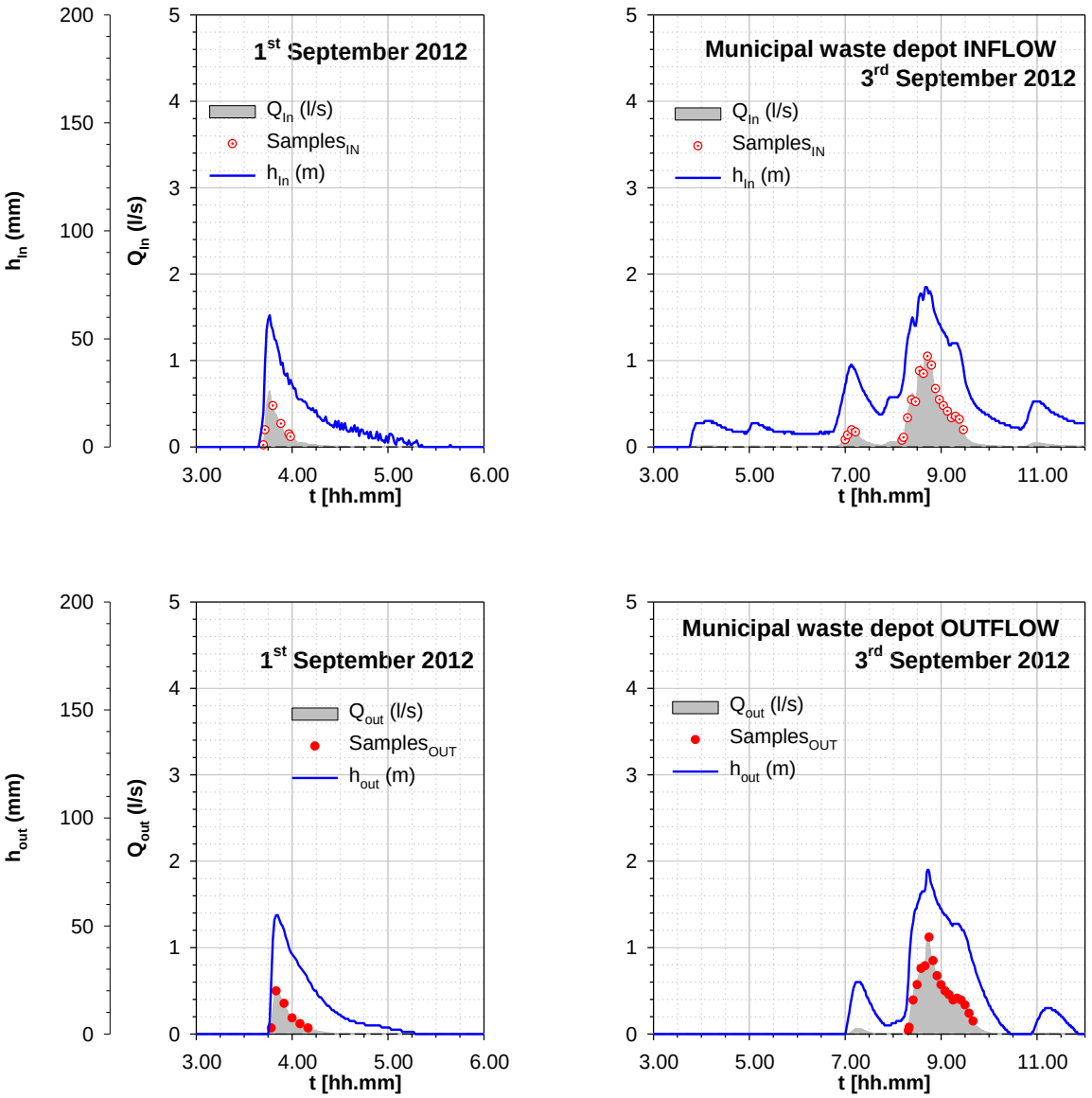

Figure 26 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 1-3 September 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

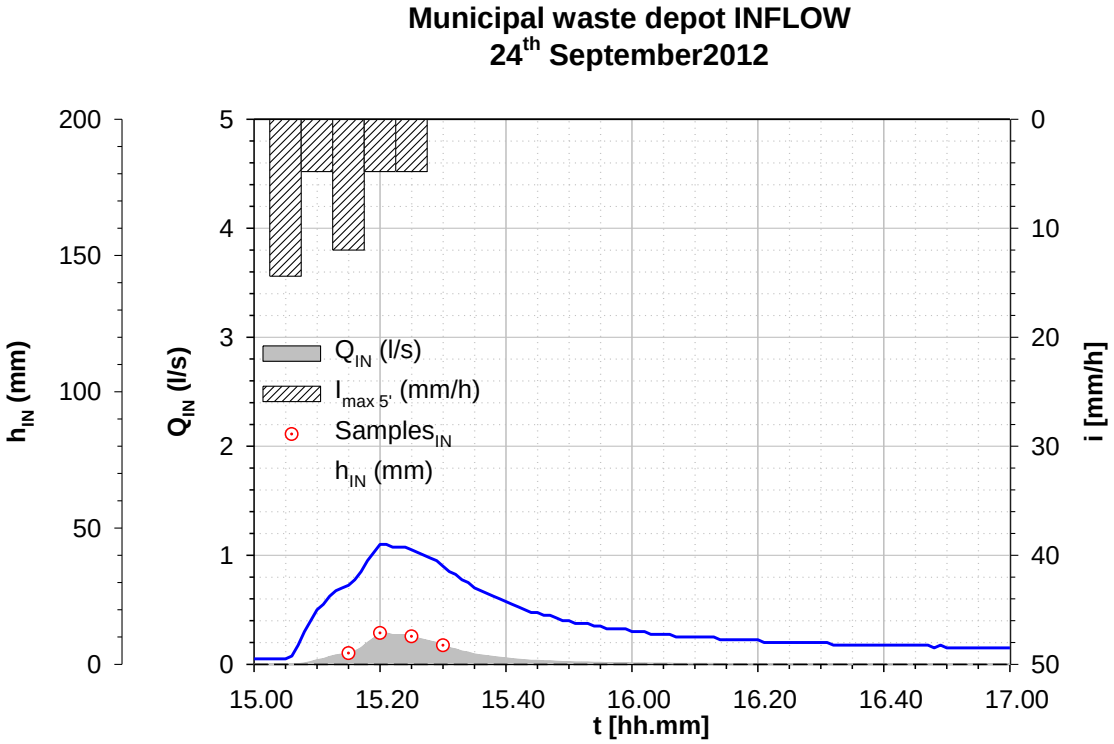

Figure 27 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 24 September 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

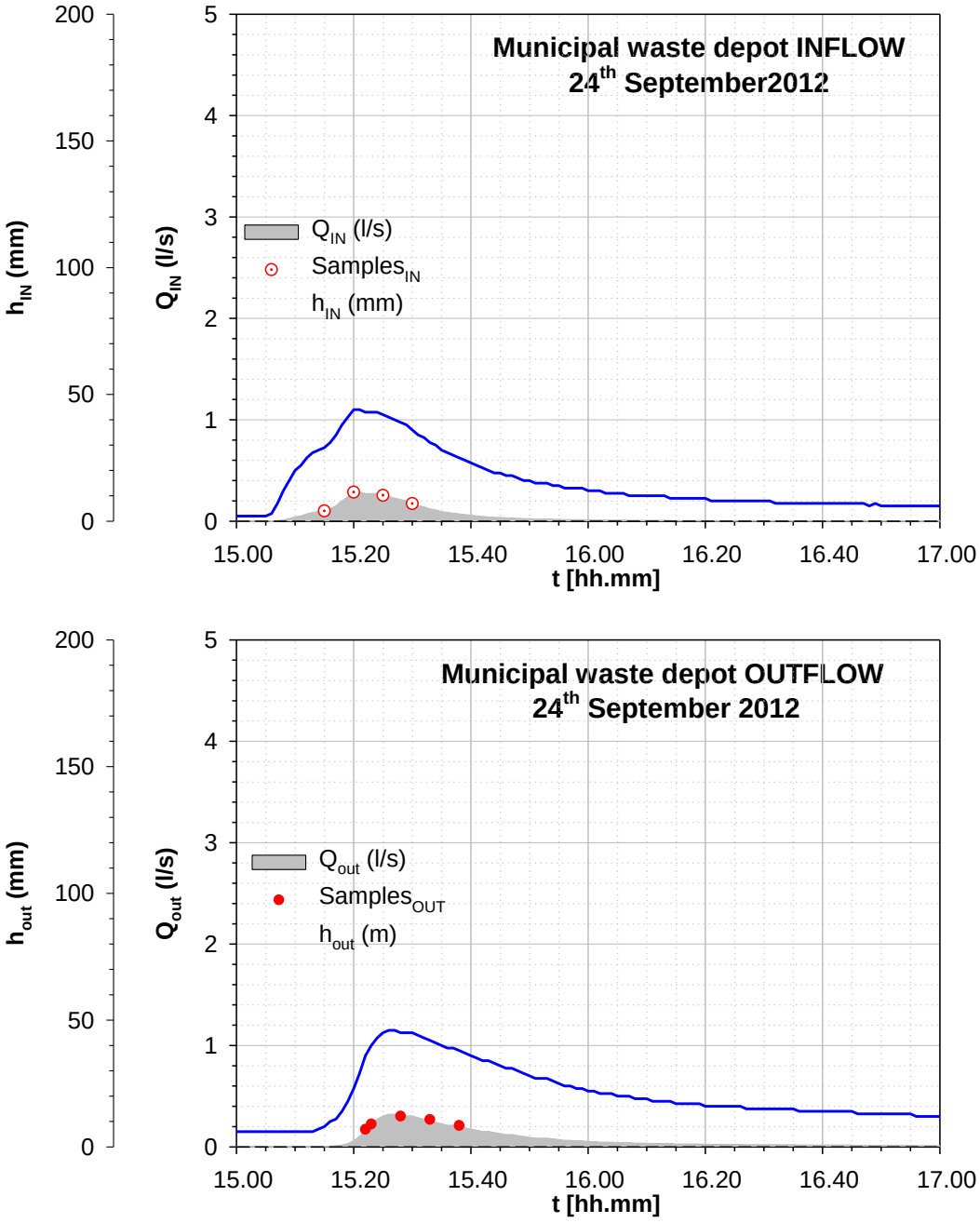

Figure 28 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 24 September 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

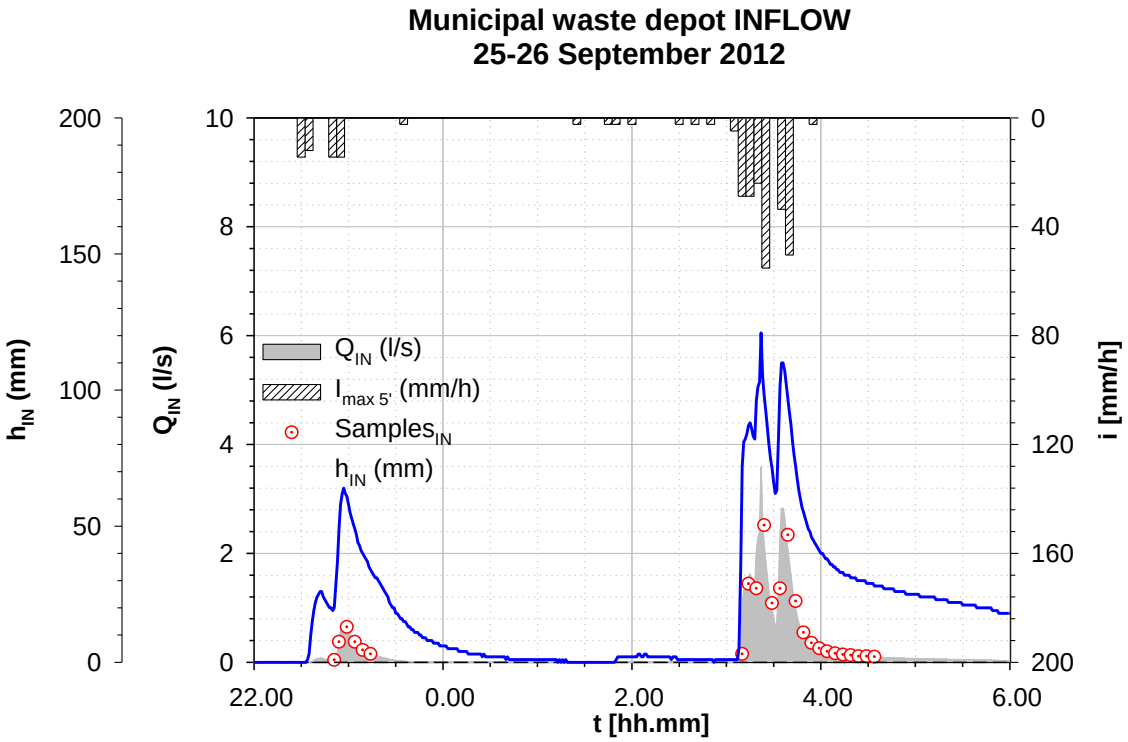

Figure 29 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 25-26 September 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

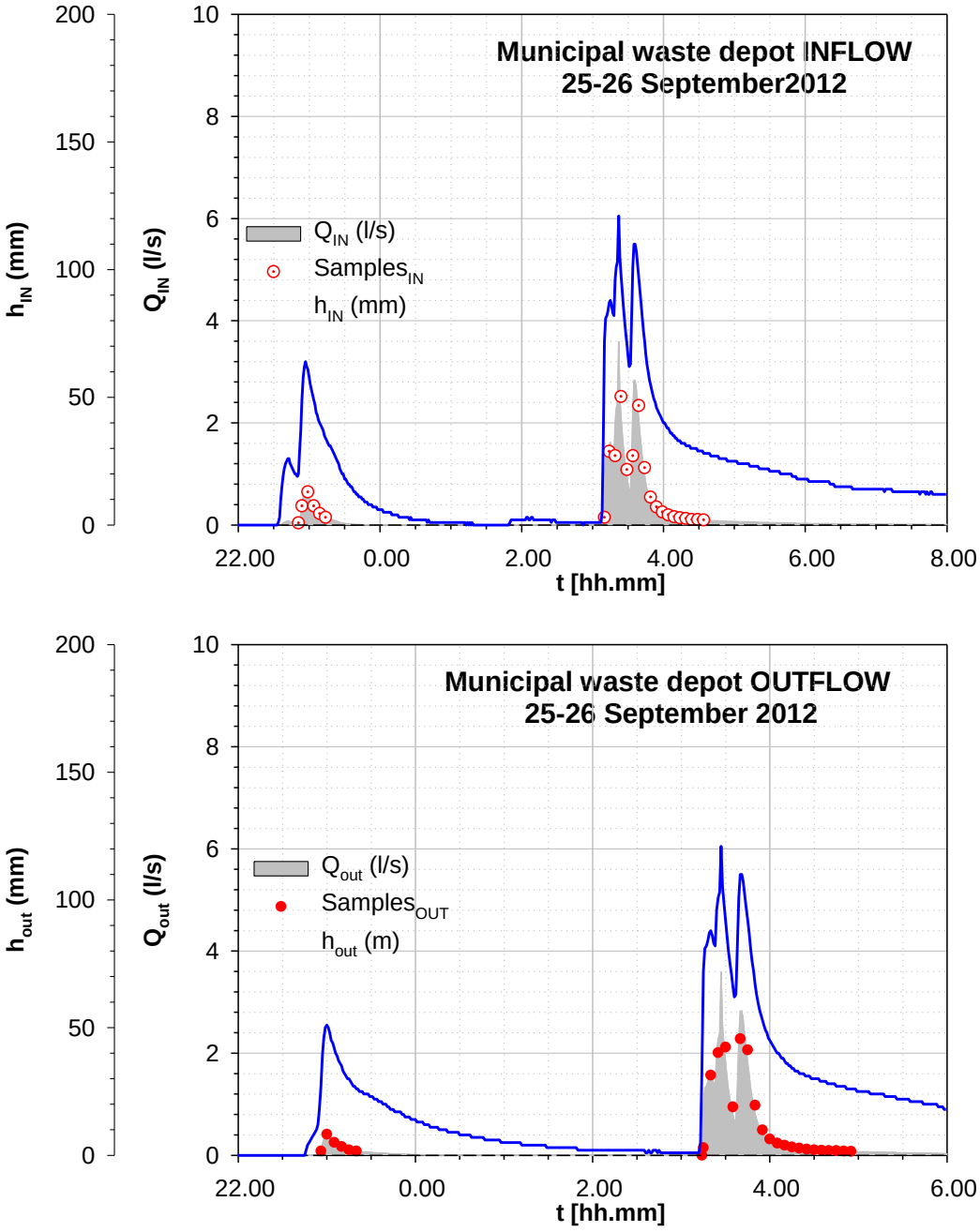

Figure 30 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 25-26 September 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

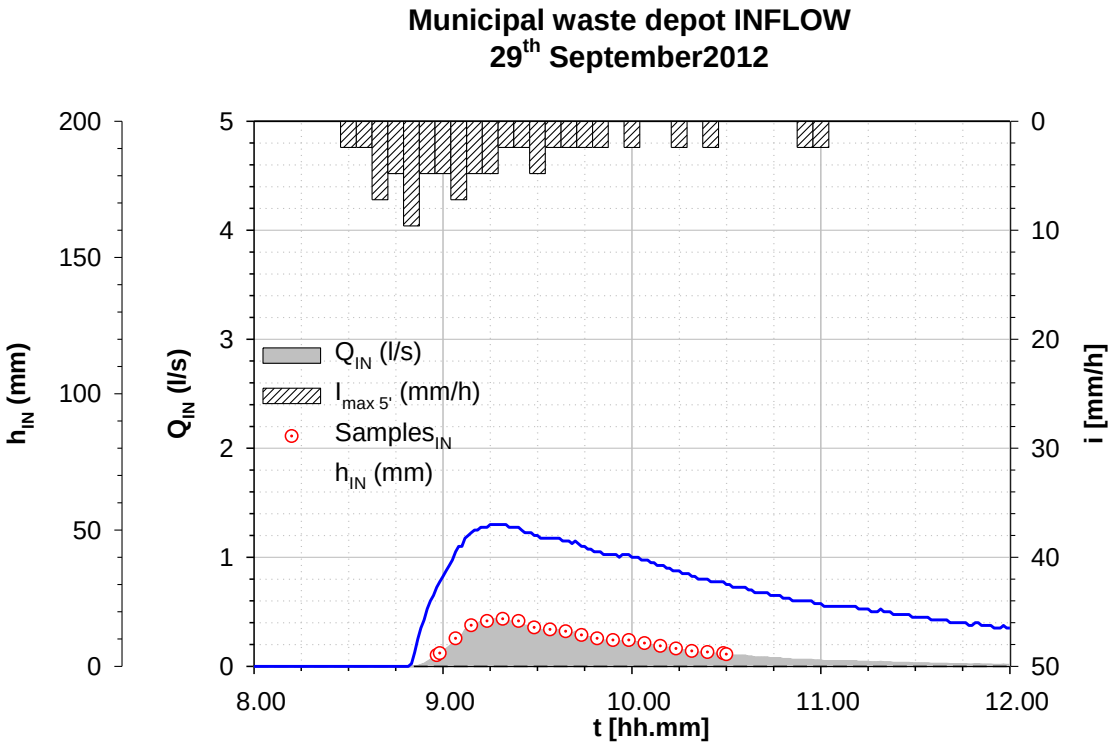

Figure 31 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 29 September 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

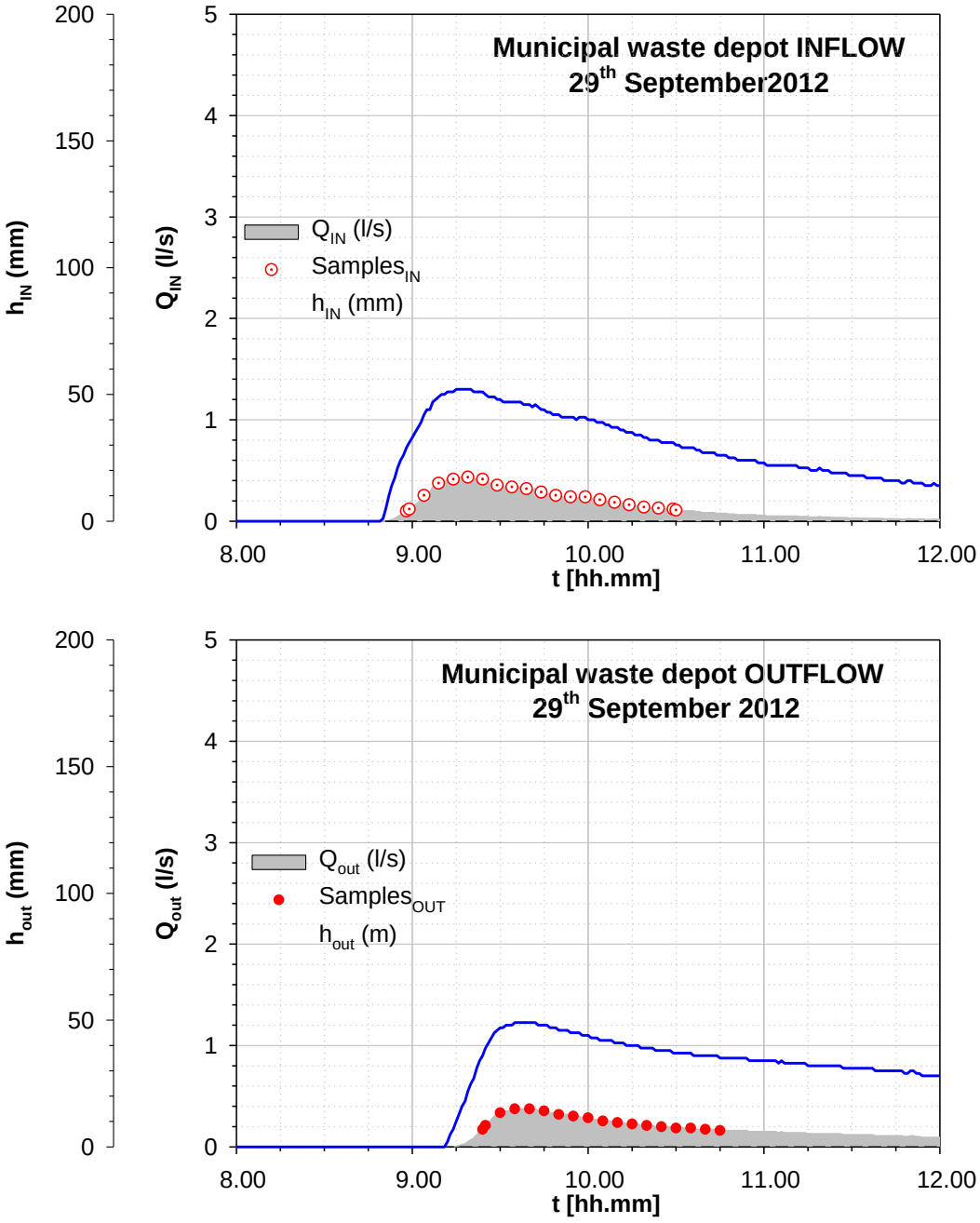

Figure 32 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 29 September 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

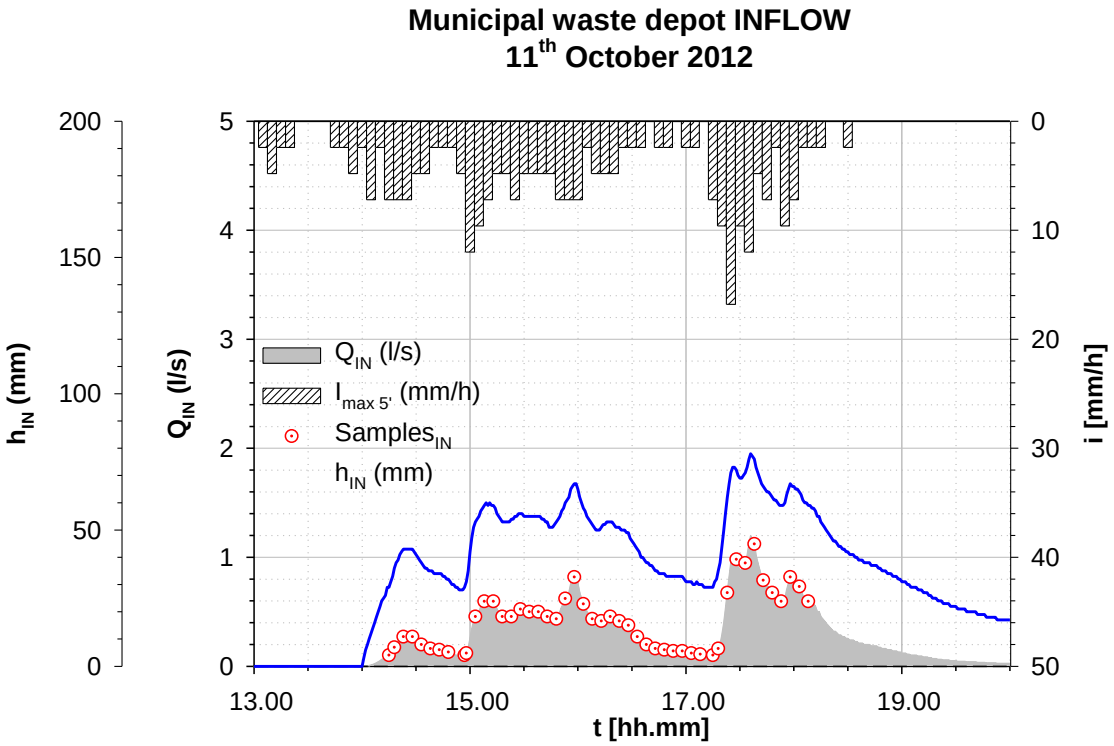

Figure 33 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 11th October 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

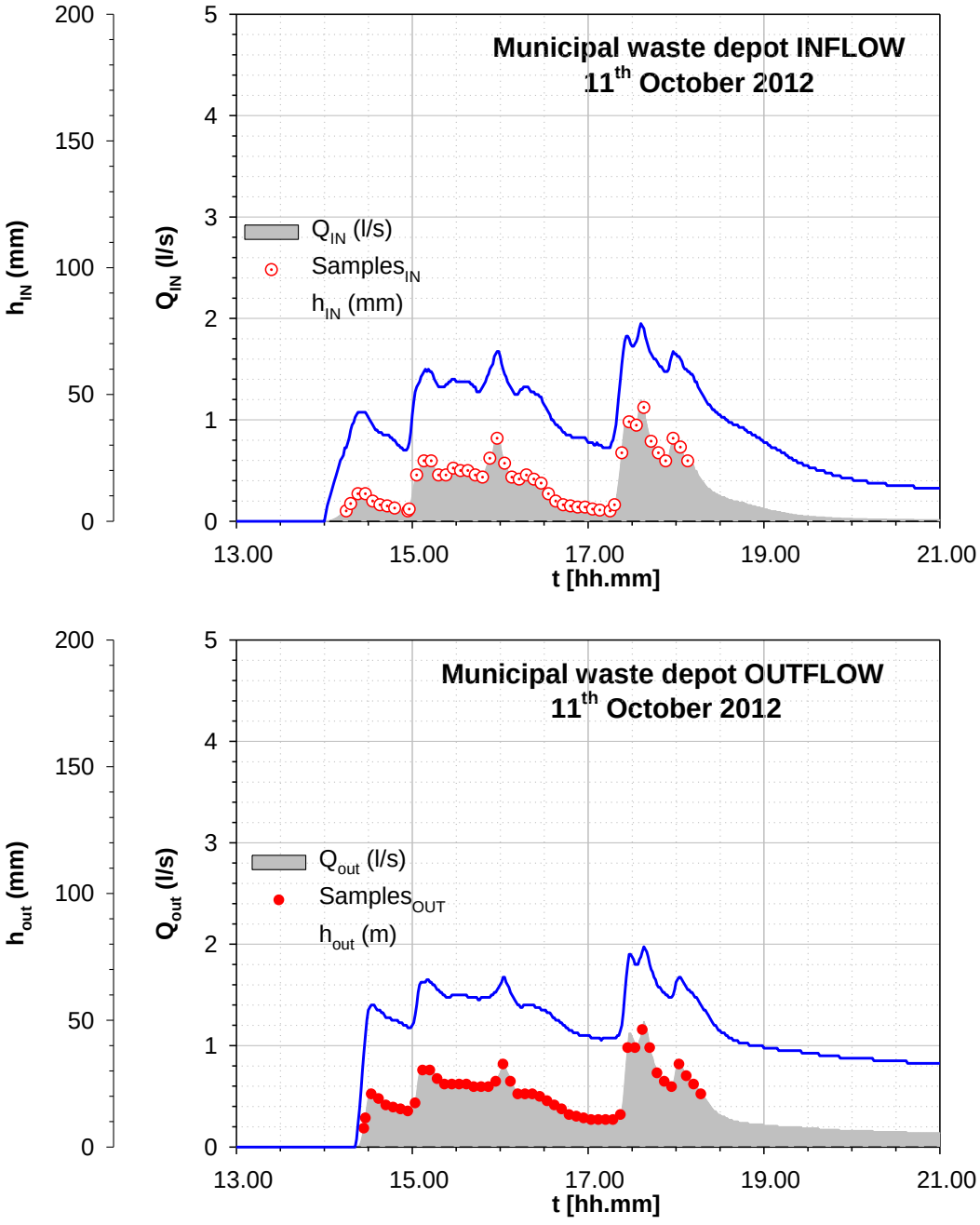

Figure 34 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 11th October 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

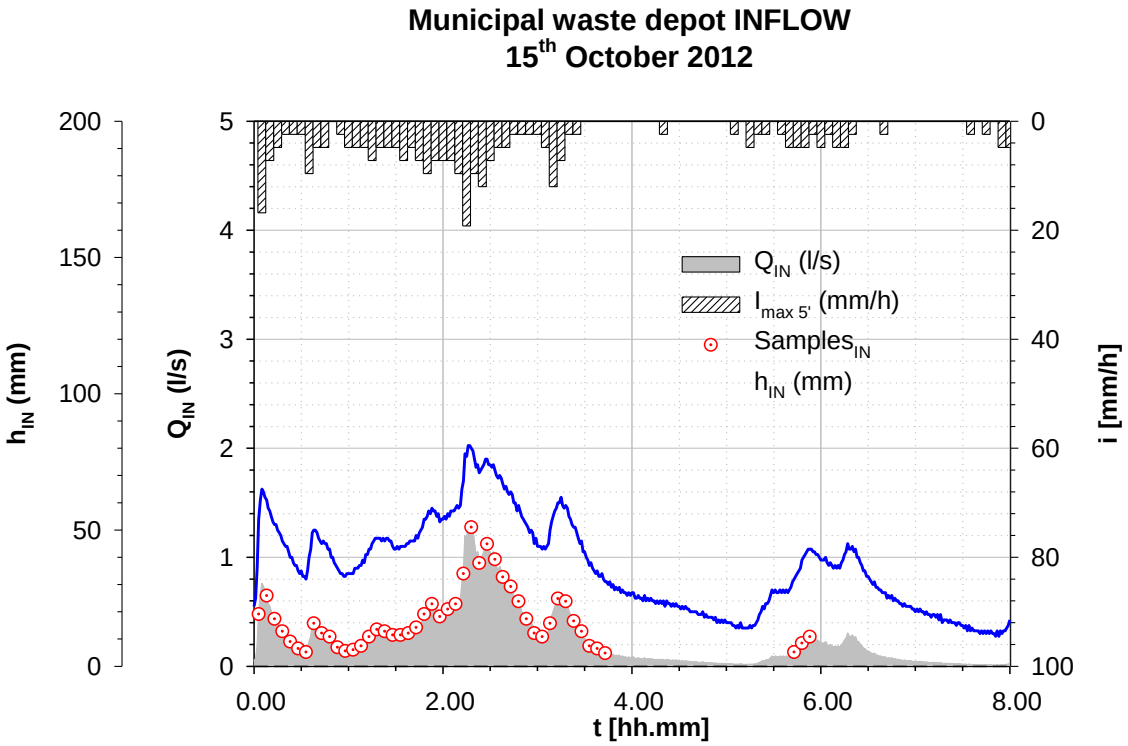

Figure 35 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 15th October 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

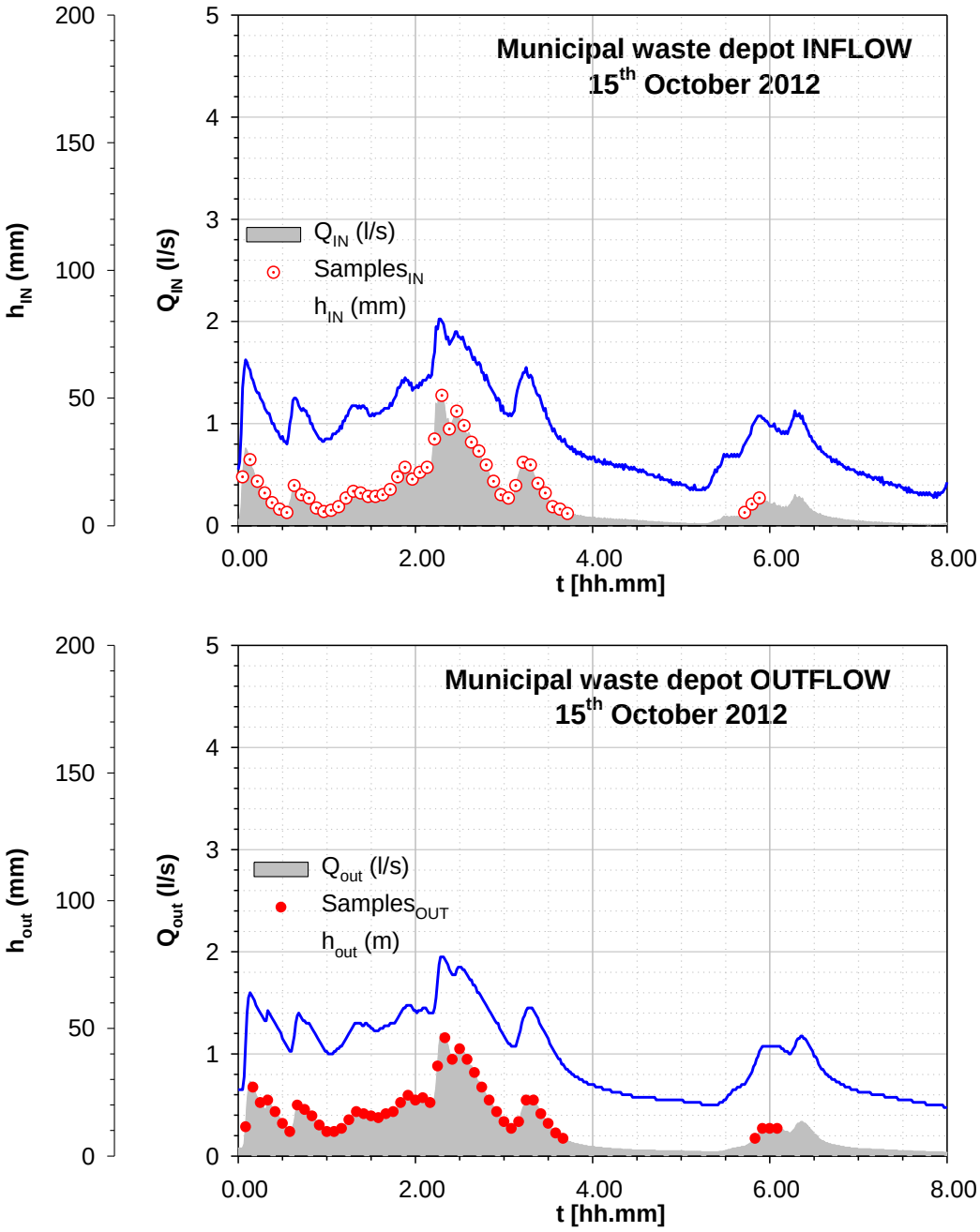

Figure 36 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 15th October 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

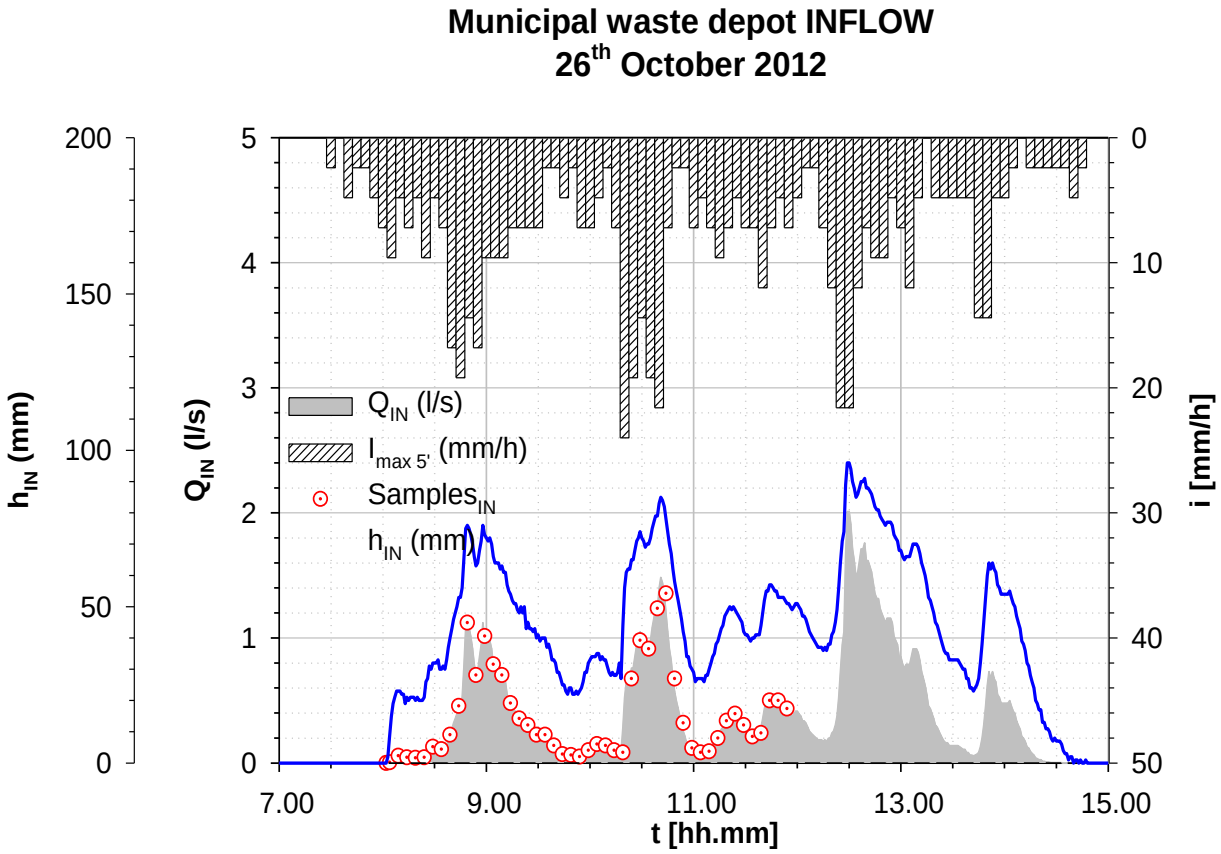

Figure 37 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 26th October 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

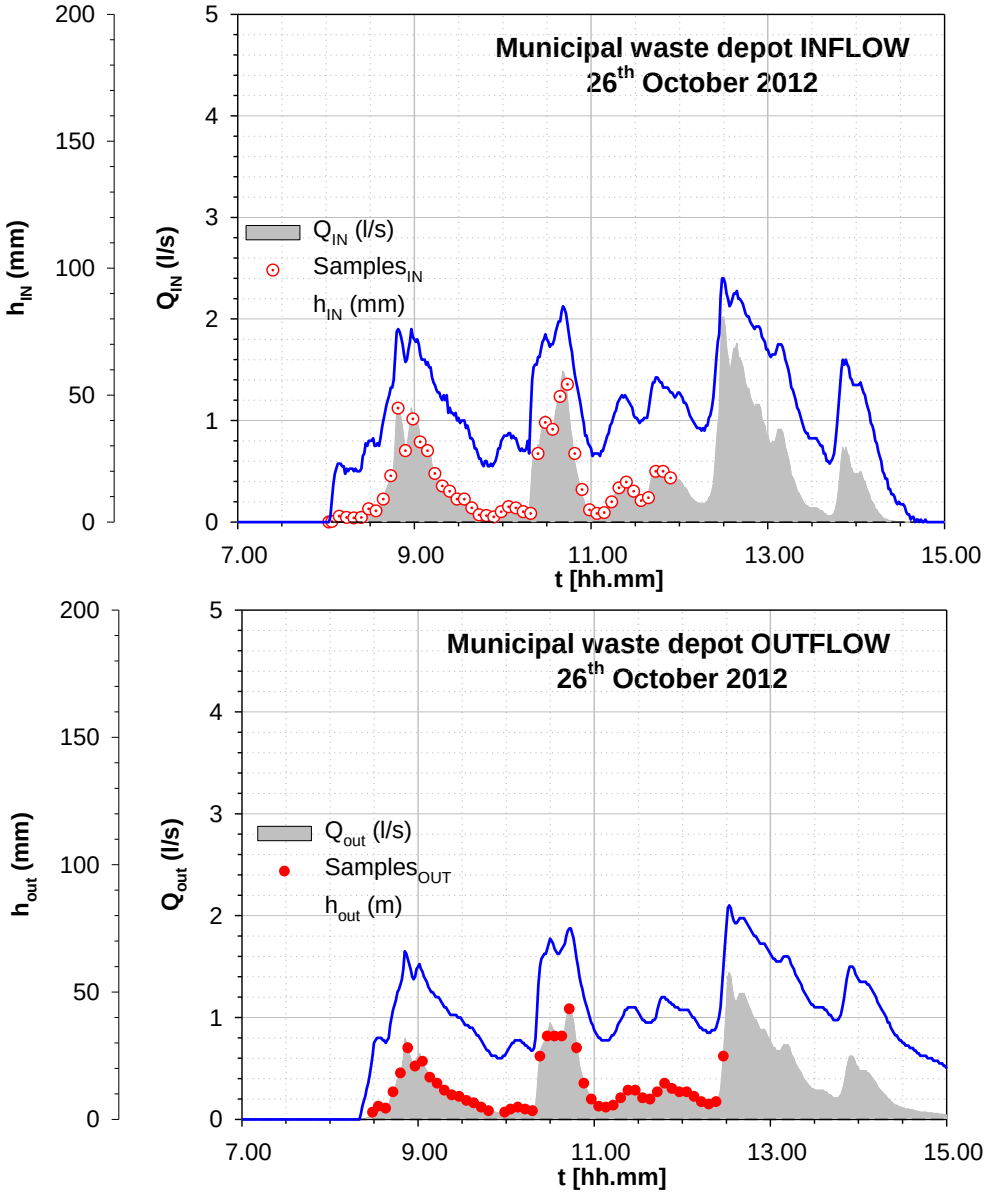

Figure 38 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 26th October 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

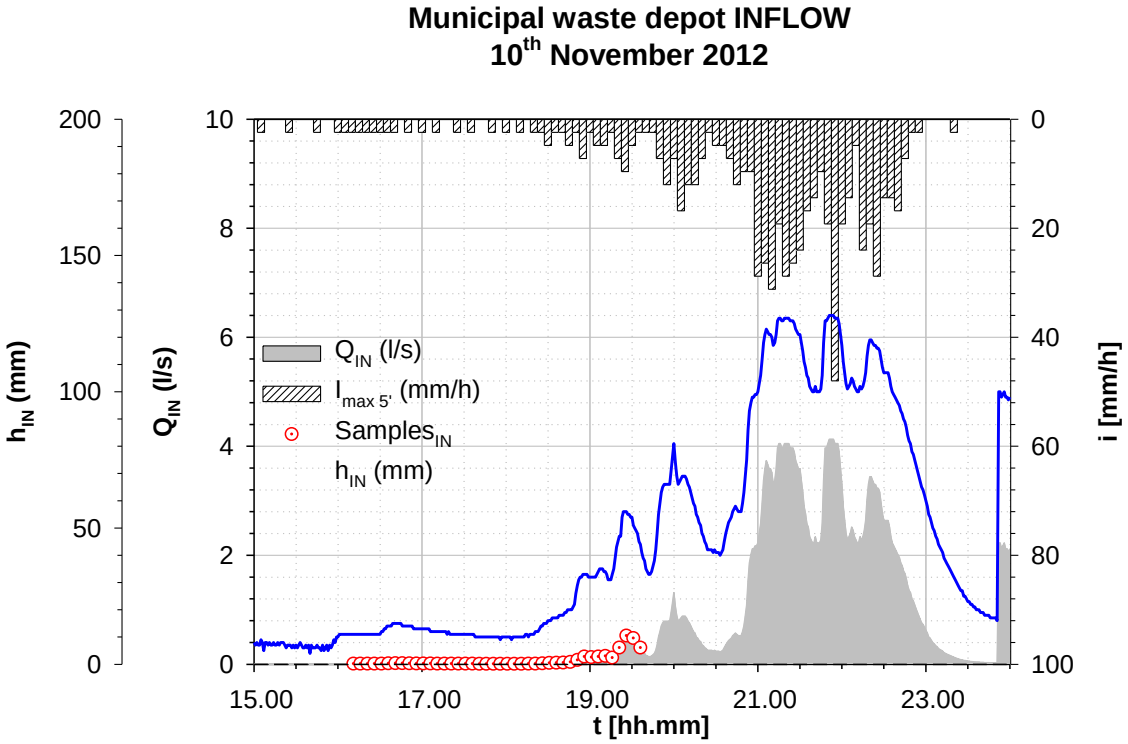

Figure 39 Hyetograph ($I_{max\ 5'}$), hydrograph (Q_{in}) and sampling time for the 10th November 2012 rainfall runoff event at Varese-IN gauge station. The graph reports also the temporal profile of level (h_{in}).

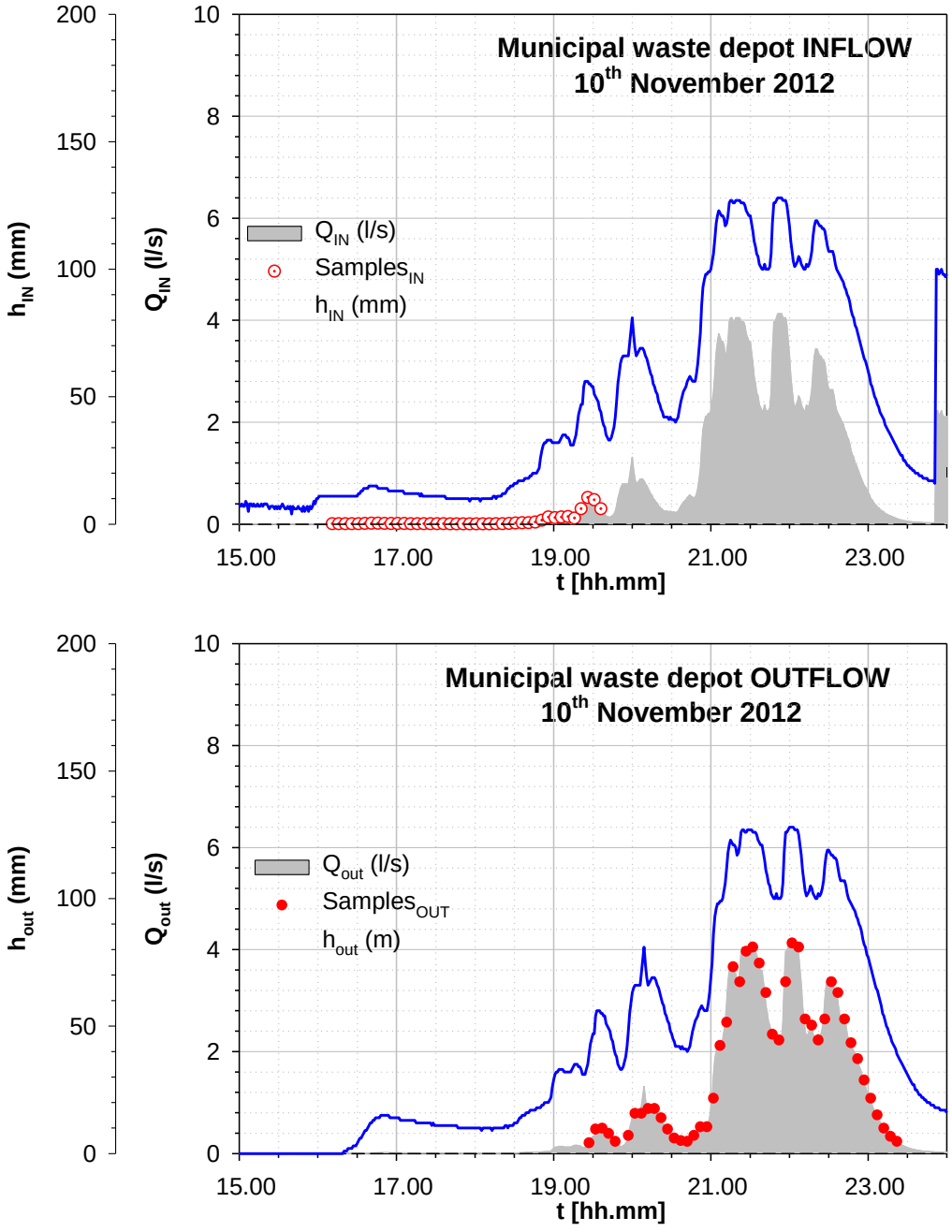

Figure 40 Hydrograph (Q_{in} and Q_{out}) and sampling time for the 10th November 2012 rainfall runoff event observed at Varese-IN and Varese-OUT gauge stations. The graphs reports also the temporal profile of level (h_{in} and h_{out}).

Table 1 Rainfall-runoff event analysed after the validation of the monitoring campaign and the corresponding analysed parameters at VARESE IN gauge station. (n.a. = not available due to the failure of the laboratory equipment).

VARESE-IN		Parameters				
Rainfall Event	Samples	pH	TSS	COD	HC	Metals (Pb, Cu, Zn)
02/12/2011	12	X	X	X	X	X
03/12/2011	12	X	X	X	n.a.	X
2-3/01/2012	7	X	X	X	X	X
03/04/2012	4	X	X	X	X	n.a.
05/04/2012	11	X	X	X	X	X
7-8/04/2012	4	X	X	X	n.a.	X
15/04/2012	7	X	X	X	X	X
18-19/04/2012	11	X	X	X	X	X
20-21/05/2012	12	X	X	X	X	X
26/08/2012	12	X	X	X	X	X
1-3/09/2012	7	X	X	X	X	X
24/09/2012	2	X	X	X	X	X
25-26/09/2012	6	X	X	X	X	X
29/09/2012	6	X	X	X	X	X
11/10/2012	12	X	X	X	X	X
15/10/2012	12	X	X	X	n.a.	X
26/10/2012	12	X	X	X	X	X
10/11/2012	12	X	X	X	X	X

Table 2 Rainfall-runoff event analysed after the validation of the monitoring campaign and the corresponding analysed parameters at VARESE OUT gauge station. (n.a. = not available due to the failure of the laboratory equipment).

VARESE-OUT		Parameters				
Rainfall Event	Samples	pH	TSS	COD	HC	Metals (Pb, Cu, Zn)
02/12/2011	12	X	X	X	X	X
03/12/2011	12	X	X	X	n.a.	X
2-3/01/2012	12	X	X	X	n.a.	X
03/04/2012	-	n.a.	n.a.	n.a.	n.a.	n.a.
05/04/2012	3	X	X	X	n.a.	X
08/04/2012	12	X	X	X	X	X
15/04/2012	12	X	X	X	X	X
18-19/04/2012	12	X	X	X	X	X
20-21/05/2012	6	X	X	X	X	X
26/08/2012	10	X	X	X	X	X
1-3/09/2012	6	X	X	X	X	X
24/09/2012	2	X	X	X	X	X
25-26/09/2012	7	X	X	X	X	X
29/09/2012	5	X	X	X	X	X
11/10/2012	12	X	X	X	n.a.	X
15/10/2012	12	X	X	X	n.a.	X
26/10/2012	12	X	X	X	X	X
10/11/2012	12	X	X	X	X	X