Air quality problems in Corrales - Use of atmospheric and dispersion modeling to investigate possible impacts of emissions on the Corrales Community (III)

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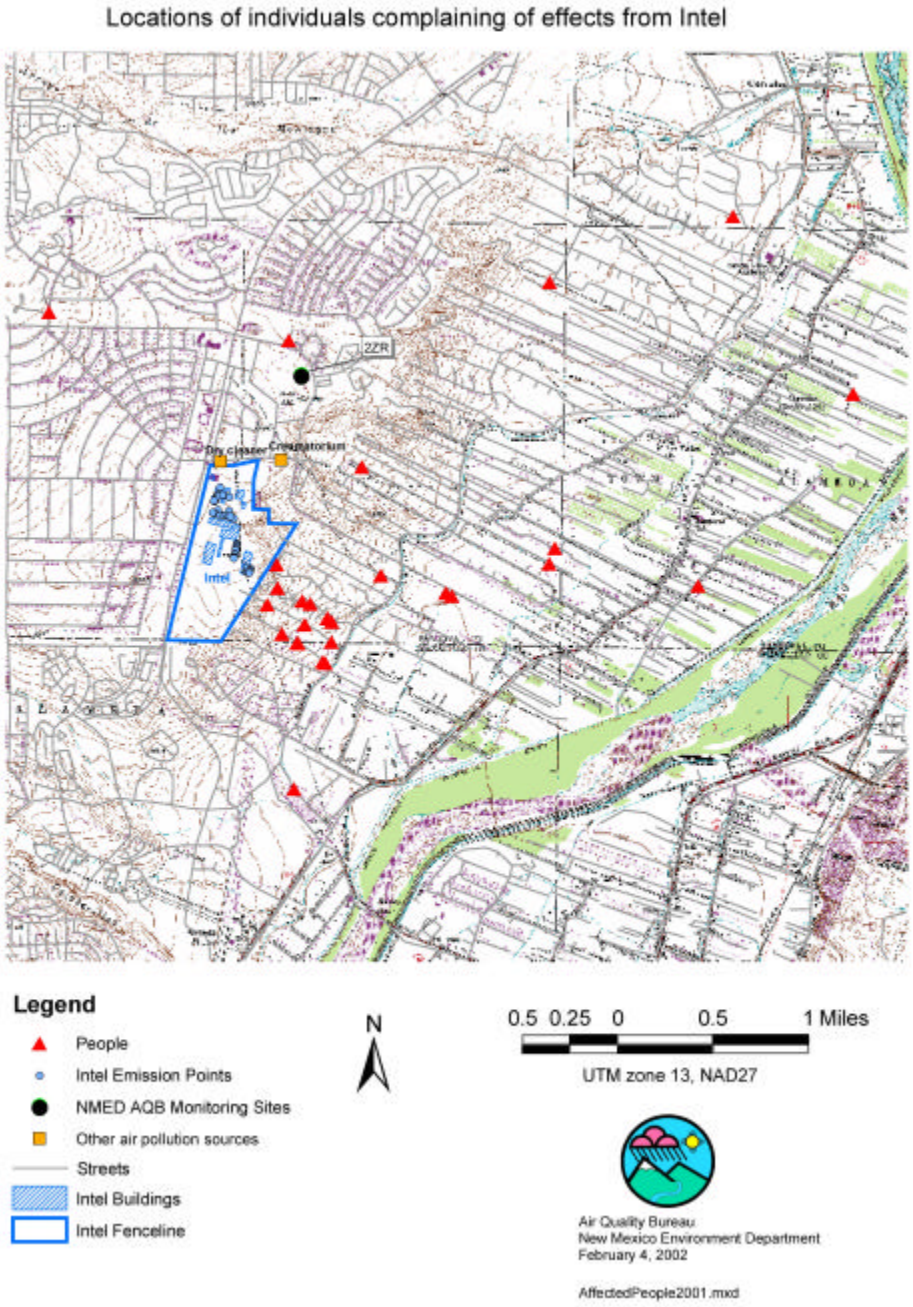
5 February 2004

Atmospheric and dispersion modeling applied to the Corrales area - *Scope of work*

- Furnish NM Environment Department Air Quality Bureau (AQB) with a dispersion modeling analysis using CALMET and CALPUFF models for the Village of Corrales.
- Use a Lagrangian Random Particle Dispersion Model to further examine several selected episodes.
- Identify areas of maximum concentrations for an annual cycle.
- Present modeling results and answer questions regarding the modeling at a public meeting in Corrales.



Map of locations of individuals with health complaints - in Rio Rancho and Corrales

Notice small spatial ranges of the map 4miles x 4miles

Greatest number of the complaints is near Intel (to the southeast)

Complaints: 1 July 2001 - 28 June 2002 Time of the day/night

- Total of 60 reported complaints (45 with identified time of the day/night).
- Nighttime (22-06 LST)xxxxxxxxxxxxxxxxxx - 17
- Morning (06-12 LST) xxxxxxx - 7
- Afternoon (12-18 LST) xxxx - 4
- Evening (18-22 LST) xxxxxxxxxxxxxxxxxx - 17

Complaints: 1 July 2001 - 28 June 2002
By season

- Summer (Jun,Jul, Aug): 28 cases
- Fall (Sep,Oct,Nov): 23 cases
- Winter (Dec,Jan,Feb): 6 cases
- Spring (Mar,Apr,May): 3 cases

Atmospheric and dispersion modeling applied to the Corrales area
- *Completed work*

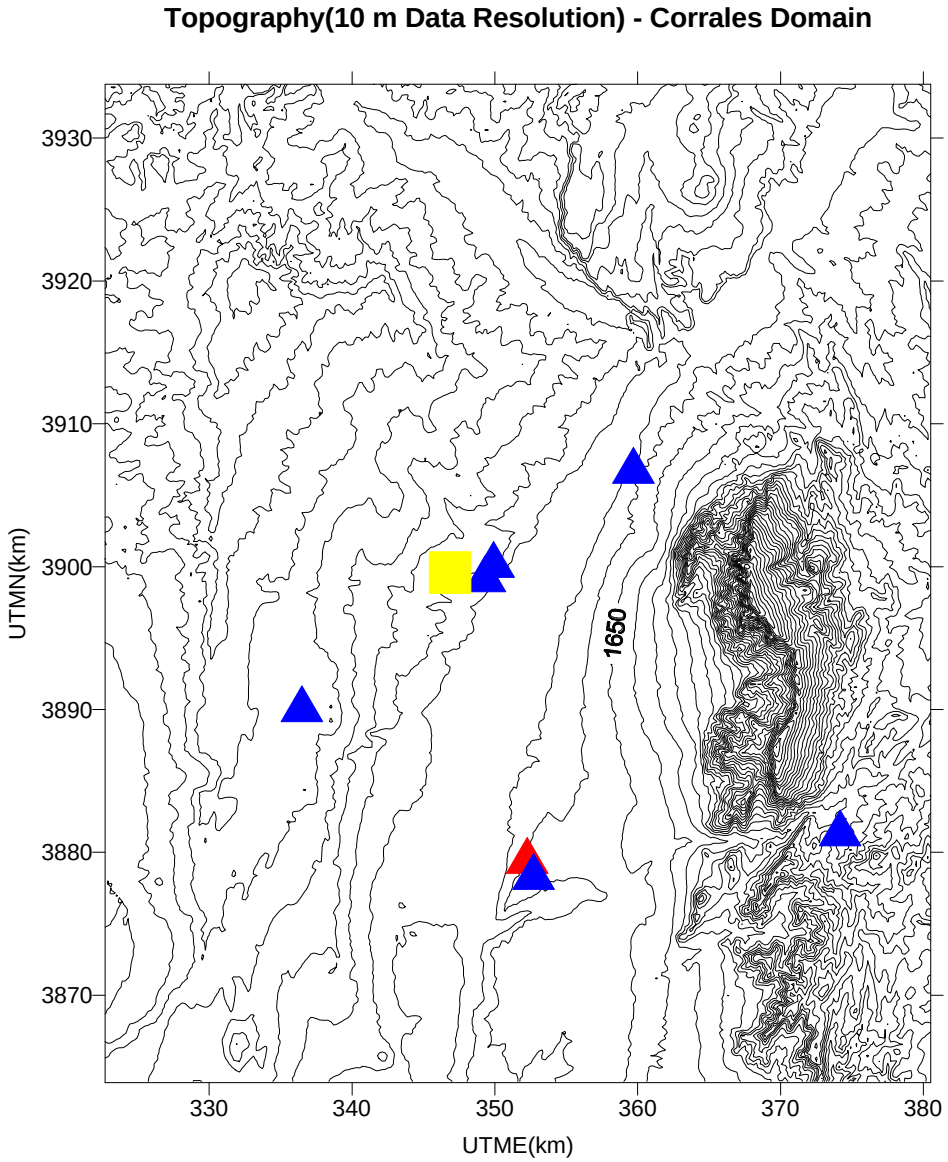
- Full annual cycle (1 July 2001 - 31 June 2002) was simulated using the atmospheric model CALMET.

- Full annual cycle (1 July 2001 - 31 June 2002) was simulated using the dispersion model CALPUFF.

- Seven characteristic episodes (8 Corrales complaint cases) were simulated using a Lagrangian Random Particle Dispersion Model.

Study results
1. Meteorology

- Method: Analyze results from the atmospheric model CALMET that was ran for entire year (1 July 2001 – 30 June 2002).
- Model grid: 51 km x 44 km centered at Corrales/Intel area.
- Model horizontal resolution: 200 m x 200 m.
- Resolution of topography: 10 m x 10 m.
- Atmospheric model outputs: 90 Gigabytes



What is the larger topographic setup of this small area around Intel?

This is complex terrain - induces local complex meteorology: channeled flow (valleys, canyons), downslope winds (nighttime), upslope convective flows (daytime, warm season).

To fully capture all meteorology that is needed to compute the transport and dispersion of atmospheric pollutants, we need many measuring stations (surface and elevated levels) - NOT REALISTIC AND FEASIBLE. SOLUTION: USE MODELS.

To understand the meteorology - *Conceptual model*

- Difficulty in understanding the meteorology:

  - Synoptic forcing on the large scale (high and low pressure systems, fronts, advection)

  - Topographic forcing (mountains, ridges, valleys)

  - Seasonal effects (variation in the intensity of solar radiation)

  - Diurnal variation (change of heating/cooling during the day/night)

New Mexico - Corrales
Strong topographic forcing

- Corrales

  - *To the east*

North-south curving river valley

Steep mountain

  - *To the west*

Gradual up-sloped terrain

High plateau

New Mexico - Corrales
General wind properties (I)

- Winter

  - *Mostly easterly and northerly flows. They are mainly channeled into the north-south valley alignment. Wind speeds and the mixing depth are generally low.*

- Summer

  - *Mainly westerly/northwesterly and southwesterly/southerly flows. Also channeled along the valley. Wind speeds and the mixing depth are generally high.*

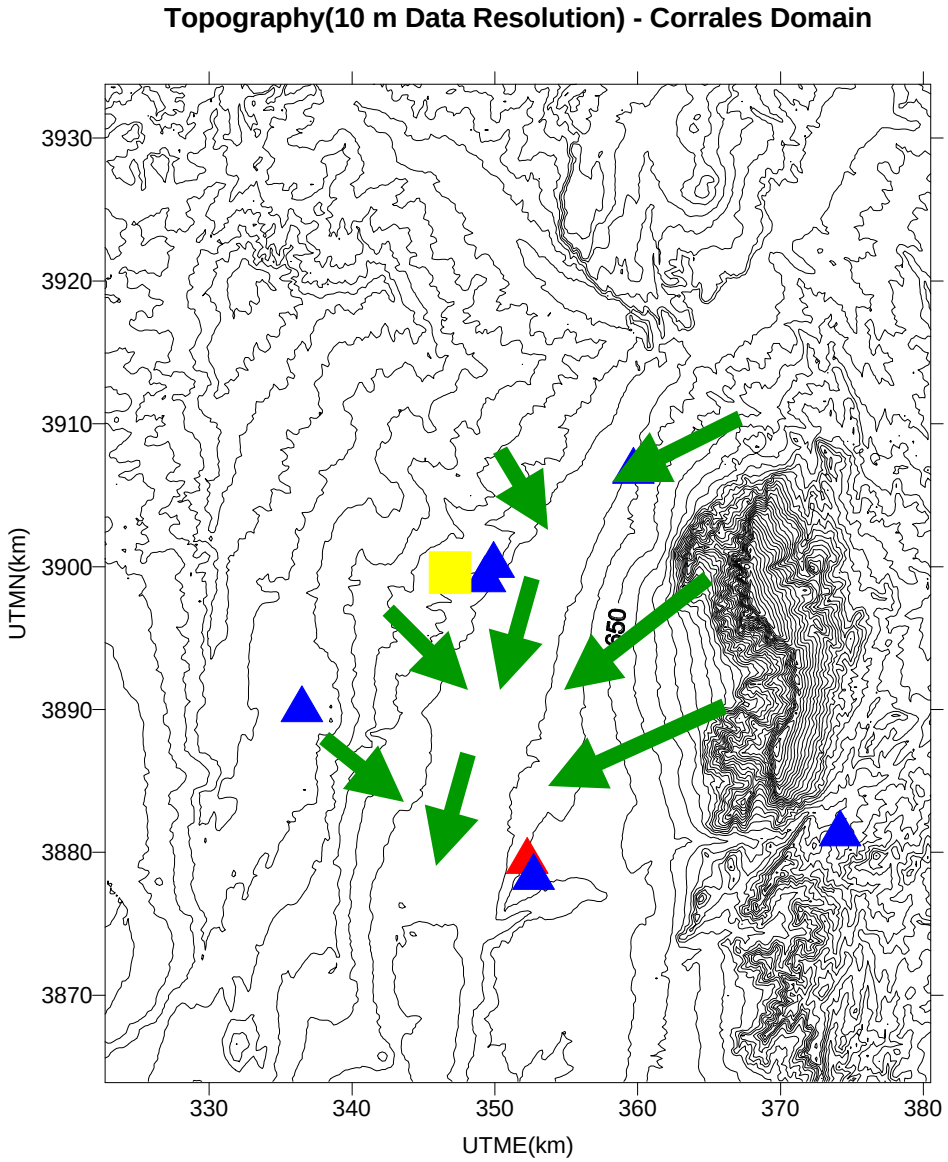
New Mexico - Corrales
General wind properties (II)

- Nighttime

  - *If the synoptic forcing is low, local circulation develop - westerly, northwesterly, and northerly drainages from the (Intel) plateau downward to the valley floor. Winds are usually light.*

- Daytime

  - *Mainly southwesterly/southerly flows develop from the cooler valley floor air toward the warmer air over the slope. Wind speeds and the mixing depth are higher compared to nighttime.*



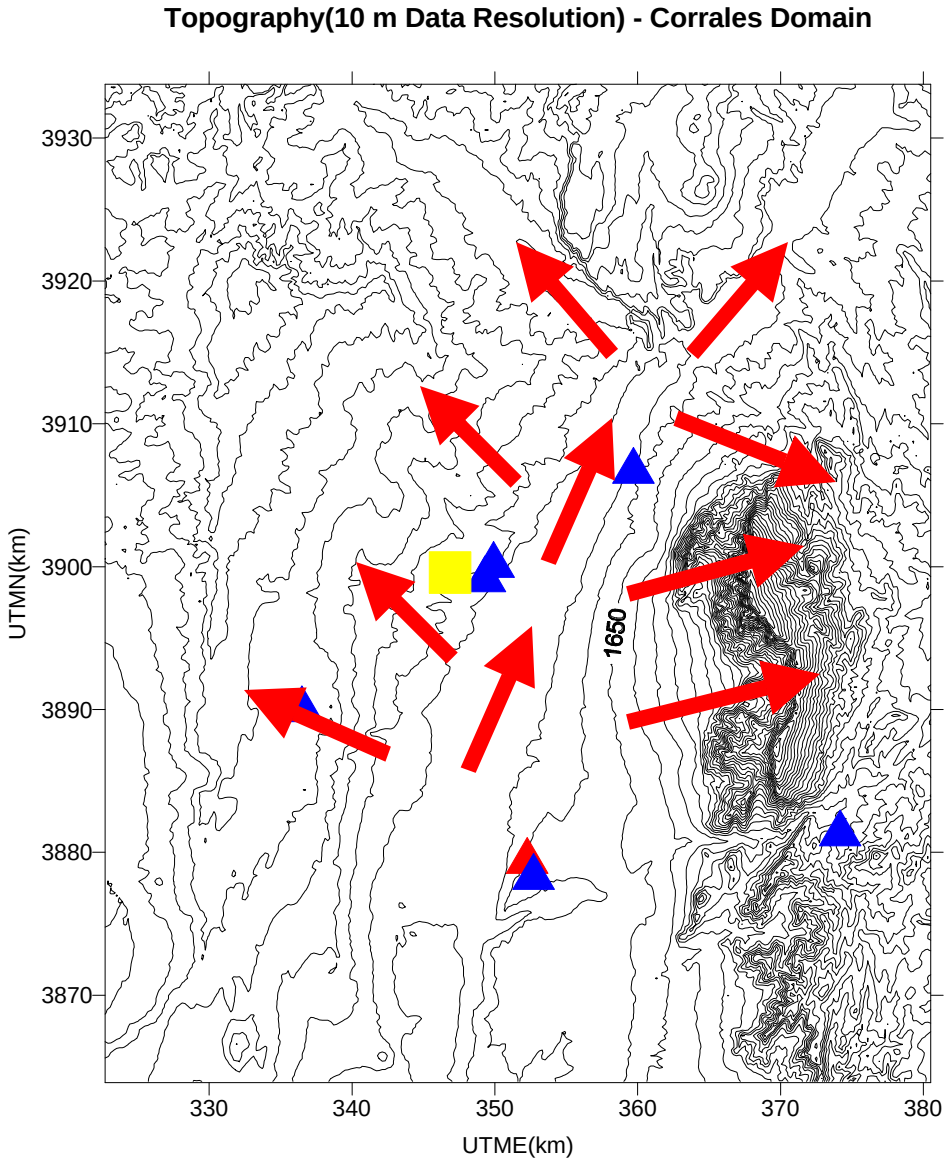
Nighttime

(with weak synoptic forcing)

- Strong downslope winds over the eastern slopes of the valley (steep mountain).
- Weaker downslope winds over the western slopes of the valley (Corrales).
- Down-valley drainage flow at the valley floor.

Arrow length - approximate wind speed magnitude

Arrow direction - wind direction



Daytime

(with weak synoptic forcing)

- Strong upslope winds over the eastern slopes of the valley (steep mountain).
- Weaker upslope winds over the western slopes of the valley (Corrales).
- Up-valley drainage flow at the valley floor.

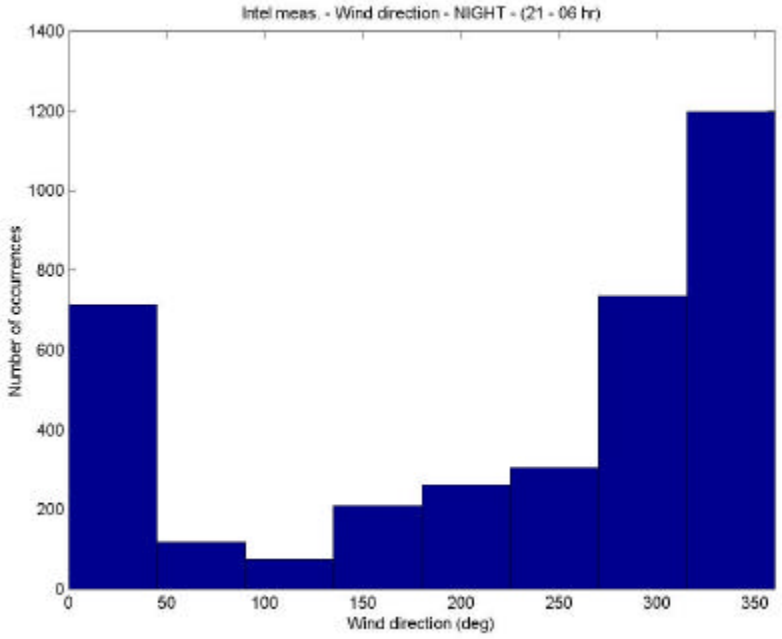
Arrow length - approximate wind speed magnitude

Arrow direction - wind direction

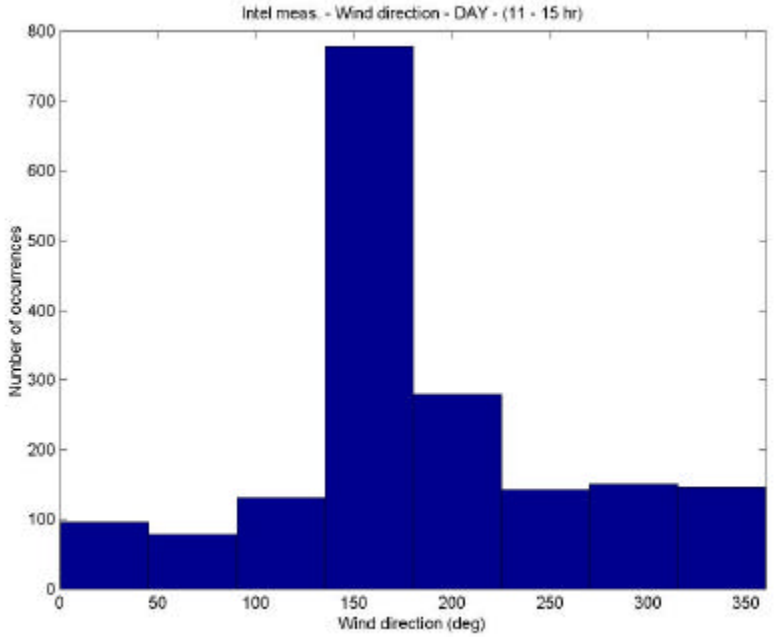
Meteorological data - measurements - Intel station

1 July 2001 - 31 June 2002

Night (21-06)



Day (11-15)

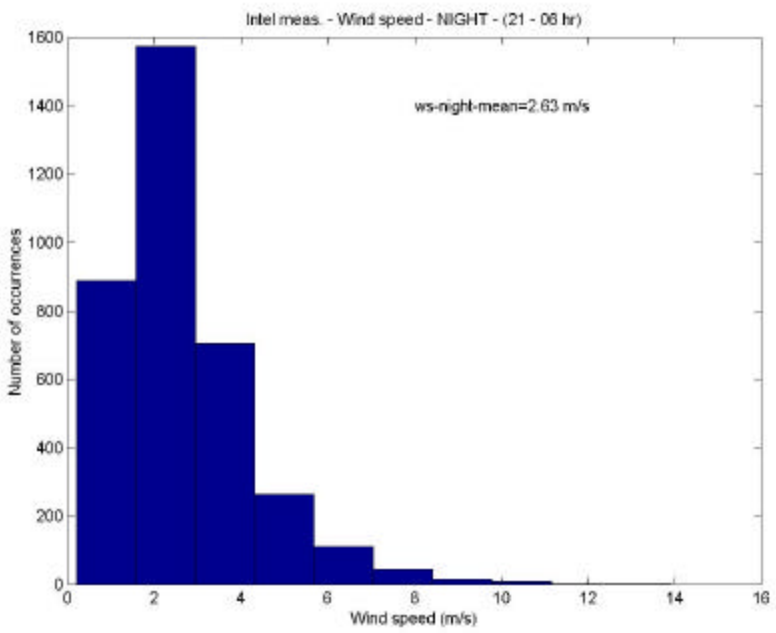


Wind direction (deg.)

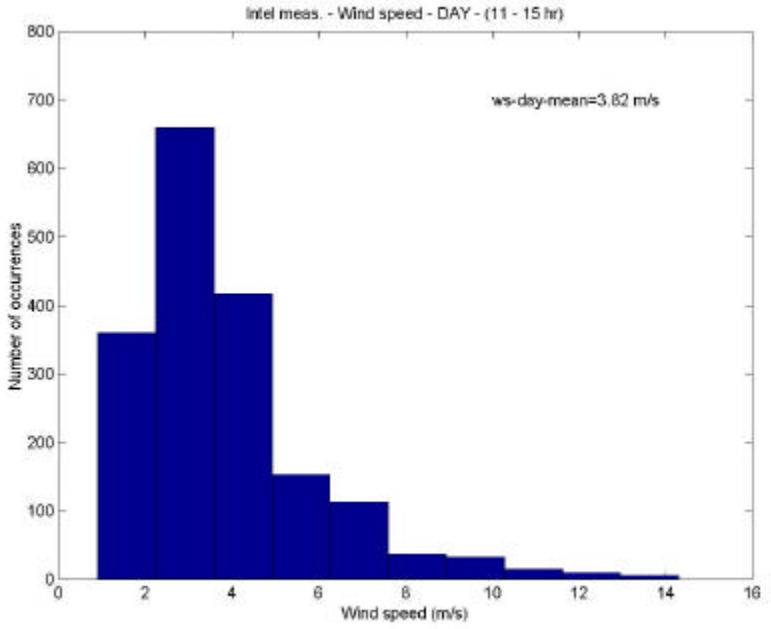
Meteorological data - measurements - Intel station

1 July 2001 - 31 June 2002

Night (21-06)



Day (11-15)



Wind speed (m/s)

Implication of the flow structure on estimated dispersion

- Favorable condition for the transport of the Intel pollutants to the Corrales area:
- Warm season nighttime/early morning westerly, northwesterly, and northerly winds – favorable transport to Corrales.
- Warm season nighttime low winds and shallow boundary layer – small dispersion and consequent coherent plumes.

Study results

1. Annual and episodic dispersion

- Method: Analyze results from the dispersion model CALPUFF that was ran for entire year (1 July 2001 – 30 June 2002) using CALMET model results as meteorological input.
- Set up emission sources. Use a list of Intel emissions (scrubbers and oxidizers) provided by Intel and NMED.
- Set up discrete receptors. Use a list provided by NMED for complaints for the simulated year (2001/2002).

Intel permitted emissions – Scrubbers and Oxidizers

Fab	Equipment Type	Stack ID	Intel Name	Permit Name	X Coord.	Y Coord.	Z Coord.	UTM easting	UTM northing	UTM elevation	Stack Height (m)	Stack Temp (K)	Exit Ve--locity (m/s)	Stack Dia. (m)
C4	Scrubber	EXSC150	Sc. 1	7.1.5	1519019.17	1538864.39	5302.09	349256.14	3899689.53	1616.08	13.4	294.3	15.96	0.91
CUB	Scrubber	EXSC117	SC12-GC1-1 (CUB Scrubber)	8.4.2a	1519590.41	1537206.02	5274.66	349423.87	3899181.93	1607.72	12.8			
CUB	Scrubber	EXSC118	SC12-C1-1 (CUB Scrubber)	8.4.2b	1519594.19	1537193.37	5274.47	349424.97	3899178.06	1607.66				
Fab 11W	Scrubber	EXSC123	Sc. 1.8	9.1.1a	1518606.02	1538389.46	5309.34	349128.40	3899546.37	1618.29	19.4	285.9	18.73	0.76
Fab 11W	Scrubber	EXSC124	Sc. 1.4	9.1.1b	1518614.74	1538387.35	5309.34	349131.05	3899545.70	1618.29	19.4	285.9	18.73	0.76
Fab 11W	Scrubber	EXSC125	Sc. 1.3	9.1.1c	1518623.38	1538385.32	5309.34	349133.67	3899545.05	1618.29	19.4	285.9	18.73	0.76
Fab 11W	Scrubber	EXSC126	Sc. 1.2	9.1.1d	1518631.96	1538383.44	5309.34	349136.28	3899544.44	1618.29	19.4	285.9	18.73	0.76
Fab 11W	Scrubber	EXSC127	Sc. 1.1	9.1.1e	1518640.60	1538381.36	5309.34	349138.91	3899543.77	1618.29	19.4	285.9	18.73	0.76
Fab 11W	Scrubber	EXSC157	Sc. 5-1-4	9.1.2a	1518826.27	1538340.16	5309.89	349195.34	3899530.50	1618.46				
Fab 11X	Scrubber	EXSC153	Fab Ammonia Scrubber	9.1.2a	1518605.63	1536309.14	5297.68	349120.30	3898912.37	1614.74	21.6	285.9	14.20	0.46
Fab 11W	Scrubber	EXSC130	Sc. 5-1-3	9.1.2b	1518793.25	1538347.98	5309.91	349185.30	3899533.01	1618.46	19.5	285.9	12.68	1.22
Fab 11W	Scrubber	EXSC131	Sc. 5-2-1	9.1.2e	1518863.60	1538339.12	5313.55	349206.71	3899530.04	1619.57	20.6	285.9	12.68	1.22
Fab 11W	Scrubber	EXSC132	Sc. 5-2-2	9.1.2f	1518872.63	1538336.91	5313.55	349209.45	3899529.34	1619.57	20.6	285.9	12.68	1.22
C4	Scrubber	EXSC151	Sc. 2	9.1.2h	1519031.93	1538861.57	5302.09	349260.01	3899688.62	1616.08	13.4	294.3	15.96	0.91
Fab 11X	Scrubber	EXSC100	SC12-LT2-1 (Fab)	9.1.3a	1518705.43	1536277.19	5302.29	349150.59	3898902.25	1616.14	23.2	285.9	20.19	1.22
Fab 11X	Scrubber	EXSC101	SC12-LT2-2 (Fab)	9.1.3b	1518722.87	1536273.01	5302.29	349155.89	3898900.91	1616.14	?	?	?	?
Fab 11N	Scrubber	EXSC135	SC12-CB1-1	10.1.1a	1518975.86	1538319.75	5300.42	349240.85	3899523.71	1615.57	16.8	294.3	13.65	1.07
Fab 11N	Scrubber	EXSC136	SC12-CB1-2	10.1.1b	1518985.42	1538317.66	5300.44	349243.75	3899523.04	1615.58	16.8	294.3	13.65	1.07
Fab 11N	Scrubber	EXSC137	SC12-CB1-3	10.1.1c	1519031.61	1538292.72	5313.32	349257.73	3899515.26	1619.50	20.6	294.3	17.95	1.07
Fab 11N	Scrubber	EXSC138	SC12-CB1-4	10.1.1d	1519042.80	1538290.15	5313.32	349261.13	3899514.43	1619.50	20.6	294.3	17.95	1.07
Fab 11N	Scrubber	EXSC139	SC12-CB1-5	10.1.1e	1519083.64	1538280.58	5313.33	349273.54	3899511.36	1619.51	20.6	294.3	17.95	1.07
Fab 11N	Scrubber	EXSC140	SC12-CB1-6	10.1.1f	1519094.74	1538277.87	5313.33	349276.92	3899510.49	1619.51	20.6	294.3	17.95	1.07
Fab 11N	Scrubber	EXSC141	SC12-CB1-7	10.1.1g	1519122.47	1538271.48	5313.33	349285.34	3899508.44	1619.51	20.6	285.9	17.95	1.07
Fab 11N	Scrubber	EXSC142	SC12-CB1-8	10.1.1h	1519133.27	1538268.75	5313.33	349288.62	3899507.56	1619.51	20.6	285.9	17.95	1.07
Fab 11N	Scrubber	EXSC143	SC12-BV1-1/BV1-2	10.4.2ab	1519034.85	1538319.27	5326.77	349258.82	3899523.34	1623.60	25.6	294.3	16.15	1.22
Fab 11X	Scrubber	EXSC104	SC12-NP2-2 (Bridge)	11.1.10	1519025.05	1537027.04	5302.41	349250.88	3899129.55	1616.18	23.2	285.9	20.19	1.22
Fab 11S	Scrubber	EXSC107	SC12-FD1-3	11.1.11	1519162.37	1537272.89	5329.17	349293.67	3899203.95	1624.33	30.0	294.3	14.30	1.52
Fab 11X	Scrubber	EXSC105	SC12-NP2-1 (Bridge)	11.1.12	1519029.05	1537044.56	5302.41	349252.17	3899134.87	1616.18	23.2	285.9	20.19	1.22
Fab 11X	Scrubber	EXSC154	Bridge Ammonia Scrubber	11.1.13	1519037.18	1537056.46	5302.41	349254.69	3899138.47	1616.18	21.6	285.9	14.20	0.46
Fab 11S	Scrubber	EXSC106	SC12-FD1-6	11.1.14	1519144.19	1537195.82	5329.36	349287.84	3899180.53	1624.39	30.0	294.3	14.30	1.52
Fab 11S	Scrubber	EXSC116	SC12-FB1-2	11.1.2	1519222.10	1537547.55	5329.28	349312.93	3899287.43	1624.37	30.0	294.3	14.30	1.52
Fab 11S	Scrubber	EXSC115	SC12-FB1-3	11.1.3	1519216.95	1537506.62	5329.17	349311.20	3899274.97	1624.33	30.0	294.3	14.30	1.52
Fab 11S	Scrubber	EXSC114	SC12-FB1-4	11.1.4	1519215.37	1537499.74	5329.36	349310.70	3899272.88	1624.39	30.0	294.3	14.30	1.52
Fab 11S	Scrubber	EXSC113	SC12-FB1-5	11.1.5	1519200.79	1537436.61	5329.23	349306.01	3899253.70	1624.35	30.0	294.3	14.30	1.52
Fab 11X	Scrubber	EXSC103	SC12-NP2-3 (Bridge)	11.1.6	1519020.89	1537009.36	5302.41	349249.54	3899124.18	1616.18	23.2	285.9	20.19	1.22
Fab 11S	Scrubber	EXSC112	SC12-FB1-7	11.1.7	1519189.63	1537389.71	5329.20	349302.43	3899239.45	1624.34	30.0	294.3	14.30	1.52
Fab 11S	Scrubber	EXSC111	SC12-FB1-8	11.1.8	1519188.33	1537382.70	5329.21	349302.01	3899237.32	1624.35	30.0	294.3	14.30	1.52
Fab 11S	Scrubber	EXSC108	SC12-FD1-1	11.1.9	1519173.12	1537319.61	5329.18	349297.13	3899218.15	1624.34	30.0	294.3	14.30	1.52
Fab 7	Thermal Oxidizer	EXVO310	Fab 7 Thermal Oxidizer	7.8.1	1518937.40	1538874.75	5315.38	349231.25	3899693.00	1620.13	22.9	294.3	23.95	1.12
Fab 11W	Thermal Oxidizer	EXVO306	Fab 11W Thermal Oxidizer-Primai	9.8.1a	1518693.77	1538490.93	5312.46	349155.53	3899576.96	1619.24		294.3	21.8	1.22
Fab 11X	Thermal Oxidizer	EXVO300	Fab 11X Fab Thermal Oxidizer	10.8.1a	1518637.66	1536218.45	5308.48	349129.71	3898884.60	1618.03	25	324.8	15.75	1.07
Fab 11S	Thermal Oxidizer	EXVO303	Fab 11S Thermal Oxidizer-Primary	11.8.1a	1519205.65	1537428.31	5328.36	349307.46	3899251.15	1624.09	30	324.8	18.19	1.22
Fab 11X	Thermal Oxidizer	EXVO301	Fab 11X Bridge Thermal Oxidizer	11.8.2a	1519077.27	1537024.54	5302.20	349266.78	3899128.59	1616.11				

Final CALPUFF model setup of Intel sources (scrubbers) by location and type

- S1 – Point source

  Scrubbers 2 and 3 – Eastern Intel boundary
- S2 – Point source

  Scrubbers 10, 15, and 16 – Southwest Intel boundary
- S3 – Line source

  Scrubbers 26-38 / 13 sources/ – Central/south Intel region
- S4 – Line source

  Scrubbers 1, 4-9, 11-14, 17-25 /20 sources/ - Central/northern source region

Final CALPUFF model setup of Intel sources (oxidizers) by location and type

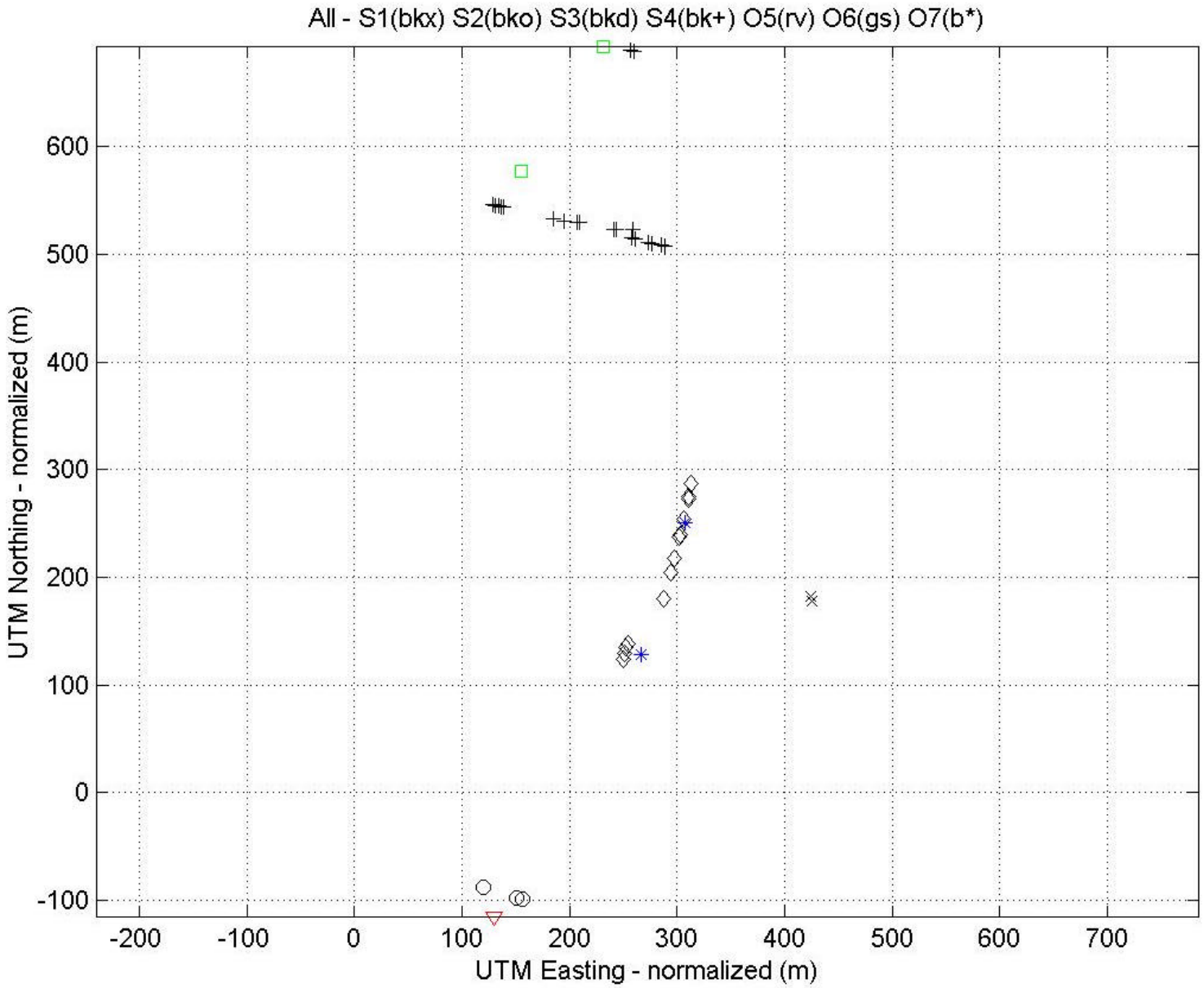
- O5 – Point source

  Oxidizer 41 – Southwest Intel boundary
- O6 – Point source

  Oxidizers 39 and 40 – Central/northern Intel boundary
- O7 – Point source

  Oxidizers 42 and 43 – Central/eastern Intel region

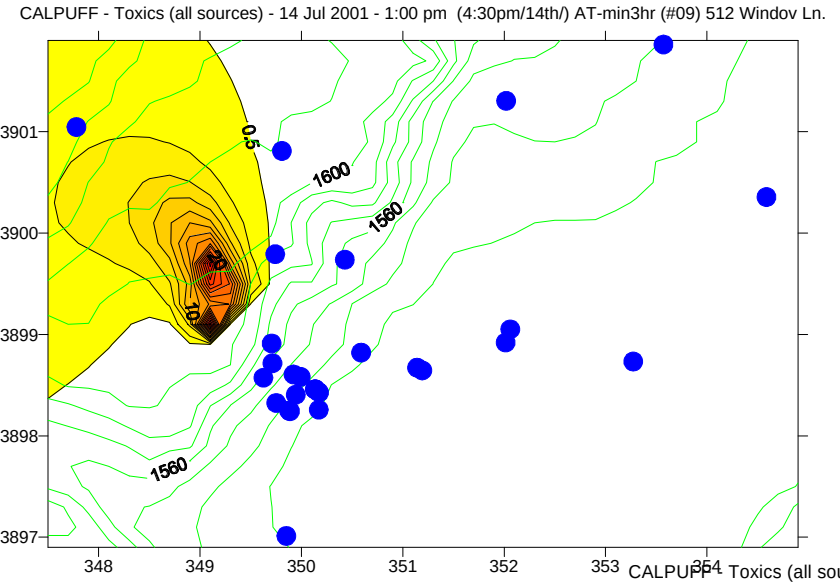
Scrubbers: 2 line and 2 point sources; *Oxidizers.:* 3 point sources

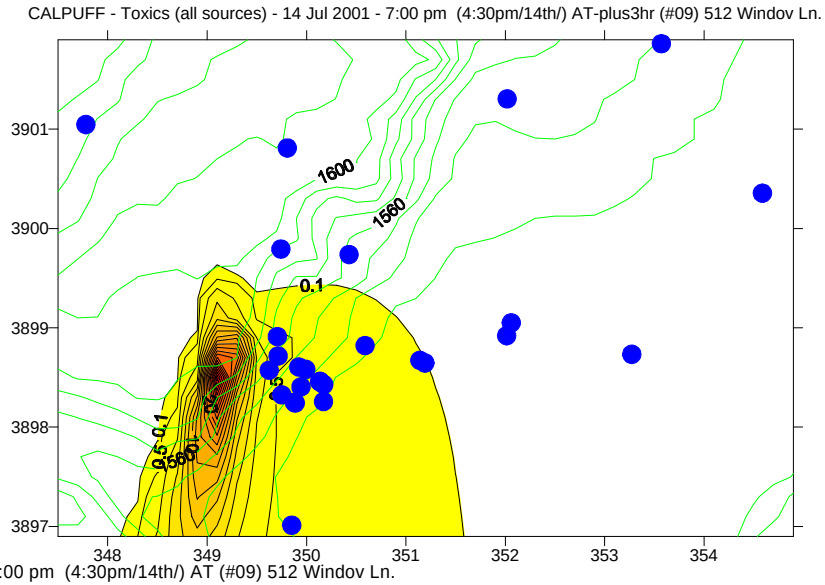


Assignment of separate pollutants for each source

- Pt.-Scr 1: TXS, ODOR, NO
- Pt.-Scr 2: TXS, ODOR, NO_2
- Ln-Scr 3: TXS, B-PINENE
- Ln-Scr 4: TXS, A-PINENE
- Pt.-Oxi 5: SO2, PM10, TXS, ODOR
- Pt.-Oxi 6: TOLUENE, PM10, TXS, ODOR
- Pt.-Oxi 7: XYLENE, PM10, TXS, ODOR

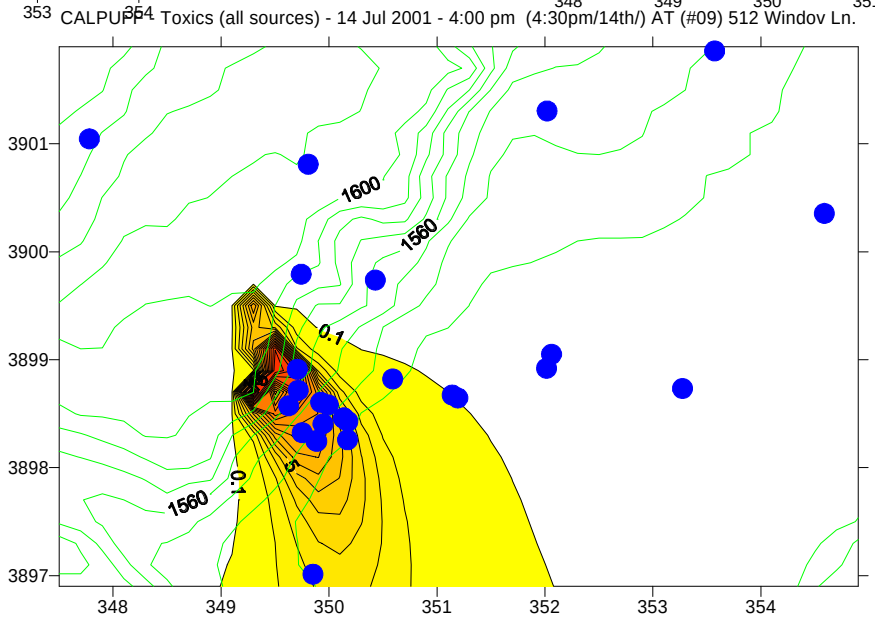
CALPUFF dispersion results – 14 July 2001 /Complaint # 9/





-3hrs

+3hrs



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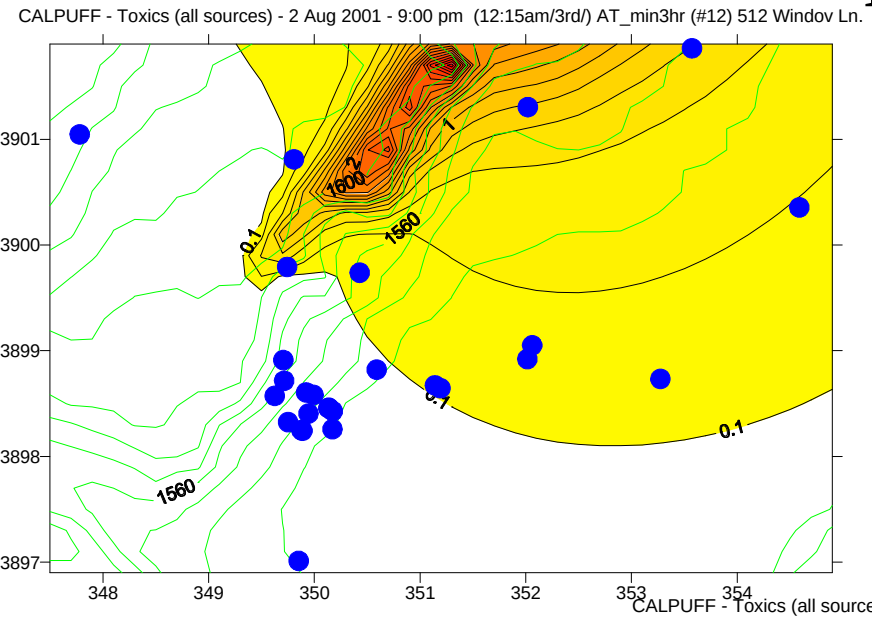
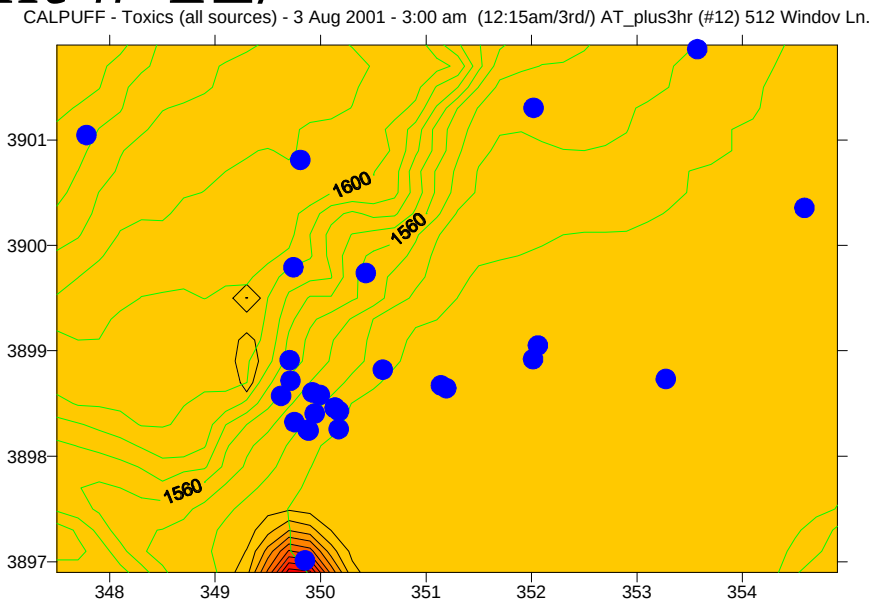
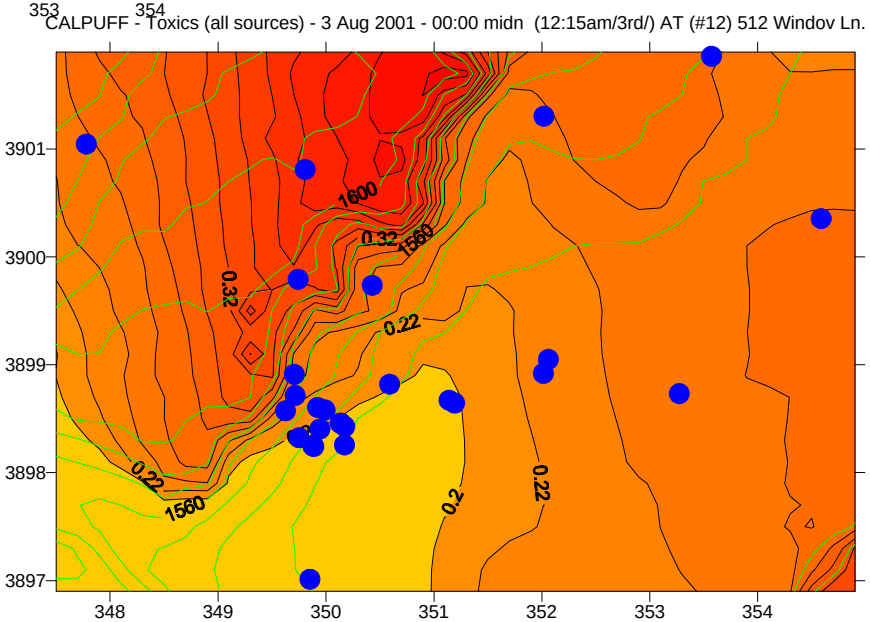
CALPUFF dispersion results – 2 Aug 2001 /Complaint # 12/





-3hrs



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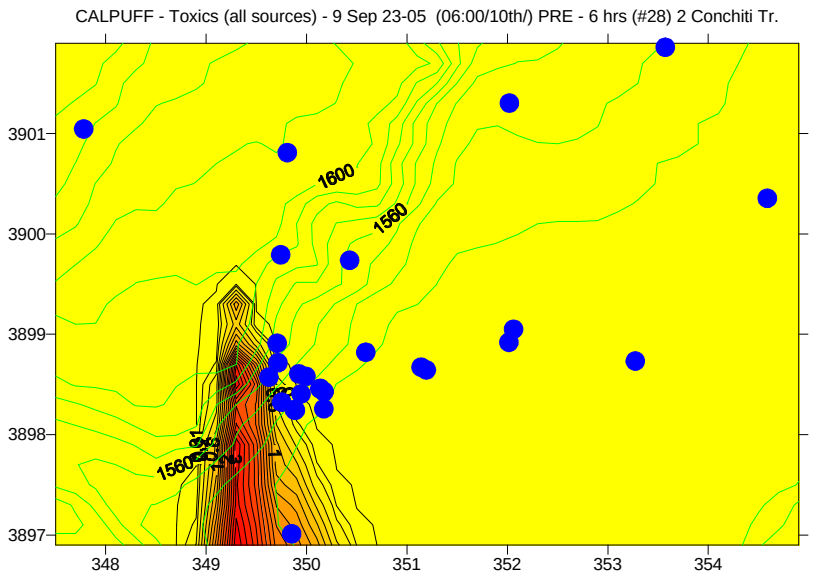
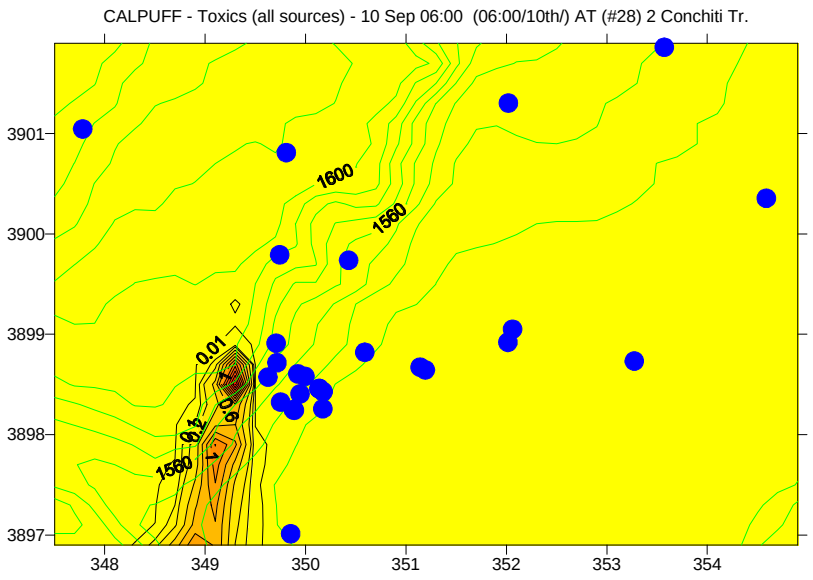
+3hrs

CALPUFF dispersion results – 2 Aug 2001 /Complaint # 28/ - Marginal agreement





-6 hrs

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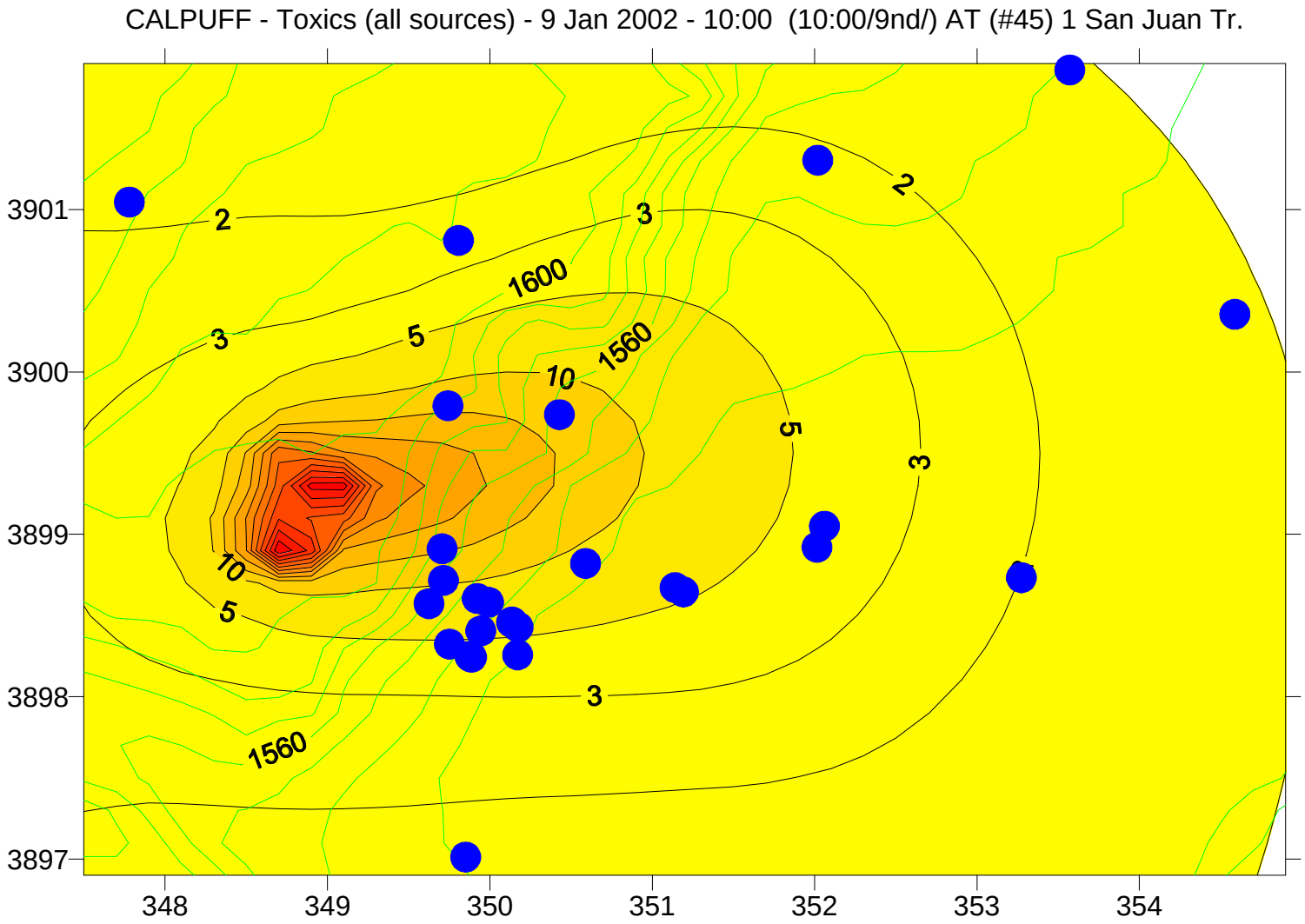
CALPUFF dispersion results – 2 Aug 2001 /Complaint # 45/ - Marginal agreement



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Example – August 2001 – Ranked highest monthly NO conc. from Scr.1

NO	1		**August**	**2001**					
TOP-50	720	HOUR	AVERAGE	CONCENT	VALUES	(ug/m**3)			
YEAR	DAY	TIME(HHM	RECEPTO	TYPE	CONCENT	COORDIN	(km)		
2001	273	2300	(	0,	22)	D	2.77E-01	349.742	3899.792
2001	273	2300	(	0,	16)	D	2.77E-01	349.807	3900.81
2001	273	2300	(	0,	14)	D	2.62E-01	349.714	3898.716
2001	273	2300	(	0,	25)	D	2.06E-01	349.706	3898.911
2001	273	2300	(	0,	13)	D	1.92E-01	349.922	3898.605
2001	273	2300	(	0,	5)	D	1.76E-01	349.625	3898.573
2001	273	2300	(	0,	12)	D	1.66E-01	349.992	3898.581
2001	273	2300	(	0,	6)	D	1.54E-01	349.944	3898.405
2001	273	2300	(	0,	2)	D	1.42E-01	349.751	3898.324
2001	273	2300	(	0,	3)	D	1.42E-01	349.877	3898.249
2001	273	2300	(	0,	4)	D	1.41E-01	349.887	3898.243
2001	273	2300	(	0,	10)	D	1.37E-01	350.134	3898.457
2001	273	2300	(	0,	8)	D	1.37E-01	350.136	3898.459
2001	273	2300	(	0,	9)	D	1.37E-01	350.136	3898.459
2001	273	2300	(	0,	11)	D	1.32E-01	350.174	3898.428
2001	273	2300	(	0,	7)	D	1.26E-01	350.171	3898.257
2001	273	2300	(	0,	1)	D	1.24E-01	349.851	3897.012
2001	273	2300	(	0,	23)	D	1.15E-01	347.78	3901.046
2001	273	2300	(	0,	15)	D	7.76E-02	350.589	3898.821
2001	273	2300	(	0,	19)	D	6.75E-02	350.428	3899.737
2001	273	2300	(	0,	17)	D	4.79E-02	351.14	3898.672
2001	273	2300	(	0,	18)	D	4.69E-02	351.192	3898.645
2001	273	2300	(	0,	28)	D	4.11E-02	354.587	3900.355
2001	273	2300	(	0,	20)	D	3.82E-02	352.014	3898.92
2001	273	2300	(	0,	26)	D	3.82E-02	352.019	3901.304
2001	273	2300	(	0,	21)	D	3.74E-02	352.06	3899.05
2001	273	2300	(	0,	24)	D	3.66E-02	353.273	3898.733
2001	273	2300	(	0,	27)	D	3.27E-02	353.571	3901.86

Example – August 2001 – Ranked highest monthly XYLENE conc. from Oxi7

XYLENE		August	2001		OXI 7				
TOP-50	744	HOUR	AVERAGE	CONCENT	VALUES	(ug/m**3)			
YEAR	DAY	TIME(HHM	RECEPTO	TYPE	CONCENT	COORDIN/	(km)		
2001	243	2300	(	0,	14)	D	1.10E-01	349.714	3898.716
2001	243	2300	(	0,	5)	D	1.05E-01	349.625	3898.573
2001	243	2300	(	0,	25)	D	9.99E-02	349.706	3898.911
2001	243	2300	(	0,	13)	D	8.41E-02	349.922	3898.605
2001	243	2300	(	0,	2)	D	8.32E-02	349.751	3898.324
2001	243	2300	(	0,	12)	D	7.62E-02	349.992	3898.581
2001	243	2300	(	0,	6)	D	7.53E-02	349.944	3898.405
2001	243	2300	(	0,	3)	D	7.37E-02	349.877	3898.249
2001	243	2300	(	0,	4)	D	7.29E-02	349.887	3898.243
2001	243	2300	(	0,	23)	D	7.10E-02	347.78	3901.046
2001	243	2300	(	0,	22)	D	6.96E-02	349.742	3899.792
2001	243	2300	(	0,	10)	D	6.47E-02	350.134	3898.457
2001	243	2300	(	0,	8)	D	6.46E-02	350.136	3898.459
2001	243	2300	(	0,	9)	D	6.46E-02	350.136	3898.459
2001	243	2300	(	0,	11)	D	6.21E-02	350.174	3898.428
2001	243	2300	(	0,	16)	D	5.92E-02	349.807	3900.81
2001	243	2300	(	0,	7)	D	5.92E-02	350.171	3898.257
2001	243	2300	(	0,	1)	D	5.79E-02	349.851	3897.012
2001	243	2300	(	0,	15)	D	4.17E-02	350.589	3898.821
2001	243	2300	(	0,	19)	D	3.51E-02	350.428	3899.737
2001	243	2300	(	0,	17)	D	3.14E-02	351.14	3898.672
2001	243	2300	(	0,	18)	D	3.10E-02	351.192	3898.645
2001	243	2300	(	0,	21)	D	2.47E-02	352.06	3899.05
2001	243	2300	(	0,	20)	D	2.45E-02	352.014	3898.92
2001	243	2300	(	0,	28)	D	2.14E-02	354.587	3900.355
2001	243	2300	(	0,	24)	D	2.09E-02	353.273	3898.733
2001	243	2300	(	0,	26)	D	2.04E-02	352.019	3901.304
2001	243	2300	(	0,	27)	D	1.76E-02	353.571	3901.86

Example – August 2001 – Ranked highest hourly B-PINENE conc. from Ln. Scr.3

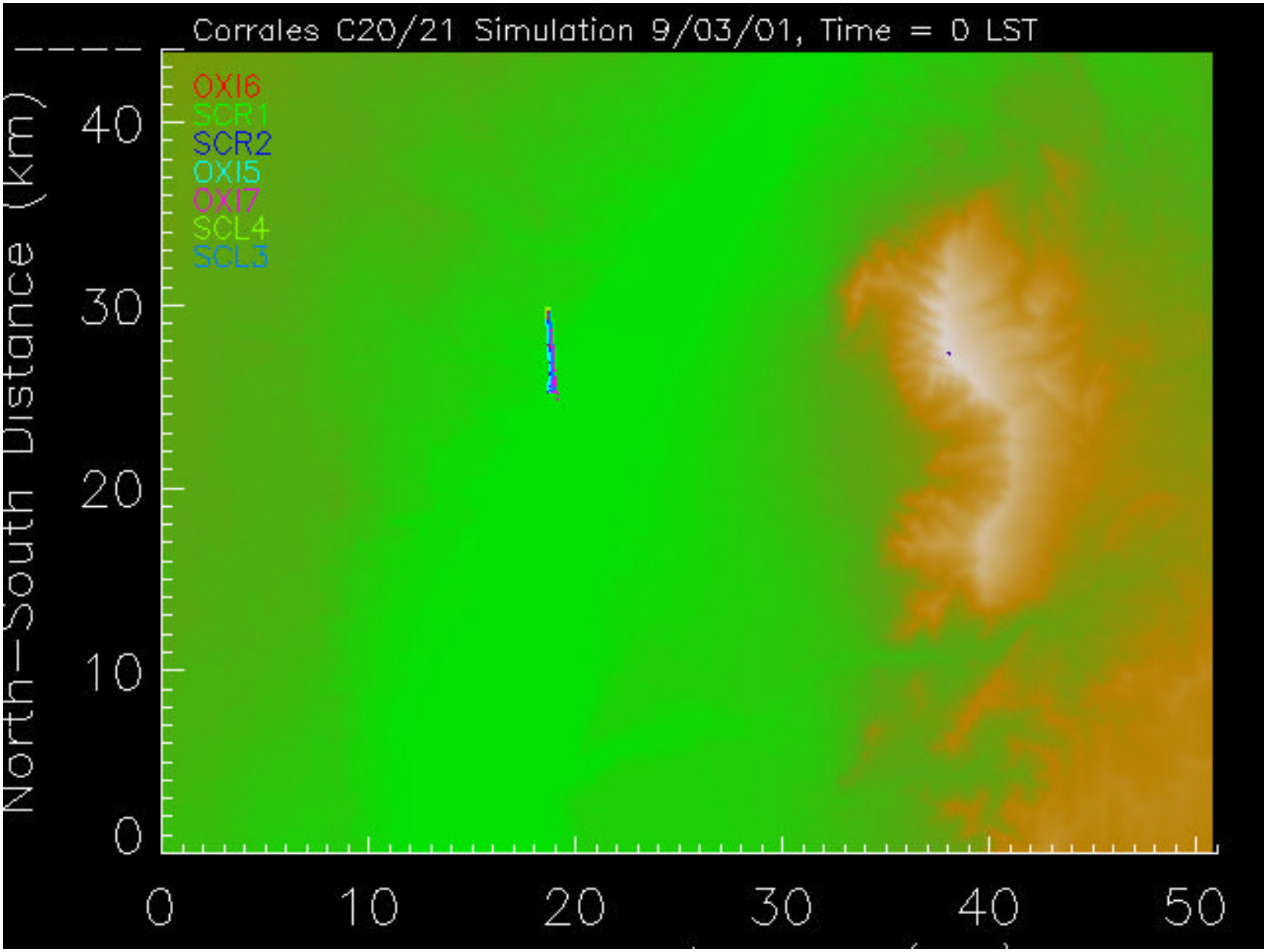
B-PINENE		August	2001		Ln. Scr.3				
TOP-50	1	HOUR	AVERAGE	CONCENT	VALUES	(ug/m**3)			
YEAR	DAY	TIME(HHM	RECEPTO	TYPE	CONCENT	COORDIN	(km)		
2001	238	0	(	0,	16)	D	7.34E+00	349.807	3900.81
2001	217	500	(	0,	16)	D	6.70E+00	349.807	3900.81
2001	227	300	(	0,	16)	D	4.82E+00	349.807	3900.81
2001	213	400	(	0,	23)	D	3.10E+00	347.78	3901.046
2001	229	300	(	0,	16)	D	2.60E+00	349.807	3900.81
2001	238	2100	(	0,	23)	D	2.49E+00	347.78	3901.046
2001	225	0	(	0,	1)	D	2.49E+00	349.851	3897.012
2001	239	100	(	0,	15)	D	2.44E+00	350.589	3898.821
2001	240	0	(	0,	26)	D	1.99E+00	352.019	3901.304
2001	233	1700	(	0,	22)	D	1.99E+00	349.742	3899.792
2001	240	100	(	0,	27)	D	1.98E+00	353.571	3901.86
2001	215	1900	(	0,	25)	D	1.94E+00	349.706	3898.911
2001	239	2200	(	0,	23)	D	1.88E+00	347.78	3901.046
2001	217	600	(	0,	16)	D	1.77E+00	349.807	3900.81
2001	234	700	(	0,	3)	D	1.76E+00	349.877	3898.249
2001	234	700	(	0,	5)	D	1.76E+00	349.625	3898.573
2001	234	700	(	0,	4)	D	1.76E+00	349.887	3898.243
2001	238	300	(	0,	11)	D	1.75E+00	350.174	3898.428
2001	223	2000	(	0,	1)	D	1.74E+00	349.851	3897.012
2001	234	700	(	0,	2)	D	1.74E+00	349.751	3898.324
2001	225	700	(	0,	14)	D	1.73E+00	349.714	3898.716
2001	233	1500	(	0,	22)	D	1.71E+00	349.742	3899.792
2001	243	1700	(	0,	22)	D	1.71E+00	349.742	3899.792
2001	224	1600	(	0,	22)	D	1.65E+00	349.742	3899.792
2001	234	700	(	0,	6)	D	1.65E+00	349.944	3898.405
2001	238	300	(	0,	9)	D	1.65E+00	350.136	3898.459
2001	238	300	(	0,	8)	D	1.65E+00	350.136	3898.459
2001	238	300	(	0,	10)	D	1.64E+00	350.134	3898.457
2001	213	1900	(	0,	3)	D	1.63E+00	349.877	3898.249
2001	213	1900	(	0,	4)	D	1.62E+00	349.887	3898.243

Top 30 hourly conc. from all 7 sources (TXS) and all 28 receptors

TXS	August	2001	ALL	SOURCES					
TOP-50	1	HOUR	AVERAGE	CONCENT	VALUES	(ug/m**3)			
YEAR	DAY	TIME(HHM	RECEPTO	TYPE	CONCENT	COORDIN	(km)		
2001	238	0	(	0,	16)	D	3.02E+01	349.807	3900.81
2001	227	1900	(	0,	16)	D	2.47E+01	349.807	3900.81
2001	221	1800	(	0,	25)	D	2.31E+01	349.706	3898.911
2001	225	700	(	0,	5)	D	2.29E+01	349.625	3898.573
2001	221	1800	(	0,	14)	D	2.22E+01	349.714	3898.716
2001	226	800	(	0,	14)	D	2.16E+01	349.714	3898.716
2001	213	1900	(	0,	5)	D	2.14E+01	349.625	3898.573
2001	220	800	(	0,	5)	D	1.99E+01	349.625	3898.573
2001	216	2100	(	0,	16)	D	1.94E+01	349.807	3900.81
2001	213	1900	(	0,	2)	D	1.91E+01	349.751	3898.324
2001	226	800	(	0,	5)	D	1.91E+01	349.625	3898.573
2001	214	1100	(	0,	25)	D	1.80E+01	349.706	3898.911
2001	225	700	(	0,	2)	D	1.77E+01	349.751	3898.324
2001	235	1600	(	0,	25)	D	1.74E+01	349.706	3898.911
2001	220	800	(	0,	14)	D	1.70E+01	349.714	3898.716
2001	226	1800	(	0,	22)	D	1.68E+01	349.742	3899.792
2001	221	1800	(	0,	5)	D	1.67E+01	349.625	3898.573
2001	233	1200	(	0,	25)	D	1.65E+01	349.706	3898.911
2001	227	1200	(	0,	25)	D	1.64E+01	349.706	3898.911
2001	226	800	(	0,	25)	D	1.60E+01	349.706	3898.911
2001	214	1400	(	0,	25)	D	1.58E+01	349.706	3898.911
2001	213	1900	(	0,	3)	D	1.57E+01	349.877	3898.249
2001	214	1100	(	0,	14)	D	1.54E+01	349.714	3898.716
2001	233	1300	(	0,	25)	D	1.54E+01	349.706	3898.911
2001	226	2000	(	0,	16)	D	1.54E+01	349.807	3900.81
2001	213	1900	(	0,	4)	D	1.52E+01	349.887	3898.243
2001	219	1800	(	0,	22)	D	1.51E+01	349.742	3899.792
2001	233	1100	(	0,	25)	D	1.50E+01	349.706	3898.911
2001	227	1200	(	0,	14)	D	1.50E+01	349.714	3898.716
2001	235	1600	(	0,	14)	D	1.50E+01	349.714	3898.716

Aug 2001

Lagrangian particle model – Compl. 20/21(22:30/6:30)

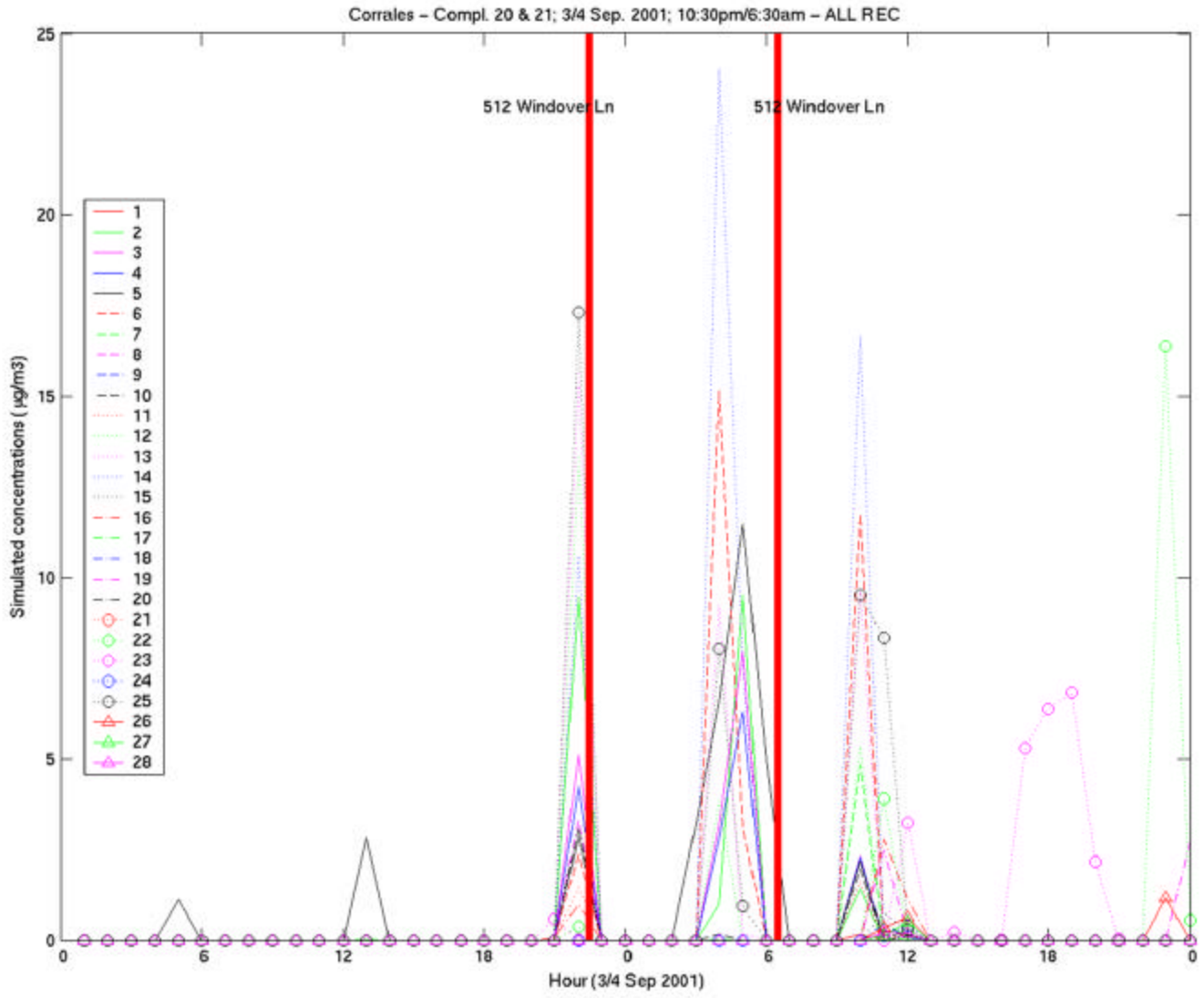


3/4

Sep

2001

Time series – Compl. 20/21 – 3/4 Sep 2001 – All sources and all receptors; Red thick line – time of the complaints



Completion of the analysis

- Hourly, 3-hourly, 8-hourly, daily, and annual averages and maxima of concentration values.
- Impact of particular sources and all sources on each of the receptors.
- Frequency of occurrence of maximum concentrations at a particular receptor.
- Ranking of the receptors with respect to the maximum concentrations.
- Estimate of the agreement between the models and complaint episodes.
- Recommendations for future monitoring, experiments, and modeling.