"ŠOŠTANJ" DATA SET FOR VALIDATION OF MODELS OVER VERY COMPLEX TERRAIN

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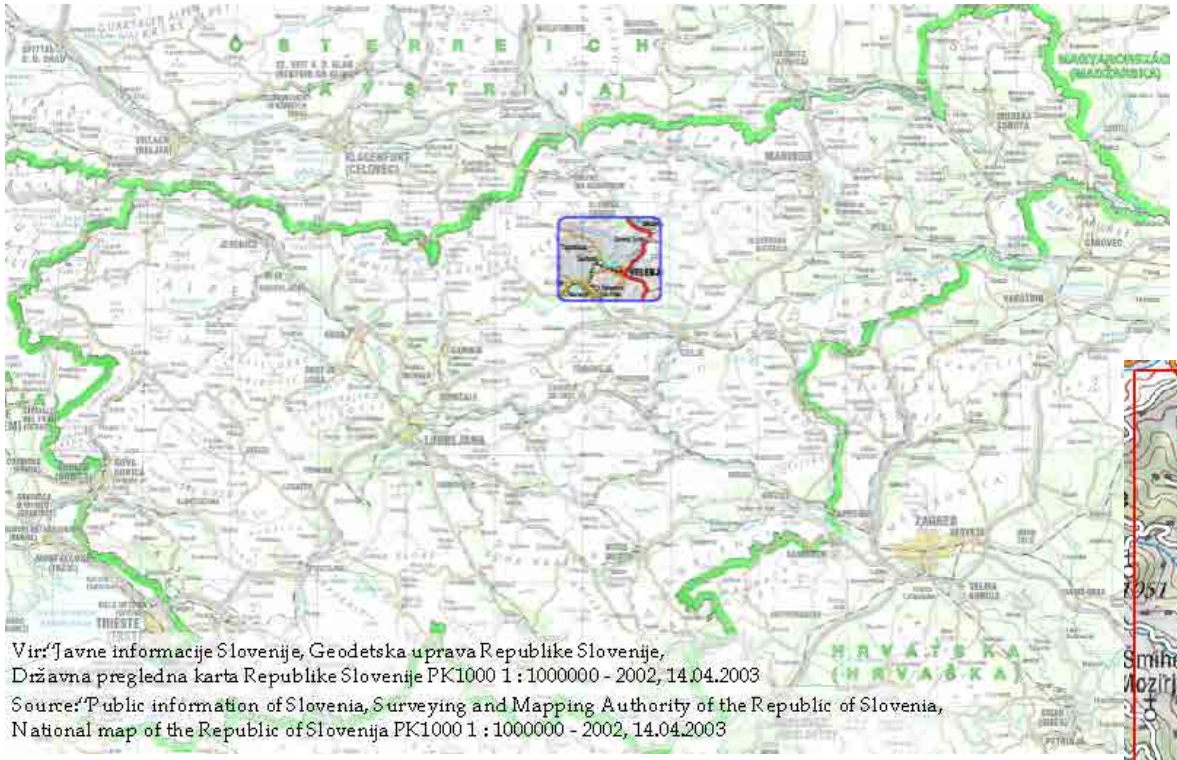
ŠOŠTANJ TPP - 1991

- Measuring campaign – spring 1991 – 3 weeks
- Complex terrain, NE Slovenia
- TPP – SO2 – tracer – no wet desulph.
- Automatic measurements:
  - 6 ambiental stations (meteo + SO2)
  - Emission stations in 3 stacks

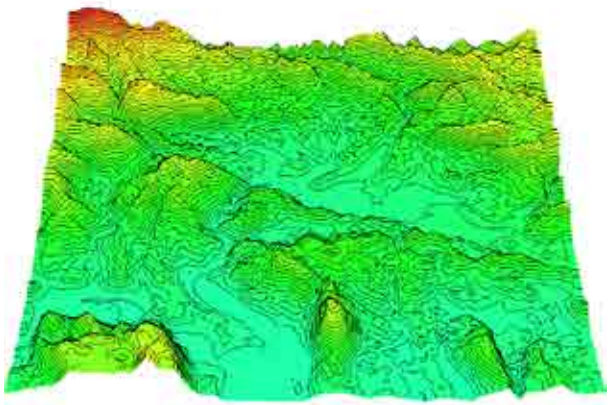
DATA SET AVAILABLE + VALIDATION RESULTS

Domain: Velenje basin / Šaleška valley



Vir: Javne informacije Slovenije, Geodetska uprava Republike Slovenije,
Državna pregledna karta Republike Slovenije PK1000 1 : 1000000 - 2002, 14.04.2003

Source: Public information of Slovenia, Surveying and Mapping Authority of the Republic of Slovenia,
National map of the Republic of Slovenija PK1000 1 : 1000000 - 2002, 14.04.2003



Source: »Javne informacije Slovenije, Geodetska uprava Republike Slovenije, Državna pregledna karta Republike Slovenije 1 : 250 000 - 2005«, 27.07.2005

Domain: Velenje basin (2013)

Author: Foto Uroš Hočevar

Domain: Velenje basin (2013)

Author: Foto Uroš Hočevar

Complex terrain: Velenje basin (2013)

Author: Foto Uroš Hočevar

Domain: Velenje basin (2013)

Author: Foto Uroš Hočevar

TPP ŠOŠTANJ (1995)

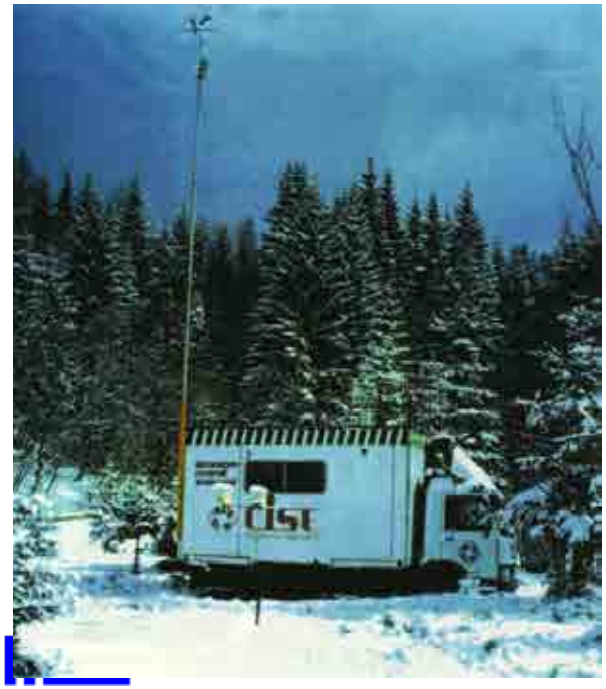
TPP ŠOŠTANJ (1995)

ŠOŠTANJ - 15/3/1991 - 5/4/1991

ENEL DSR/CRTN

CISE

institut "jožef stefan" ljubljana slovenija



Campaign report:

- G. Elisei, G. Brusasca, M.G. Morselli, G. Tinarrelli et al
- G. Catenacci, S. Finardi et al
- Lesjak, M., Božnar, M., Mlakar, P., Slavič, F.

Experimental campaign for the environmental impact evaluation of Šoštanj thermal power plant : progress report.

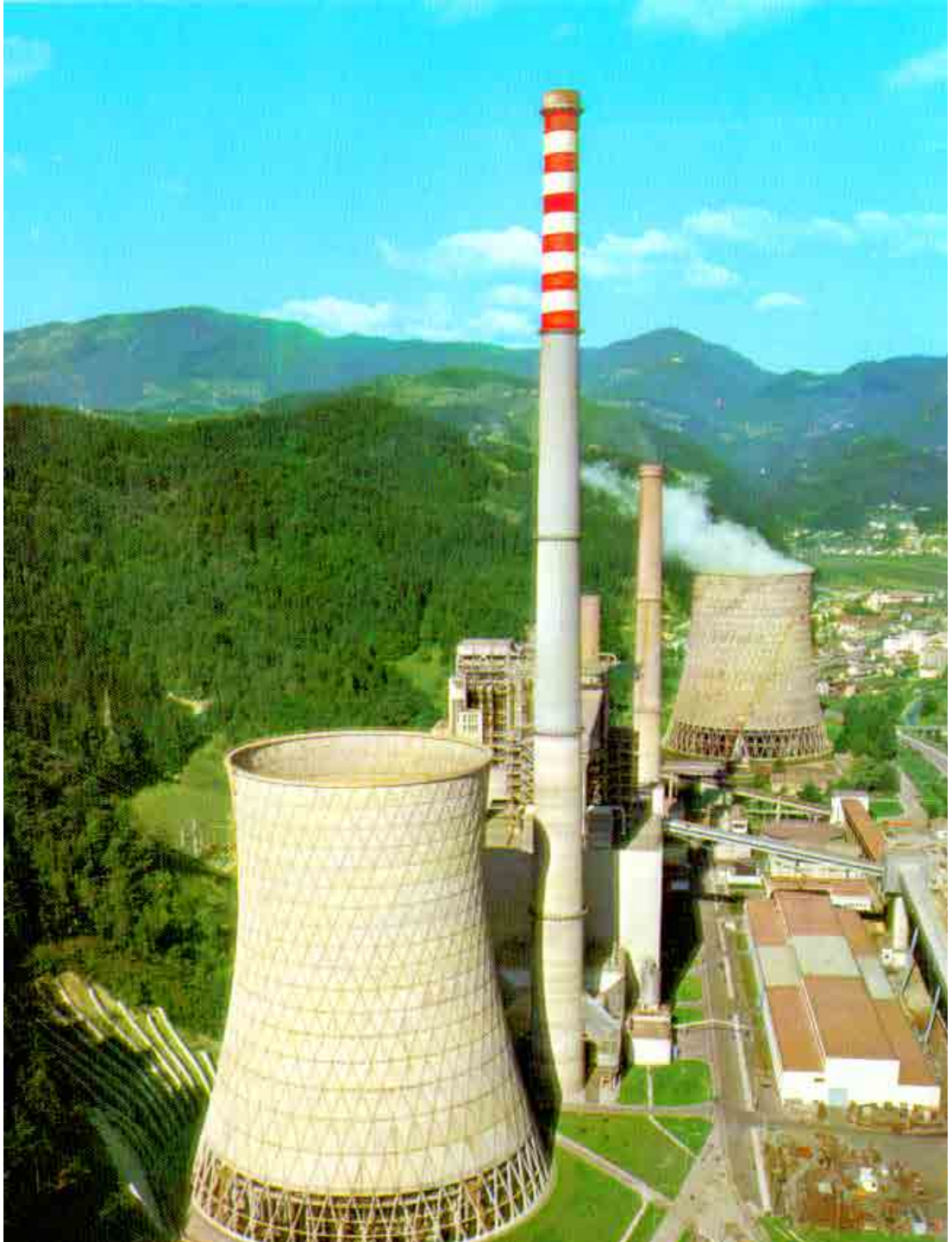
ENEL, Milano,

CISE, Milano,

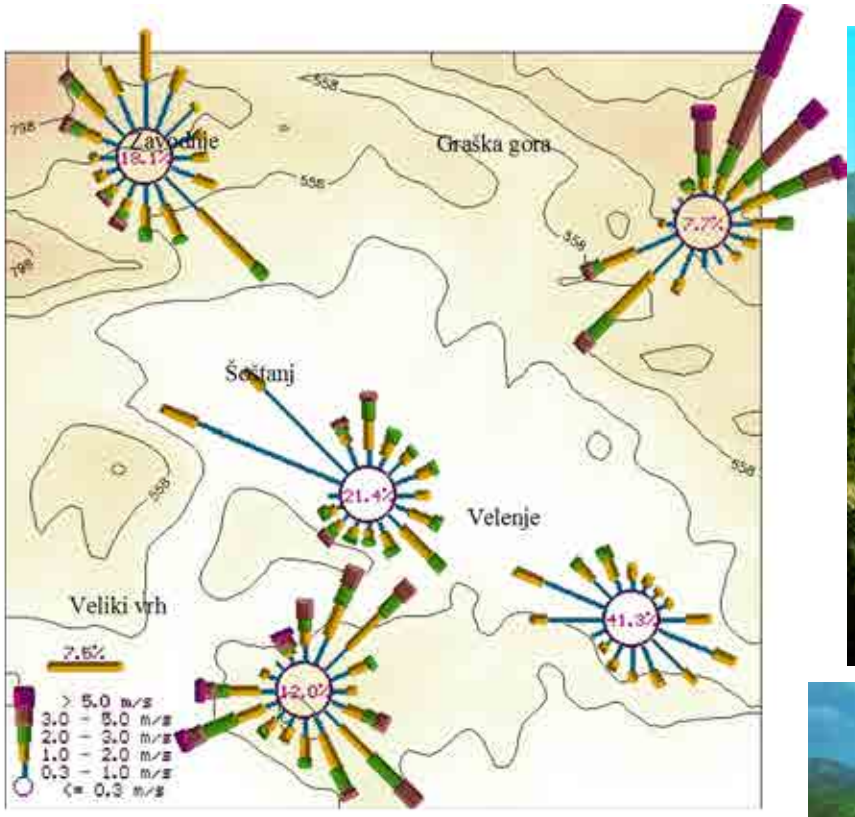
Jožef Stefan Institute, Ljubljana

1992

TPP ŠOŠTANJ



SO_2 main pollutant ´80 & ´90

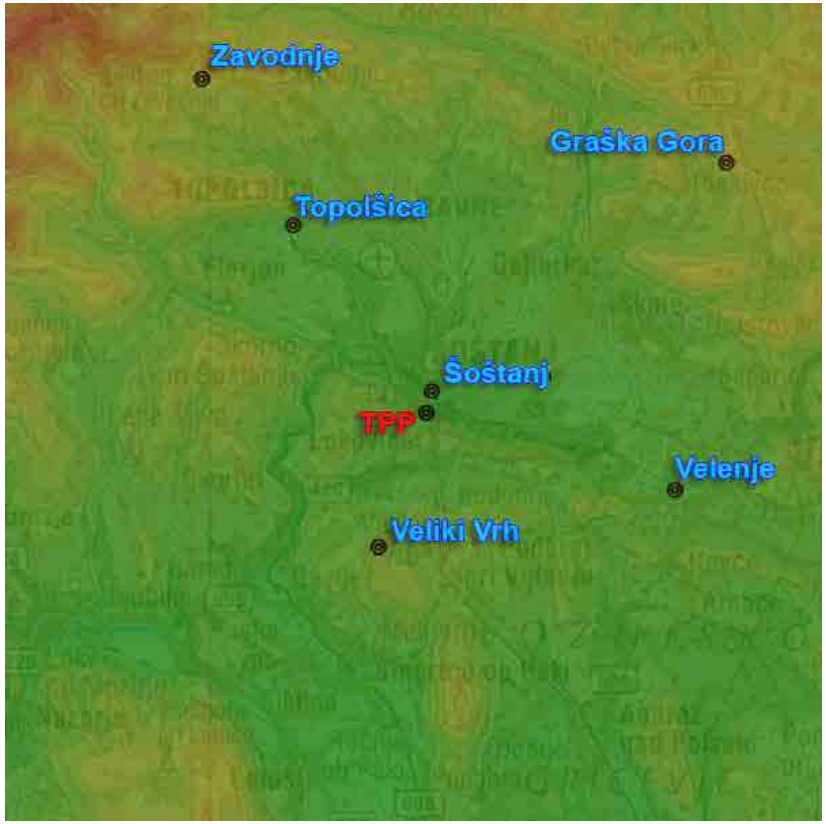


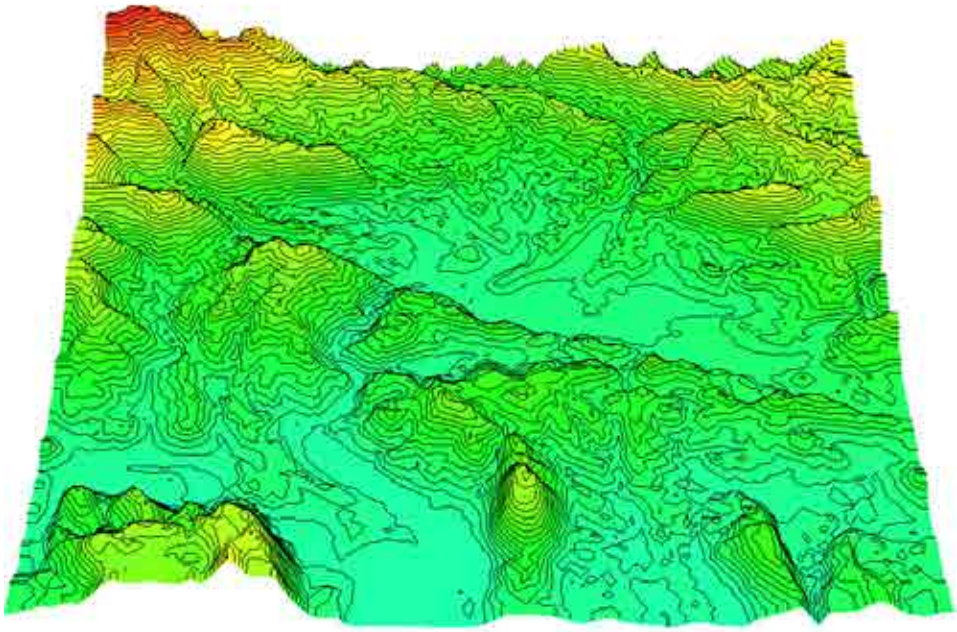
Ground level (10m) winds

TPP ŠOŠTANJ
700 MW
10 t/h SO_2
ambient 2 mg/m3

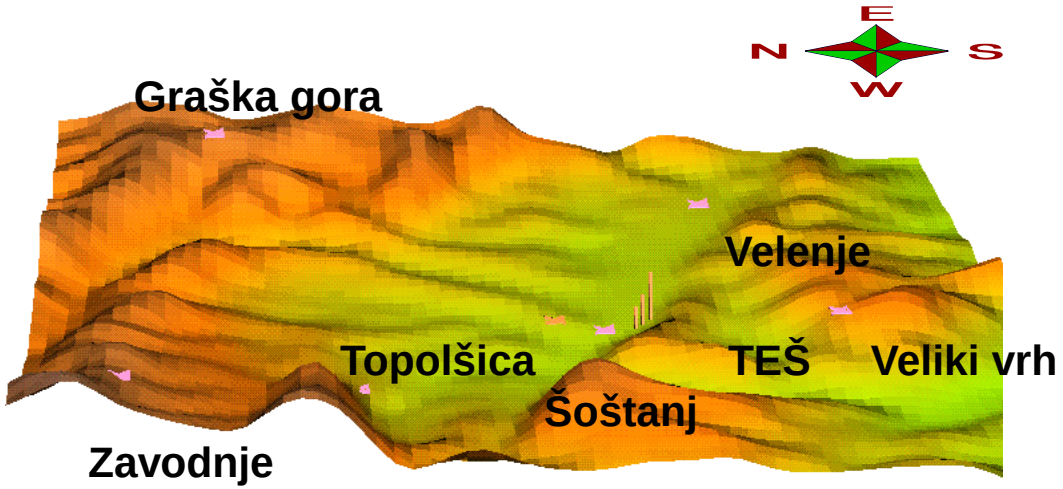
- low winds,
- Thermal inversions

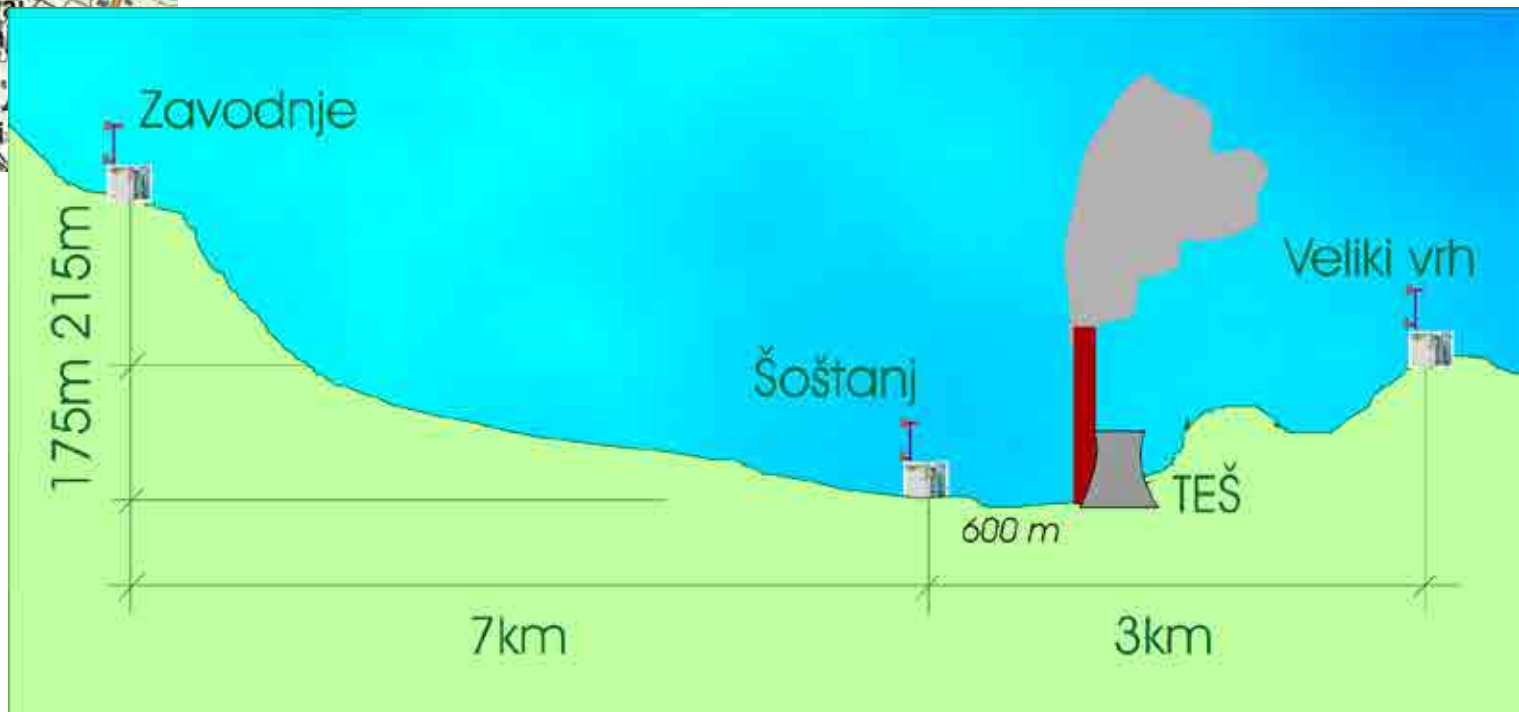
ŠOŠTANJ TPP and stations





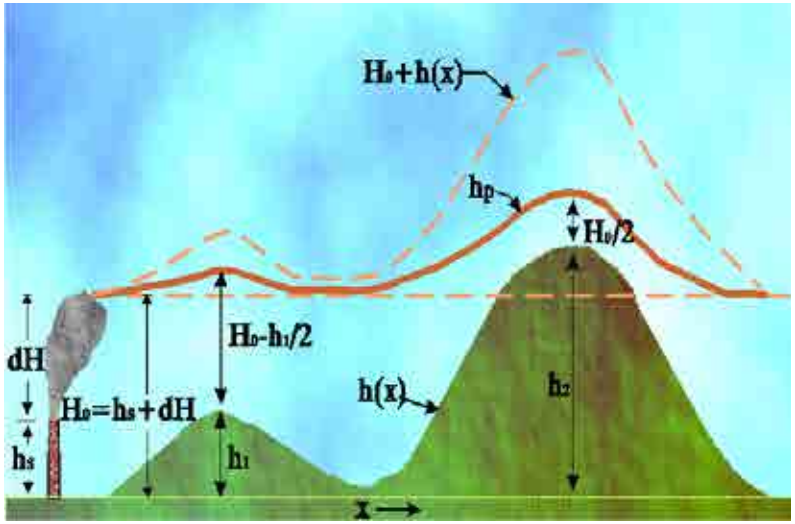
LOCATIONS: Zavodnje, Šoštanj in Veliki Vrh



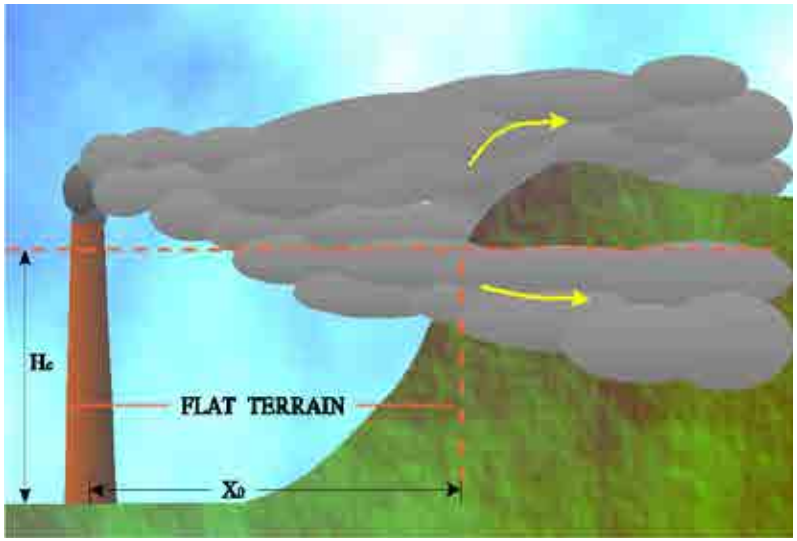


US EPA MODELS ‘90

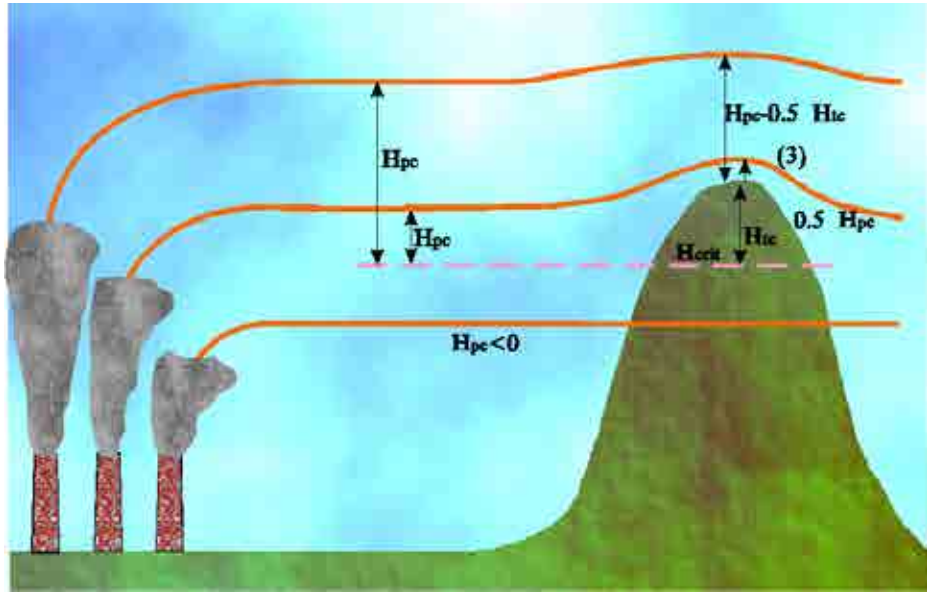
COMPLEX-1



CTDMPLUS



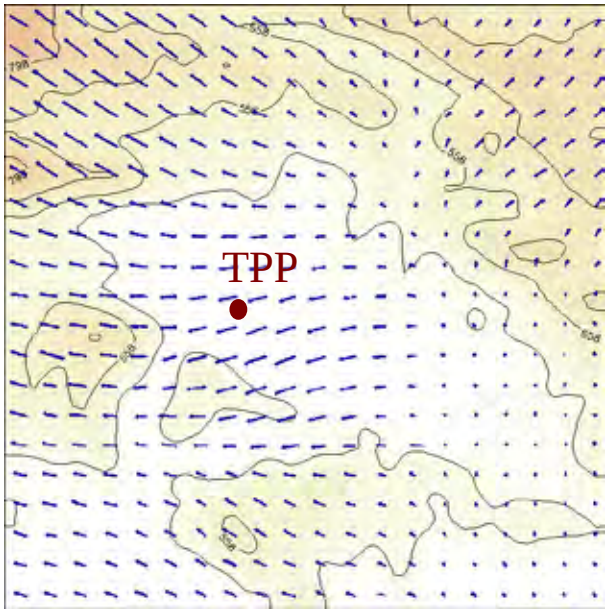
RTDM



3D DIAGNOSTIC MODELING

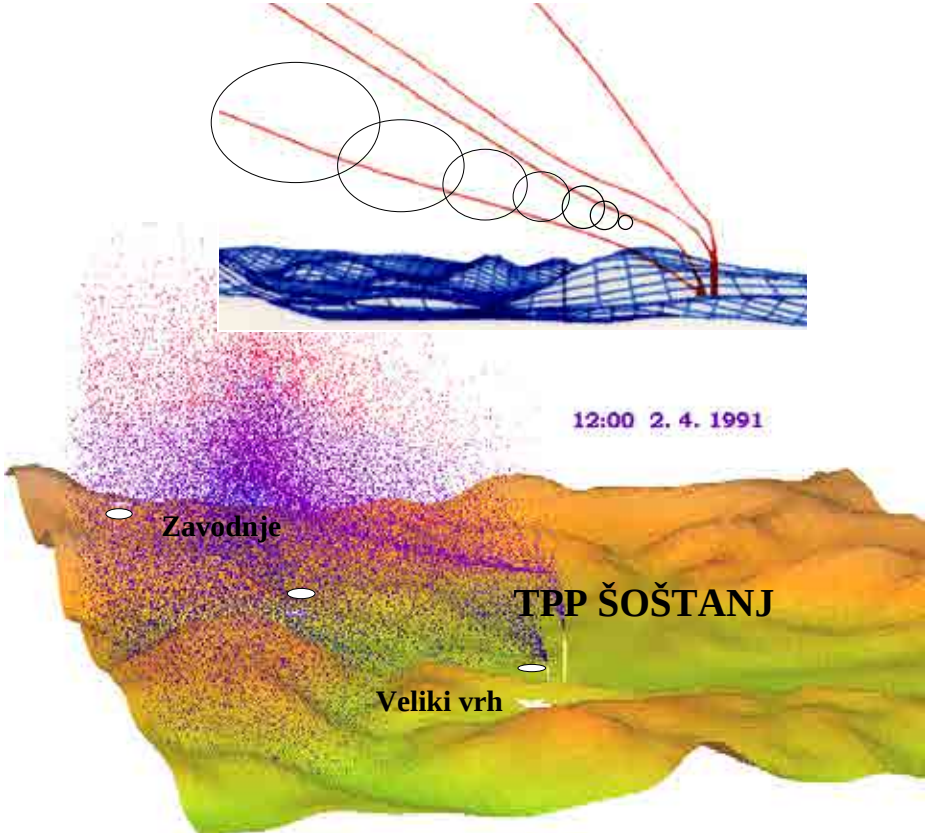
3D METEO:

- WIND FIELD
- TURBULENCE FIELD
- TEMPERATURE PROFILE



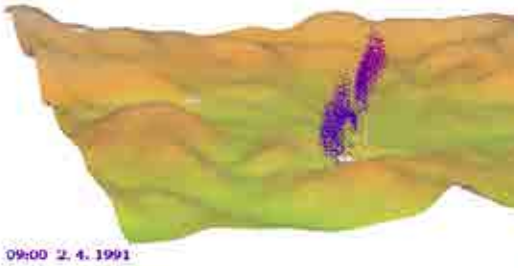
WIND FIELD 50 m ABOVE THE GROUND

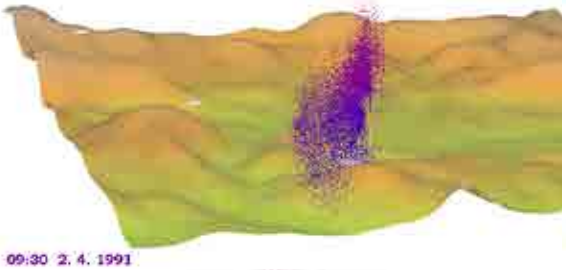
TRAMES
LAGRANGIAN PUFF MODEL

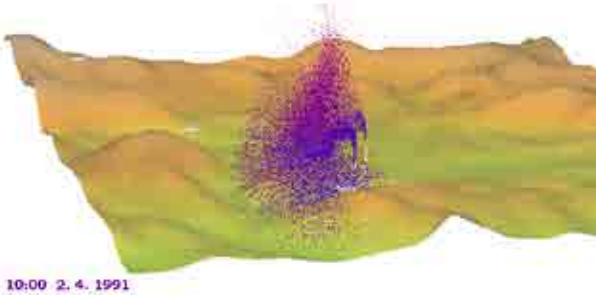


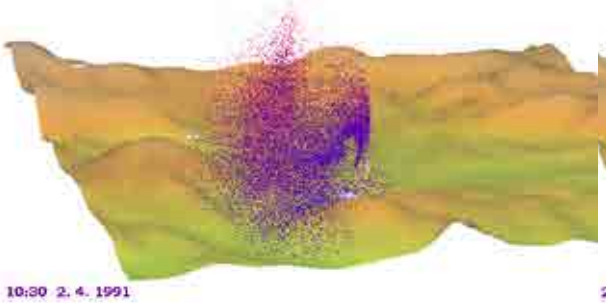
SPRAY
LAGRANGIAN
PARTICLE MODEL

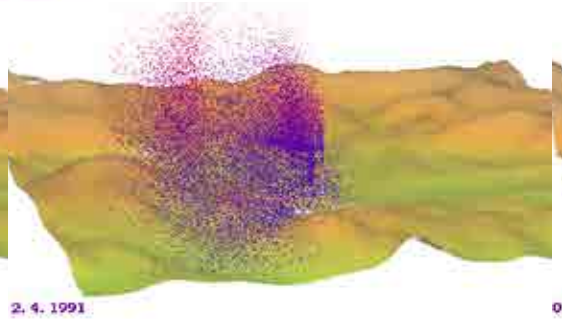
4 h SIMULATION (1994)
situation 2.4.1991 9:00-13:00

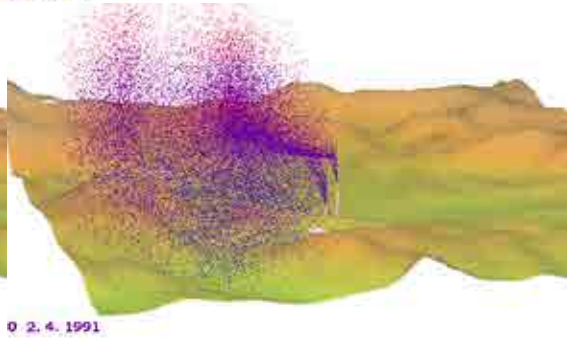


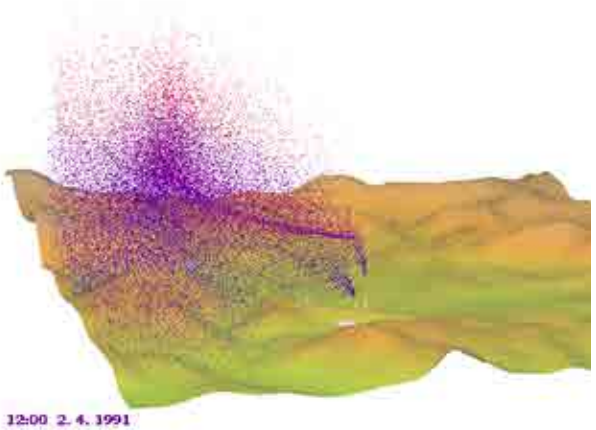


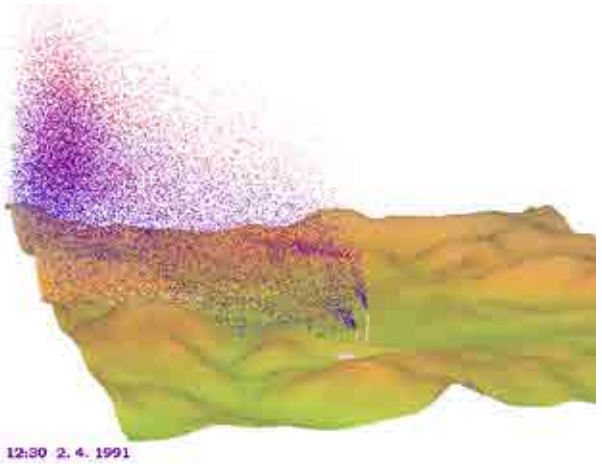












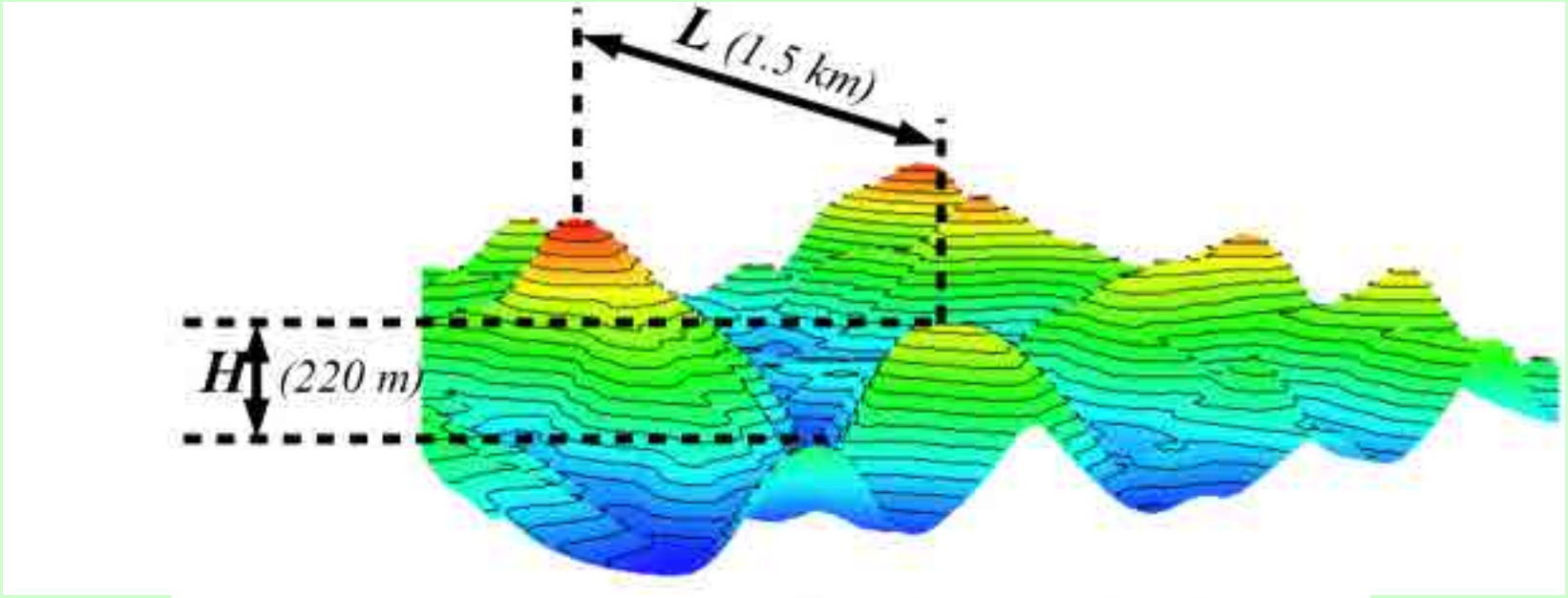
Field data set „ŠOŠTANJ91“

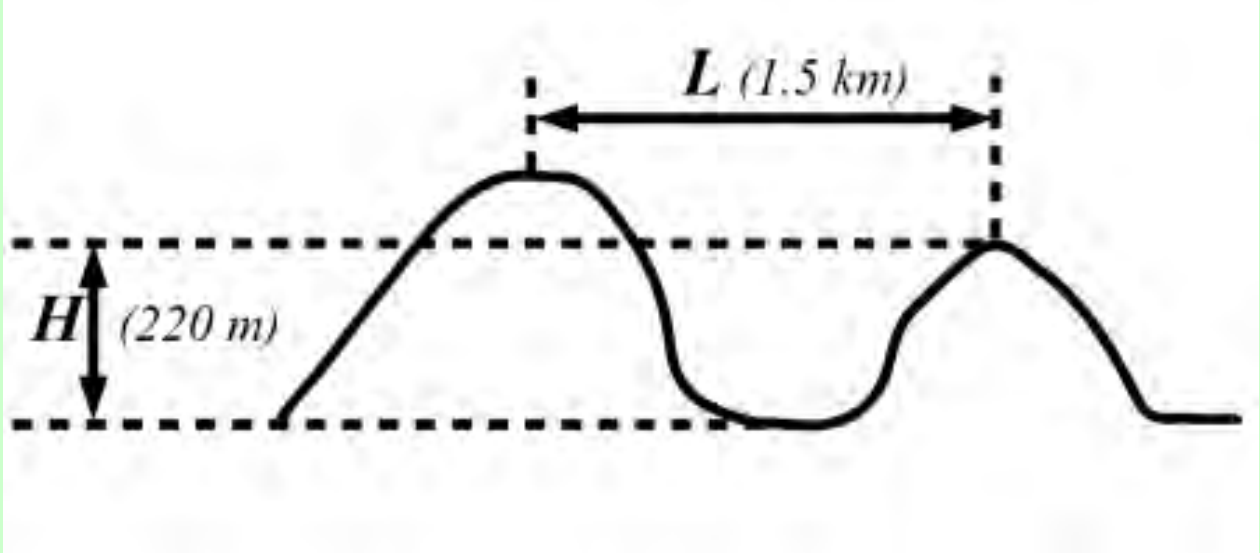
- Domain: Velenje basin / Šaleška valley
- Duration: spring 1991 (from 15 March 1991 till 05 April 1991)
- 6 automatic environmental monitoring stations
- SODAR
- 3 emission automatic measuring stations

Domain: Velenje basin

- Size: 15 km x 15 km
- Resolution: 100 x 100 cells
- Cell size: 150 m
- S-W corner X: 496250 UTM zone 33 (14,9513E)
- S-W corner Y: 5128000 UTM zone 33 (46,3056N)
- N-E corner X: 511250 UTM zone 33 (15,1465E)
- N-E corner Y: 5143000 UTM zone 33 (46,4405N)

Terrain complexity hlTc=(220 m, 1.5 km)

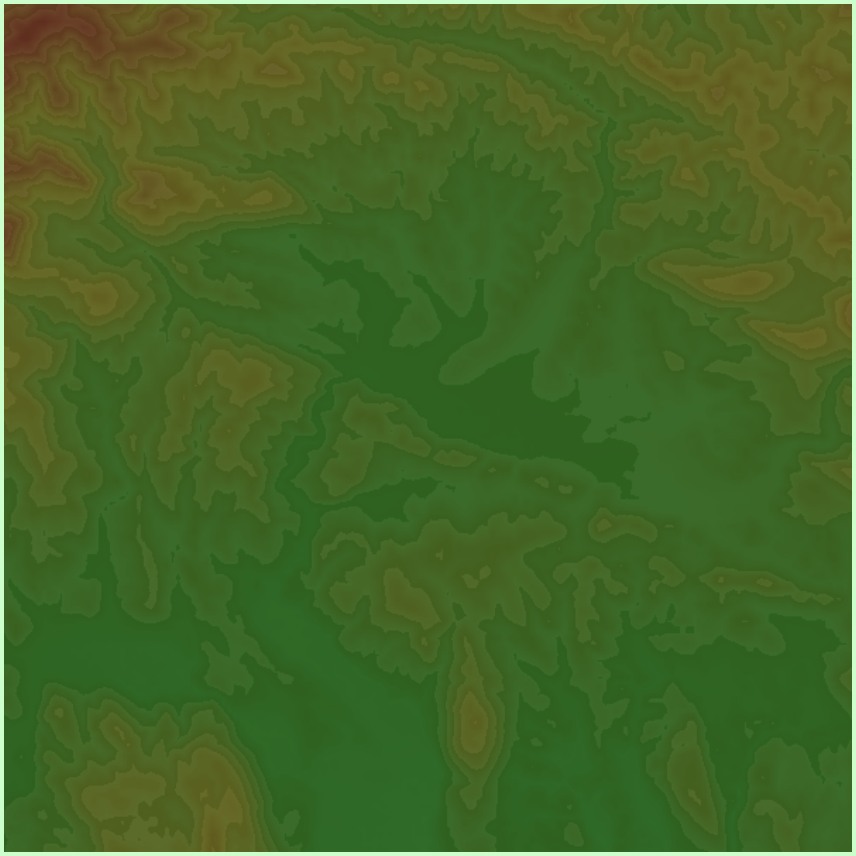


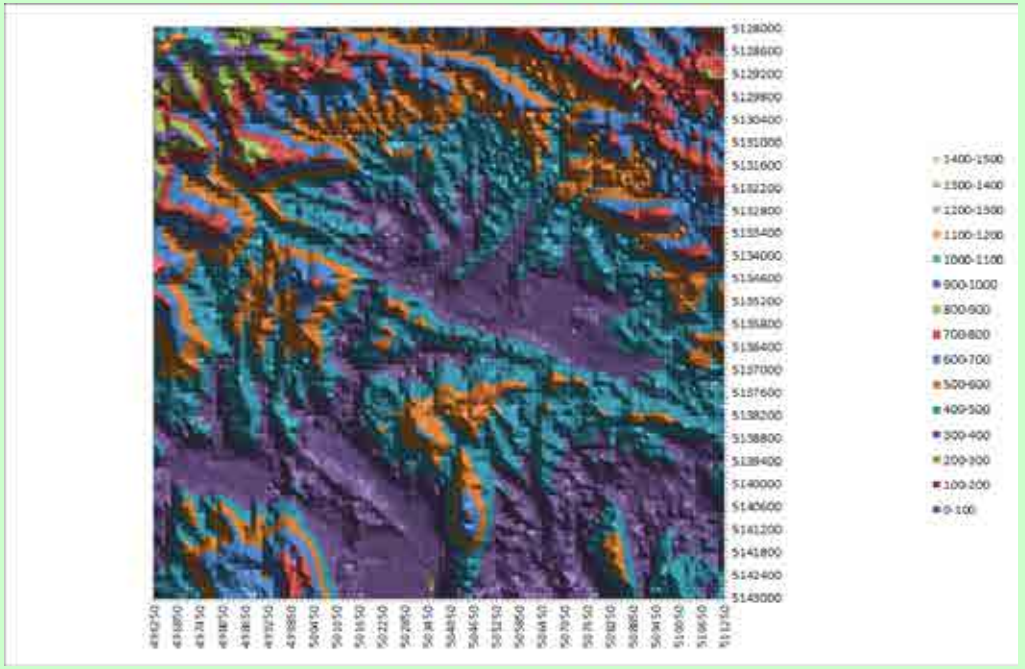


Domain: Velenje basin

- Digital elevation model (file: ***dem_v02.xlsx***)
- Corine Landuse Cover (file: ***clc_v02.xlsx***)
- Surface Roughness Length (file: ***z0_v02.xlsx***)
- Measured environmental and emission data (files: ***locations-30MAR_v02.xlsx, SOSTANJ91-30MAR-data_v02.zip***)

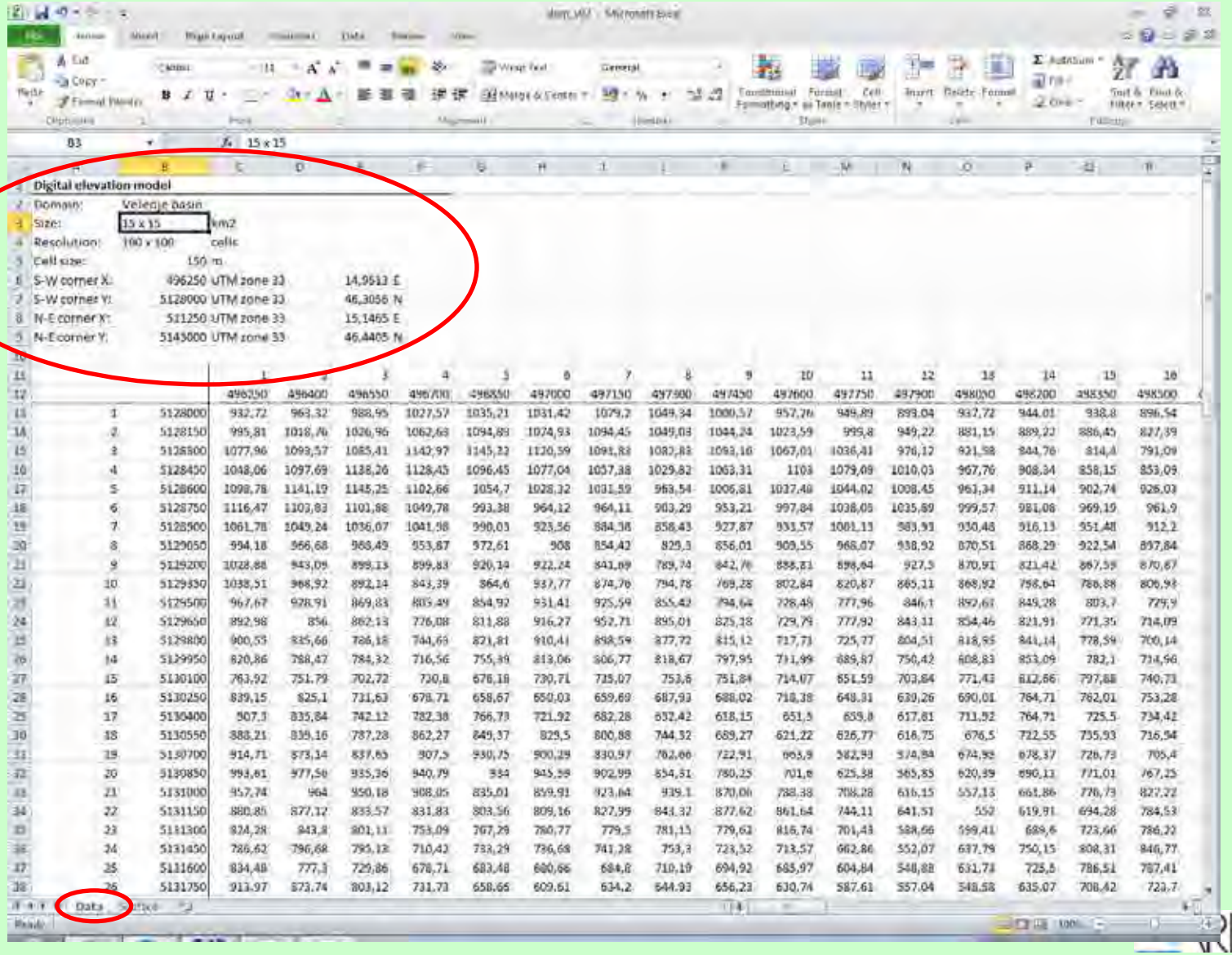
Digital elevation model





As seen by Excel

Digital elevation model (file: ***dem_v02.xlsx***)

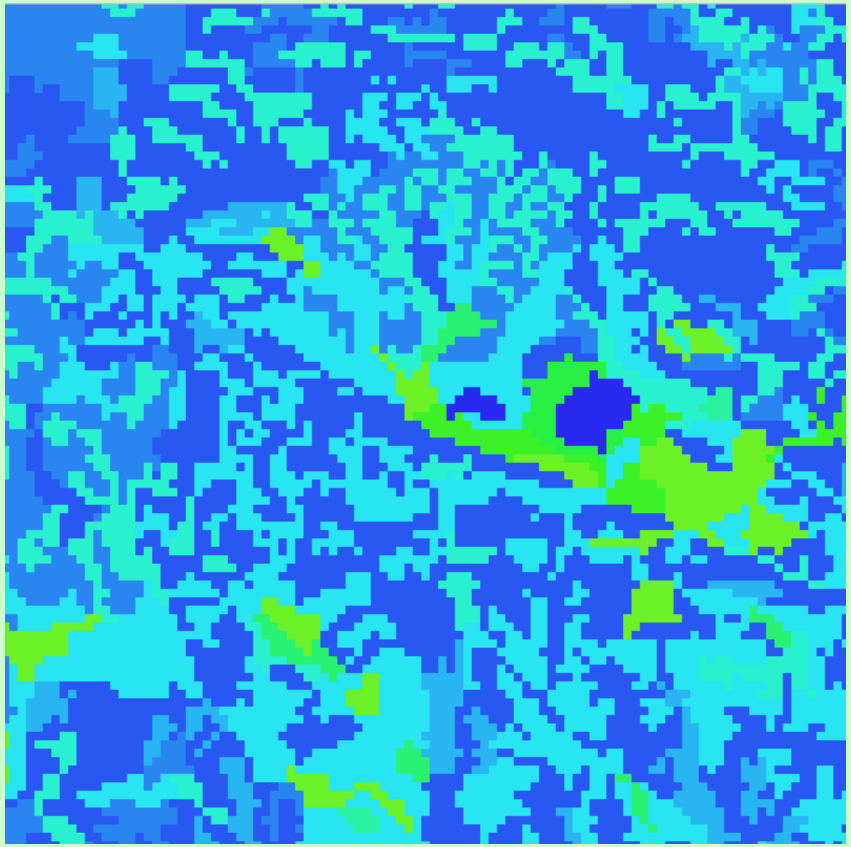


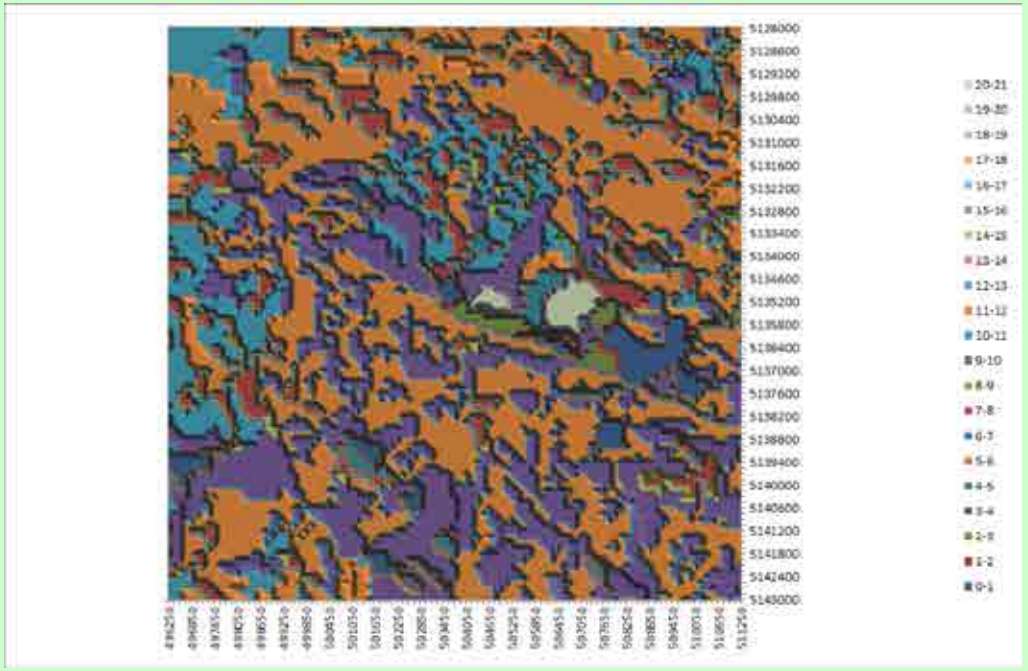
Digital elevation model

Domain:	Veleaje basin
Size:	15 x 15 km2
Resolution:	100 x 100 cells
Cell size:	150 m
S-W corner X:	496250 UTM zone 33 14,9513 E
S-W corner Y:	5128000 UTM zone 33 46,3056 N
N-E corner X:	511250 UTM zone 33 15,1465 E
N-E corner Y:	5143000 UTM zone 33 46,4405 N

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		496250	496400	496550	496700	496850	497000	497150	497300	497450	497600	497750	497900	498050	498200	498350	498500
1	5128000	932,72	963,32	988,95	1027,57	1035,21	1031,42	1079,2	1049,34	1000,57	957,76	949,89	893,04	937,72	944,01	938,8	896,54
2	5128150	995,81	1018,76	1026,96	1062,63	1094,89	1074,93	1094,45	1049,03	1044,24	1023,59	995,8	949,22	881,15	889,22	886,45	827,39
3	5128300	1077,96	1093,57	1085,41	1142,97	1145,22	1120,39	1091,83	1080,83	1063,16	1067,01	1036,41	976,12	921,58	844,76	814,4	791,09
4	5128450	1048,06	1097,69	1138,26	1128,43	1096,45	1077,04	1057,38	1029,82	1063,31	1103	1079,09	1010,03	967,76	908,34	858,15	853,09
5	5128600	1098,78	1141,19	1145,25	1102,66	1054,7	1028,32	1031,59	963,54	1006,81	1037,48	1044,02	1008,45	961,34	911,14	902,74	928,03
6	5128750	1116,47	1103,83	1101,88	1049,78	993,38	964,12	964,11	983,29	953,21	997,84	1038,05	1035,89	999,57	981,08	969,19	961,9
7	5128900	1061,78	1049,24	1036,07	1041,98	990,03	923,56	884,38	858,43	927,87	933,57	1001,13	983,93	930,48	916,13	951,48	912,2
8	5129050	994,18	966,68	968,49	953,87	972,61	908	854,42	825,3	856,01	909,55	968,07	938,92	870,51	868,29	922,54	897,84
9	5129200	1028,88	943,09	899,13	899,83	920,14	922,24	841,69	789,74	842,76	888,81	898,64	927,5	870,91	821,42	867,59	870,67
10	5129350	1038,51	968,92	892,14	843,39	864,6	937,77	874,76	794,78	769,28	802,84	820,87	865,11	868,92	798,64	786,88	806,98
11	5129500	967,67	928,91	869,83	803,49	854,92	931,41	925,59	855,42	794,64	728,48	777,96	846,1	892,61	849,28	803,7	729,9
12	5129650	892,98	856	862,13	776,08	811,88	916,27	952,71	895,01	825,18	729,79	777,92	843,11	854,46	821,91	771,35	714,09
13	5129800	900,53	835,66	786,18	744,69	821,81	910,41	898,59	877,72	815,12	717,73	725,77	804,51	818,95	841,14	778,59	700,14
14	5129950	820,86	788,47	784,32	716,56	755,39	813,06	806,77	818,67	797,95	731,99	689,87	756,42	808,83	853,09	782,1	734,96
15	5130100	763,92	751,79	702,72	720,8	676,18	730,71	725,07	753,6	751,84	714,07	651,59	703,84	771,43	812,66	797,88	740,73
16	5130250	839,15	825,1	731,63	678,71	658,67	650,03	659,69	687,93	688,02	718,38	648,31	639,26	690,01	764,71	762,01	753,28
17	5130400	907,3	835,84	742,12	782,38	766,73	721,92	682,28	632,42	618,15	651,5	659,8	617,81	711,92	764,71	725,5	734,42
18	5130550	888,21	839,16	787,28	862,27	849,37	825,5	800,88	744,32	689,27	621,22	626,77	616,75	676,5	722,55	735,93	716,54
19	5130700	914,71	873,14	837,65	907,5	930,75	900,29	830,97	762,66	722,91	663,9	582,93	574,84	674,93	678,37	728,73	705,4
20	5130850	993,61	977,56	935,36	940,79	934	945,59	902,99	854,51	780,25	701,8	625,38	565,85	620,39	690,11	771,01	767,25
21	5131000	957,74	964	950,18	908,05	835,01	859,91	923,64	939,1	870,06	788,38	708,28	616,15	557,13	661,86	776,73	827,22
22	5131150	880,85	877,12	833,57	831,83	803,56	809,16	827,99	843,32	877,62	861,64	744,11	641,51	552	619,91	694,28	784,53
23	5131300	824,28	843,8	801,11	753,09	767,29	780,77	779,5	781,15	779,62	816,74	701,43	588,66	599,41	689,6	723,66	786,22
24	5131450	786,62	796,68	795,12	710,42	733,29	736,68	741,28	753,3	723,52	713,57	662,86	552,07	637,79	750,15	808,31	846,77
25	5131600	834,48	777,3	729,86	678,71	683,48	680,66	684,8	710,19	694,92	685,97	604,84	548,88	631,73	725,5	786,51	787,41
26	5131750	913,97	873,74	803,12	731,73	658,65	609,61	634,2	644,93	656,23	630,74	587,61	557,04	548,58	635,07	708,42	723,7

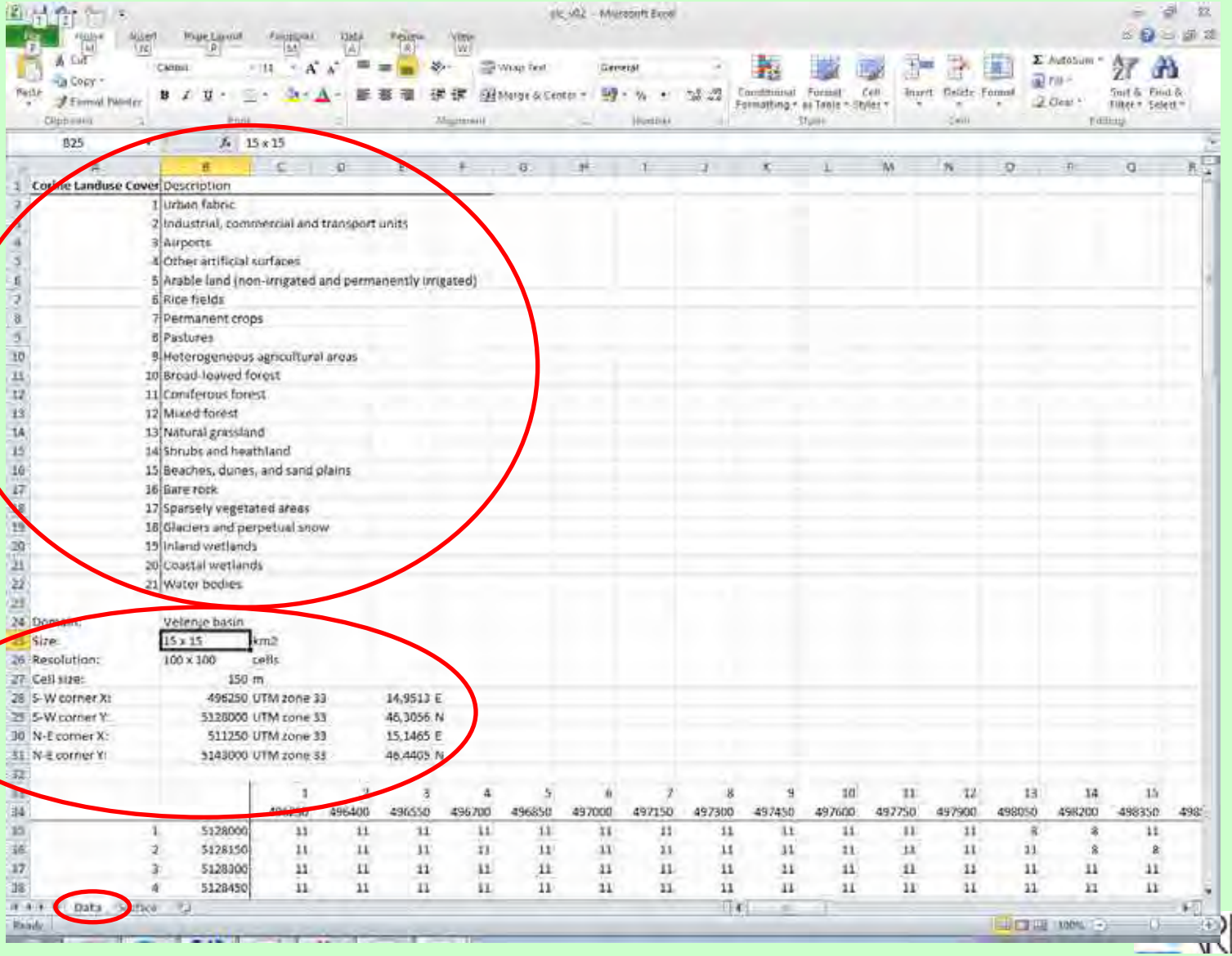
Corine Land Cover





As seen by Excel

Corine Land Cover (file: ***clc_v02.xlsx***)

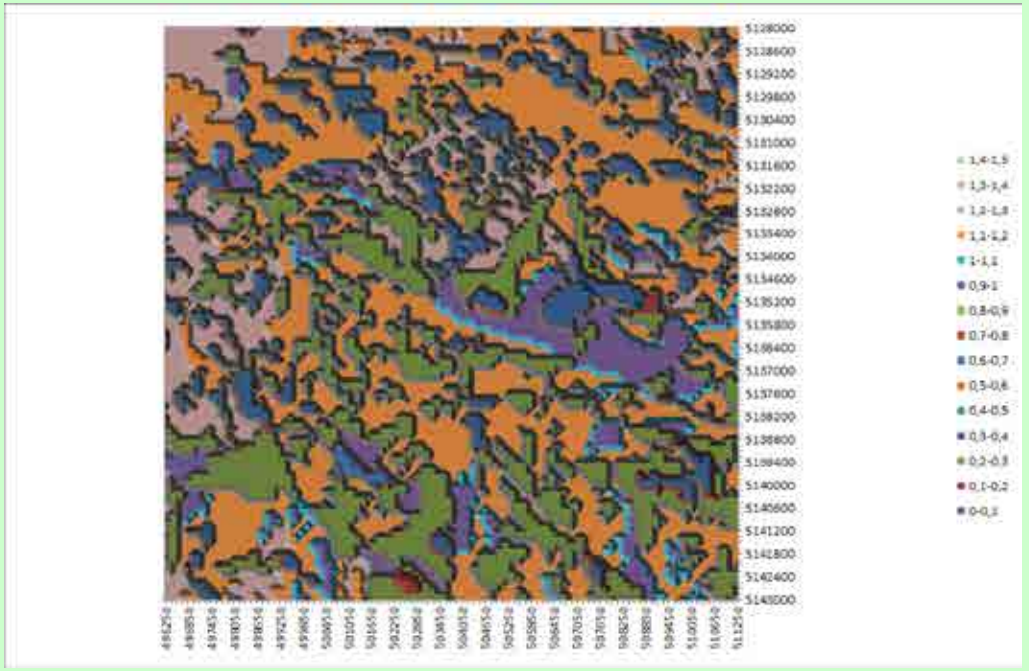


Corine Landuse Cover	Description
1	Urban fabric
2	Industrial, commercial and transport units
3	Airports
4	Other artificial surfaces
5	Arable land (non-irrigated and permanently irrigated)
6	Rice fields
7	Permanent crops
8	Pastures
9	Heterogeneous agricultural areas
10	Broad-leaved forest
11	Coniferous forest
12	Mixed forest
13	Natural grassland
14	Shrubs and heathland
15	Beaches, dunes, and sand plains
16	Bare rock
17	Sparsely vegetated areas
18	Glaciers and perpetual snow
19	Inland wetlands
20	Coastal wetlands
21	Water bodies

Domain:	Velenje basin		
Size:	15 x 15	km2	
Resolution:	100 x 100	cells	
Cell size:	150	m	
S-W corner X:	496250	UTM zone 33	14,9513 E
S-W corner Y:	5128000	UTM zone 33	46,3056 N
N-E corner X:	511250	UTM zone 33	15,1465 E
N-E corner Y:	5143000	UTM zone 33	46,4405 N

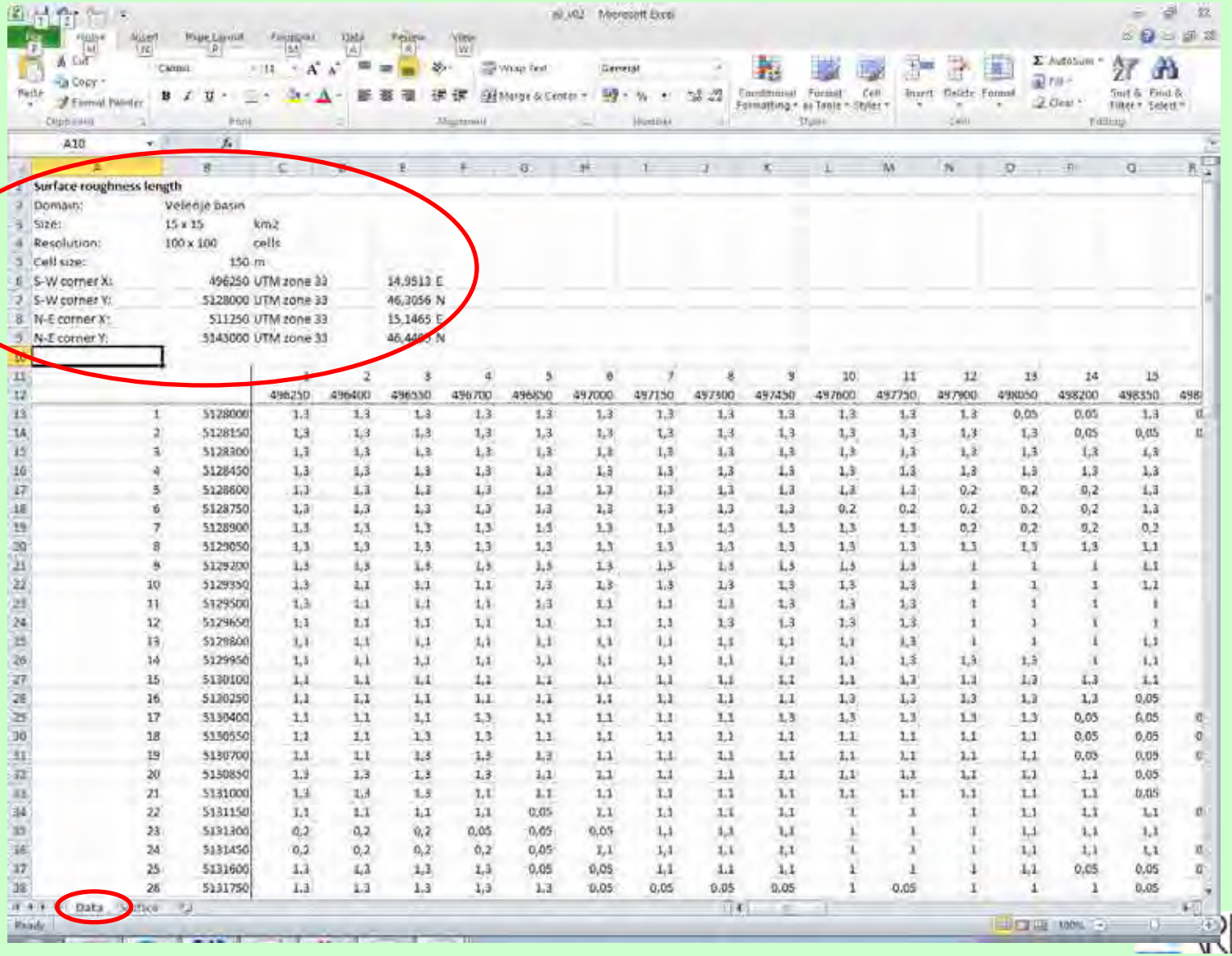
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		496250	496400	496550	496700	496850	497000	497150	497300	497450	497600	497750	497900	498050	498200	498350
1	5128000	11	11	11	11	11	11	11	11	11	11	11	11	8	8	11
2	5128150	11	11	11	11	11	11	11	11	11	11	11	11	11	8	8
3	5128300	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
4	5128450	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11

Surface Roughness Length



As seen by Excel

Surface Roughness Length (file: ***z0_v02.xlsx***)



Surface roughness length

Domain:	Velenje basin
Size:	15 x 15 km2
Resolution:	100 x 100 cells
Cell size:	150 m
S-W corner X:	496250 UTM zone 33 14,9513 E
S-W corner Y:	5128000 UTM zone 33 46,3056 N
N-E corner X:	511250 UTM zone 33 15,1465 E
N-E corner Y:	5143000 UTM zone 33 46,4465 N

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		496250	496400	496550	496700	496850	497000	497150	497300	497450	497600	497750	497900	498050	498200	498350
1	5128000	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	0,05	0,05	1,3
2	5128150	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	0,05	0,05
3	5128300	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
4	5128450	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
5	5128600	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	0,2	0,2	0,2	1,3
6	5128750	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	0,2	0,2	0,2	0,2	0,2	1,3
7	5128900	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	0,2	0,2	0,2	0,2
8	5129050	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,1
9	5129200	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1	1	1	1,1
10	5129350	1,3	1,1	1,1	1,1	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1	1	1	1,1
11	5129500	1,3	1,1	1,1	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1	1	1	1
12	5129650	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,3	1,3	1,3	1,3	1	1	1	1
13	5129800	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,3	1	1	1	1,1
14	5129950	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,3	1,3	1,3	1	1,1
15	5130100	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,3	1,3	1,3	1,3	1,1
16	5130250	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,3	1,3	1,3	1,3	1,3	0,05
17	5130400	1,1	1,1	1,1	1,3	1,1	1,1	1,1	1,1	1,3	1,3	1,3	1,3	1,3	0,05	0,05
18	5130550	1,1	1,1	1,3	1,3	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	0,05	0,05
19	5130700	1,1	1,1	1,3	1,3	1,3	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	0,05	0,05
20	5130850	1,3	1,3	1,3	1,3	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	0,05
21	5131000	1,3	1,3	1,3	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	1,1	0,05
22	5131150	1,1	1,1	1,1	1,1	0,05	1,1	1,1	1,1	1,1	1	1	1	1,1	1,1	1,1
23	5131300	0,2	0,2	0,2	0,05	0,05	0,05	1,1	1,1	1,1	1	1	1	1,1	1,1	1,1
24	5131450	0,2	0,2	0,2	0,2	0,05	1,1	1,1	1,1	1,1	1	1	1	1,1	1,1	1,1
25	5131600	1,3	1,3	1,3	1,3	0,05	0,05	1,1	1,1	1,1	1	1	1	1,1	0,05	0,05
26	5131750	1,3	1,3	1,3	1,3	1,3	0,05	0,05	0,05	0,05	1	0,05	1	1	1	0,05

Measured environmental and emission data

- 6 automatic environmental monitoring stations (Graška Gora, Šoštanj, Topolšica, Velenje, Veliki Vrh, Zavodnje) – meteorological (air temperature, relative humidity, wind, air pressure, global solar radiation and precipitation) and air pollution (SO_2 – sulphur dioxide concentrations) data
- SODAR
- 3 emission automatic measuring stations (Blok1-2-3, Blok 4 and Blok 5) - emission data (exhaust gas temperature, gas flow and SO_2 emission).

Veliki Vrh station and view towards stacks

1991 CAMPAIGN DATA IN RECENT FORMATS

2 SELECTED INTERESTING INTERVALS:

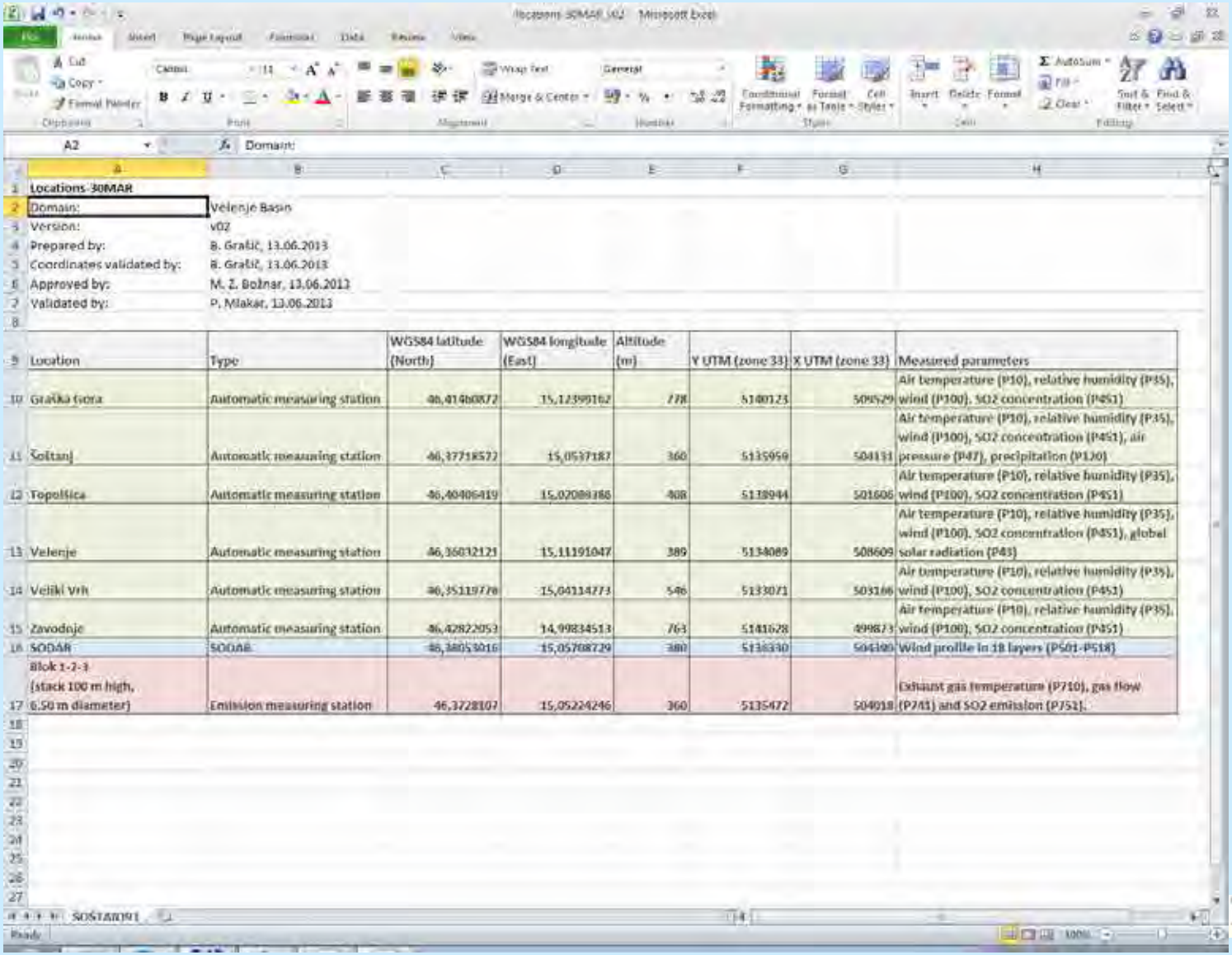
30. MARCH 1991 & 2. APRIL 1991

Case: 30th March 1991

„ŠOŠTANJ91-30MARCH“ == Veliki Vrh station air pollution

- One stack (Blok 1-2-3) emitting SO_2
- Approximately NE wind
- Nice air pollution peak at 12:00 hour at Veliki Vrh station
- Direct wind from TPP to hill of Veliki Vrh
- Relatively simple situation on complex terrain

Measured environmental and emission data (file: ***locations-30MAR_v02.xlsx)***

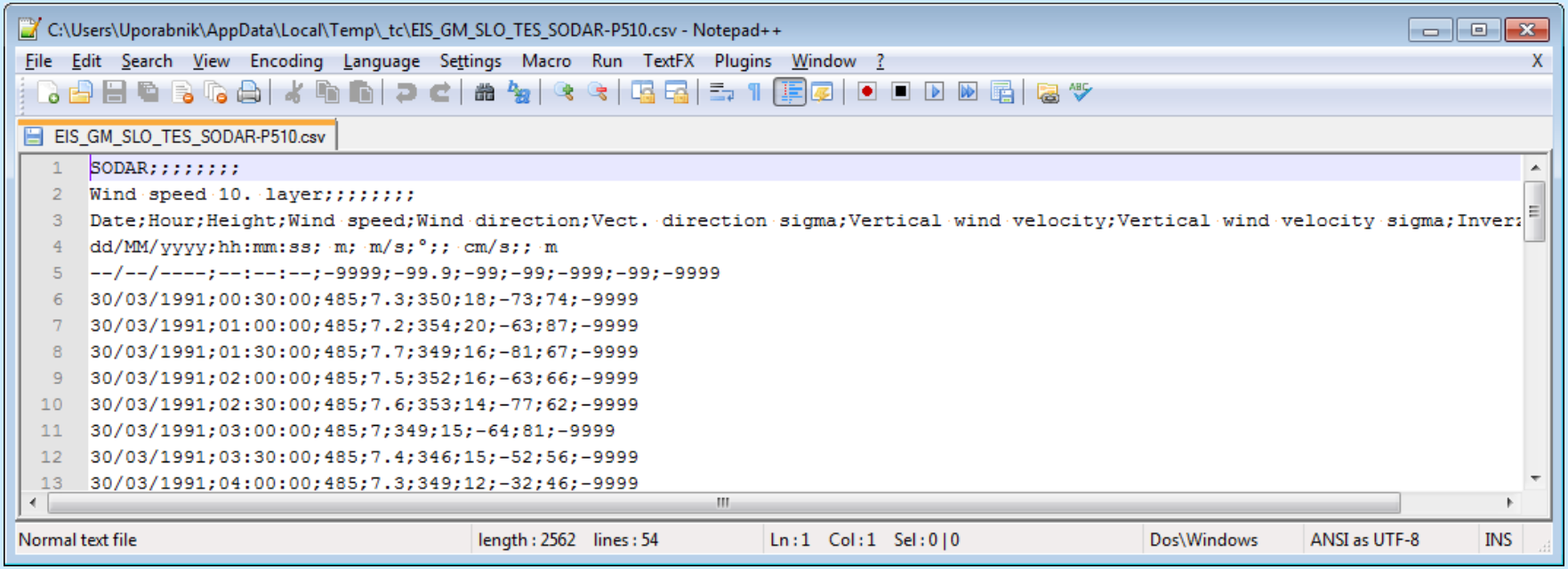


Locations-30MAR

Domain:	Velenje Basin
Version:	v02
Prepared by:	B. Gralič, 13.06.2013
Coordinates validated by:	B. Gralič, 13.06.2013
Approved by:	M. Z. Božnar, 13.06.2013
Validated by:	P. Mlakar, 13.06.2013

Location	Type	WGS84 latitude (North)	WGS84 longitude (East)	Altitude (m)	Y UTM (zone 33)	X UTM (zone 33)	Measured parameters
Graška Gora	Automatic measuring station	46,41460872	15,12399162	778	5140123	508529	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
Šoštanj	Automatic measuring station	46,37718572	15,0537187	360	5135959	504131	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451), air pressure (P47), precipitation (P130)
Topolšica	Automatic measuring station	46,40406419	15,02088386	408	5138944	501606	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
Velenje	Automatic measuring station	46,36032121	15,11191047	389	5134089	508609	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451), global solar radiation (P43)
Veliki Vrh	Automatic measuring station	46,35119778	15,04114773	546	5133071	503166	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
Zavodnje	Automatic measuring station	46,42822053	14,99834513	763	5141628	499873	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
SODAR	SODAR	46,38053016	15,05708729	380	5136330	504190	Wind profile in 18 layers (P501-P518)
Blok 1-2-3 (stack 100 m high, 6.50 m diameter)	Emission measuring station	46,3728107	15,05224246	360	5135472	504018	Exhaust gas temperature (P710), gas flow (P711) and SO2 emission (P751).

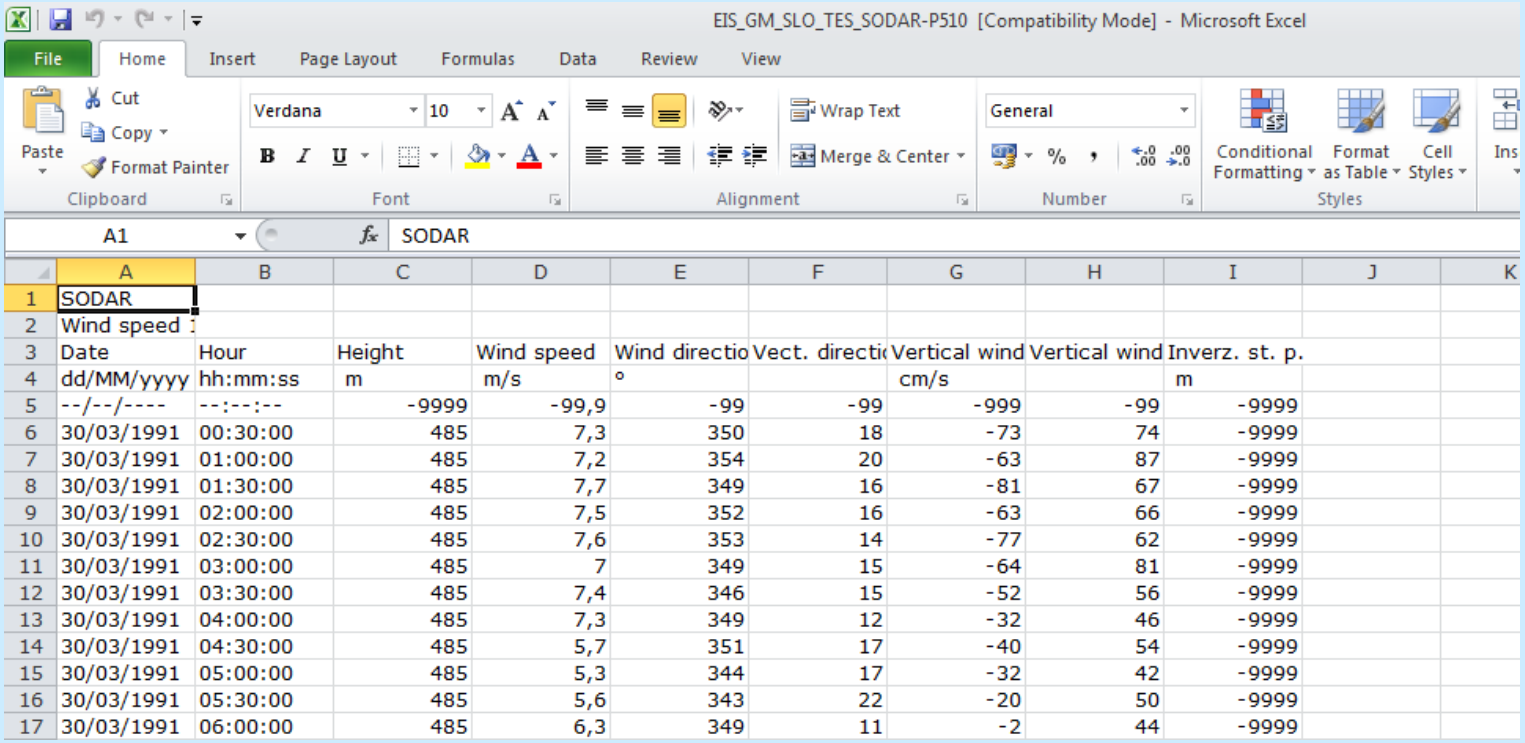
Measured environmental and emission data (file: ***SOSTANJ91-30MAR-data_v02.zip)***



Example of csv (comma-separated values) file.

ZIP pack contains 55 csv files, one file for each measured parameter.

Measured environmental and emission data (file: ***SOSTANJ91-30MAR-data_v02.zip)***



	A	B	C	D	E	F	G	H	I	J	K
1	SODAR										
2	Wind speed										
3	Date	Hour	Height	Wind speed	Wind directio	Vect. directi	Vertical wind	Vertical wind	Inverz. st. p.		
4	dd/MM/yyyy	hh:mm:ss	m	m/s	°		cm/s		m		
5	--/--/----	--:--:--	-9999	-99,9	-99	-99	-999	-99	-9999		
6	30/03/1991	00:30:00	485	7,3	350	18	-73	74	-9999		
7	30/03/1991	01:00:00	485	7,2	354	20	-63	87	-9999		
8	30/03/1991	01:30:00	485	7,7	349	16	-81	67	-9999		
9	30/03/1991	02:00:00	485	7,5	352	16	-63	66	-9999		
10	30/03/1991	02:30:00	485	7,6	353	14	-77	62	-9999		
11	30/03/1991	03:00:00	485	7	349	15	-64	81	-9999		
12	30/03/1991	03:30:00	485	7,4	346	15	-52	56	-9999		
13	30/03/1991	04:00:00	485	7,3	349	12	-32	46	-9999		
14	30/03/1991	04:30:00	485	5,7	351	17	-40	54	-9999		
15	30/03/1991	05:00:00	485	5,3	344	17	-32	42	-9999		
16	30/03/1991	05:30:00	485	5,6	343	22	-20	50	-9999		
17	30/03/1991	06:00:00	485	6,3	349	11	-2	44	-9999		

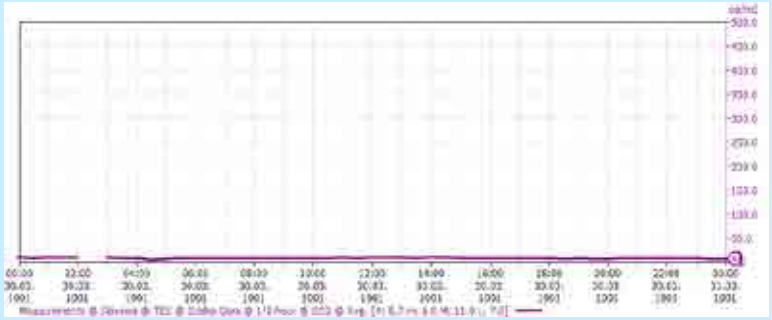
Example of xls (Excel) file.

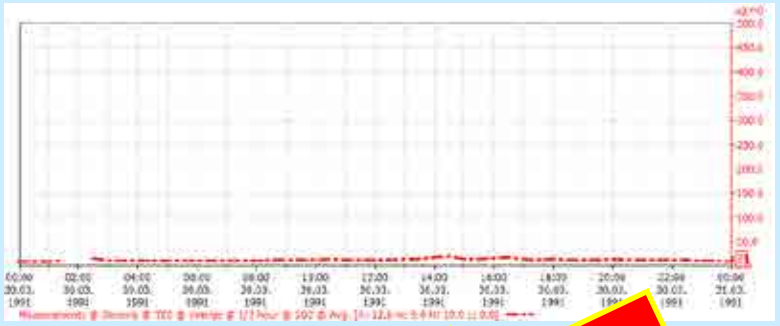
ZIP pack contains 55 xls files, one file for each measured parameter.

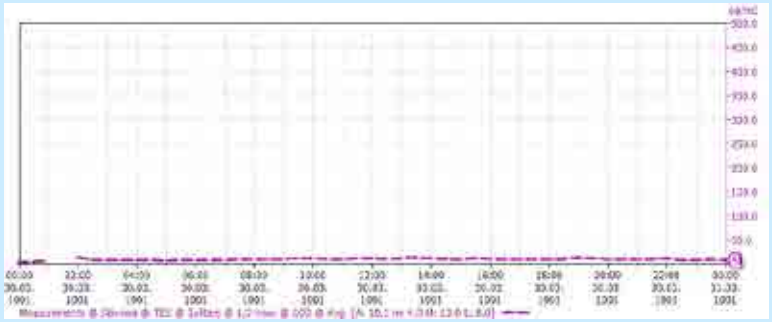
MEASUREMENTS

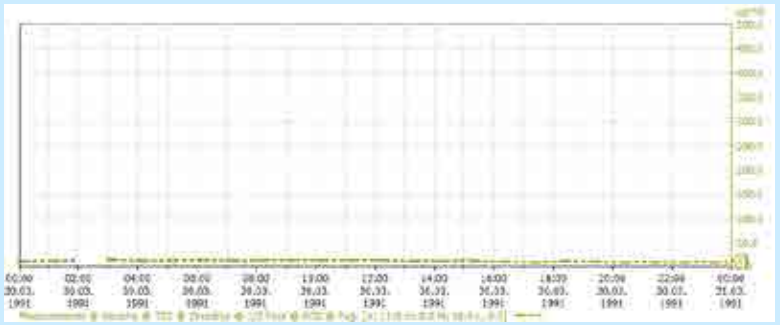
„ŠOŠTANJ91-30MARCH“

Veliki Vrh station air pollution





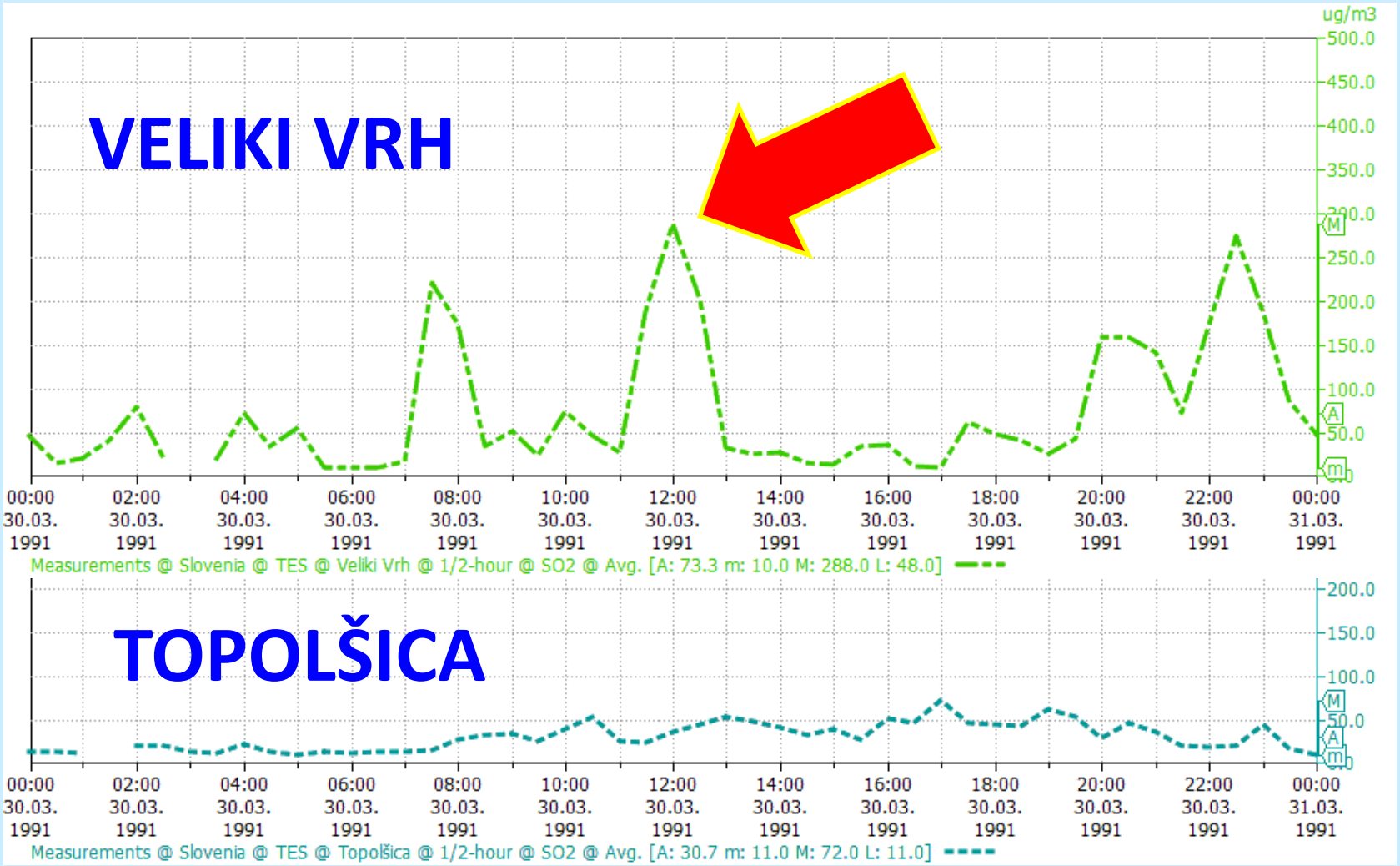




MEASUREMENTS

„ŠOŠTANJ91-30MARCH“

Veliki Vrh station air pollution



Case: 2nd April 1991

Described in the same format
As shown for case 30th March 1991

Field data set „ŠOŠTANJ91-2APRIL“

- Based on „ŠOŠTANJ91“ field data set
- Domain: Velenje basin / Šaleška valley
- Terrain complexity hlTc=(220 m, 1.5 km)
- Duration: 1-2 April 1991
- 6 automatic environmental monitoring stations
- SODAR
- 2 active emission sources from Blok1-2-3 and Blok5

„ŠOŠTANJ91-2APRIL“== complex air pollution situation with accumulation

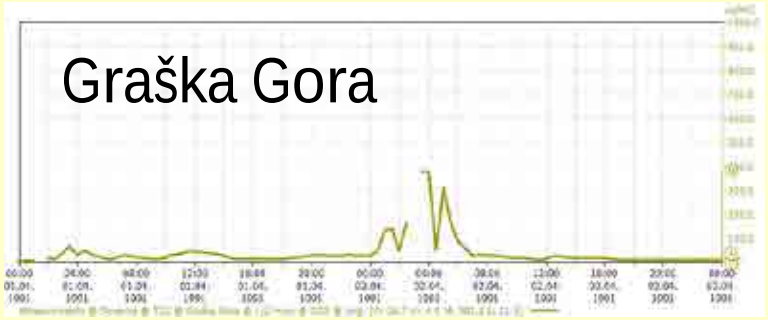
- Two stacks (Blok 1-2-3 and Blok 5) emitting SO_2
- Complex meteorological situation
- Slow spreading of air pollution
- Air pollution in all directions
- Occurance of air pollution accumulation

MEASUREMENTS

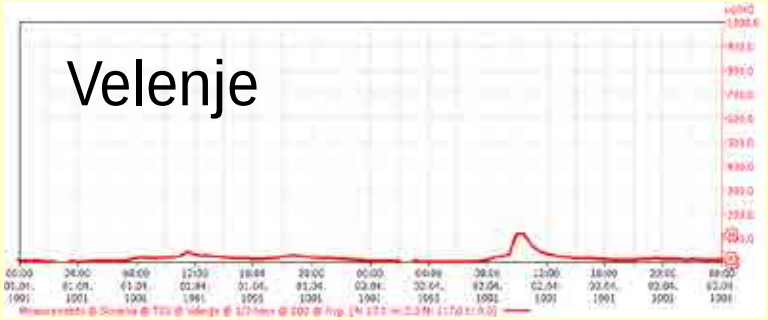
„ŠOŠTANJ91-2APRIL“ ==

1st April 00:00 – 2nd April 24:00

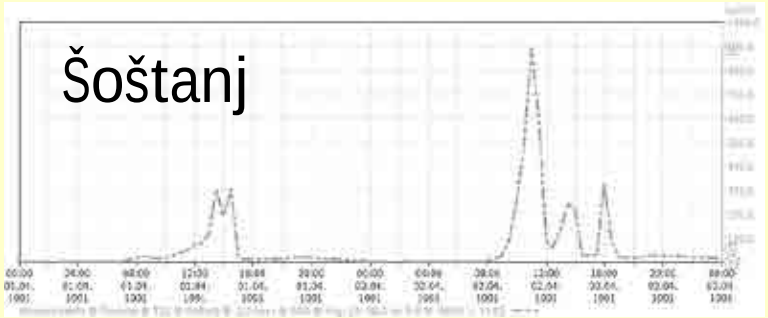
Graška Gora



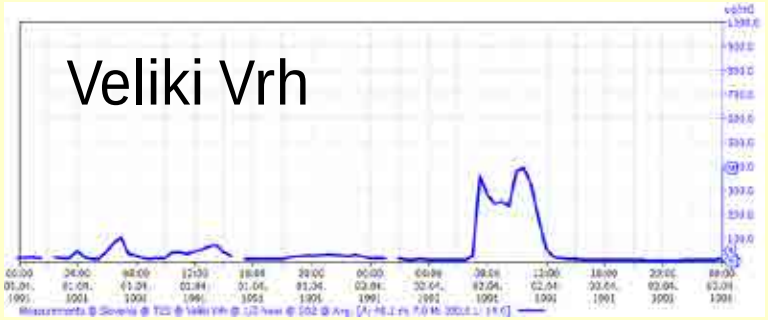
Velenje



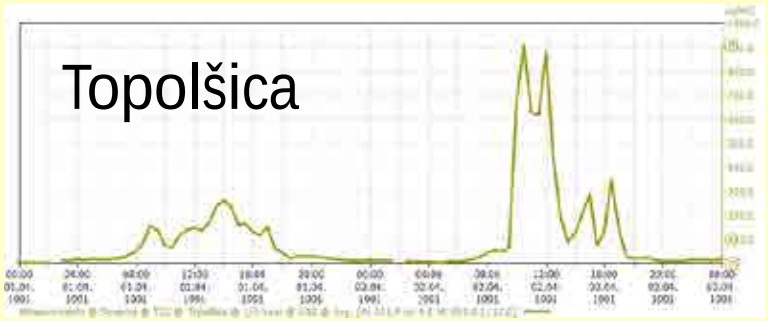
Šoštanj



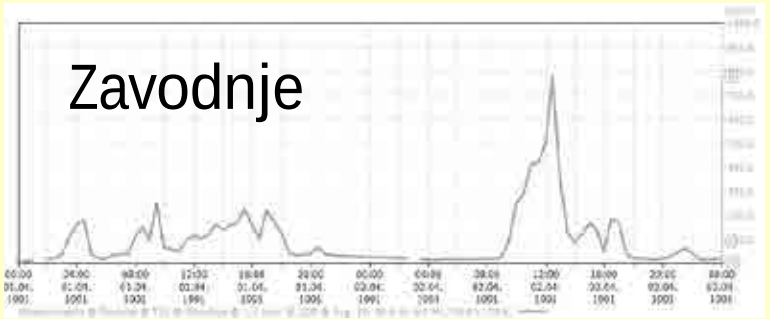
Veliki Vrh



Topolšica



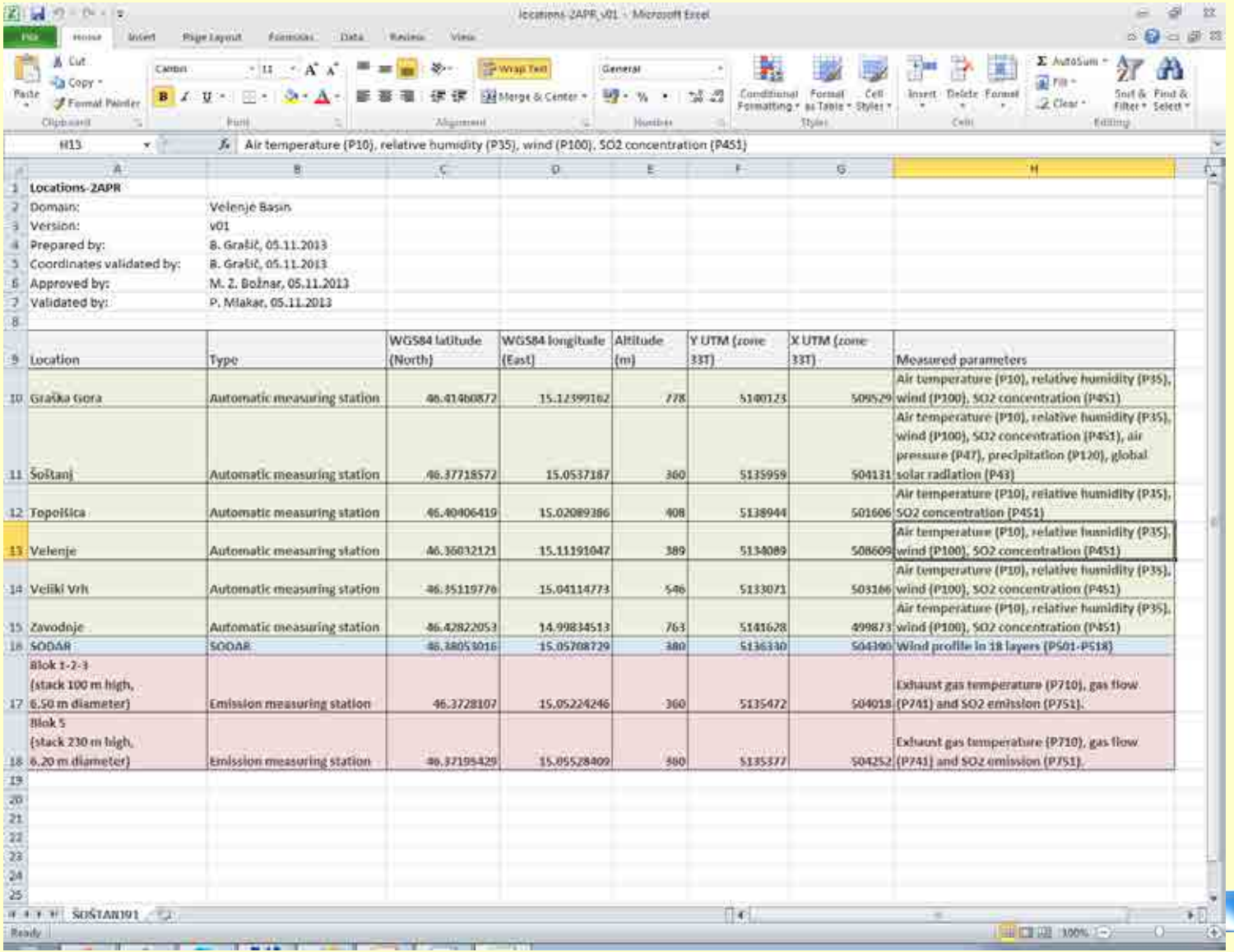
Zavodnje



Domain: Velenje basin

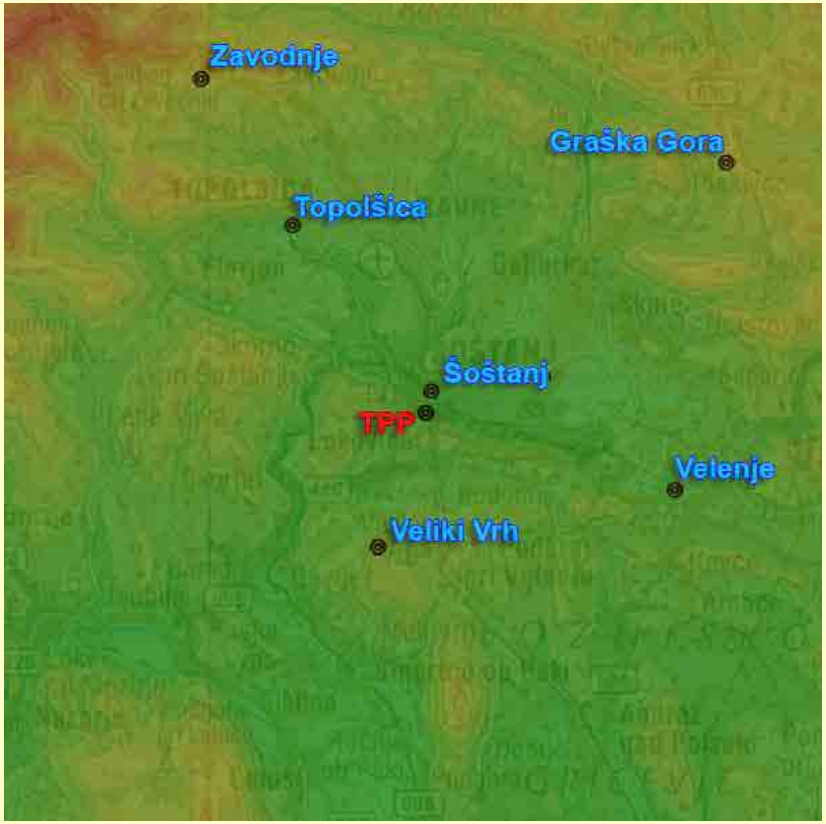
- Digital elevation model (file: ***dem_v02.xlsx***)
- Corine Landuse Cover (file: ***clc_v02.xlsx***)
- Surface Roughness Length (file: ***z0_v02.xlsx***)
- Measured environmental and emission data (files: ***locations-2APR_v01.xlsx, SOSTANJ91-2APR-data_v02.zip***)

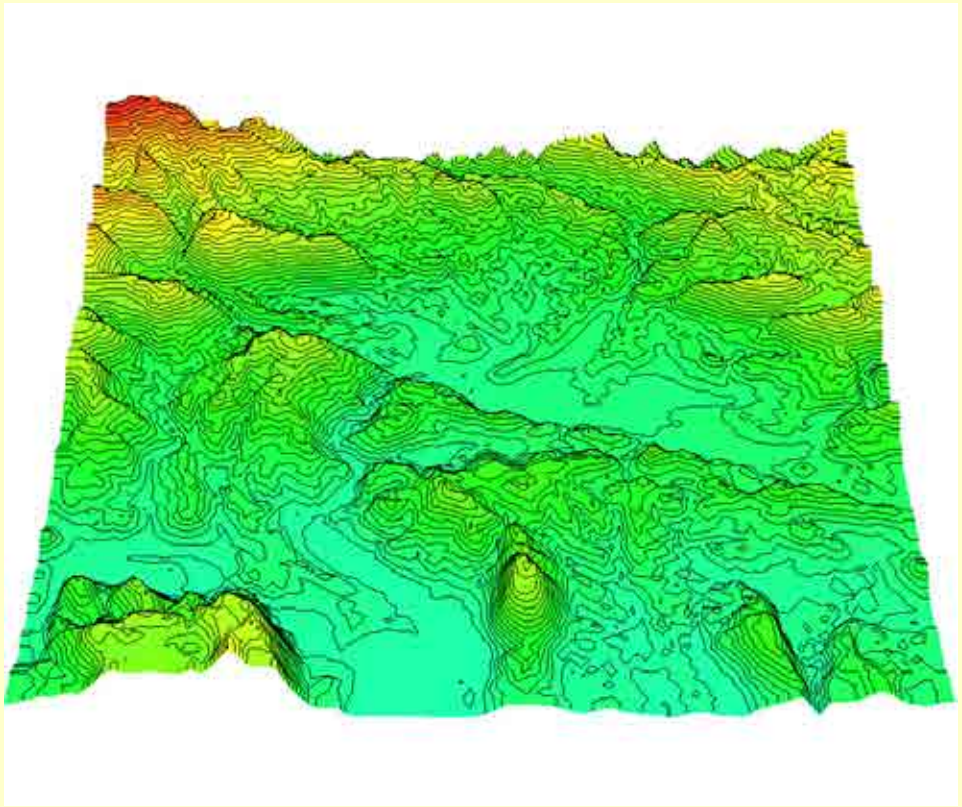
Measured environmental and emission data (file: ***locations-2APR_v01.xlsx)***



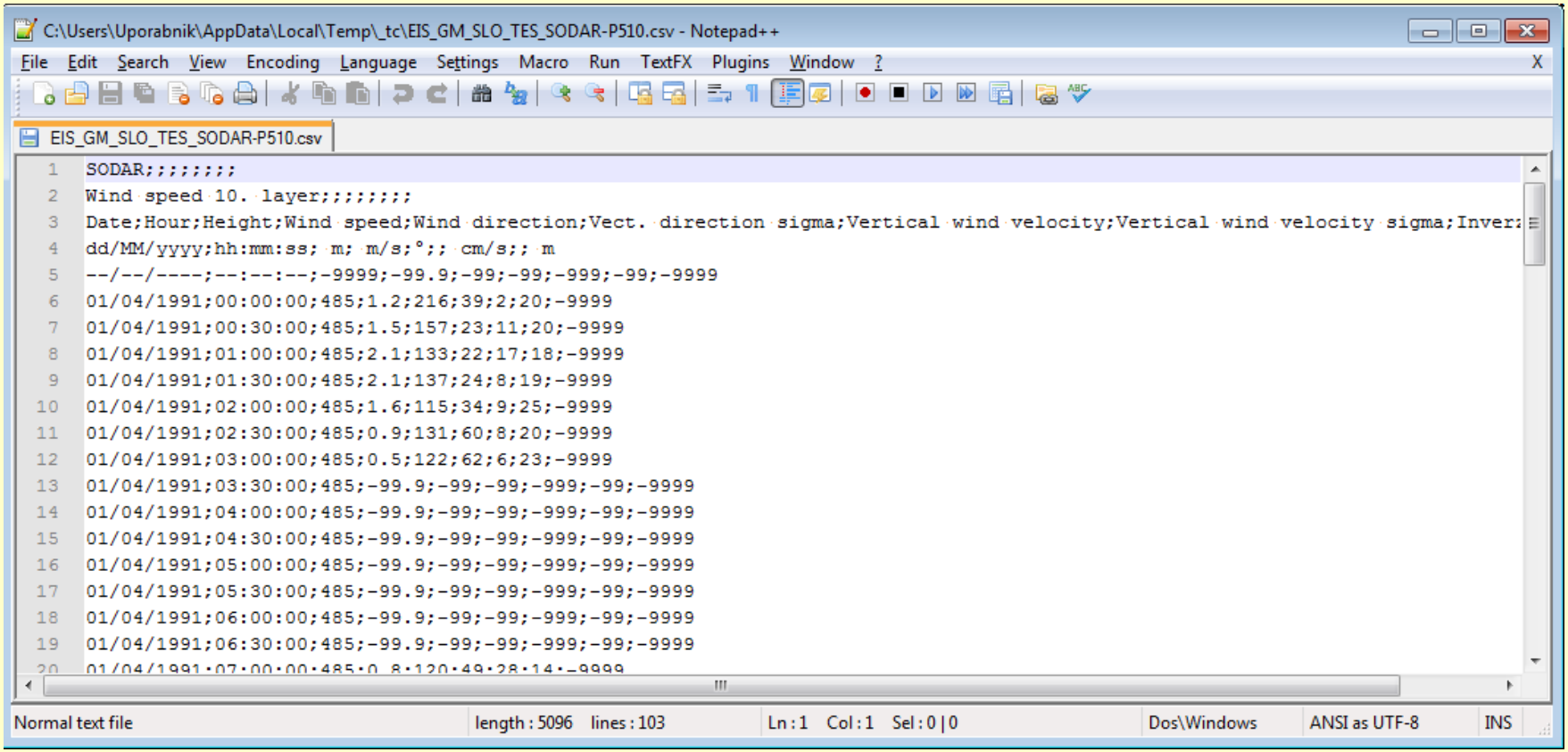
	A	B	C	D	E	F	G	H
1	Locations-2APR							
2	Domain:	Velenje Basin						
3	Version:	v01						
4	Prepared by:	B. Gralič, 05.11.2013						
5	Coordinates validated by:	B. Gralič, 05.11.2013						
6	Approved by:	M. Z. Božnar, 05.11.2013						
7	Validated by:	P. Mlakar, 05.11.2013						
8								
9	Location	Type	WGS84 latitude (North)	WGS84 longitude (East)	Altitude (m)	Y UTM (zone 33T)	X UTM (zone 33T)	Measured parameters
10	Graška Gora	Automatic measuring station	46.41460872	15.12599162	778	5140123	509529	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
11	Šoštanj	Automatic measuring station	46.37718572	15.0537187	360	5135959	504131	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451), air pressure (P47), precipitation (P120), global solar radiation (P43)
12	Topolšica	Automatic measuring station	46.40406419	15.02089386	408	5138944	501606	Air temperature (P10), relative humidity (P35), SO2 concentration (P451)
13	Velenje	Automatic measuring station	46.36032121	15.11191047	389	5134089	508609	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
14	Veliki Vrh	Automatic measuring station	46.35119776	15.04114773	546	5133071	503166	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
15	Zavodnje	Automatic measuring station	46.42822053	14.99834513	763	5141628	499873	Air temperature (P10), relative humidity (P35), wind (P100), SO2 concentration (P451)
16	SODAR	SODAR	46.38053016	15.05708729	380	5136330	504390	Wind profile in 18 layers (PS01-PS18)
17	Blok 1-2-3 (stack 100 m high, 6.50 m diameter)	Emission measuring station	46.3728107	15.05224246	360	5135472	504018	Exhaust gas temperature (P710), gas flow (P741) and SO2 emission (P751).
18	Blok 5 (stack 230 m high, 6.20 m diameter)	Emission measuring station	46.37195429	15.05528409	380	5135377	504252	Exhaust gas temperature (P710), gas flow (P741) and SO2 emission (P751).
19								
20								
21								
22								
23								
24								
25								

Measured environmental and emission data (file: ***locations-2APR_v01.xlsx)***



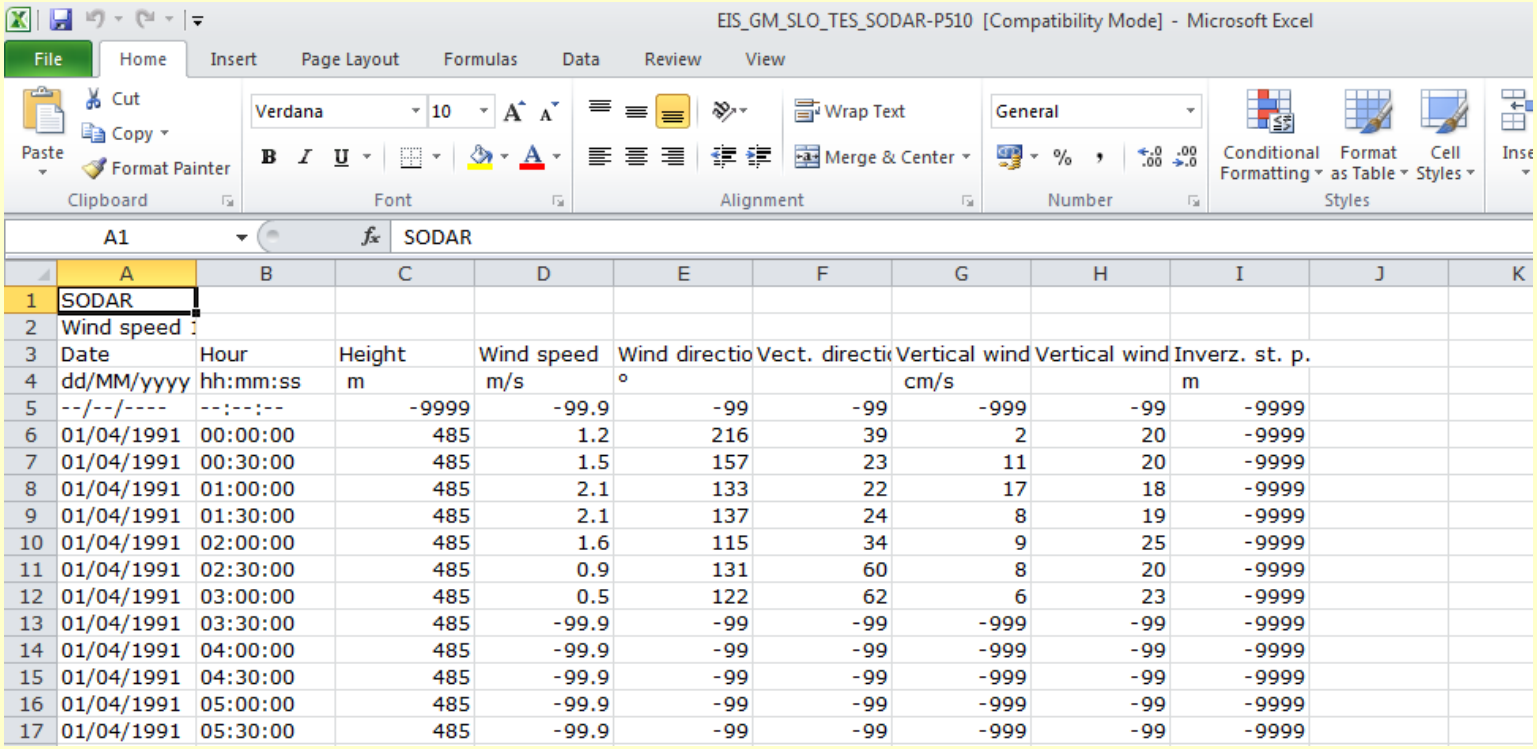


Measured environmental and emission data (file: ***SOSTANJ91-2APR-data_v02.zip)***



ZIP pack contains 53 csv files, one file for each measured parameter.

Measured environmental and emission data (file: ***SOSTANJ91-2APR-data_v02.zip)***



	A	B	C	D	E	F	G	H	I	J	K
1	SODAR										
2	Wind speed										
3	Date	Hour	Height	Wind speed	Wind directio	Vect. directi	Vertical wind	Vertical wind	Inverz. st. p.		
4	dd/MM/yyyy	hh:mm:ss	m	m/s	°		cm/s		m		
5	--/--/----	--:--:--	-9999	-99.9	-99	-99	-999	-99	-9999		
6	01/04/1991	00:00:00	485	1.2	216	39	2	20	-9999		
7	01/04/1991	00:30:00	485	1.5	157	23	11	20	-9999		
8	01/04/1991	01:00:00	485	2.1	133	22	17	18	-9999		
9	01/04/1991	01:30:00	485	2.1	137	24	8	19	-9999		
10	01/04/1991	02:00:00	485	1.6	115	34	9	25	-9999		
11	01/04/1991	02:30:00	485	0.9	131	60	8	20	-9999		
12	01/04/1991	03:00:00	485	0.5	122	62	6	23	-9999		
13	01/04/1991	03:30:00	485	-99.9	-99	-99	-999	-99	-9999		
14	01/04/1991	04:00:00	485	-99.9	-99	-99	-999	-99	-9999		
15	01/04/1991	04:30:00	485	-99.9	-99	-99	-999	-99	-9999		
16	01/04/1991	05:00:00	485	-99.9	-99	-99	-999	-99	-9999		
17	01/04/1991	05:30:00	485	-99.9	-99	-99	-999	-99	-9999		

Example of xls (Excel) file.

ZIP pack contains 53 xls files, one file for each measured parameter.

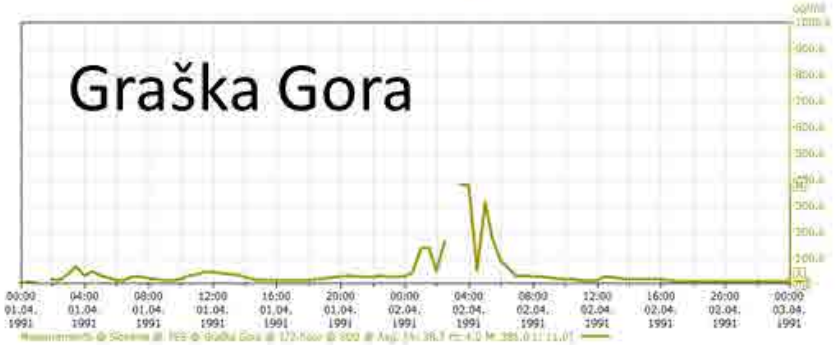
VALIDATION

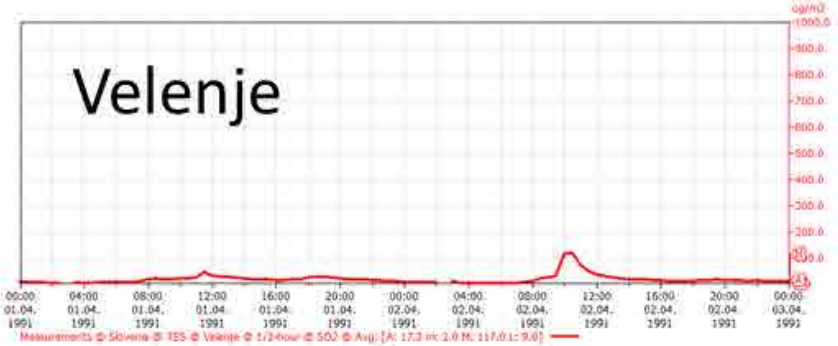
Methodology and results

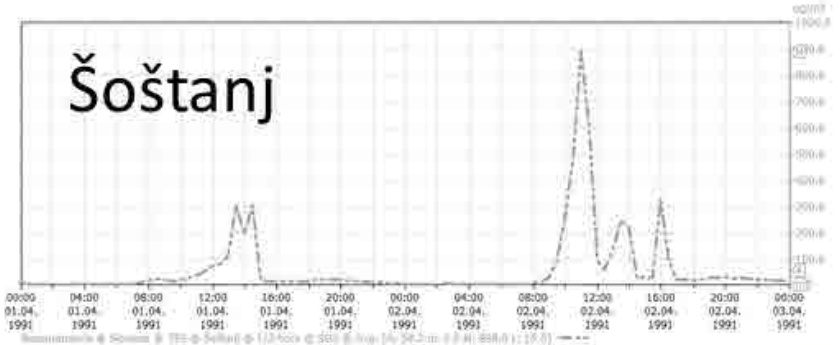
MEASUREMENTS

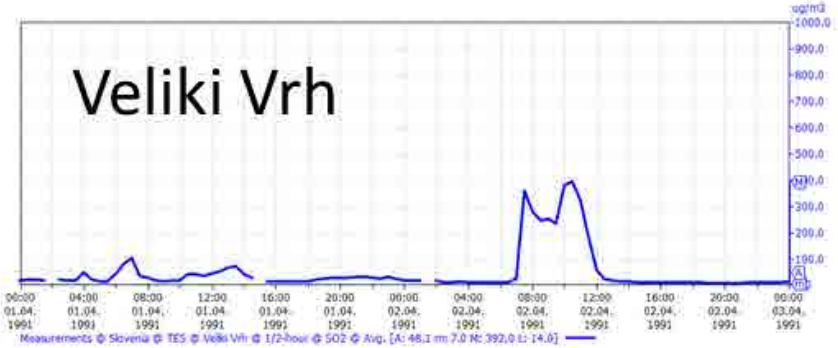
„ŠOŠTANJ91-2APRIL“ ==

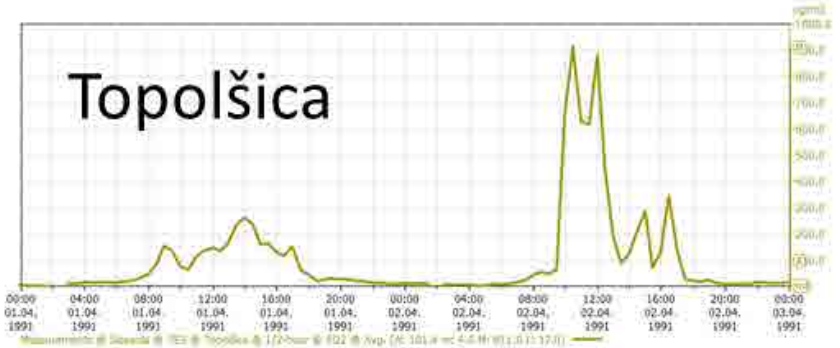
1st April 00:00 – 2nd April 24:00

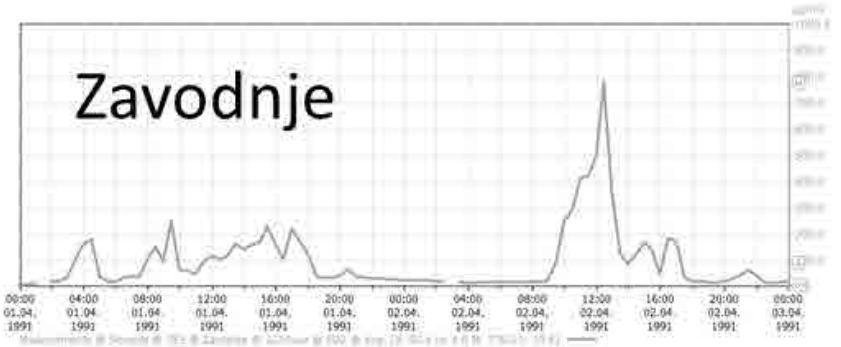




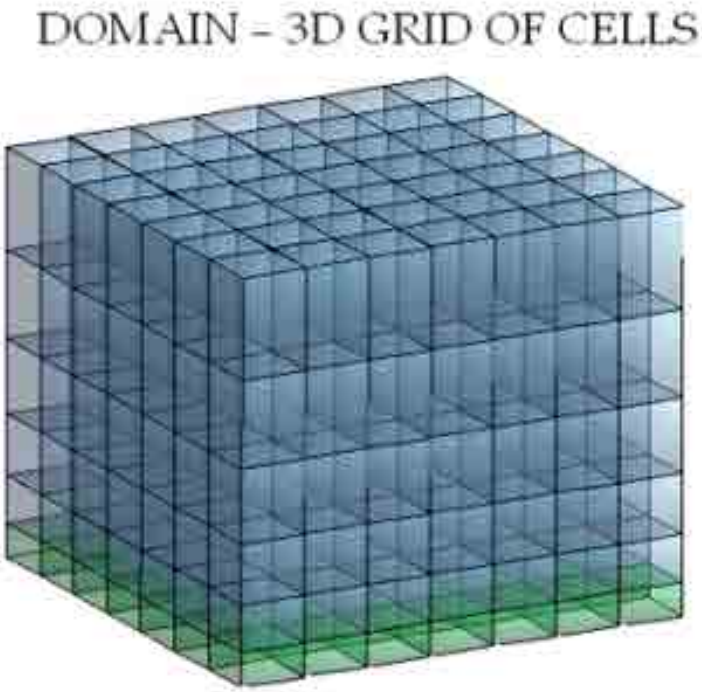


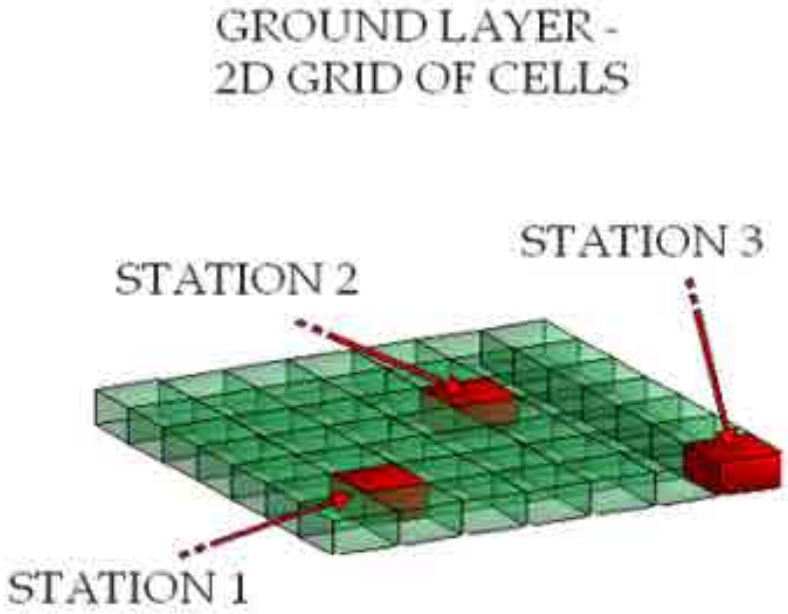






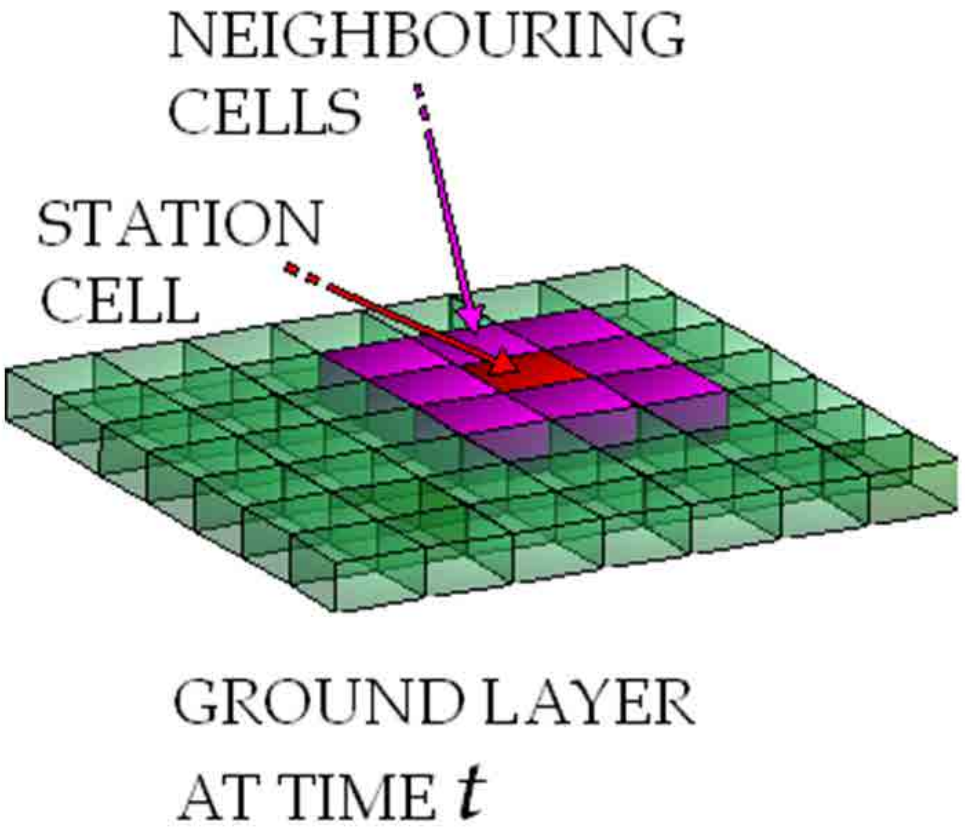
Validation methodology



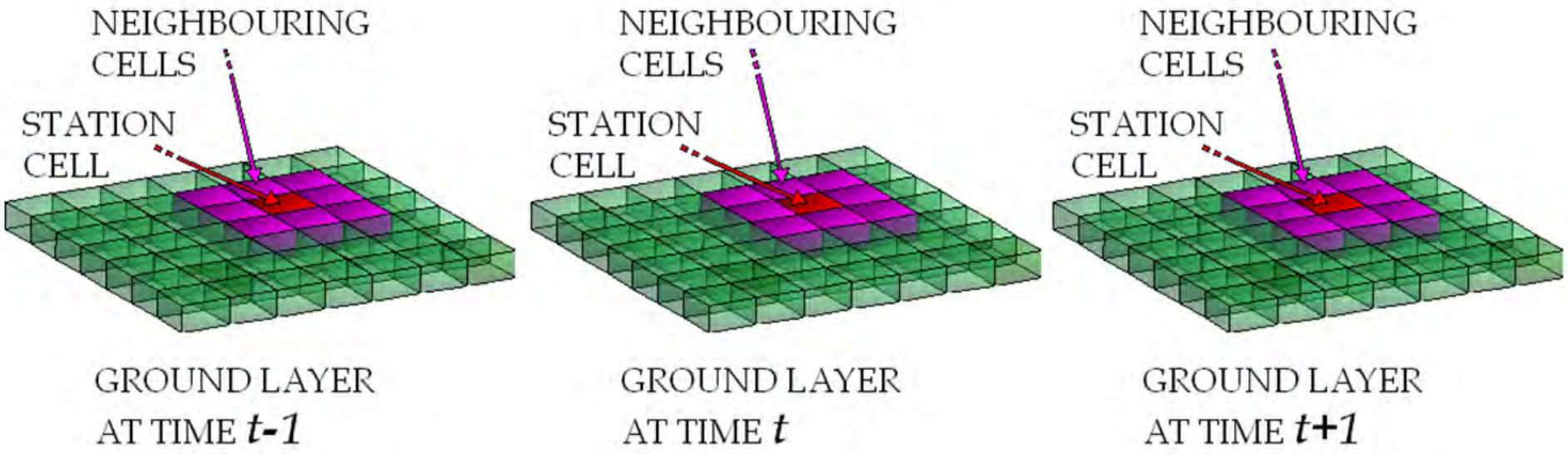


Real case: terrain following cordinates!

Errors estimation



Errors estimation

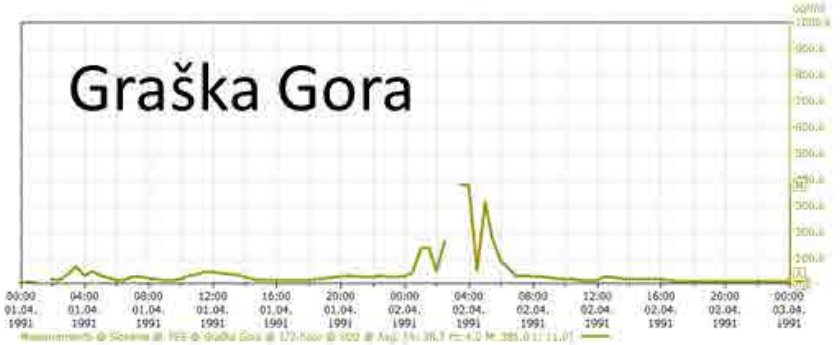


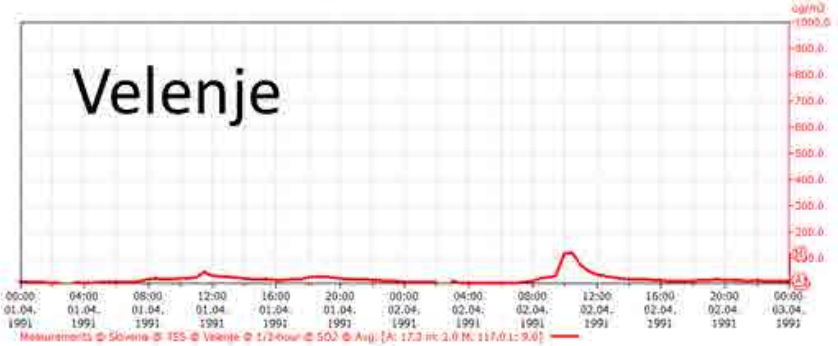
GRAŠIČ, Boštjan, MLAKAR, Primož, BOŽNAR, Marija,
Method for validation of Lagrangian particle air pollution dispersion model based on experimental field data set from complex terrain. V: NEJADKOORKI, Farhad (ed.) *Advanced air pollution*. Rijeka: InTech, cop. 2011, 535-556.

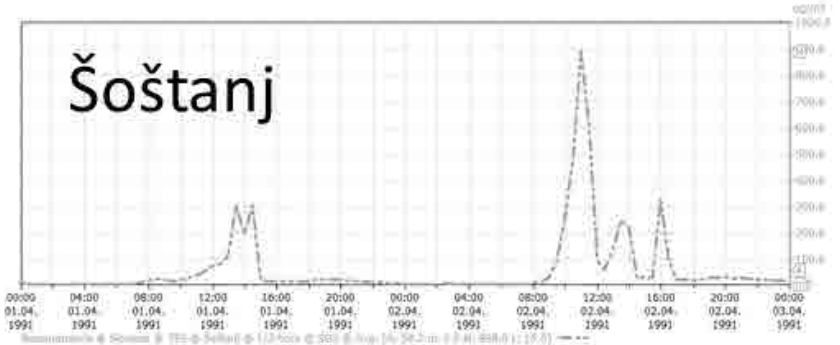
MEASUREMENTS

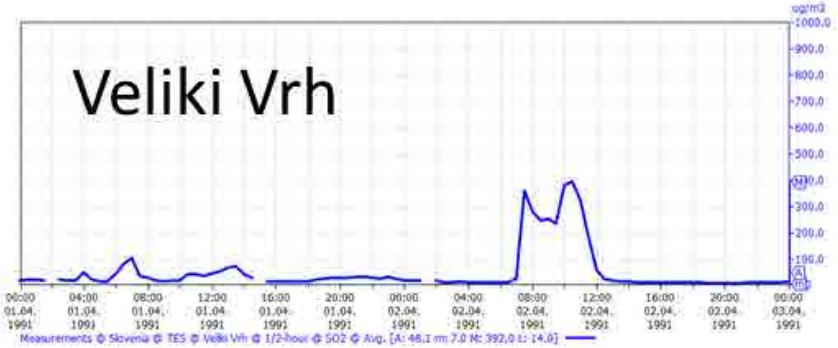
„ŠOŠTANJ91-2APRIL“ ==

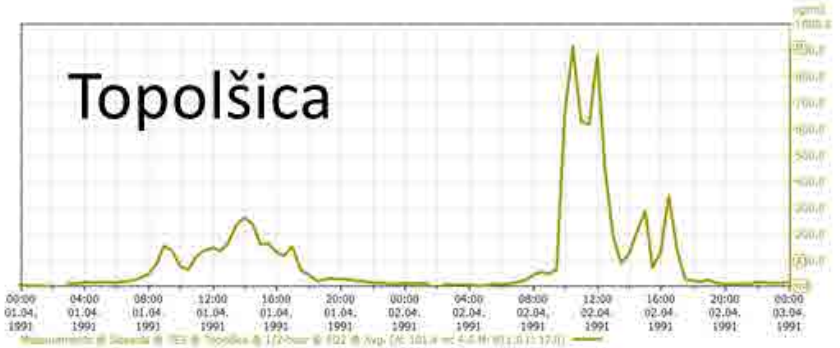
1st April 00:00 – 2nd April 24:00

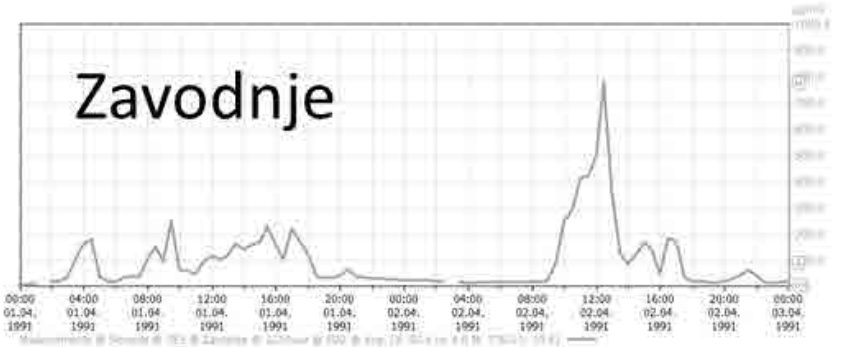




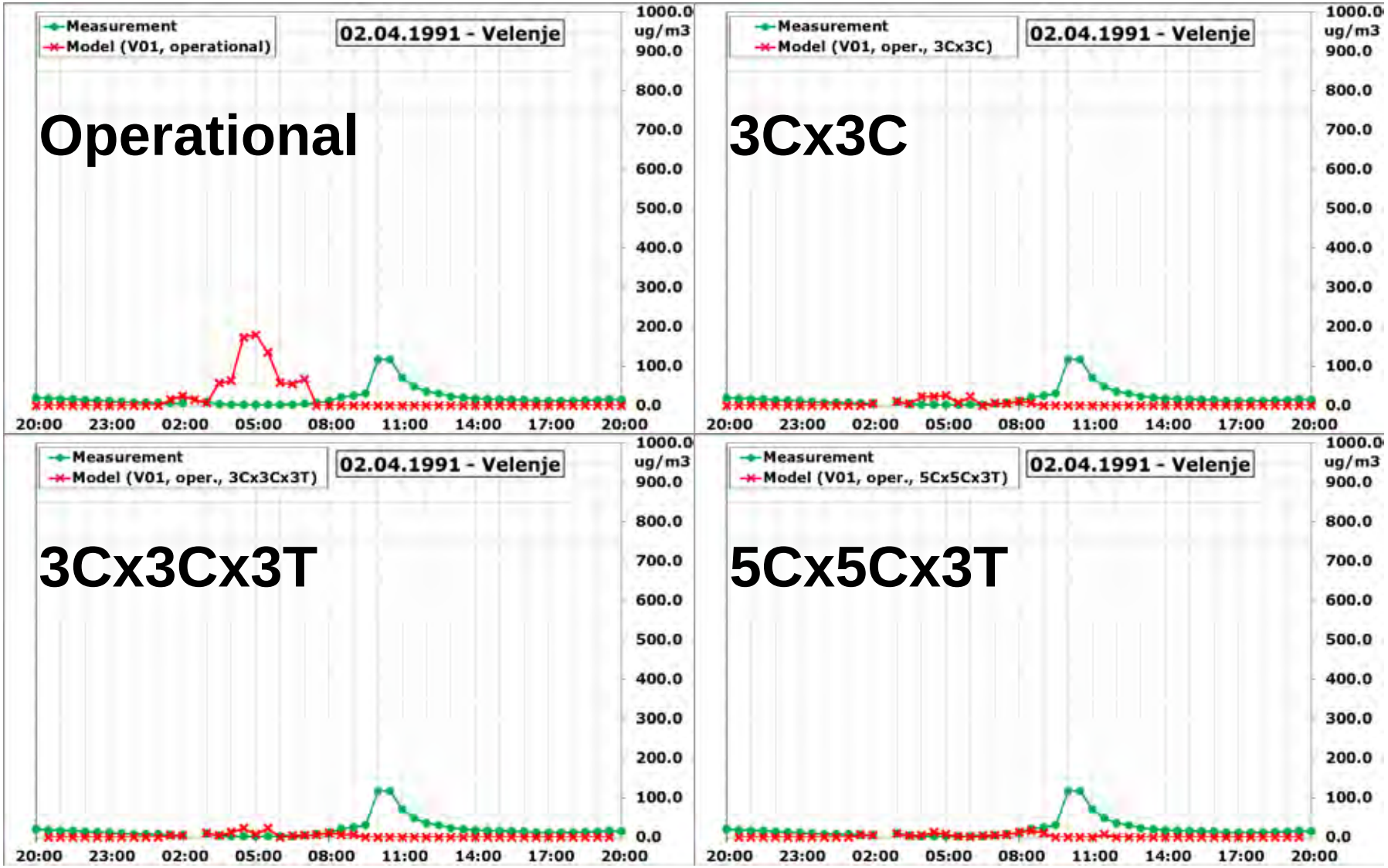








Velenje


Measurement
Model (V01, operational)
02.04.1991 - Velenje
Operational
Measurement
Model (V01, oper., 3Cx3C)
02.04.1991 - Velenje
3Cx3C
Measurement
Model (V01, oper., 3Cx3Cx3T)
02.04.1991 - Velenje
3Cx3Cx3T
Measurement
Model (V01, oper., 5Cx5Cx3T)
02.04.1991 - Velenje
5Cx5Cx3T
1000.0
ug/m3
900.0
800.0
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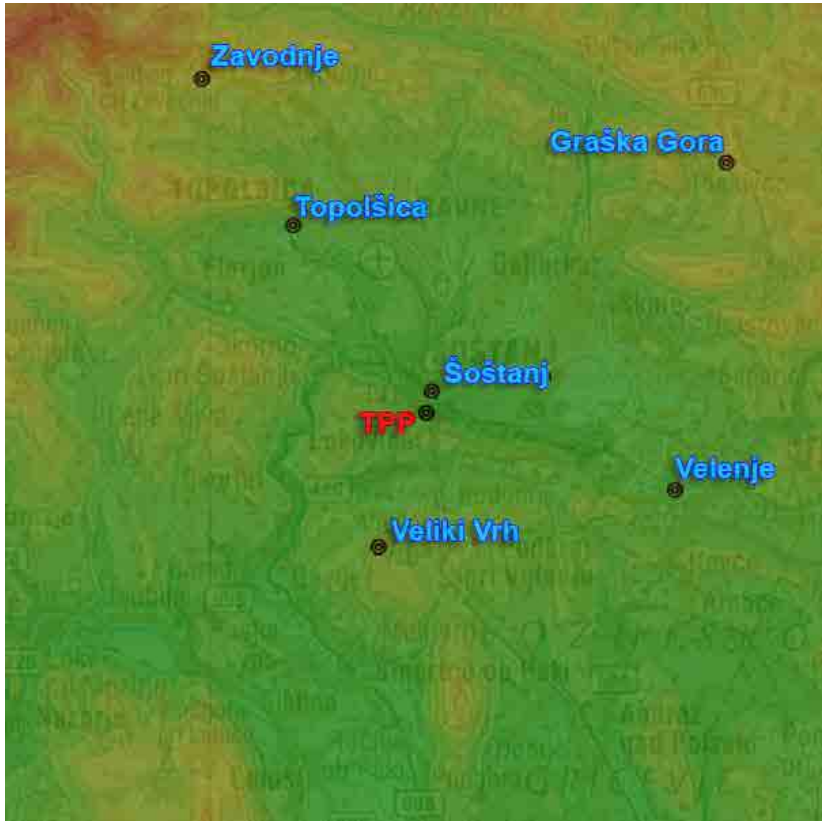
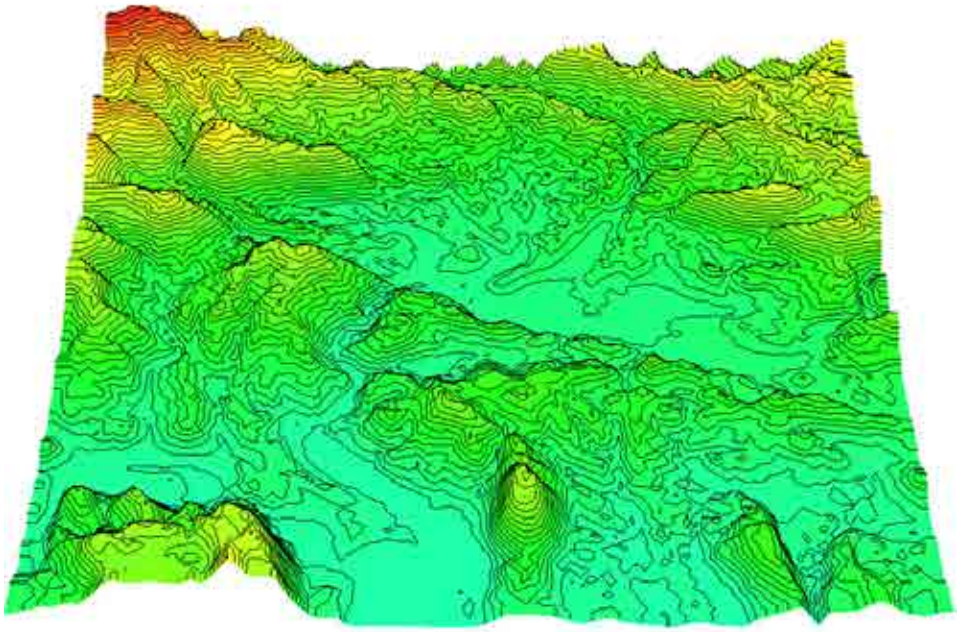
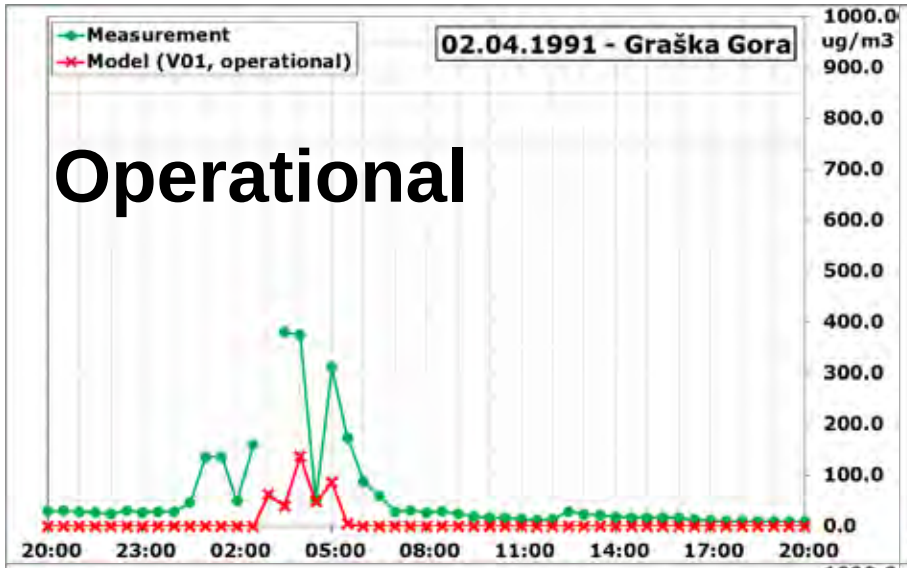
ŠOŠTANJ TPP and stations

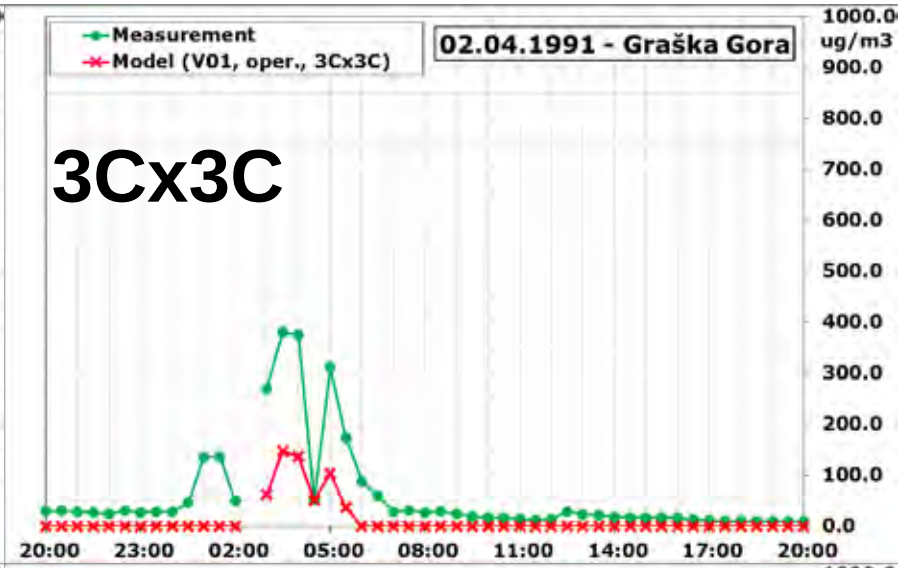




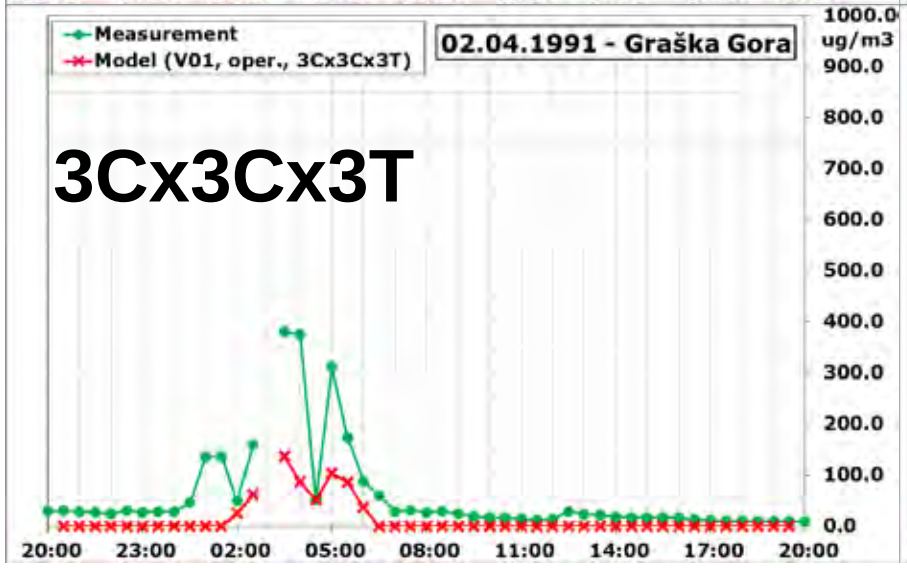
Graška Gora



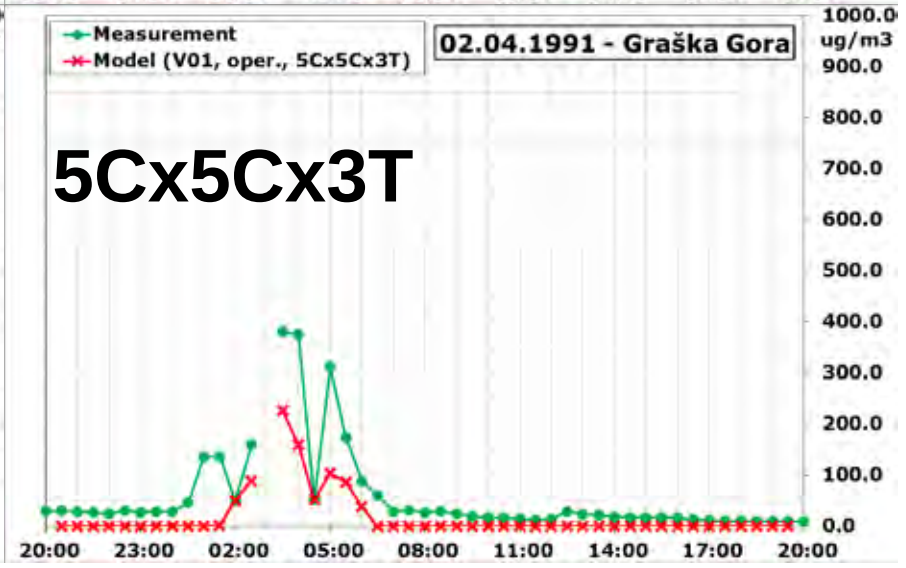
Operational



3Cx3C

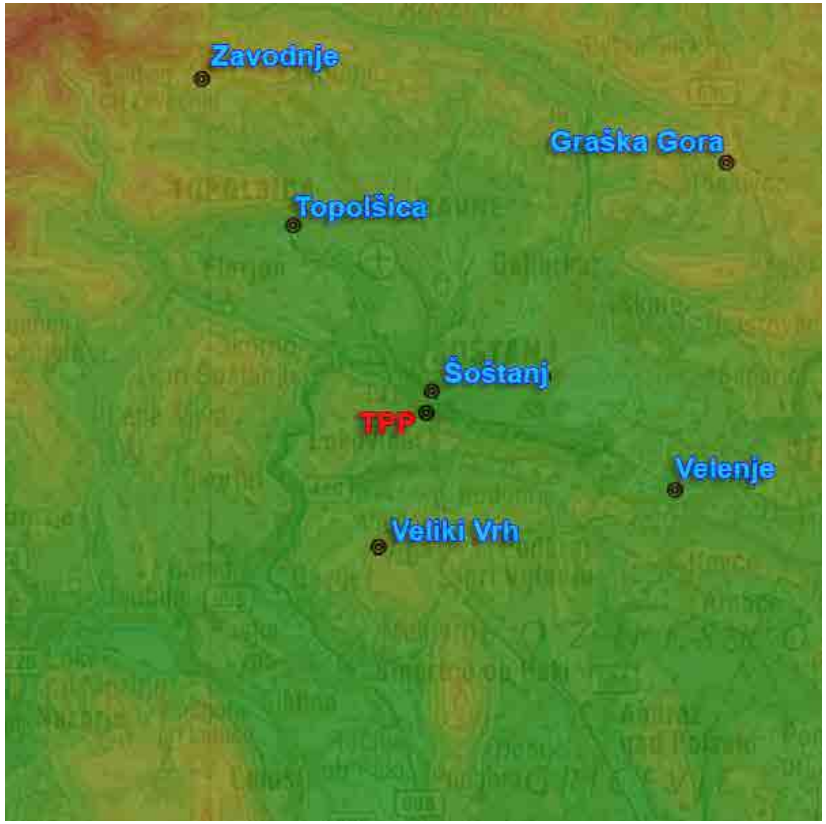


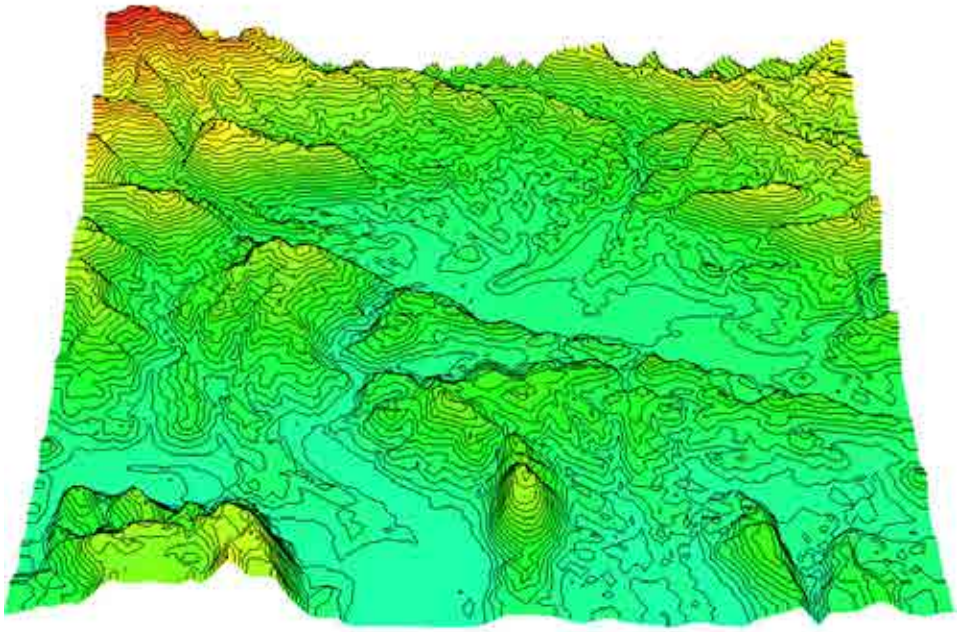
3Cx3Cx3T



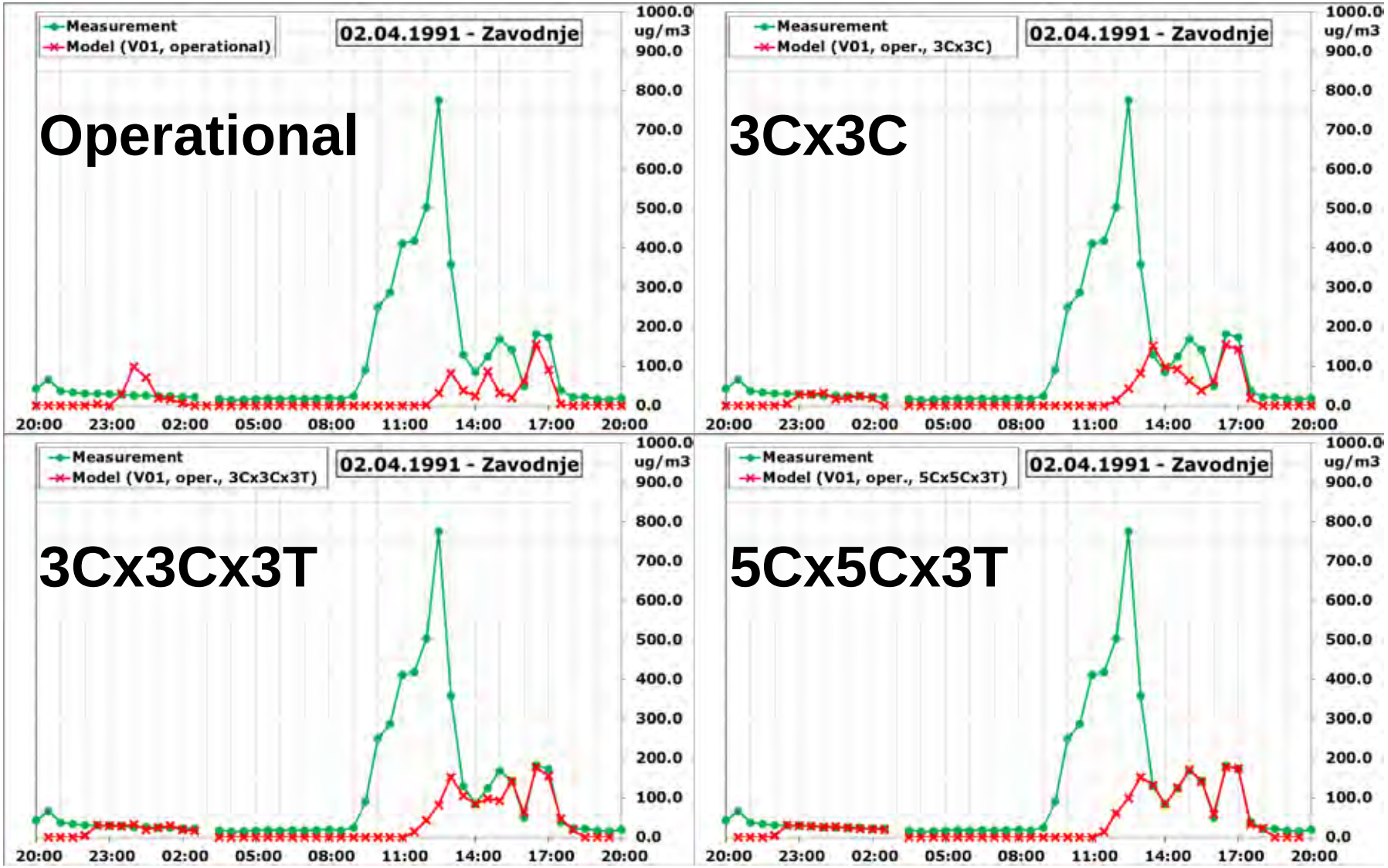
5Cx5Cx3T

ŠOŠTANJ TPP and stations





Zavodnje


Measurement
Model (V01, operational)
02.04.1991 - Zavodnje
Operational
Measurement
Model (V01, oper., 3Cx3C)
02.04.1991 - Zavodnje
3Cx3C
Measurement
Model (V01, oper., 3Cx3Cx3T)
02.04.1991 - Zavodnje
3Cx3Cx3T
Measurement
Model (V01, oper., 5Cx5Cx3T)
02.04.1991 - Zavodnje
5Cx5Cx3T
ug/m3
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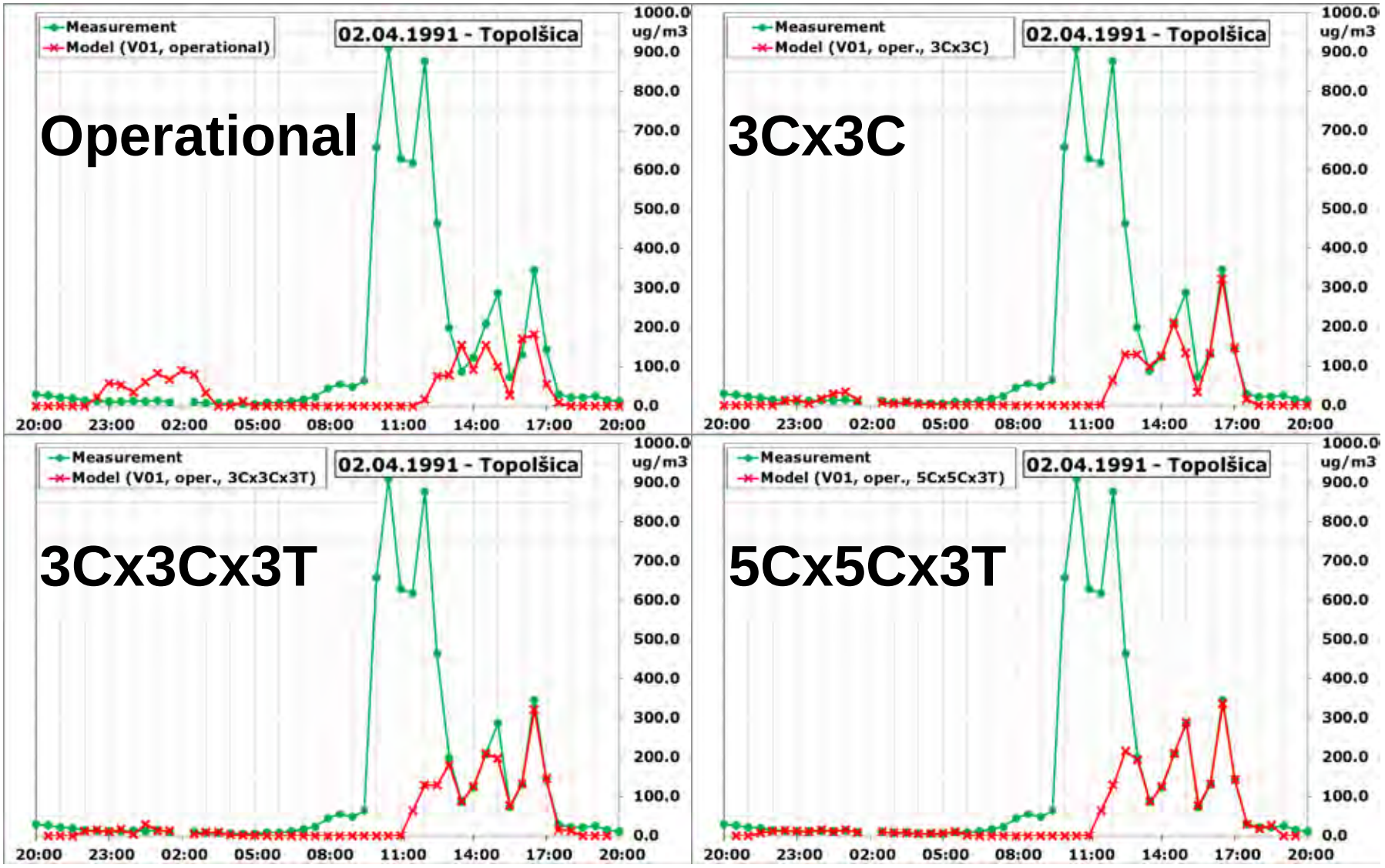
Topolšica


Measurement
Model (V01, operational)
02.04.1991 - Topolšica
Operational
Measurement
Model (V01, oper., 3Cx3C)
02.04.1991 - Topolšica
3Cx3C
Measurement
Model (V01, oper., 3Cx3Cx3T)
02.04.1991 - Topolšica
3Cx3Cx3T
Measurement
Model (V01, oper., 5Cx5Cx3T)
02.04.1991 - Topolšica
5Cx5Cx3T
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ug/m3
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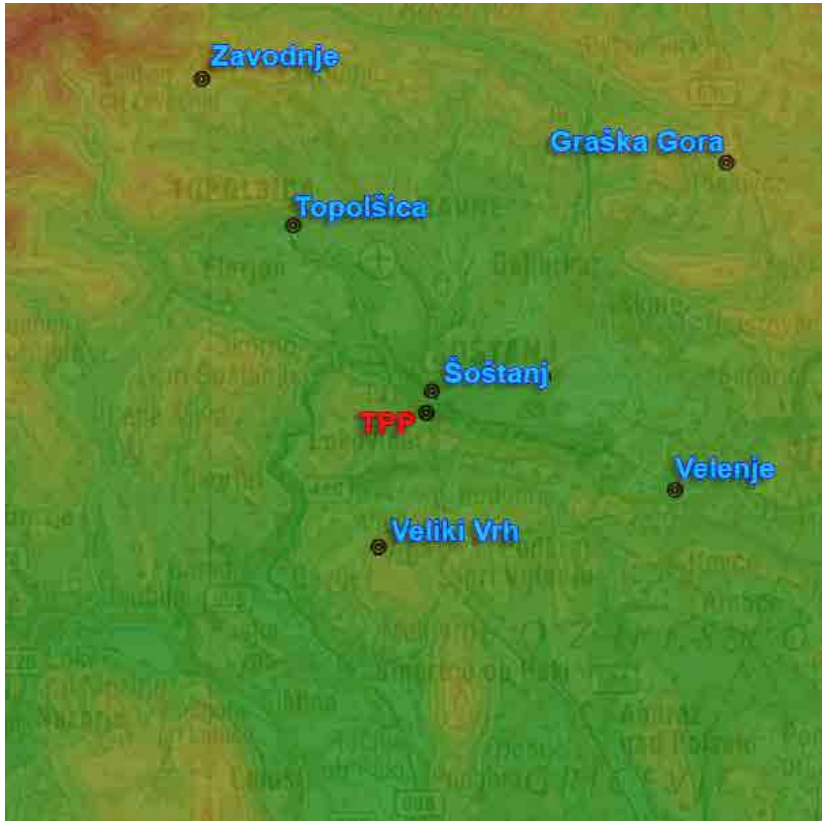
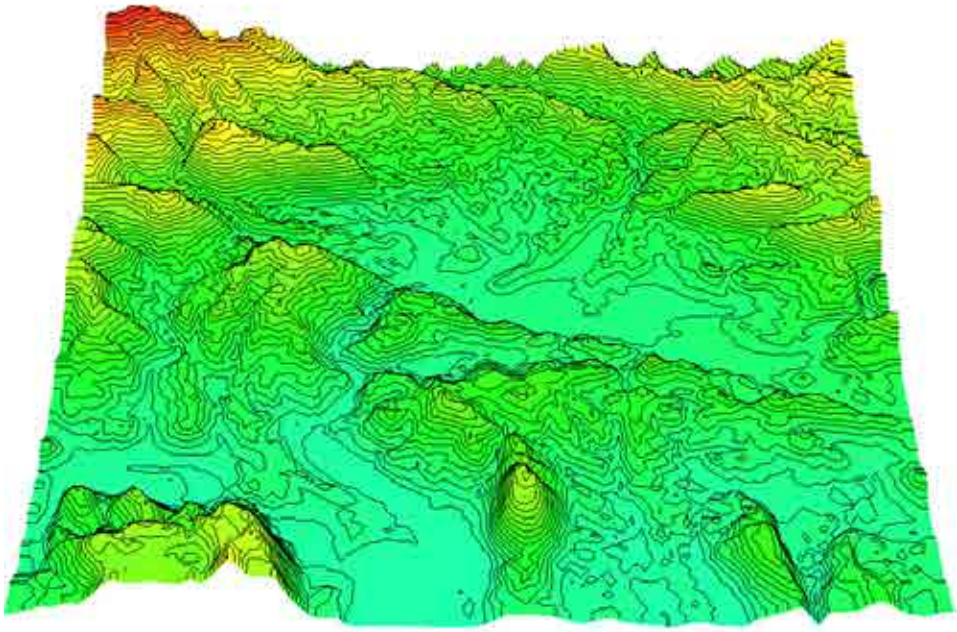
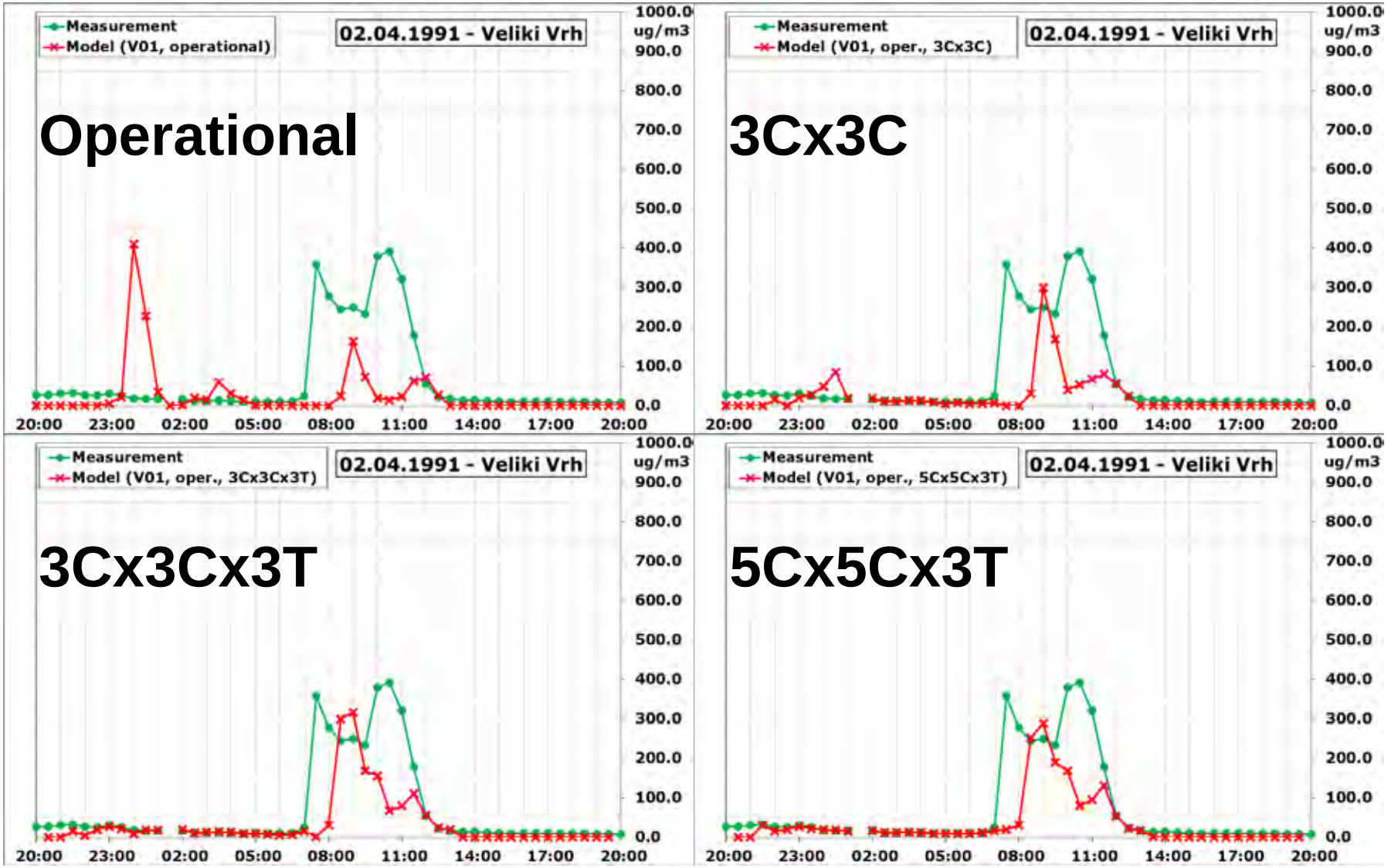
ŠOŠTANJ TPP and stations





Veliki Vrh


Measurement
Model (V01, operational)
02.04.1991 - Veliki Vrh
Operational
Measurement
Model (V01, oper., 3Cx3C)
02.04.1991 - Veliki Vrh
3Cx3C
Measurement
Model (V01, oper., 3Cx3Cx3T)
02.04.1991 - Veliki Vrh
3Cx3Cx3T
Measurement
Model (V01, oper., 5Cx5Cx3T)
02.04.1991 - Veliki Vrh
5Cx5Cx3T
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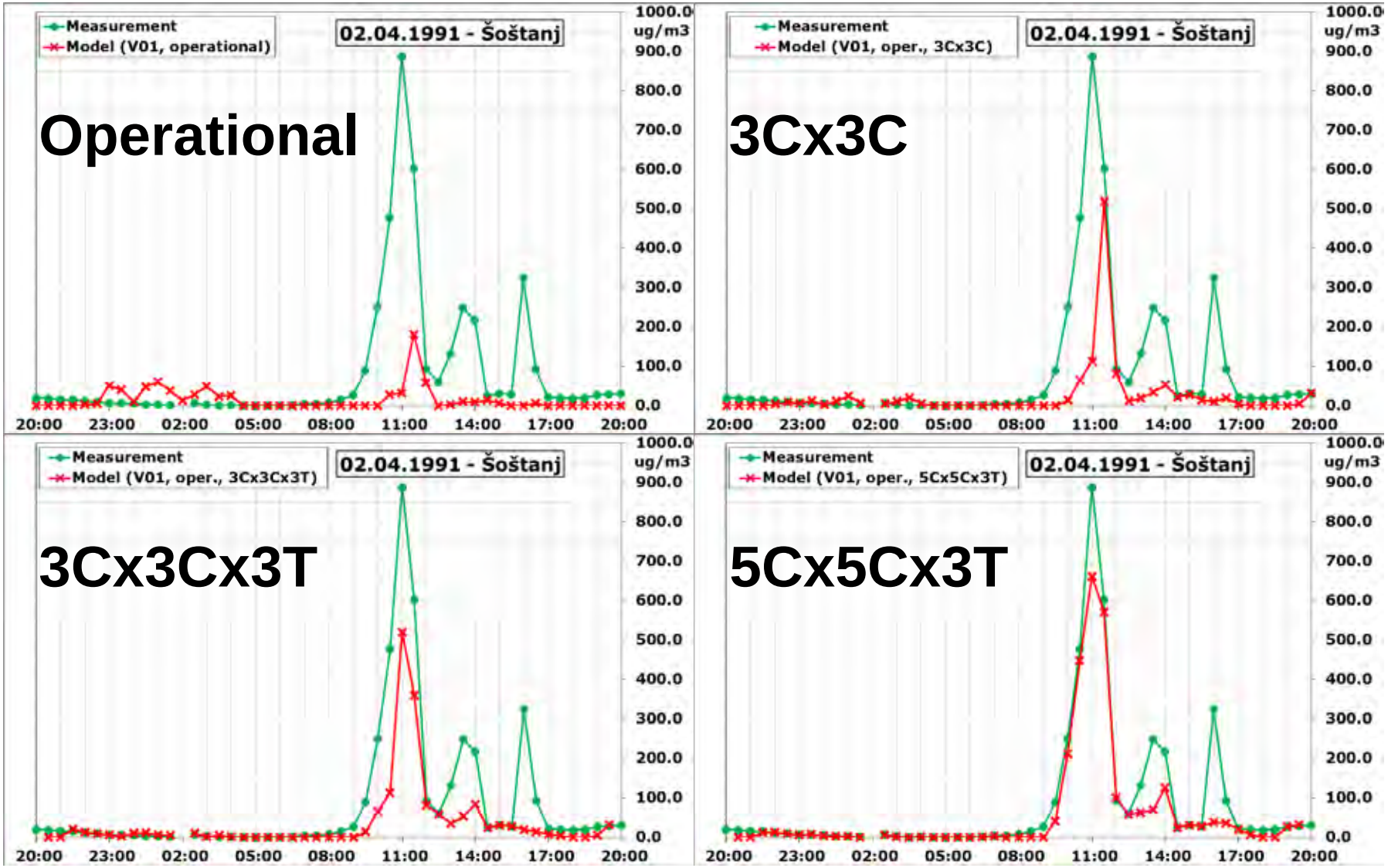
Šoštanj


Operational
Measurement
Model (V01, operational)
02.04.1991 - Šoštanj
3Cx3C
Measurement
Model (V01, oper., 3Cx3C)
02.04.1991 - Šoštanj
3Cx3Cx3T
Measurement
Model (V01, oper., 3Cx3Cx3T)
02.04.1991 - Šoštanj
5Cx5Cx3T
Measurement
Model (V01, oper., 5Cx5Cx3T)
02.04.1991 - Šoštanj
ug/m3
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Thank you!!!

For data write to:

info@meis.si