



MONTHLY AIR QUALITY REPORT FOR
JUNE 2009

AOI COLOR SCALE

GOOD	MODERATE	UNHEALTHY FOR SENSITIVE GROUPS	UNHEALTHY
0-50	51-100	101-150	151-200

Calendar of maximum AQI values & their corresponding color for June 2009*

*Preliminary data

SAMPLE POLLUTANT REPORTING BOX

1 (day of month)	O3	CO
	PM10	PM2.5

	SUN	MON	TUES	WED	THU	FRI	SAT						
		1	48 07 50 33	2	47 07 45 34	3	46 09 52 25	4	42 09 50 32	5	43 04 62 28	6	46 05 33 28
7	61 05 27 29	8	43 06 32 33	9	36 06 43 28	10	39 05 30 23	11	44 06 43 32	12	45 05 30 28	13	39 06 48 22
14	44 06 29 28	15	42 07 40 33	16	47 07 39 35	17	42 07 36 32	18	49 08 37 34	19	45 09 56 39	20	49 06 29 32
21	44 06 70 39	22	109 08 48 35	23	87 13 50 42	24	87 15 53 40	25	41 07 53 28	26	58 11 44 37	27	61 06 42 35
28	64 07 38 32	29	51 08 50 30	30	74 06 48 29								

Calendar of High Pollution Advisories and Health Watches issued during June 2009

	SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6	
7	8	9	10	11	12	13	
14	15	16	17	18	19	20	
21	22	23	F	C	25	26	27
28	29	F	F				

LEGEND

HIGH POLLUTION ADVISORIES
A = PM-10 High Pollution Advisory
B = PM-2.5 High Pollution Advisory
C = Ozone High Pollution Advisory

HEALTH WATCHES
D = PM-10 Health Watch
E = PM-2.5 Health Watch
F = Ozone Health Watch

Calendar of Meteorological Conditions observed in Metro Phoenix during June 2009

	SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6	
7	8	9	A B	A B	11	12	13
14	15	16	17	18	19	B	20
21	22	23	B	24	25	B	26
28	29	30	A D				

LEGEND

ELECTROMETEORS
A = Thunderstorm

HYDROMETEORS
B = Rain/Drizzle/Hail/Snow
C = Fog

LITHOMETEORS
D = Blowing Dust
E = Haze (vsby <10SM)
F = Smoke

Non-Ozone Exceedance days during JUN 2009-

Total= 0 Date Max AQI Pollutant Site/s

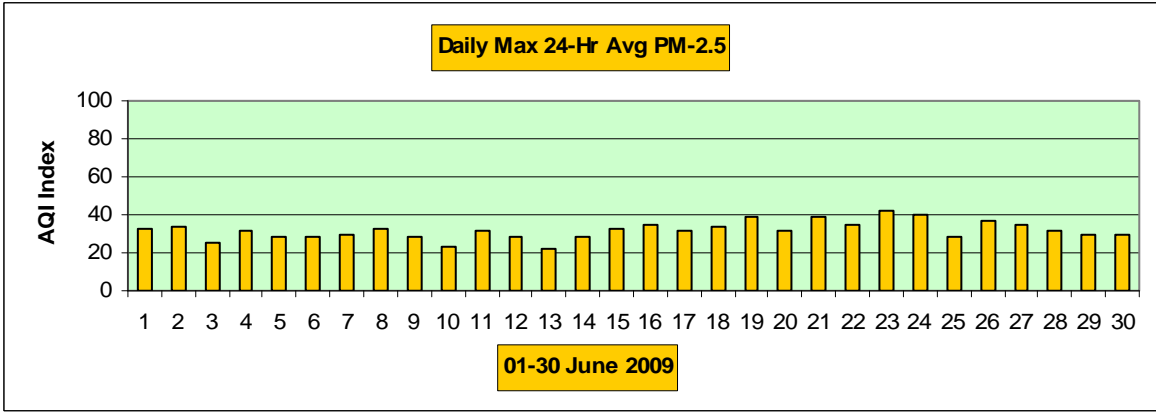
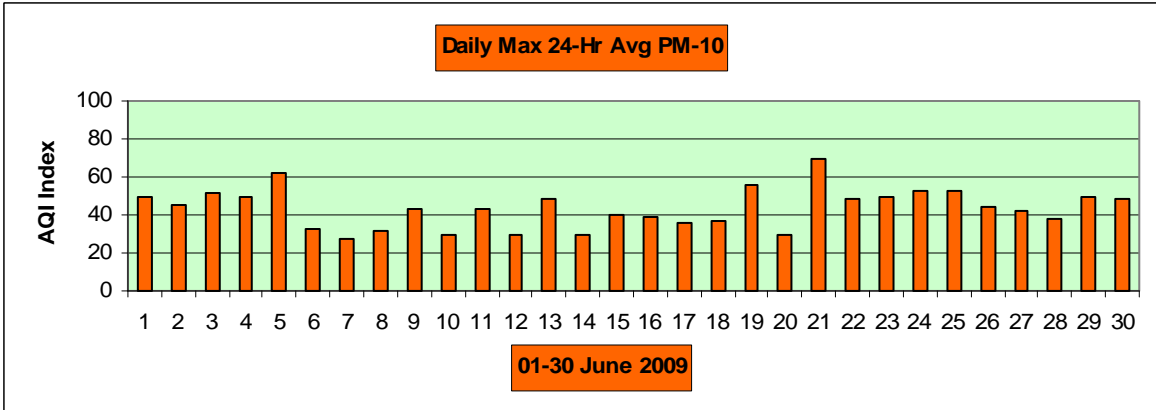
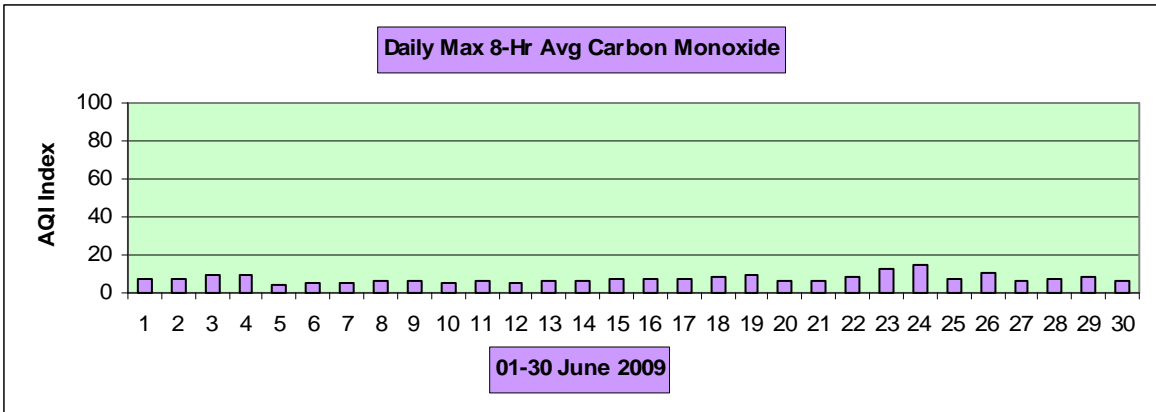
Non-Ozone Health Watches issued during JUN 2009-

Total= 0 Date Max AQI Pollutant Site/s

Non-Ozone High Pollution Advisories issued during JUN 2009-

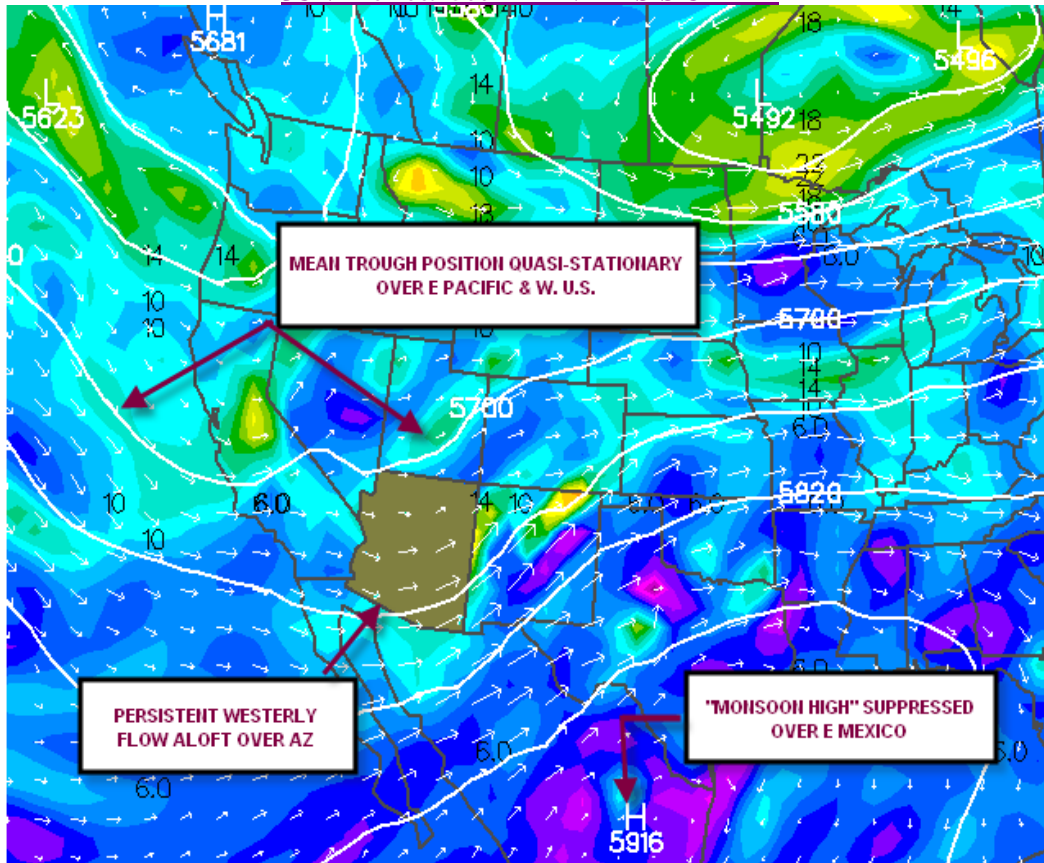
Total= 0 Date Max AQI Pollutant Site/s

Concentration Recap: Days in the **Good** category: 17
Days in the **Moderate** category: 12
Days in the **Unhealthy for Sensitive Groups** category: 1
Days in the **Unhealthy** category: 0
Total Forecast Days: 30



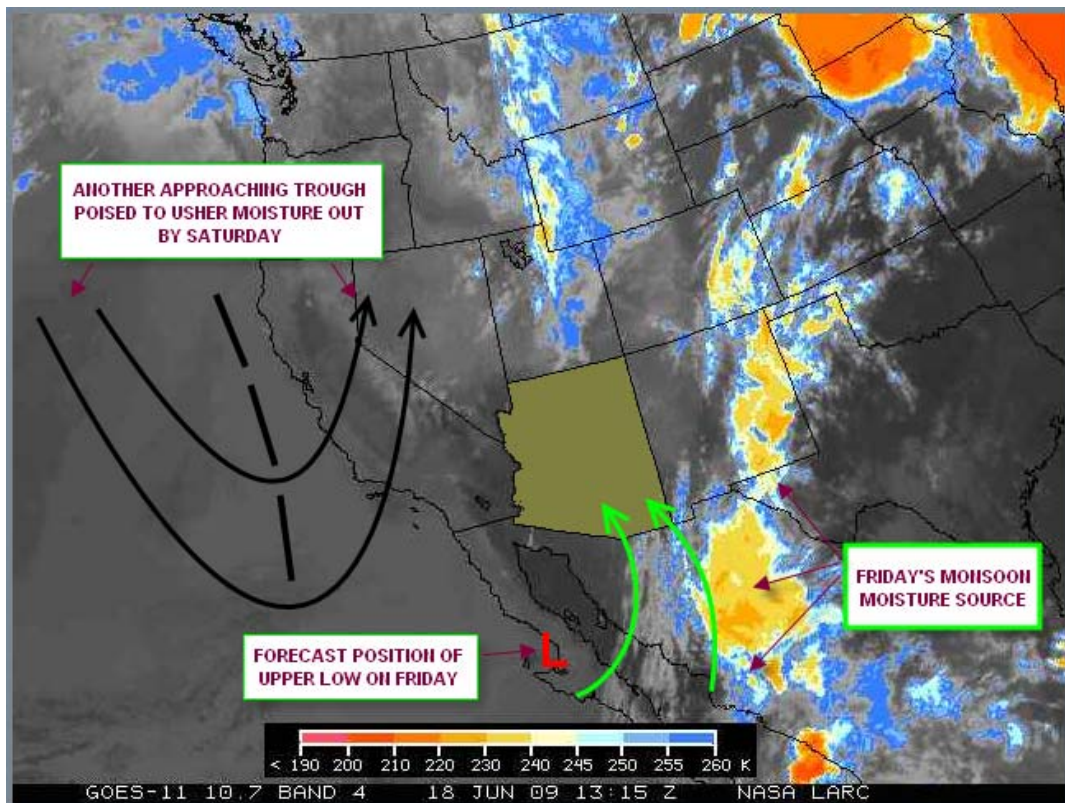
Narrative: The mean position of a long-wave trough in the mid-latitude storm track was located just west of Arizona from the 1st thru the 24th of this month. During this period numerous embedded short wave troughs propagated eastward toward or over the state then moved northeast or weakened in place. An example of this configuration can be seen in the graphic below:

JUNE 10 2009 500MB ANALYSIS CHART



This peculiar weather pattern for this time of year produced very good to excellent dispersion characteristics throughout the period with air mass stagnation virtually non-existent. Also, there were no trough or frontal passages to generate large-scale blowing dust episodes as is the norm. Thus, particle pollution concentrations were never a concern the entire month.

After mid-month a nearly stationary closed upper low (see graphic below) was able to draw pre-monsoon moisture from Mexico over parts of Arizona including the Phoenix metro area and some light rain showers occurred on the 19th accompanied by 35 mph outflow winds from distant thunderstorms; only light blowing dust was reported. A true summer monsoon flow pattern finally set up on the 27th but the main impacts thru the end of the month were additional outflow boundaries and occasional blowing dust. Very little rainfall occurred locally. As mentioned earlier, despite the winds and blowing dust PM-10 (coarse particle) levels were in the good range of the Air Quality Index on all but five days during June. –Reith



DETAILED OZONE SECTION

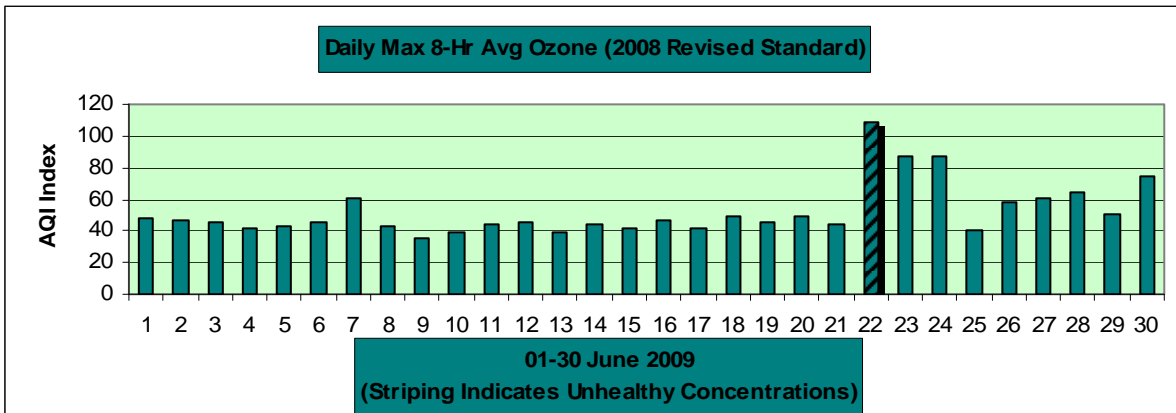
(Based on the 2008 EPA Revised 8-Hour Ozone Standard)

GOOD	MODERATE	UNHEALTHY FOR SENSITIVE GROUPS	UNHEALTHY
0-50	51-100	101-150	151-200

SUMMARY OF MAXIMUM 8-HR OZONE AQI VALUES FOR JUNE 2009*

*Preliminary data

SUN		MON		TUES		WED		THU		FRI		SAT	
		1	48	2	47	3	46	4	42	5	43	6	46
7	61	8	43	9	36	10	39	11	44	12	45	13	39
14	44	15	42	16	47	17	42	18	49	19	45	20	49
21	44	22	109	23	87	24	87	25	41	26	58	27	61
28	64	29	51	30	74								



<u>8-hr Ozone exceedance days in JUN:</u>	Total= 1	<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
		6/22	79/109	Pinnacle Peak
			76/101	Humboldt Mtn.

Total number of exceedance days since APR 01: 3
Total number of exceedance sites since APR 01: 8

<u>Ozone Health Watches in JUN:</u> (Forecast max value 72-75 ppb)	Total= 3	<u>Date</u>	<u>Max ppb/AQI</u>	<u>Site/s</u>
		6/23	71/87	Humboldt Mtn.
		6/29	60/51	Fountain Hills
		6/30	67/74	Tonto Nat'l Mon

Ozone Health Watches since APR 01: Total= 16

High Pollution Advisories in JUN: Total= 1 6/24 71/87 Apache Junction
(Forecast max value 76+ppb)

High Pollution Advisories since APR 01: Total= 5

Concentration Recap: Days in the **Good** category: 21
Days in the **Moderate** category: 8
Days in the **Unhealthy for Sensitive Groups** category: 1
Days in the **Unhealthy** category: 0
Total Forecast Days: 30

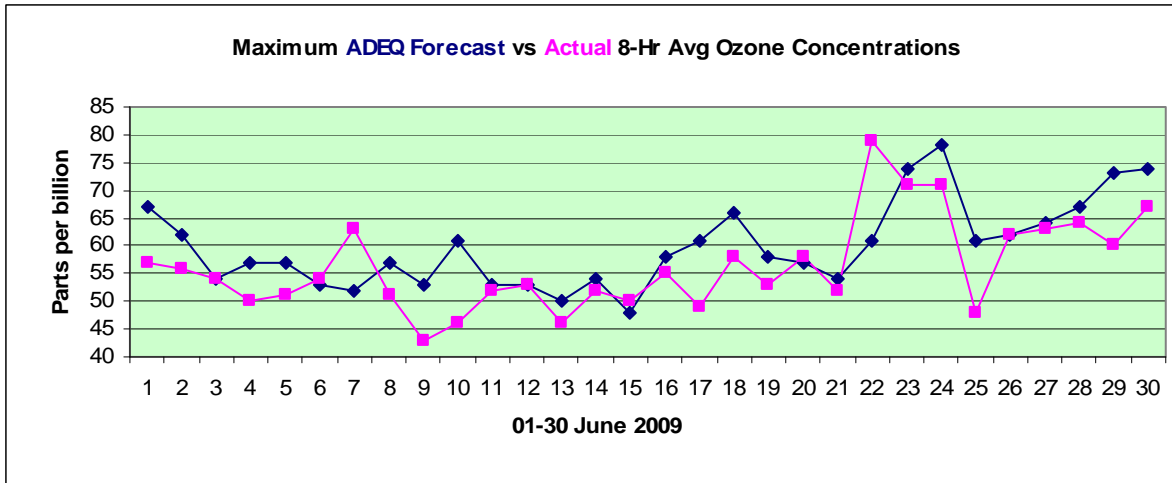
Maximum 8-Hr value: Date Hour Site ppb/AQI DOW
6/22 1400 Pinnacle Peak 79/109 Mon

Maximum 1-Hr value: Date Hour Site ppb/AQI DOW
6/24 1600 Apache Junction 91/76 Wed

Average daily max 8-Hr concentration (ppb): 56.3
Deviation from the 1996-2008 average (ppb): -15.6

JUN Climatology: Average number of 8-Hr exceedance days: 3.5
(Period 1996-2008 Maximum number of 8-Hr exceedance days: 10 in 2008
using 1997 85ppb Minimum number of 8-Hr exceedance days: 0 in 2003, 2004, 2007
standard & 2008 Average daily max 8-Hr concentration (ppb): 71.9
using 76ppb Record high max 8-Hr concentration (ppb): 102 on the 1st, 1996
standard) Record low max 8-Hr concentration (ppb): 45 on the 10th, 2003

Forecast Verification:	# of days maximum concentrations were over-forecast:	22
	# of days maximum concentrations were under-forecast:	5
	# of days maximum concentrations were correctly forecast:	3
	Jun average forecast accuracy (ppb):	+/-5.9
	Jun average forecast bias (ppb):	+3.7



Narrative: The first three weeks of June 2009 were remarkable in that highest ozone levels on all but one day were in the good range of the Air Quality Index. The average daily max 8-hour concentration during the month was nearly 16 parts per billion lower than the 13-year average (1996-2008). On top of this, the 43 parts per billion concentration on the 9th was the lowest daily 8-hour average during any June since at least 1996!! The previous low reading was 45 ppb on June 10 2003. During the period 1996 – 2008 highest ozone levels on June 9 ranged from 62-82 ppb so this was indeed a spectacular departure from normal. Although ozone precursor emissions were probably lower than normal due to the existing economic situation, the main reason for the plunging ozone levels was the very unusual and nearly stationary synoptic weather pattern that was in place over the western U.S. during all but the final six days of the month. This pattern featured a closed low or long-wave trough in the mid-latitude storm track whose axes were situated along or near the west coast. A series of weak disturbances propagating thru the mean trough position from time to time even managed to drop light rain on the Valley on the 9th, 10th, and 19th. As a result, not only was daily cloud cover more conspicuous than normal for the month of June, but due to the enhanced low-level contour gradient associated with the low/trough proximity, afternoon westerly wind gusts at the surface in the 25-30 mph range were practically a daily occurrence. In addition, afternoon temperatures were much below normal as can be seen from this excerpt from a statement issued the Phoenix office of the National Weather Service:

PUBLIC INFORMATION STATEMENT
 NATIONAL WEATHER SERVICE PHOENIX AZ
 200 PM MST WED JUN 10 2009

...INFO ON SUB-100 DAYS IN JUNE...

DAYTIME HIGH TEMPERATURES HAVE REMAINED BELOW 100 DEGREES AT PHOENIX COMMENCING 5 JUNE. THE CURRENT FORECAST CALLS FOR TEMPERATURES TO REMAIN BELOW 100 DEGREES DURING THE UPCOMING SEVEN DAYS AND POSSIBLY LONGER. IF THIS FORECAST VERIFIES...THE STRETCH OF CONSECUTIVE SUB-100 DEGREE DAYS AT PHOENIX WILL BE UNUSUALLY LONG.

SINCE 1896...THE LONGEST STREAK OF SUB-100 DAYS IN JUNE FOR PHOENIX OCCURRED IN 1913 WHEN THE TEMPERATURE FAILED TO BREAK THE CENTURY MARK FOR 17 DAYS...1ST THROUGH THE 17TH. THE HIGH FINALLY HIT 101 ON THE 18TH...THE FIRST 100 DEGREE DAY OF 1913 AND THE LATEST FOR IT TO EVER OCCUR IN PHOENIX. NOT SURPRISINGLY...JUNE 1913 HOLDS THE RECORD FOR THE MOST SUB-100 DAYS WITH 22 (LONG TERM AVERAGE IS 9 DAYS). MORE RECENTLY...1995 HAD 12 JUNE DAYS BELOW 100...11 IN 1997...14 IN 1998...11 IN 1999...AND 10 IN 2005.

THE RECENT RELATIVELY COOL WEATHER IS DUE TO A WEATHER PATTERN WITH A PERSISTENT TROUGH OF LOW PRESSURE OVER THE WEST COAST. THIS TROUGH SUPPRESSES THE RIDGE OF HIGH PRESSURE OVER MEXICO WHICH TYPICALLY STRENGTHENS AND EXPANDS NORTHWARD DURING JUNE...BRINGING OUR REGION ITS INFAMOUS SUMMER HEAT. TOP 5 LONGEST SUB-100 DAY STREAKS IN JUNE FOR PHOENIX:

- 1913 JUN 1-17 17 DAYS
- 1907 JUN 1-16 16 DAYS
- 2009 JUN 5-19 15 DAYS**
- 1901 JUN 1-15 15 DAYS
- 1971 JUN 1-12 12 DAYS
- 1967 JUN 1-12 12 DAYS
- 1954 JUN 5-16 12 DAYS
- 1942 JUN 1-12 12 DAYS

Finally, this weather pattern eliminated the periodic influxes of additional ozone and its precursors from California that usually occur in the wake of trough passages. Since the parent trough axis never moved east of the state, transport winds from CA never set up. Ozone concentrations did finally increase in a big way – starting with an unhealthy level episode on the 22nd. This date marked the first subtle modification from a trough-dominated weather pattern to that of a sub-tropical ridge that typically precedes the onset of the summer monsoon. On that date afternoon winds were mostly <15 mph and frequently light or calm, cloud cover was nearly absent, and the afternoon high at Sky Harbor Airport reached 105 deg F. By the 27th a true monsoon flow had become established and a thunderstorm outflow boundary reached the metro area the evening of the 28th. Afternoon temperatures near 110 deg F began on the 27th and 24-hour average dew point temperatures rose into the 50’s by the 28th. The graph below sums up the highest measured (preliminary data) local ozone levels from April 1-June 24 2009. -Reith

