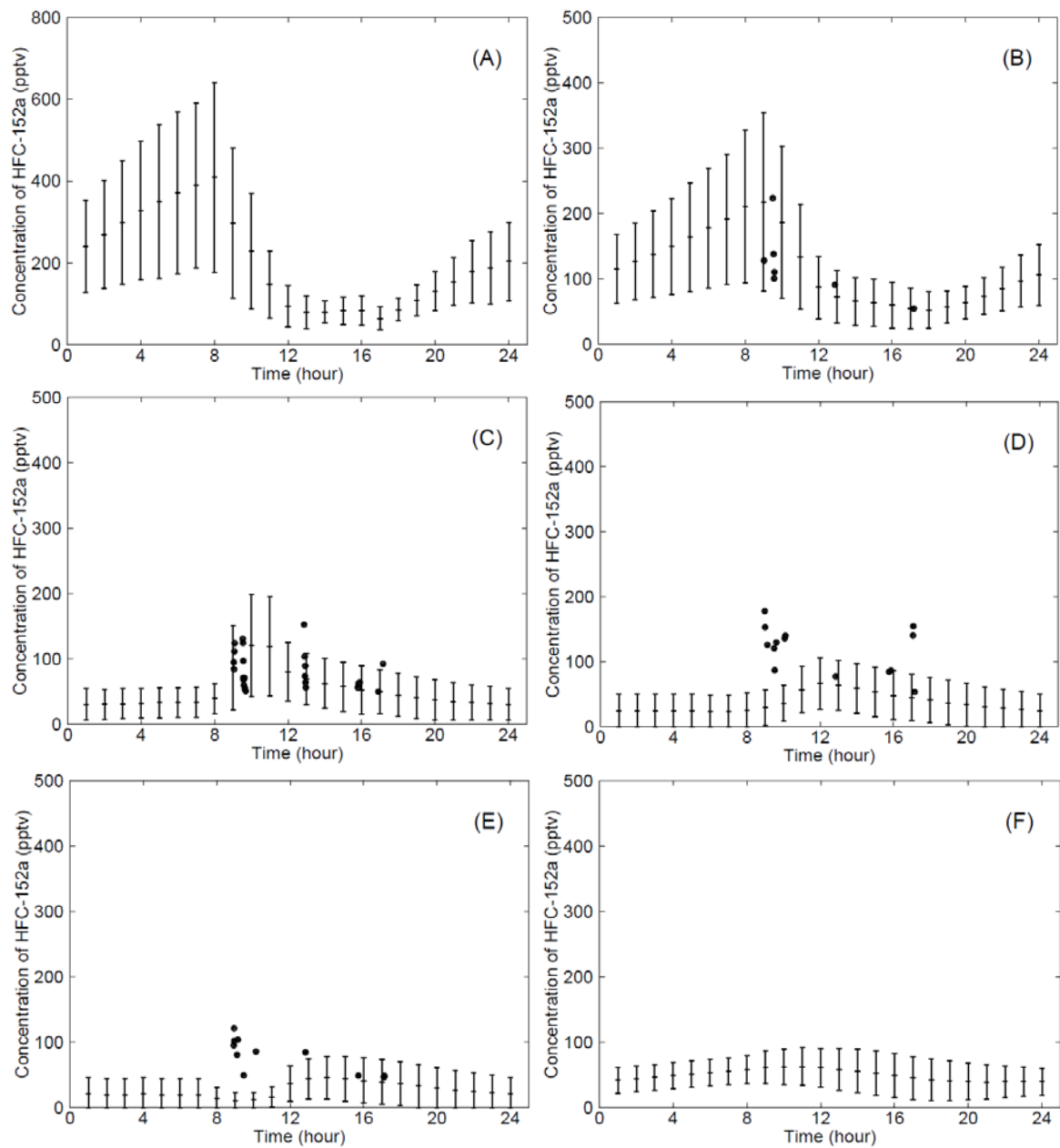
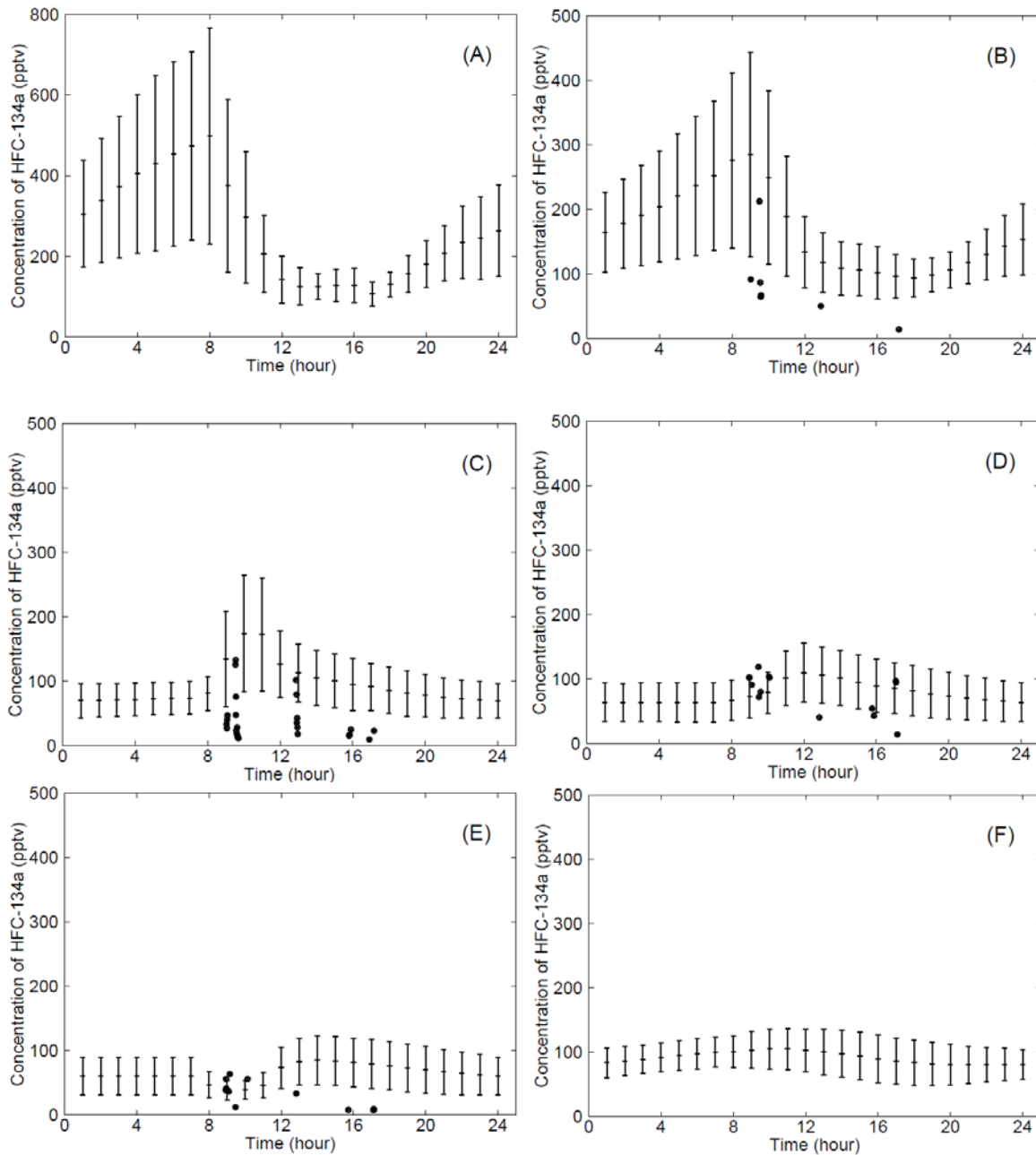


Supplementary Figure 1: The mean concentration and  $1-\sigma$  values of HFC-134a at different vertical layers in the cells comprising the SoCAB, as calculated by the UCI-CIT model using the September 9, 1993 meteorological data set and landuse data from the USGS. The mean concentration in the (A) lowest layer, (B) second layer, (C) third layer, (D) fourth layer, and (E) highest layer are calculated using equation (4). The average concentration over all vertical layers in the SoCAB (F) is calculated using equation (3). Measurements from the ARCTAS-CARB flights are shown as solid black dots. No measurements were collected in the lowest layer.



Supplementary Figure 2: The mean concentration and  $1-\sigma$  values of HFC-152a at different vertical layers in the cells comprising the LA Area, as calculated by the UCI-CIT model using the September 9, 1993 meteorological data set and landuse data from the USGS. The mean concentration in the (A) lowest layer, (B) second layer, (C) third layer, (D) fourth layer, and (E) highest layer are calculated using equation (4). The average concentration over all vertical layers in the SoCAB (F) is calculated using equation (3). Measurements from the ARCTAS-CARB flights are shown as solid black dots. No measurements were collected in the lowest layer.



Supplementary Figure 3: The mean concentration and  $1-\sigma$  values of HFC-134a at different vertical layers in the cells comprising the LA Area, as calculated by the UCI-CIT model using the September 9, 1993 meteorological data set and landuse data from the USGS. The mean concentration in the (A) lowest layer, (B) second layer, (C) third layer, (D) fourth layer, and (E) highest layer are calculated using equation (4). The average concentration over all vertical layers in the SoCAB (F) is calculated using equation (3). Measurements from the ARCTAS-CARB flights are shown as solid blank dots. No measurements were collected in the lowest layer.

**Supplementary Table 1a:** Wind speed and direction in Long Beach, CA during the four ARCTAS-CARB flights in June 2008 and the six simulation days. The June 2008 data is taken from the official National Weather Service Daily Summary, available online at [http://www.wrh.noaa.gov/lox/main.php?suite=fire\\_weather&page=historical](http://www.wrh.noaa.gov/lox/main.php?suite=fire_weather&page=historical).

Time	06/16/08		06/18/08		06/20/08		06/22/08		Simulation hour	08/27/87		08/28/87		09/08/93		09/09/93		10/18/95		10/19/95	
	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction		Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction
11:53 PM	0		0		0	ESE	3	ESE	12 AM	1	SSW	2	SSW	1	SW	3	S	2	ESE	3	WSW
10:53 PM	3	Var.	3	S	6	ESE	0		11 PM	0	W	1	S	0	SSW	3	SSE	2	ESE	2	WNW
9:53 PM	3	NW	8	SE	5	ESE	6	ESE	10 PM	1	NNW	0	E	1	SW	3	S	4	SW	1	WSW
8:53 PM	3	NW	8	SSE	3	NW	0		9 PM	1	NW	1	SSW	1	W	3	S	1	WSW	5	NW
7:53 PM	8	NW	6	S	5	WNW	6	NW	8 PM	2	W	2	SSW	3	W	2	W	1	SW	5	WNW
6:53 PM	9	WNW	12	SSE	3	W	12	WNW	7 PM	3	W	2	WSW	4	W	4	W	1	SW	6	W
5:53 PM	9	NW	13	S	7	WNW	12	WNW	6 PM	5	W	3	W	4	W	4	W	3	S	7	WNW
4:53 PM	8	WNW	6	WNW	0		7	SSE	5 PM	7	W	5	W	6	W	5	W	7	S	9	WNW
3:53 PM	6	Var.*	12	WNW	7	NW	8	SSW	4 PM	7	W	5	W	7	W	7	W	9	S	10	NW
2:53 PM	7	S	12	WNW	7	SSW	10	SSW	3 PM	7	W	6	WSW	6	W	6	W	6	NNW	6	WNW
1:53 PM	8	S	10	W	6	S	9	SSW	2 PM	7	W	4	SW	5	WSW	5	WSW	8	NNW	5	NW
12:53 PM	8	SSW	8	S	8	S	7	Var.	1 PM	6	W	4	SW	5	WSW	6	WSW	6	NNW	8	NW
11:53 AM	7	SSE	7	S	8	S	9	S	12 PM	5	W	4	SW	4	SW	5	WSW	6	SSW	7	NNW
10:53 AM	3	Var.	6	S	0		7	S	11 AM	4	W	2	W	2	SW	3	W	3	SSW	5	NNW
9:53 AM	5	SSW	0		0		7	SSE	10 AM	4	W	1	S	1	ESE	2	W	3	WSW	3	SW
8:53 AM	0		0		0		5	S	9 AM	3	W	0	SW	0	W	1	WNW	2	W	2	SSW
7:53 AM	0		0		0		7	SSE	8 AM	2	WNW	1	NW	1	WNW	1	WSW	2	SSW	1	WSW
6:53 AM	0		0		0		3	SSE	7 AM	1	WNW	2	W	1	W	1	NNW	4	SE	1	SSW
5:53 AM	0		0		0		0		6 AM	1	WNW	2	SW	2	WNW	1	WNW	3	ESE	2	W
4:53 AM	0		0		0		3	S	5 AM	1	NW	2	W	1	WNW	1	WSW	4	ESE	2	WSW
3:53 AM	3	NNW	0		0		3	ESE	4 AM	2	WNW	1	WSW	1	W	1	WSW	3	SE	3	SW
2:53 AM	3	N	0		0		3	ESE	3 AM	3	WNW	0	SSW	1	W	0	W	1	ESE	2	WSW
1:53 AM	5	NNW	5	SSE	3	S	0		2 AM	2	WNW	1	SSW	1	WSW	1	W	3	SSE	1	S
12:53 AM	3	NNW	5	SSE	0		5	SSE	1 AM	2	NW	1	SSW	1	WSW	1	W	2	ESE	0	E

\* Var. = Variable wind speed

**Supplementary Table 1b:** Wind speed and direction in Hawthorne, CA during the four ARCTAS-CARB flights in June 2008 and the six simulation days. The June 2008 data is taken from the official National Weather Service Daily Summary, available online at [http://www.wrh.noaa.gov/lox/main.php?suite=fire\\_weather&page=historical](http://www.wrh.noaa.gov/lox/main.php?suite=fire_weather&page=historical).

Time	06/16/08		06/18/08		06/20/08		06/22/08		Simulation hour	08/27/87		08/28/87		09/08/93		09/09/93		10/18/95		10/19/95	
	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction		Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction
11:53 PM	0		0		3	SSW	6	WSW	12 AM	0		3	WSW	2	WSW	2	S	3	SSW	3	NW
10:53 PM	5	WSW	7	ESE	0		6	Var.*	11 PM	1	NW	1	W	1	SSW	2	SSE	3	SSW	3	NW
9:53 PM	7	WSW	6	SE	9	W	5	SW	10 PM	1	NW	1	WNW	1	SSW	2	S	4	SSW	3	NW
8:53 PM	5	SW	0		7	W	5	WSW	9 PM	1	W	2	W	3	SW	2	S	5	SSW	3	WNW
7:53 PM	7	WSW	5	WSW	5	W	7	W	8 PM	4	WSW	5	W	4	WSW	3	WSW	4	SSW	3	WNW
6:53 PM	7	W	7	WSW	7	WNW	12	WSW	7 PM	5	WSW	6	WSW	5	WSW	5	WSW	4	SSW	4	WNW
5:53 PM	12	W	9	WSW	7	W	12	WSW	6 PM	8	W	7	WSW	6	W	7	WSW	4	SSW	7	WNW
4:53 PM	8	W	10	WSW	8	W	8	W	5 PM	11	W	8	W	7	W	7	W	6	SSW	9	W
3:53 PM	12	WSW	8	WSW	12	W	10	WSW	4 PM	12	W	9	W	9	WSW	10	W	6	SSW	8	W
2:53 PM	9	W	8	W	13	WSW	10	WSW	3 PM	11	W	10	WSW	8	WSW	10	WSW	7	SSW	9	W
1:53 PM	12	W	12	WSW	9	W	9	W	2 PM	11	W	8	W	8	WSW	7	WSW	9	SSW	8	WSW
12:53 PM	9	W	9	WSW	9	WSW	6	W	1 PM	9	W	7	W	8	WSW	7	W	8	SW	6	WSW
11:53 AM	6	W	9	W	12	WSW	8	W	12 PM	8	W	6	W	6	WSW	6	WSW	6	SW	5	SW
10:53 AM	8	W	5	WSW	3	ESE	5	S	11 AM	7	W	5	WSW	4	WSW	5	W	4	SW	3	W
9:53 AM	0		3		3	Var.	0		10 AM	7	W	4	W	1	SSW	2	WSW	2	WNW	2	WSW
8:53 AM	0		0		0		3	SSE	9 AM	5	WSW	3	W	1	WSW	2	WSW	3	N	1	SW
7:53 AM	3	W	0		0		3	SE	8 AM	2	WNW	4	W	0		2	WSW	3	N	2	SSW
6:53 AM	3	WSW	0		0		3	E	7 AM	1	WNW	4	WSW	1	SW	0		3	N	3	SSW
5:53 AM	0		0		0		0		6 AM	1	W	3	WNW	2	WSW	1	WSW	3	N	4	SSW
4:53 AM	0		0		0		3	E	5 AM	2	W	2	W	1	W	2	WSW	3	SSW	4	SSW
3:53 AM	0		0		0		5	E	4 AM	3	WNW	1	WNW	2	WSW	1	WSW	4	NW	4	SSW
2:53 AM	0		0		0		0		3 AM	4	WNW	2	W	2	WSW	1	WSW	3	NNW	1	WSW
1:53 AM	6	WSW	0		3	SW	5	SE	2 AM	3	WNW	2	WNW	2	SW	2	WSW	3	SSW	2	WSW
12:53 AM	6	WSW	0		5	SE	5	ESE	1 AM	3	WNW	2	W	1	WSW	2	WSW	2	SW	1	SE

\* Var. = Variable wind speed

**Supplementary Table 1c:** Wind speed and direction in Santa Ana, CA during the four ARCTAS-CARB flights in June 2008 and the six simulation days. The June 2008 data is taken from the official National Weather Service Daily Summary, available online at [http://www.wrh.noaa.gov/lox/main.php?suite=fire\\_weather&page=historical](http://www.wrh.noaa.gov/lox/main.php?suite=fire_weather&page=historical).

Time	06/16/08		06/18/08		06/20/08		06/22/08		Simulation hour	08/27/87		08/28/87		09/08/93		09/09/93		10/18/95		10/19/95	
	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction		Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction	Wind speed (mph)	Wind direction
11:53 PM	3	SSW	0		0		6	WSW	12 AM	0		1	SSW	1	SSW	3	SSE	1	SSE	1	W
10:53 PM	5	SSW	0		0		5	SSW	11 PM	1	SSW	0		2	SSW	4	SSE	2	S	0	
9:53 PM	6	SSW	0		7	SSW	7	SW	10 PM	1	SSW	0		2	S	4	S	1	SSE	1	WSW
8:53 PM	9	SSW	9	SW	10	SSW	5	Var.	9 PM	2	S	1	S	3	SSW	3	S	3	S	2	WNW
7:53 PM	9	SSW	7	WSW	7	SSW	6	SSW	8 PM	2	S	3	S	3	SSW	4	SSW	3	SSW	3	W
6:53 PM	10	S	8	SW	6	SSW	8	S	7 PM	2	SW	4	SSW	3	SW	3	SSW	3	SSW	5	W
5:53 PM	9	SW	9	SSW	0		9	S	6 PM	4	WSW	3	SSW	3	SW	4	SW	3	SSE	5	W
4:53 PM	8	SW	14	SW	8	SW	10	SSW	5 PM	4	WSW	4	SSW	4	WSW	4	SW	3	SW	6	W
3:53 PM	6	Var.*	9	SW	6	Var.	12	SSW	4 PM	4	W	3	SW	5	WSW	5	WSW	3	SW	7	W
2:53 PM	8	SW	10	SW	8	SSW	14	SSW	3 PM	5	W	4	WSW	5	SW	5	SW	4	SW	8	W
1:53 PM	12	SSW	9	SW	8	SW	14	SW	2 PM	4	WSW	4	WSW	5	SW	5	WSW	5	WSW	9	W
12:53 PM	13	SW	9	SSW	8	SW	13	SW	1 PM	4	WSW	3	WSW	5	WSW	6	WSW	3	SW	5	W
11:53 AM	6	Var.	7	WSW	10	SSW	12	SW	12 PM	3	WSW	3	WSW	4	WSW	4	WSW	2	SSW	5	W
10:53 AM	6	SW	0		5	SW	12	SW	11 AM	3	W	2	WSW	2	WSW	2	WSW	2	SSE	2	NW
9:53 AM	3	WSW	5	W	3	SSW	8	SSW	10 AM	3	W	1	SW	1	SSW	1	WSW	2	SSE	1	WSW
8:53 AM	6	SSW	0		5	Var.	0		9 AM	2	WSW	1	S	0		1	WSW	1	SSW	0	
7:53 AM	7	SSW	0		3	S	0		8 AM	1	WNW	1	SW	0		1	SE	1	S	1	W
6:53 AM	5	SSW	3	NNW	0		0		7 AM	1	WNW	1	SW	0		0		2	SSW	1	NNW
5:53 AM	0		0		0		0		6 AM	0		1	SW	1	W	0		1	WSW	1	NNW
4:53 AM	3	SE	3	N	3	NNE	0		5 AM	0		1	WSW	0		0		2	ESE	1	WNW
3:53 AM	0		0		0		0		4 AM	1	WNW	1	WSW	0		0		2	SSE	1	SSW
2:53 AM	0		0		0		0		3 AM	1	WNW	0		1	WNW	0		2	ESE	1	SSE
1:53 AM	0		3	SW	3	SW	3	SW	2 AM	1	NW	0		0		1	SW	3	SE	1	SSW
12:53 AM	3	WSW	5	WSW	3	SSW	0		1 AM	1	WNW	0		0		1	SW	4	SSE	2	SSW

\* Var. = Variable wind speed