



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Sampling and Analysis of Samples Collected in the Cities of Duarte and Azusa

Follow-up #4

November 2008

MA #2008-03

TABLE OF CONTENTS

Executive Summary.....	Ex-1
1.0 Introduction.....	1
2.0 Crystalline Silica.....	1
3.0 Analysis.....	1
4.0 Results.....	2
5.0 Summary.....	7
6.0 Concluding Remark.....	8
7.0 References.....	8

LIST OF FIGURES

Figure 1	First Three Quarters of 2008 PM ₁₀ Mass at Duarte and Azusa.....	2
Figure 2	PM ₁₀ Data at Duarte and Azusa Since Study Inception.....	3
Figure 3	First Three Quarters of 2008 PM _{2.5} Mass at Duarte and Azusa.....	4
Figure 4	PM _{2.5} Data at Duarte and Azusa Since Study Inception.....	4
Figure 5	PM ₄ Crystalline Silica First Three Quarters 2008.....	5
Figure 6	PM ₄ Crystalline Silica Data Since Study Inception.....	6

LIST OF APPENDICES

Appendix A	PM ₁₀ First Second and Third Quarters of 2008 Data for Duarte and Azusa AMS
Appendix B	PM _{2.5} First Second and Third Quarters of 2008 Data for Duarte and Azusa AMS
Appendix C	PM ₄ Crystalline Silica Data for First Three Quarters of 2008
Appendix D	PM ₁₀ Data for Duarte and Azusa Since Study Inception
Appendix E	PM _{2.5} Data for Duarte and Azusa Since Study Inception
Appendix F	PM ₄ Crystalline Silica Data Since Study Inception
Appendix G	Wind Roses from Duarte and Azusa

EXECUTIVE SUMMARY

Purpose

In a letter dated April 12, 2005, the city of Duarte requested the AQMD to examine potential air quality impacts of quarry operations in the area. Specifically, the city requested that the AQMD conduct particle matter (PM) sampling in the community. The AQMD worked with the city to identify a suitable sampling location and deployed a PM₁₀ sampler at Royal Oaks Elementary in Duarte beginning in August 2005. In October 2005, a PM_{2.5} sampler was added at the school and fallout samples were collected at various locations in the community. The AQMD held a town hall meeting on September 21, 2005 to inform the public of the air monitoring program and to hear community concerns. Comments were made that elevated levels of crystalline silica may occur from the quarry activities and are a potential health concern. Subsequent to the meeting, the AQMD initiated air monitoring for crystalline silica. This fourth report details findings for the first three quarters of 2008 and for the entire duration of sampling starting in August 2005 and ending on September 9th 2008. The sampling at Royal Oaks Elementary has established baseline levels of PM₁₀, PM_{2.5}, and crystalline silica which may be used to compare future samples.

Sampling

Sampling at Royal Oaks Elementary located in Duarte began in August 2005 with federal reference method (FRM) sampling of PM₁₀. A PM_{2.5} FRM sampler was then added in October 2005. Due to concerns about crystalline silica, an additional PM sampler specific to crystalline silica, was added on May 23, 2006. From the beginning of sampling, a meteorological system has measured and recorded wind speed and direction at the site. The PM and meteorological data are used for comparison to AQMD's air monitoring station (AMS) data collected in Azusa, immediately east of the quarrying and materials handling facility, and to air quality standards established by both the state of California and U.S. EPA.

Key Findings

- The state 24-hour standard for PM₁₀ is 50µg/m³. This standard was exceeded on two sampling days in Duarte and ten sampling days in Azusa during the period of January to September 9th 2008. Average 24-hour PM₁₀ concentrations were 28µg/m³ in Duarte and 35µg/m³ in Azusa when same sampling dates are compared.
- The federal 24-hour standard for PM_{2.5} is set at 35µg/m³. This standard was exceeded on two days in Duarte and one day in Azusa during this reporting period. The federal level was exceeded in Duarte on July 5th with a measured value of 60µg/m³, likely as a result of 4th of July fireworks activities; no sample

was recovered from Azusa on this day. The other day in Duarte exceeding the federal standard occurred on Feb 18th 2008 with a value of 35.3 $\mu\text{g}/\text{m}^3$, the same day as Azusa (36.5 $\mu\text{g}/\text{m}^3$). PM_{2.5} averaged 14.6 $\mu\text{g}/\text{m}^3$ in Duarte compared to 14.4 $\mu\text{g}/\text{m}^3$ at the Azusa AMS when same sampling days were compared for the first three quarters of 2008.

- Crystalline silica results show that for the duration of the study, no samples exceeded the non-cancer chronic reference exposure level of 3 $\mu\text{g}/\text{m}^3$ as PM₄ established by the State of California. The maximum 24-hour reported value for crystalline silica was 1.3 $\mu\text{g}/\text{m}^3$, with an average of 0.5 $\mu\text{g}/\text{m}^3$.
- Wind direction at Duarte and AQMD's Azusa air monitoring station (AMS) demonstrates a great deal of similarity for months where data is available. Wind speeds at the Azusa AMS are typically higher than those measured in Duarte.

1.0 INTRODUCTION

This is the fourth and final follow-up to AQMD's report on particulate matter (PM) monitoring conducted at Royal Oaks Elementary School, located in Duarte, California (SCAQMD, 2006). New sampling results in this report cover the first, second, and third quarters of 2008 (January to September 9th 2008). Details regarding background, project discussion, and sampler siting protocols are provided in the 2006 report¹. For this monitoring period, 76 samples were collected for PM₁₀, 76 samples for PM_{2.5} mass determination and 33 PM₄ samples were collected to determine ambient crystalline silica concentrations. Twenty one of the crystalline silica samples had concentrations greater than the detection limit of 0.4µg/m³.

2.0 Crystalline Silica

Silica refers to silicon dioxide (SiO₂), which occurs naturally in crystalline and amorphous forms. It is exposure to respirable crystalline silica that has been determined to have health impacts. Crystalline silica is the crystalline form of silicon dioxide and is naturally occurring; the most common form of crystalline silica is quartz. Exposure to crystalline silica may result from activities that involve the suspension of respirable crystalline silica into the air; such activities might include mining, quarry work, rock drilling, stonecutting, and abrasive blasting.

Atmospheric sampling for respirable crystalline silica is based on sampling particulate matter with an aerodynamic diameter of 4 micro-meters or less (PM₄). A PM₄ sampler was deployed in May 2006 at Royal Oaks Elementary. This sampler was replaced with a higher flow rate PM₄ sampler at the beginning of January 2007. Samples for PM₁₀, PM_{2.5}, and PM₄ are all collected over a one-day, 24-hour period, from midnight to midnight.

There is very little information on ambient levels of PM₄ crystalline silica. In a document dated 1996, U.S. EPA estimated background levels of crystalline silica at 3µg/m³ of PM₁₅, but has no estimates for PM₄ crystalline silica. An upper bound estimate of 10% for silica in PM₁₀ in metropolitan areas was also given, but it was noted that this upper bound is uncertain. Crystalline silica is listed as a Proposition 65 cancer-causing compound by the State of California and has set a non-cancer chronic reference exposure level (REL) of 3µg/m³ as PM₄. Chronic exposure refers to exposure of 8 years or longer and is not based on a specific sampling period. The National Institute of Occupational Safety and Health (NIOSH) has set a recommended exposure limit of 50µg/m³ PM₄ averaged over a work shift of 8 to 10 hours.

3.0 ANALYSIS

Analysis for PM mass is conducted in accordance with established U.S. EPA and AQMD methods. The determination of crystalline silica follows AQMD's method. All samples are accompanied with a completed Sample Analysis Request – Chain of Custody Form upon receipt by the AQMD Laboratory. Specific details regarding sampling and analysis protocols can be found in the 2006 AQMD report.

4.0 RESULTS

PM Sampling

Results of PM₁₀ sampling for the first, second and third quarters in Duarte and Azusa for 2008 are listed in Appendix A and plotted in Figure 1. PM₁₀ data collected since the start of the study are shown in Figure 2 and Appendix D. Results of PM_{2.5} sampling for the first, second, and third quarters in Duarte and Azusa for 2008 are listed in Appendix B and plotted in Figure 3. Data for all PM_{2.5} samples collected since the beginning of the monitoring program are shown in Figure 4 and in Appendix E. All results are based on samples being taken every sixth day for a 24-hour sampling period.

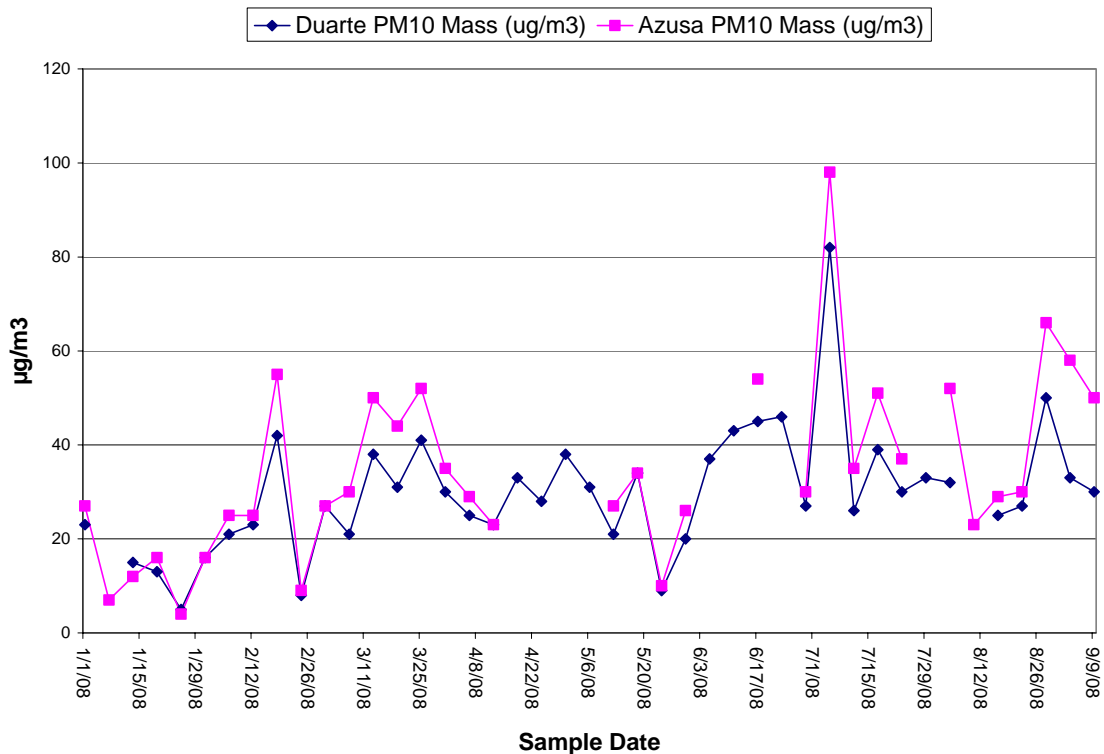


Figure 1. First Three Quarters of 2008 PM₁₀ Mass at Duarte and Azusa

For the three quarter period of 2008, the 24-hour PM₁₀ data collected at Duarte track well with data collected in Azusa. All sampled PM₁₀ concentrations at Duarte and Azusa are below the federal 24-hour standard of 150 $\mu\text{g}/\text{m}^3$. The state 24-hour PM₁₀ standard of 50 $\mu\text{g}/\text{m}^3$ set by the California Air Resources Board was exceeded on two days in Duarte and ten days in Azusa. On the July 5th 2008 sample day, both Duarte (82 $\mu\text{g}/\text{m}^3$) and Azusa (98 $\mu\text{g}/\text{m}^3$) largely exceeded the state PM₁₀ standard; likely a result of Fourth of July fireworks. The average PM₁₀ mass concentration during this three quarter period when comparing the same sample days was 28 $\mu\text{g}/\text{m}^3$ in Duarte and 35 $\mu\text{g}/\text{m}^3$ Azusa.

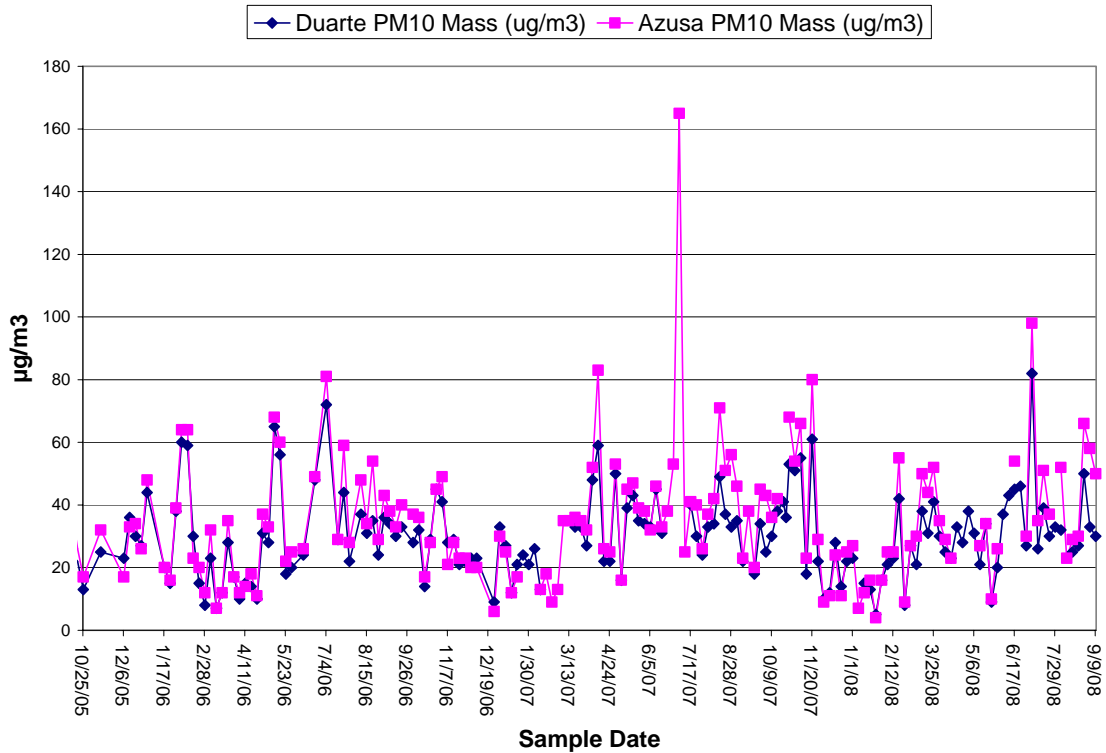


Figure 2. PM₁₀ Data at Duarte and Azusa Since Study Inception

PM_{2.5} concentrations at the two sites also track each other very well. The federal 24-hour standard for PM_{2.5} is established at 35µg/m³. This standard was exceeded on two days in Duarte and one day in Azusa during this reporting period. One day the federal level was exceeded in Duarte occurred on July 5th likely as a result of 4th of July fireworks activities; no sample was recovered from Azusa on this day. The other day in Duarte exceeding the federal standard occurred on Feb 18th 2008, the same day as Azusa. PM_{2.5} averaged 14.6µg/m³ in Duarte compared to 14.4µg/m³ at the Azusa AMS when same sampling days were compared.

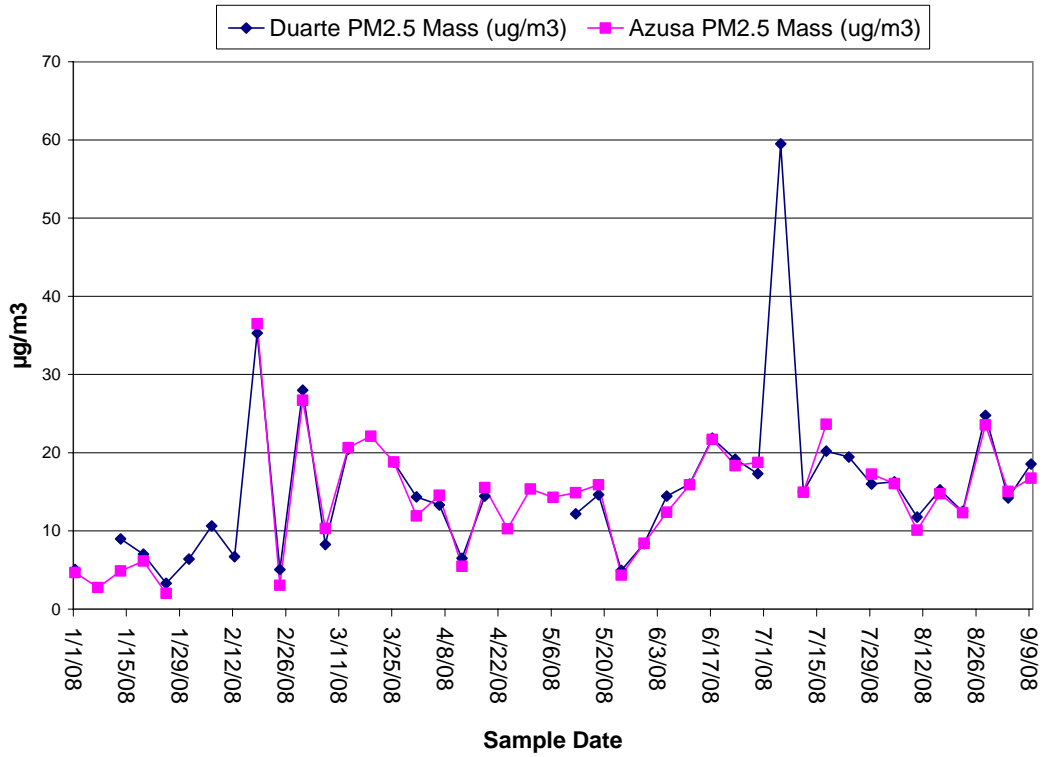


Figure 3. First Three Quarters of 2008 PM_{2.5} Mass at Duarte and Azusa

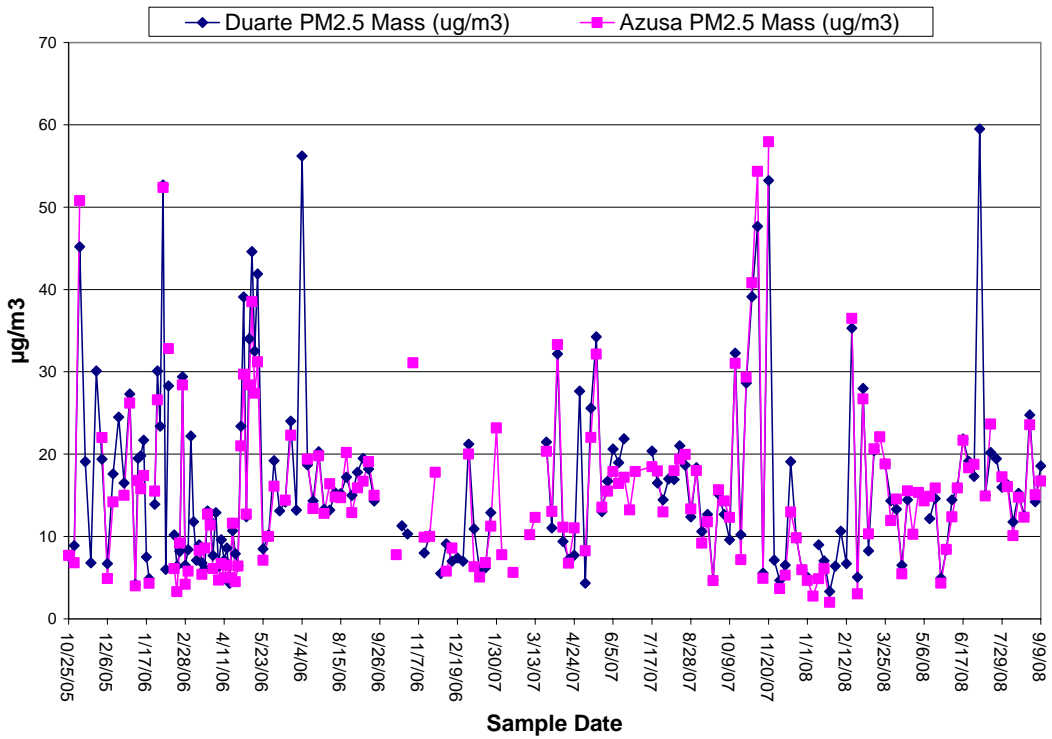


Figure 4. PM_{2.5} Data at Duarte and Azusa Since Study Inception

Crystalline Silica

A crystalline silica non-cancer chronic reference exposure level (REL) of $3\mu\text{g}/\text{m}^3$ as PM_{10} has been set by the State of California. This non-cancer chronic level was not exceeded during the entirety of the study. Likewise, the NIOSH occupational limit of $50\mu\text{g}/\text{m}^3$, also as PM_{10} , was not exceeded. For the thirty three samples at or above the non-detection limit of $0.4\mu\text{g}/\text{m}^3$ PM_{10} crystalline silica averaged $0.6\mu\text{g}/\text{m}^3$ for the period of January 2008 into early September 2008. The average crystalline silica value for the entirety of the study was $0.5\mu\text{g}/\text{m}^3$ and the highest detected level of crystalline silica was $1.3\mu\text{g}/\text{m}^3$. Results of crystalline silica sampling in Duarte are shown in Appendix C. Figure 5 presents data in graph form. Data for all samples collected since the start of the study are provided in Figure 6 and in Appendix F. In figures 5 and 6 all data at or below the detection level of $0.4\mu\text{g}/\text{m}^3$ or $0.3\mu\text{g}/\text{m}^3$ are plotted at these levels. In Figure 5 the detection limit of crystalline silica from November 2006 through December 2007 was lowered to $0.3\mu\text{g}/\text{m}^3$ from $0.4\mu\text{g}/\text{m}^3$.

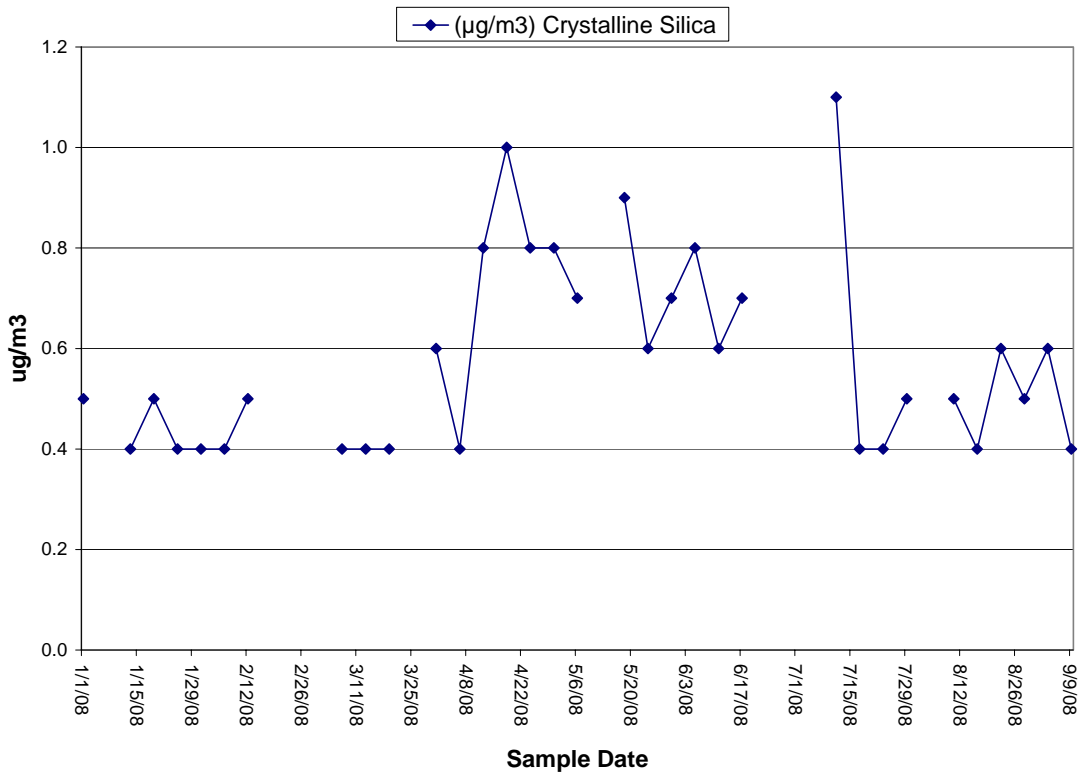
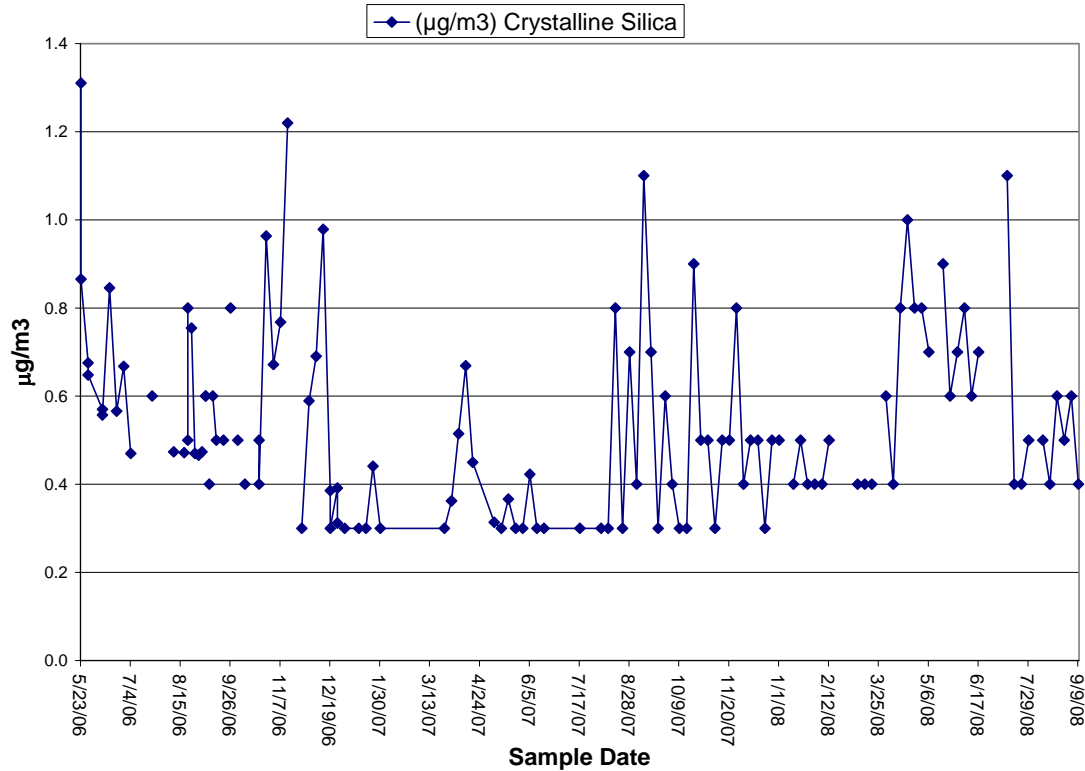


Figure 5. PM_{10} Crystalline Silica First Three Quarters 2008



5.0 SUMMARY

For this reporting period of the first three quarters in 2008 and duration of the study; the PM₁₀ and PM_{2.5} measurements show similar patterns and concentrations at Duarte and Azusa. PM₁₀ concentrations at Duarte and Azusa are below the federal 24-hour standard for PM₁₀ of 150µg/m³. During the first three quarters of 2008, the PM₁₀ levels did exceed the state standard of 50µg/m³ on two days at Duarte and ten days at the Azusa AMS. The federal standard for PM_{2.5} established at 35µg/m³ was exceeded on two days in Duarte and one day in Azusa during this reporting period. No crystalline silica samples exceeded the REL set by the state and averaged 0.6µg/m³. All samples were collected over a one day, 24-hour period.

For the duration of the study from August 2005 to September 9th 2008, a total of 319 PM₁₀, 330 PM_{2.5}, and 120 PM₄ crystalline silica samples were analyzed. PM₁₀ concentrations during the study were all below the federal 24-hour standard of 150µg/m³. The 24-hr PM₁₀ state standard was exceeded five times at Duarte and thirty four times at Azusa. Crystalline silica averaged 0.5µg/m³ and had a maximum measured value of 1.3µg/m³ for the duration of the study.

Key Findings

- The state 24-hour standard for PM₁₀ is 50µg/m³. This standard was exceeded on two sampling days in Duarte and ten sampling days in Azusa during the period of January to September 9th 2008. Average 24-hour PM₁₀ concentrations were 28µg/m³ in Duarte and 35µg/m³ in Azusa when same sampling dates are compared.
- The federal 24-hour standard for PM_{2.5} is set at 35µg/m³. This standard was exceeded on two days in Duarte and one day in Azusa during this reporting period. The federal level was exceeded in Duarte on July 5th with a measured value of 60µg/m³, likely as a result of 4th of July fireworks activities; no sample was recovered from Azusa on this day. The other day in Duarte exceeding the federal standard occurred on Feb 18th 2008 with a value of 35.3µg/m³, the same day as Azusa (36.5µg/m³). PM_{2.5} averaged 14.6µg/m³ in Duarte compared to 14.4µg/m³ at the Azusa AMS when same sampling days were compared for the first three quarters of 2008.
- Crystalline silica results show that for the duration of the study, no samples exceeded the non-cancer chronic reference exposure level of 3µg/m³ as PM₄ established by the State of California. The maximum 24-hour reported value for crystalline silica was 1.3µg/m³, with an average of 0.5µg/m³.

- Wind direction at Duarte and AQMD's Azusa air monitoring station (AMS) demonstrates a great deal of similarity for months where data is available. Wind speeds at the Azusa AMS are typically higher than those measured in Duarte.

6.0 CONCLUDING REMARK

In response to a letter from the City of Duarte requesting AQMD to determine potential impacts of quarrying operations in the area, the AQMD has been monitoring particulate matter (PM) at Royal Oaks Elementary School in Duarte since August 2005. In May 2006 sampling for crystalline silica began. The intent of the sampling was to establish a baseline for ambient PM and crystalline silica concentrations, the baseline was to be established over a one year period.

As of September 9th 2008, all sampling ended at Royal Oaks Elementary due to the need for equipment to be used to address concerns in other communities. Data collected up to this point can be used as a baseline measurement should sampling need to be resumed at Royal Oaks Elementary. The AQMD is committed to working with the city and community of Duarte to resume sampling if determined necessary as a result of expanded quarrying activities or other circumstances.

7.0 REFERENCES

- 1). "Sampling and Analysis of Samples Collected in the Cities of Duarte and Azusa", December 2006.

APPENDIX A

PM₁₀ First Second and Third Quarters of 2008 Data for Duarte and Azusa AMS

All Samples

Sample Date	PM10 (µg/m ³)	PM10 (µg/m ³)
	Duarte	Azusa
1/1/2008	23	27
1/7/2008	No Sample	7
1/13/2008	15	12
1/19/2008	13	16
1/25/2008	5	4
1/31/2008	16	16
2/6/2008	21	25
2/12/2008	23	25
2/18/2008	42	55
2/24/2008	8	9
3/1/2008	27	27
3/7/2008	21	30
3/13/2008	38	50
3/19/2008	31	44
3/25/2008	41	52
3/31/2008	30	35
4/6/2008	25	29
4/12/2008	23	23
4/18/2008	33	No Sample
4/24/2008	28	No Sample
4/30/2008	38	No Sample
5/6/2008	31	No Sample
5/12/2008	21	27
5/18/2008	34	34
5/24/2008	9	10
5/30/2008	20	26
6/5/2008	37	No Sample
6/11/2008	43	No Sample
6/17/2008	45	54
6/23/2008	46	No Sample
6/29/2008	27	30
7/5/2008	82	98
7/11/2008	26	35
7/17/2008	39	51
7/23/2008	30	37
7/29/2008	33	No Sample
8/4/2008	32	52
8/10/2008	No Sample	23
8/16/2008	25	29
8/22/2008	27	30
8/28/2008	50	66
9/3/2008	33	58
9/9/2008	30	50
Average	30	34

Same Day Samples

Sample Date	PM10 (µg/m ³)	PM10 (µg/m ³)
	Duarte	Azusa
1/1/2008	23	27
1/7/2008	No Sample	
1/13/2008	15	12
1/19/2008	13	16
1/25/2008	5	4
1/31/2008	16	16
2/6/2008	21	25
2/12/2008	23	25
2/18/2008	42	55
2/24/2008	8	9
3/1/2008	27	27
3/7/2008	21	30
3/13/2008	38	50
3/19/2008	31	44
3/25/2008	41	52
3/31/2008	30	35
4/6/2008	25	29
4/12/2008	23	23
4/18/2008		No Sample
4/24/2008		No Sample
4/30/2008		No Sample
5/6/2008		No Sample
5/12/2008	21	27
5/18/2008	34	34
5/24/2008	9	10
5/30/2008	20	26
6/5/2008		No Sample
6/11/2008		No Sample
6/17/2008	45	54
6/23/2008		No Sample
6/29/2008	27	30
7/5/2008	82	98
7/11/2008	26	35
7/17/2008	39	51
7/23/2008	30	37
7/29/2008		No Sample
8/4/2008	32	52
8/10/2008	No Sample	
8/16/2008	25	29
8/22/2008	27	30
8/28/2008	50	66
9/3/2008	33	58
9/9/2008	30	50
Average	28	35

APPENDIX B

PM_{2.5} First Second and Third Quarters of 2008 Data for Duarte and Azusa AMS

All Samples

Same Day Samples

Sample Date	PM2.5 (µg/m ³)	PM2.5 (µg/m ³)
	Duarte	Azusa
1/1/2008	5.1	4.7
1/7/2008	No Sample	2.8
1/13/2008	9.0	4.9
1/19/2008	7.0	6.1
1/25/2008	3.3	2.0
1/31/2008	6.4	No Sample
2/6/2008	10.6	No Sample
2/12/2008	6.7	No Sample
2/18/2008	35.3	36.5
2/24/2008	5.1	3.0
3/1/2008	28.0	26.7
3/7/2008	8.3	10.3
3/13/2008	20.4	20.6
3/19/2008	No Sample	22.1
3/25/2008	18.8	18.8
3/31/2008	14.3	11.9
4/6/2008	13.3	14.6
4/12/2008	6.5	5.5
4/18/2008	14.4	15.5
4/24/2008	No Sample	10.3
4/30/2008	No Sample	15.3
5/6/2008	No Sample	14.3
5/12/2008	12.2	14.9
5/18/2008	14.6	15.9
5/24/2008	5.0	4.3
5/30/2008	8.4	8.4
6/5/2008	14.4	12.4
6/11/2008	16.0	15.9
6/17/2008	21.9	21.7
6/23/2008	19.2	18.3
6/29/2008	17.3	18.8
7/5/2008	59.5	No Sample
7/11/2008	15.0	14.9
7/17/2008	20.2	23.6
7/23/2008	19.5	No Sample
7/29/2008	16.0	17.3
8/4/2008	16.3	16.1
8/10/2008	11.8	10.1
8/16/2008	15.2	14.8
8/22/2008	12.5	12.3
8/28/2008	24.8	23.6
9/3/2008	14.2	15.1
9/9/2008	18.6	16.7
Average	15.4	14.2

Sample Date	PM2.5 (µg/m ³)	PM2.5 (µg/m ³)
	Duarte	Azusa
1/1/2008	5.1	4.7
1/7/2008	No Sample	
1/13/2008	9.0	4.9
1/19/2008	7.0	6.1
1/25/2008	3.3	2.0
1/31/2008		No Sample
2/6/2008		No Sample
2/12/2008		No Sample
2/18/2008	35.3	36.5
2/24/2008	5.1	3.0
3/1/2008	28.0	26.7
3/7/2008	8.3	10.3
3/13/2008	20.4	20.6
3/19/2008	No Sample	
3/25/2008	18.8	18.8
3/31/2008	14.3	11.9
4/6/2008	13.3	14.6
4/12/2008	6.5	5.5
4/18/2008	14.4	15.5
4/24/2008	No Sample	
4/30/2008	No Sample	
5/6/2008	No Sample	
5/12/2008	12.2	14.9
5/18/2008	14.6	15.9
5/24/2008	5.0	4.3
5/30/2008	8.4	8.4
6/5/2008	14.4	12.4
6/11/2008	16.0	15.9
6/17/2008	21.9	21.7
6/23/2008	19.2	18.3
6/29/2008	17.3	18.8
7/5/2008		No Sample
7/11/2008	15.0	14.9
7/17/2008	20.2	23.6
7/23/2008		No Sample
7/29/2008	16.0	17.3
8/4/2008	16.3	16.1
8/10/2008	11.8	10.1
8/16/2008	15.2	14.8
8/22/2008	12.5	12.3
8/28/2008	24.8	23.6
9/3/2008	14.2	15.1
9/9/2008	18.6	16.7
Average	14.6	14.4

APPENDIX C

PM₄ Crystalline Silica Data for First Three Quarters of 2008

	($\mu\text{g}/\text{m}^3$)
Sample Date	Crystalline Silica
1/1/2008	0.5
1/7/2008	No Sample
1/13/2008	0.4
1/19/2008	0.5
1/25/2008	0.4
1/31/2008	0.4
2/6/2008	0.4
2/12/2008	0.5
2/18/2008	No Sample
2/24/2008	No Sample
3/1/2008	No Sample
3/7/2008	0.4
3/13/2008	0.4
3/19/2008	0.4
3/25/2008	No Sample
3/31/2008	0.6
4/6/2008	0.4
4/12/2008	0.8
4/18/2008	1
4/24/2008	0.8
4/30/2008	0.8
5/6/2008	0.7
5/12/2008	No Sample
5/18/2008	0.9
5/24/2008	0.6
5/30/2008	0.7
6/5/2008	0.8
6/11/2008	0.6
6/17/2008	0.7
6/23/2008	No Sample
6/29/2008	No Sample
7/5/2008	No Sample
7/11/2008	1.1
7/17/2008	0.4
7/23/2008	0.4
7/29/2008	0.5
8/4/2008	No Sample
8/10/2008	0.5
8/16/2008	0.4
8/22/2008	0.6
8/28/2008	0.5
9/3/2008	0.6
9/9/2008	0.4
Average	0.6

APPENDIX D

PM₁₀ Data for Duarte and Azusa Since Study Inception

	PM ₁₀ ug/m3	PM ₁₀ ug/m3		PM ₁₀ ug/m3	PM ₁₀ ug/m3
Sample Date	Duarte	Azusa	Sample Date	Duarte	Azusa
8/20/2005	21	43	7/28/2006	22	28
8/26/2005	42	64	8/9/2006	37	48
8/30/2005	46	63	8/15/2006	31	34
9/1/2005	47	65	8/21/2006	35	54
9/7/2005	43	52	8/27/2006	24	29
9/13/2005	36	34	9/2/2006	36	43
9/19/2005	53	53	9/8/2006	34	38
10/7/2005	41	43	9/14/2006	30	33
10/13/2005	24	38	9/20/2006	33	40
10/19/2005	22	26	10/2/2006	28	37
10/25/2005	13	17	10/8/2006	32	36
11/12/2005	25	32	10/14/2006	14	17
12/6/2005	23	17	10/20/2006	29	28
12/12/2005	36	33	10/26/2006	45	45
12/18/2005	30	34	11/1/2006	41	49
12/24/2005	27	26	11/7/2006	28	21
12/30/2005	44	48	11/13/2006	29	28
1/17/2006	20	20	11/19/2006	21	23
1/23/2006	15	16	11/25/2006	22	23
1/29/2006	38	39	12/1/2006	23	20
2/4/2006	60	64	12/7/2006	23	20
2/10/2006	59	64	12/25/2006	9	6
2/16/2006	30	23	12/31/2006	33	30
2/22/2006	15	20	1/6/2007	27	25
2/28/2006	8	12	1/12/2007	12	12
3/6/2006	23	32	1/18/2007	21	17
3/12/2006	7	7	1/24/2007	24	No Sample
3/18/2006	12	12	1/30/2007	21	No Sample
3/24/2006	28	35	2/5/2007	26	No Sample
3/30/2006	17	17	2/11/2007	13	13
4/5/2006	10	12	2/17/2007	No Sample	18
4/11/2006	15	14	2/23/2007	No Sample	9
4/17/2006	14	18	3/1/2007	No Sample	13
4/23/2006	10	11	3/7/2007	No Sample	35
4/29/2006	31	37	3/13/2007	No Sample	35
5/5/2006	28	33	3/19/2007	33	36
5/11/2006	65	68	3/25/2007	33	35
5/17/2006	56	60	3/31/2007	27	32
5/23/2006	18	22	4/6/2007	48	52
5/29/2006	20	25	4/12/2007	59	83
6/10/2006	24	26	4/18/2007	22	26
6/22/2006	48	49	4/24/2007	22	25
7/4/2006	72	81	4/30/2007	50	53
7/16/2006	29	29	5/6/2007	16	16
7/22/2006	44	59	5/12/2007	39	45

PM₁₀ Data for Duarte and Azusa Since Study Inception (cont)

	PM ₁₀ ug/m3	PM ₁₀ ug/m3
Sample Date	Duarte	Azusa
5/18/2007	43	47
5/24/2007	35	39
5/30/2007	34	38
6/5/2007	33	32
6/11/2007	45	46
6/17/2007	31	33
6/23/2007	No Sample	38
6/29/2007	No Sample	53
7/5/2007	No Sample	165
7/11/2007	No Sample	25
7/17/2007	40	41
7/23/2007	30	40
7/29/2007	24	26
8/4/2007	33	37
8/10/2007	34	42
8/16/2007	49	71
8/22/2007	37	51
8/28/2007	33	56
9/3/2007	35	46
9/9/2007	22	23
9/15/2007	No Sample	38
9/21/2007	18	20
9/27/2007	34	45
10/3/2007	25	43
10/9/2007	30	36
10/15/2007	38	42
10/21/2007	41	No Sample
10/24/2007	36	No Sample
10/27/2007	53	68
11/2/2007	51	54
11/8/2007	55	66
11/14/2007	18	23
11/20/2007	61	80
11/26/2007	22	29
12/2/2007	10	9
12/8/2007	12	11
12/14/2007	28	24
12/20/2007	14	11
12/26/2007	22	25
1/1/2008	23	27
1/7/2008	No Sample	7
1/13/2008	15	12

	PM ₁₀ ug/m3	PM ₁₀ ug/m3
Sample Date	Duarte	Azusa
1/19/2008	13	16
1/25/2008	5	4
1/31/2008	16	16
2/6/2008	21	25
2/12/2008	23	25
2/18/2008	42	55
2/24/2008	8	9
3/1/2008	27	27
3/7/2008	21	30
3/13/2008	38	50
3/19/2008	31	44
3/25/2008	41	52
3/31/2008	30	35
4/6/2008	25	29
4/12/2008	23	23
4/18/2008	33	No Sample
4/24/2008	28	No Sample
4/30/2008	38	No Sample
5/6/2008	31	No Sample
5/12/2008	21	27
5/18/2008	34	34
5/24/2008	9	10
5/30/2008	20	26
6/5/2008	37	No Sample
6/11/2008	43	No Sample
6/17/2008	45	54
6/23/2008	46	No Sample
6/29/2008	27	30
7/5/2008	82	98
7/11/2008	26	35
7/17/2008	39	51
7/23/2008	30	37
7/29/2008	33	No Sample
8/4/2008	32	52
8/10/2008	No Sample	23
8/16/2008	25	29
8/22/2008	27	30
8/28/2008	50	66
9/3/2008	33	58
9/9/2008	30	50
Average	31	36

APPENDIX E

PM_{2.5} Data for Duarte and Azusa Since Study Inception

	PM _{2.5} µg/m ³	PM _{2.5} µg/m ³		PM _{2.5} µg/m ³	PM _{2.5} µg/m ³
Sample Date	Duarte	Azusa	Sample Date	Duarte	Azusa
10/25/05	7.6	7.7	4/23/06	7.9	4.5
10/31/05	8.9	6.8	4/26/06	6.4	6.4
11/6/05	45.2	50.8	4/29/06	23.4	21
11/12/05	19.1	No Sample	5/2/06	39.1	29.7
11/18/05	6.8	No Sample	5/5/06	12.4	12.7
11/24/05	30.1	No Sample	5/8/06	34	28.4
11/30/05	19.4	22	5/11/06	44.6	38.5
12/6/05	6.7	4.9	5/14/06	32.5	27.4
12/12/05	17.6	14.2	5/17/06	41.9	31.2
12/18/05	24.5	No Sample	5/23/06	8.5	7.1
12/24/05	16.5	15	5/29/06	10.2	10
12/30/05	27.3	26.2	6/4/06	19.2	16.1
1/5/06	4.2	4	6/10/06	13.1	No Sample
1/8/06	19.5	16.8	6/16/06	14.2	14.4
1/11/06	19.8	15.8	6/22/06	24	22.3
1/14/06	21.7	17.4	6/28/06	13.2	No Sample
1/17/06	7.5	No Sample	7/4/06	56.2	No Sample
1/20/06	4.9	4.3	7/10/06	18.7	19.4
1/23/06		No Sample	7/16/06	14.3	13.4
1/26/06	13.9	15.5	7/22/06	20.3	19.8
1/29/06	30.1	26.6	7/28/06	13.3	12.8
2/1/06	23.4	No Sample	8/3/06	13.2	16.4
2/4/06	52.7	52.4	8/9/06	15.3	14.8
2/7/06	6	No Sample	8/15/06	15.2	14.7
2/10/06	28.3	32.8	8/21/06	17.2	20.2
2/13/06		No Sample	8/27/06	15	12.9
2/16/06	10.2	6.1	9/2/06	17.8	15.9
2/19/06	6.4	3.3	9/8/06	19.5	16.7
2/22/06	8.2	9.2	9/14/06	18.2	19.1
2/25/06	29.4	28.4	9/20/06	14.3	15
2/28/06	6.5	4.2	10/2/06	No Sample	No Sample
3/3/06	8.4	5.8	10/8/06	No Sample	No Sample
3/6/06	22.2	No Sample	10/14/06	No Sample	7.8
3/9/06	11.8	No Sample	10/20/06	11.3	No Sample
3/12/06	7.1	No Sample	10/26/06	10.3	No Sample
3/15/06	9	8.3	11/1/06	No Sample	31.1
3/18/06	6.8	5.4	11/7/06	No Sample	No Sample
3/21/06	6.1	8.6	11/13/06	8	9.9
3/24/06	13.1	12.7	11/19/06	10.1	10
3/27/06	11.9	11.4	11/25/06	No Sample	17.8
3/30/06	7.7	6.1	12/1/06	5.5	No Sample
4/2/06	12.9	No Sample	12/7/06	9.1	5.8
4/5/06	6.4	4.7	12/13/06	7	8.6
4/8/06	9.6	6.7	12/19/06	7.4	No Sample
4/11/06	7.1	5	12/25/06	7	No Sample
4/14/06	8.6	6.5	12/31/06	21.2	20
4/17/06	4.3	5	1/6/07	10.9	6.3
4/20/06	10.7	11.6	1/12/07	5.9	5.1

PM_{2.5} Data for Duarte and Azusa Since Study Inception (cont)

	PM _{2.5} µg/m ³	PM _{2.5} µg/m ³		PM _{2.5} µg/m ³	PM _{2.5} µg/m ³
Sample Date	Duarte	Azusa	Sample Date	Duarte	Azusa
1/18/07	6.2	6.8	11/2/07	39.1	40.8
1/24/07	12.9	11.3	11/8/07	47.7	54.3
1/30/07	No Sample	23.2	11/14/07	5.6	4.9
2/5/07	No Sample	7.8	11/20/07	53.2	58.0
2/11/07	No Sample	No Sample	11/26/07	7.1	No Sample
2/17/07	No Sample	5.6	12/2/07	4.6	3.7
2/23/07	No Sample	No Sample	12/8/07	6.5	5.3
3/1/07	No Sample	No Sample	12/14/07	19.1	13.0
3/7/07	No Sample	10.2	12/20/07	9.8	9.8
3/13/07	No Sample	12.3	12/26/07	6.0	6.0
3/19/07	No Sample	No Sample	1/1/08	5.06	4.67
3/25/07	21.5	20.3	1/7/08	No Sample	2.75
3/31/07	11.0	13.0	1/13/08	8.98	4.88
4/6/07	32.2	33.3	1/19/08	7.03	6.13
4/12/07	9.4	11.1	1/25/08	3.31	2.00
4/18/07	7.2	6.8	1/31/08	6.40	No Sample
4/24/07	7.7	11.1	2/6/08	10.64	No Sample
4/30/07	27.6	No Sample	2/12/08	6.70	No Sample
5/6/07	4.3	8.3	2/18/08	35.31	36.49
5/12/07	25.6	22.0	2/24/08	5.06	3.04
5/18/07	34.2	32.2	3/1/08	28.00	26.71
5/24/07	13.0	13.6	3/7/08	8.26	10.30
5/30/07	16.7	15.5	3/13/08	20.44	20.64
6/5/07	20.6	17.9	3/19/08	No Sample	22.10
6/11/07	19.0	16.4	3/25/08	18.80	18.81
6/17/07	21.9	17.2	3/31/08	14.34	11.93
6/23/07	No Sample	13.2	4/6/08	13.31	14.55
6/29/07	No Sample	17.9	4/12/08	6.50	5.46
7/17/07	20.4	18.5	4/18/08	14.45	15.52
7/23/07	16.5	17.9	4/24/08	No Sample	10.26
7/29/07	14.5	13.0	4/30/08	No Sample	15.34
8/4/07	17.0	No Sample	5/6/08	No Sample	14.30
8/10/07	16.9	18.0	5/12/08	12.18	14.89
8/16/07	21.0	19.4	5/18/08	14.63	15.89
8/22/07	18.7	20.0	5/24/08	4.95	4.34
8/28/07	12.4	13.3	5/30/08	8.35	8.42
9/3/07	18.4	18.0	6/5/08	14.45	12.38
9/9/07	10.6	9.2	6/11/08	16.00	15.90
9/15/07	12.7	11.8	6/17/08	21.85	21.69
9/21/07	4.7	4.6	6/23/08	19.17	18.35
9/27/07	15.2	15.7	6/29/08	17.31	18.77
10/3/07	12.7	14.3	7/5/08	59.50	No Sample
10/9/07	9.6	12.3	7/11/08	15.02	14.93
10/15/07	32.3	31.0	7/17/08	20.20	23.64
10/21/07	10.2	7.2	7/23/08	19.45	No Sample
10/27/07	28.7	29.4	7/29/08	15.98	17.26

PM_{2.5} Data for Duarte and Azusa Since Study Inception (cont)

	PM _{2.5} µg/m ³	PM _{2.5} µg/m ³
Sample Date	Duarte	Azusa
8/4/08	16.3	16.1
8/10/08	11.8	10.1
8/16/08	15.2	14.8
8/22/08	12.5	12.3
8/28/08	24.8	23.6
9/3/08	14.2	15.1
9/9/08	18.6	16.7
Average	16.3	15.4

APPENDIX F

PM₄ Crystalline Silica Data Since Study Inception

Sample Date	Crystalline Silica (µg/m ³)
5/23/2006	1.1
5/29/2006	0.7
6/10/2006	0.6
6/16/2006	0.8
6/22/2006	0.6
6/28/2006	0.7
7/4/2006	0.5
7/10/2006	N.D.
7/22/2006	0.6
7/28/2006	N.D.
8/3/2006	N.D.
8/6/2006	N.D.
8/9/2006	0.5
8/12/2006	N.D.
8/15/2006	invalid
8/18/2006	0.5
8/21/2006	0.5
8/24/2006	0.8
8/27/2006	0.5
8/30/2006	0.5
9/2/2006	0.5
9/5/2006	0.6
9/8/2006	N.D.
9/11/2006	N.D.
9/14/2006	0.5
9/20/2006	0.5
9/26/2006	0.4
10/2/2006	0.5
10/8/2006	0.4
10/14/2006	N.D.
10/20/2006	0.5
10/26/2006	1.0
11/1/2006	0.7
11/7/2006	0.8
11/13/2006	1.2
11/19/2006	N.D.
11/25/2006	N.D.
N.D. = Not Detected	

Sample Date	Crystalline Silica (µg/m ³)
12/1/2006	0.6
12/7/2006	0.7
12/13/2006	0.9
12/19/2006	N.D.
12/25/2006	N.D.
1/6/2007	no sample
1/12/2007	0.3
1/18/2007	0.3
1/24/2007	0.4
1/30/2007	N.D.
2/5/2007	no sample
2/11/2007	no sample
2/17/2007	no sample
2/23/2007	no sample
3/1/2007	no sample
3/7/2007	no sample
3/13/2007	no sample
3/19/2007	no sample
3/25/2007	N.D.
3/31/2007	0.4
4/6/2007	0.5
4/12/2007	0.7
4/18/2007	0.4
4/24/2007	no sample
4/30/2007	no sample
5/6/2007	0.3
5/12/2007	0.3
5/18/2007	0.4
5/24/2007	0.3
5/30/2007	N.D.
6/5/2007	0.4
6/11/2007	N.D.
6/17/2007	N.D.
6/23/2007	no sample
6/29/2007	no sample

*For average calculation, 1/2 of detection limit was substituted for N.D.

Note: As of 1/1/07 detection limit was reduced from 0.5 to 0.3 µg/m³.

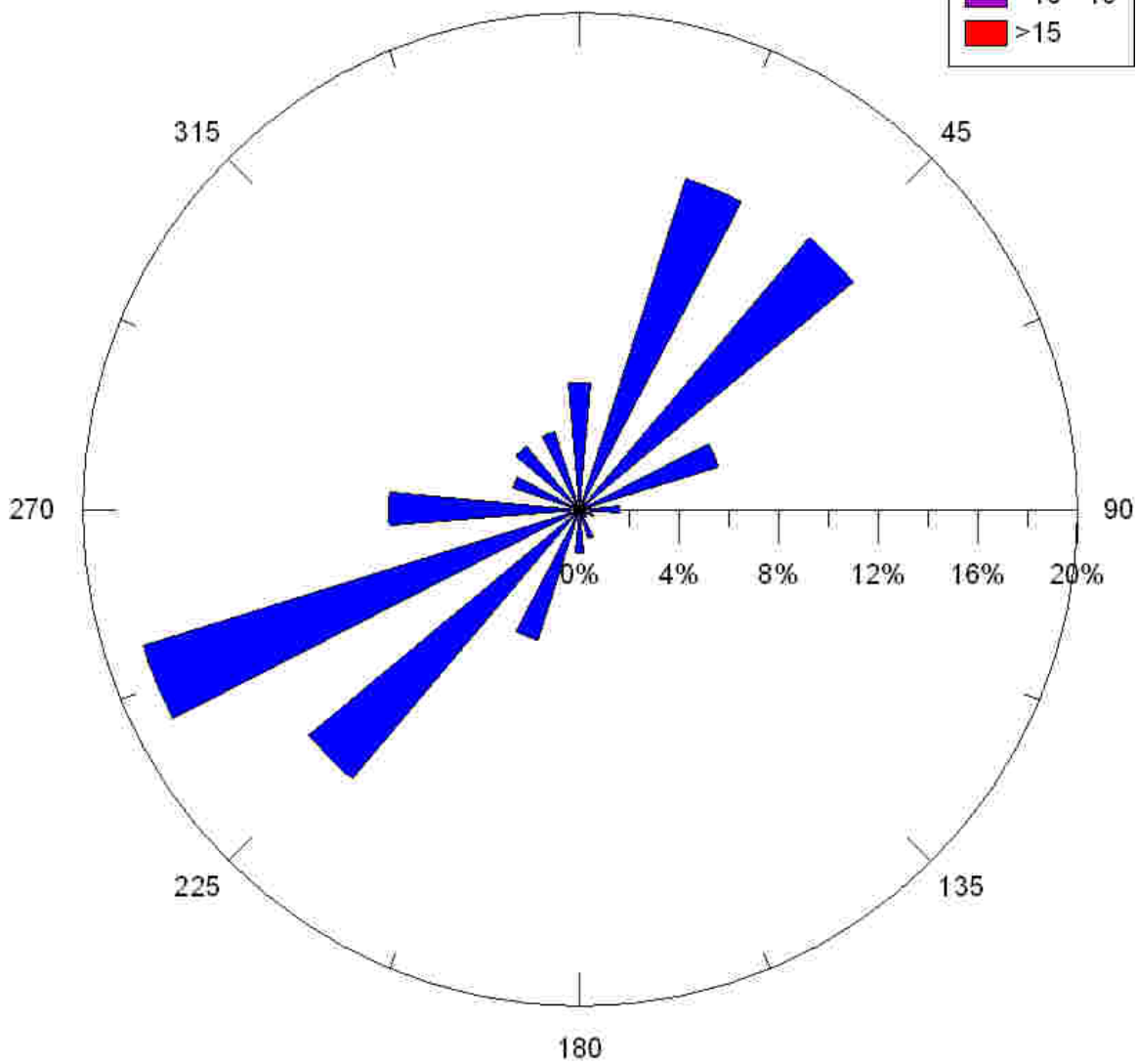
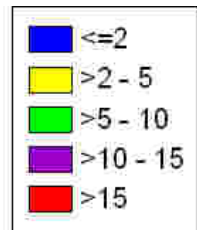
PM₄ Crystalline Silica Data Since Study Inception (cont)

Sample Date	Crystalline Silica (µg/m ³)
7/17/2007	0.3
8/4/2007	0.3
8/10/2007	0.3
8/16/2007	0.8
8/22/2007	0.3
8/28/2007	0.7
9/3/2007	0.4
9/9/2007	1.1
9/15/2007	0.7
9/21/2007	0.3
9/27/2007	0.6
10/3/2007	0.4
10/9/2007	0.3
10/15/2007	0.3
10/21/2007	0.9
10/27/2007	0.5
11/2/2007	0.5
11/8/2007	0.3
11/14/2007	0.5
11/20/2007	0.5
11/26/2007	0.8
12/2/2007	0.4
12/8/2007	0.5
12/14/2007	0.5
12/20/2007	0.4
12/26/2007	0.5
1/1/2008	0.5
1/7/2008	No Sample
1/13/2008	0.4
1/19/2008	0.5
1/25/2008	0.4
1/31/2008	0.4
2/6/2008	0.4
2/12/2008	0.5
2/18/2008	No Sample

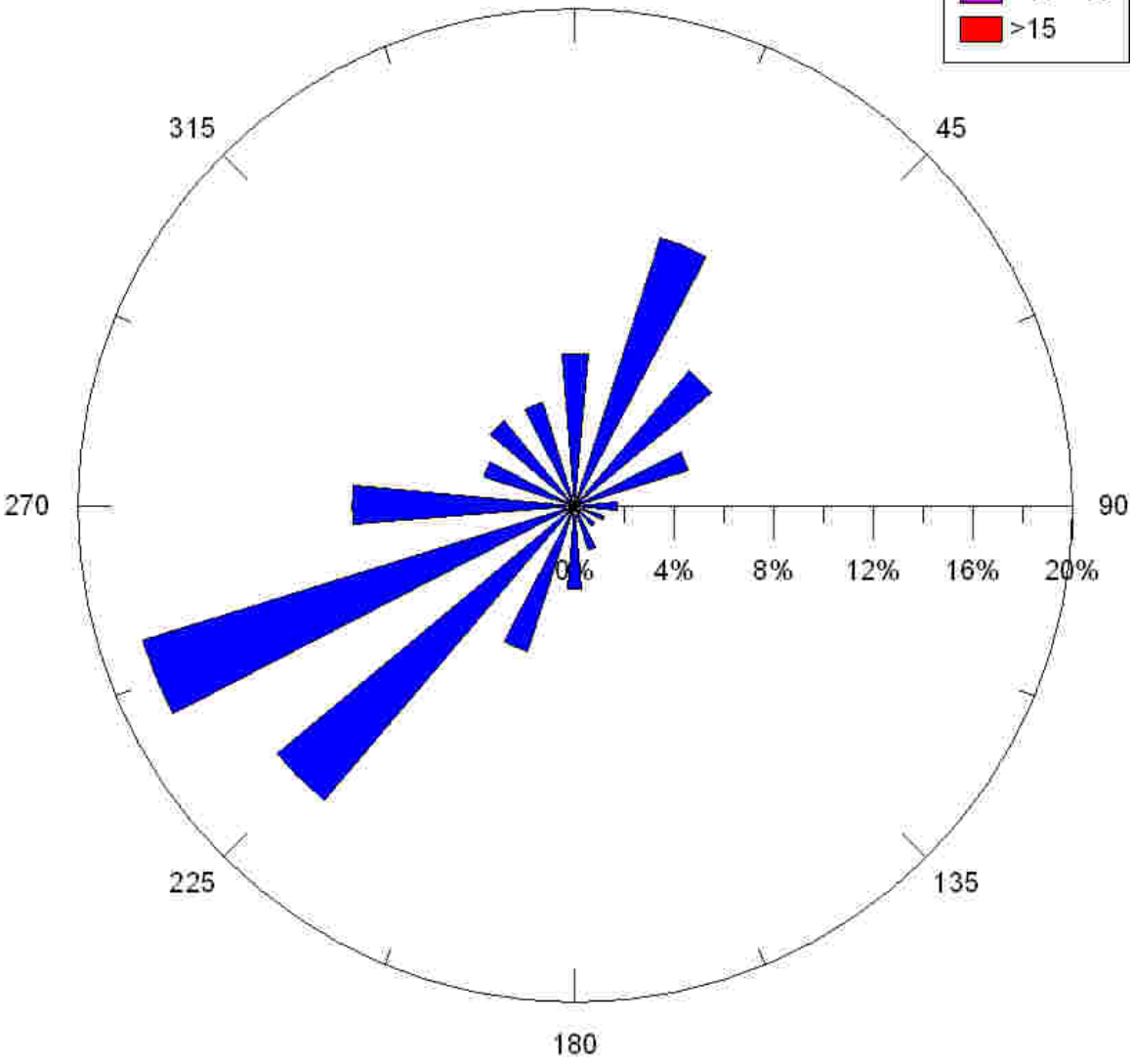
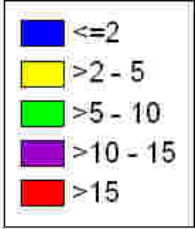
Sample Date	Crystalline Silica (µg/m ³)
2/24/2008	No Sample
3/1/2008	No Sample
3/7/2008	0.4
3/13/2008	0.4
3/19/2008	0.4
3/25/2008	No Sample
3/31/2008	0.6
4/6/2008	0.4
4/12/2008	0.8
4/18/2008	1
4/24/2008	0.8
4/30/2008	0.8
5/6/2008	0.7
5/12/2008	No Sample
5/18/2008	0.9
5/24/2008	0.6
5/30/2008	0.7
6/5/2008	0.8
6/11/2008	0.6
6/17/2008	0.7
6/23/2008	No Sample
6/29/2008	No Sample
7/5/2008	No Sample
7/11/2008	1.1
7/17/2008	0.4
7/23/2008	0.4
7/29/2008	0.5
8/4/2008	No Sample
8/10/2008	0.5
8/16/2008	0.4
8/22/2008	0.6
8/28/2008	0.5
9/3/2008	0.6
9/9/2008	0.4
Average	0.5

APPENDIX G

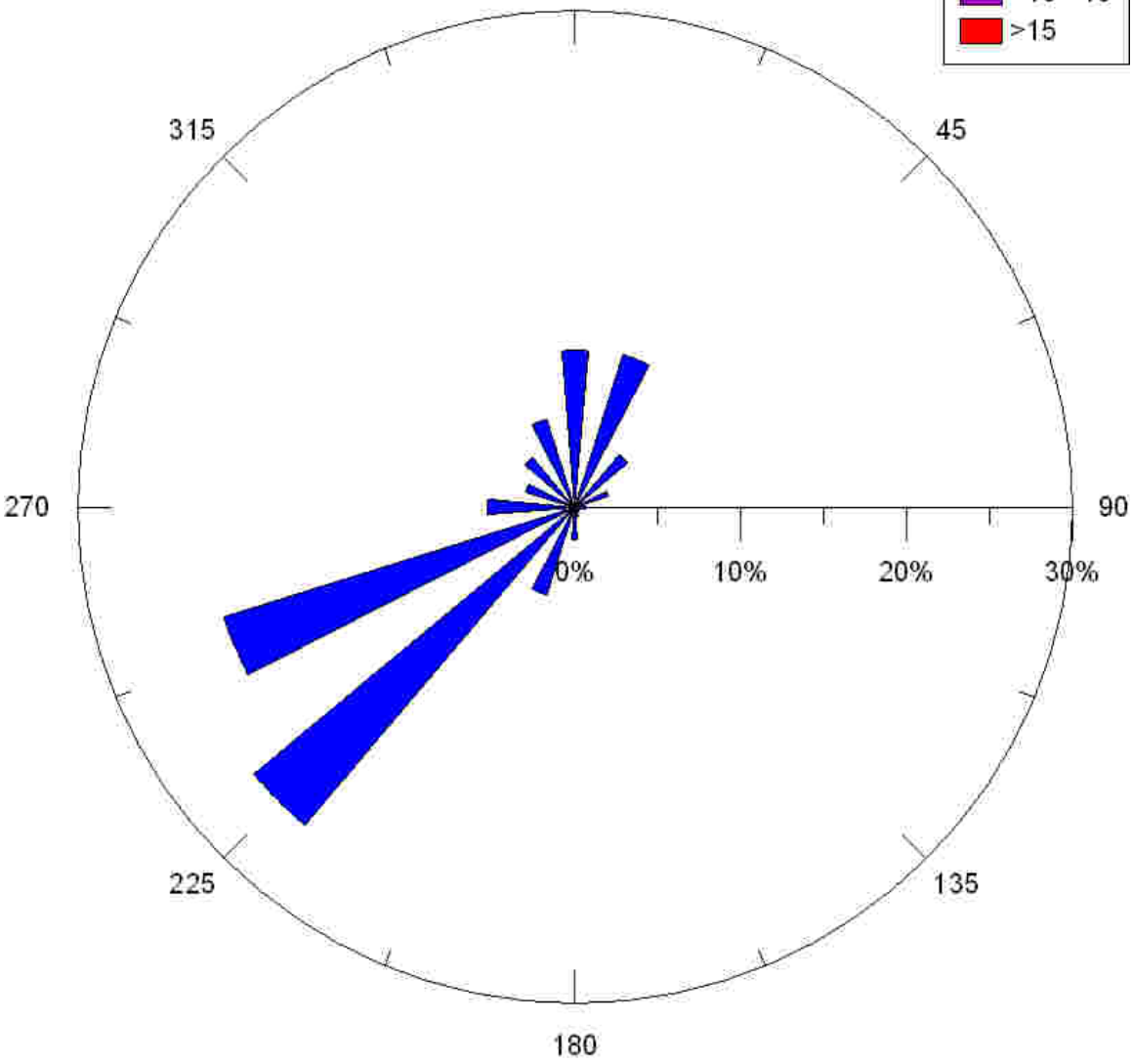
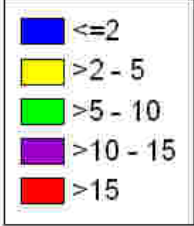
DUARTE
APRIL 2008



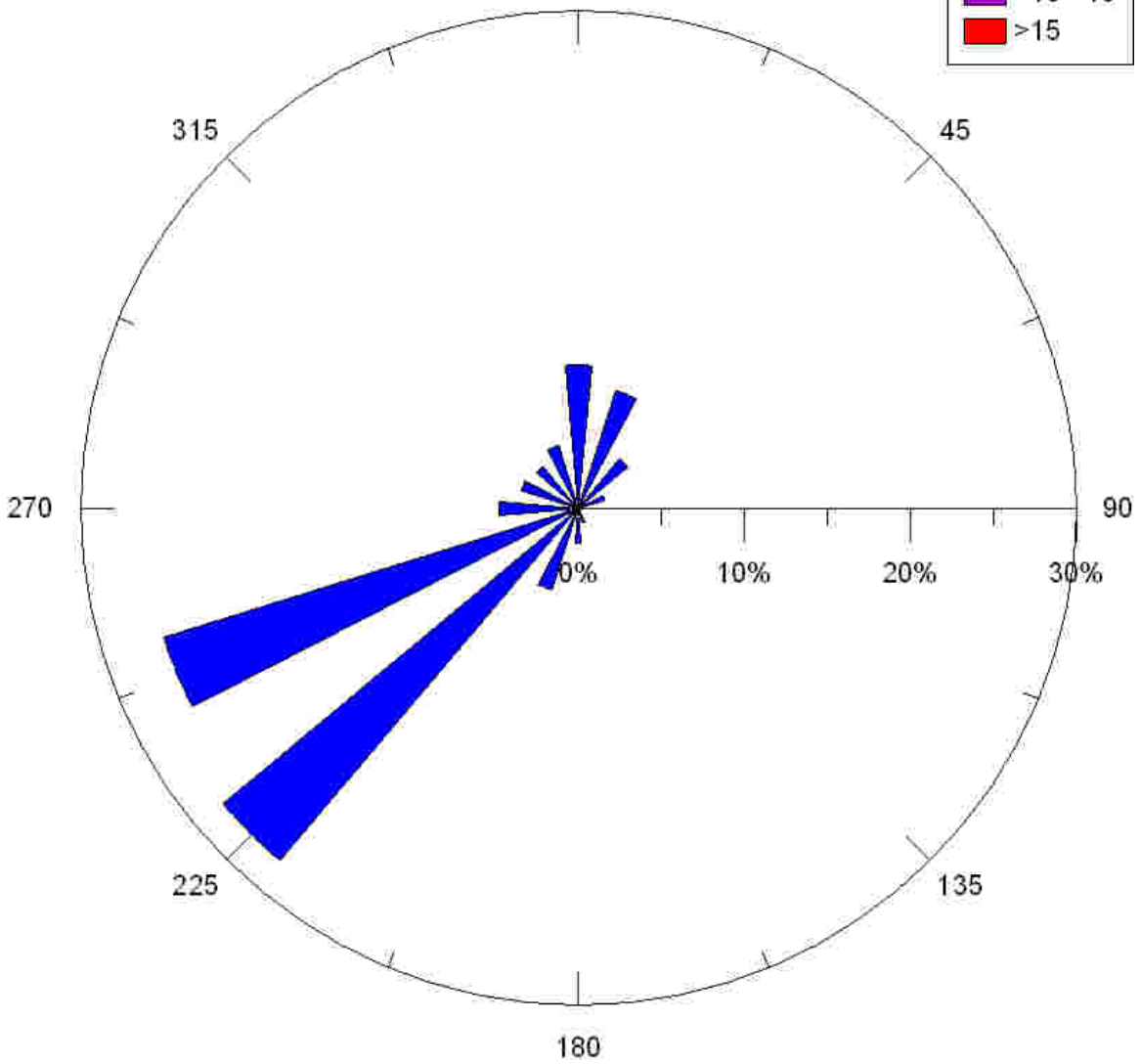
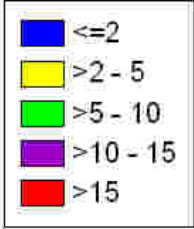
DUARTE
MAY 2008



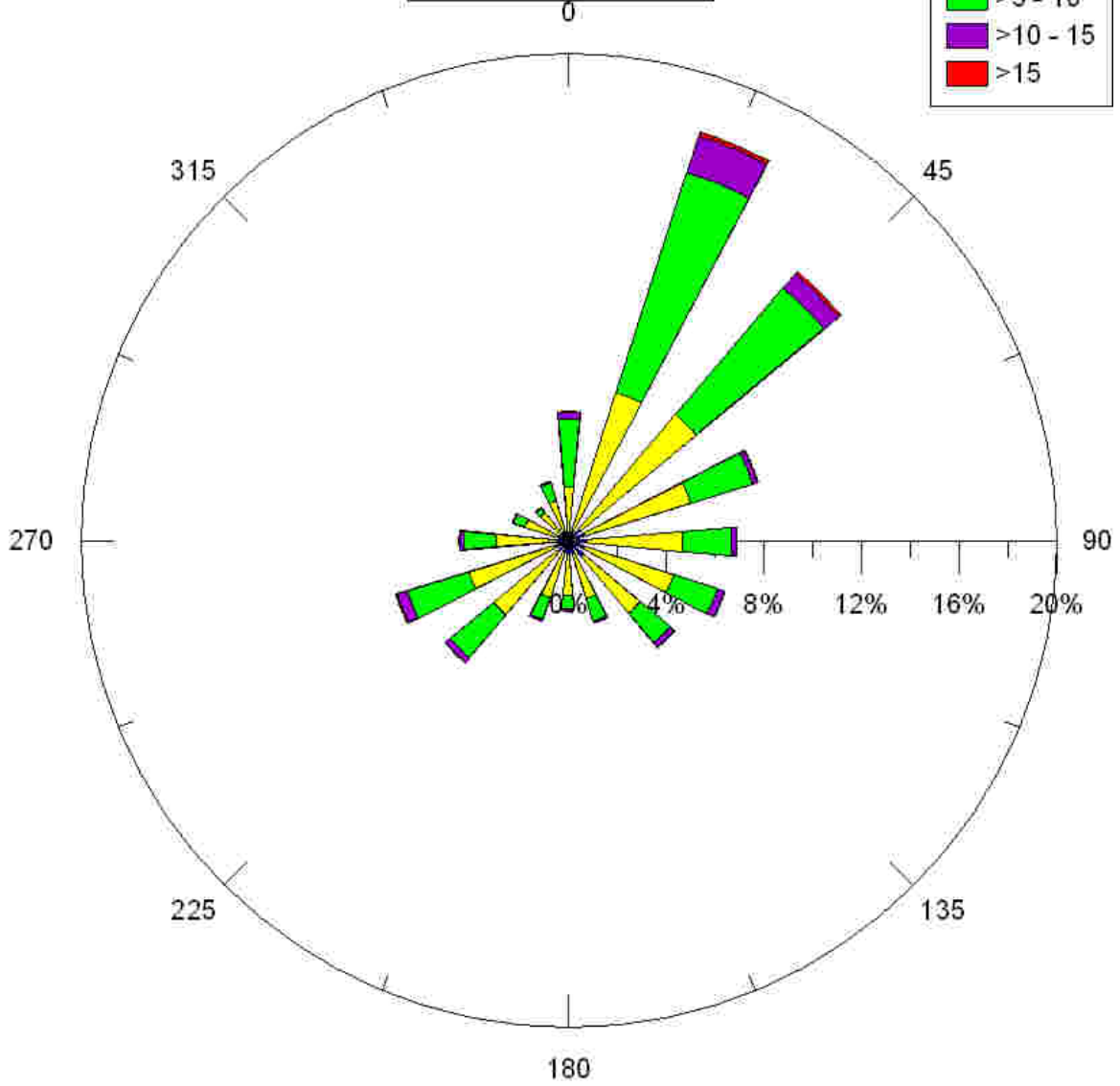
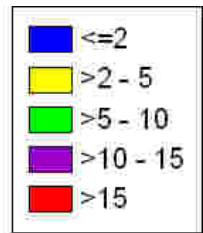
DUARTE
JUNE 2008



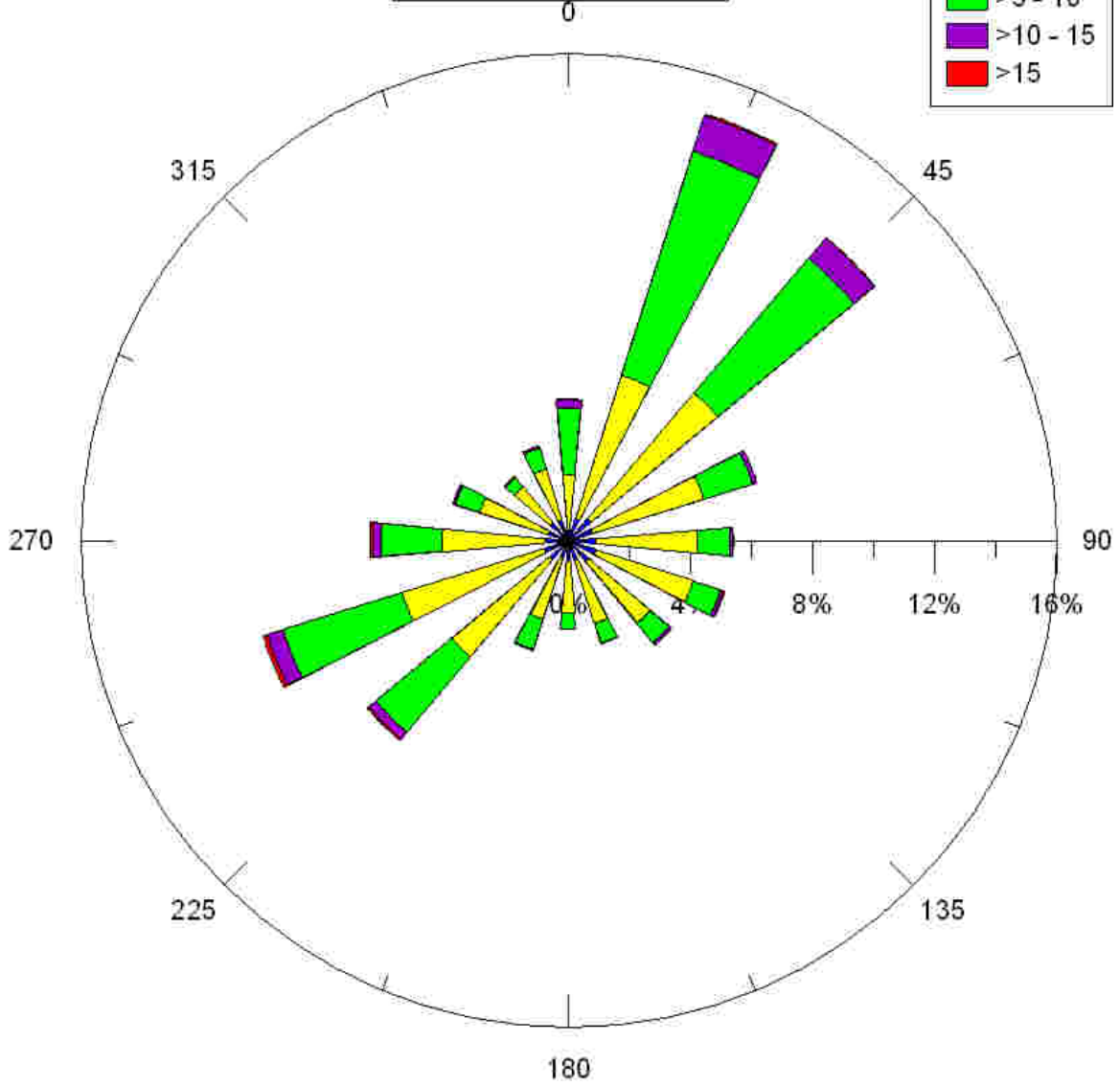
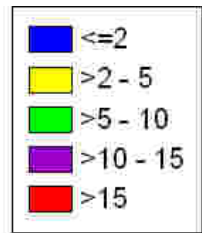
DUARTE
JULY 2008



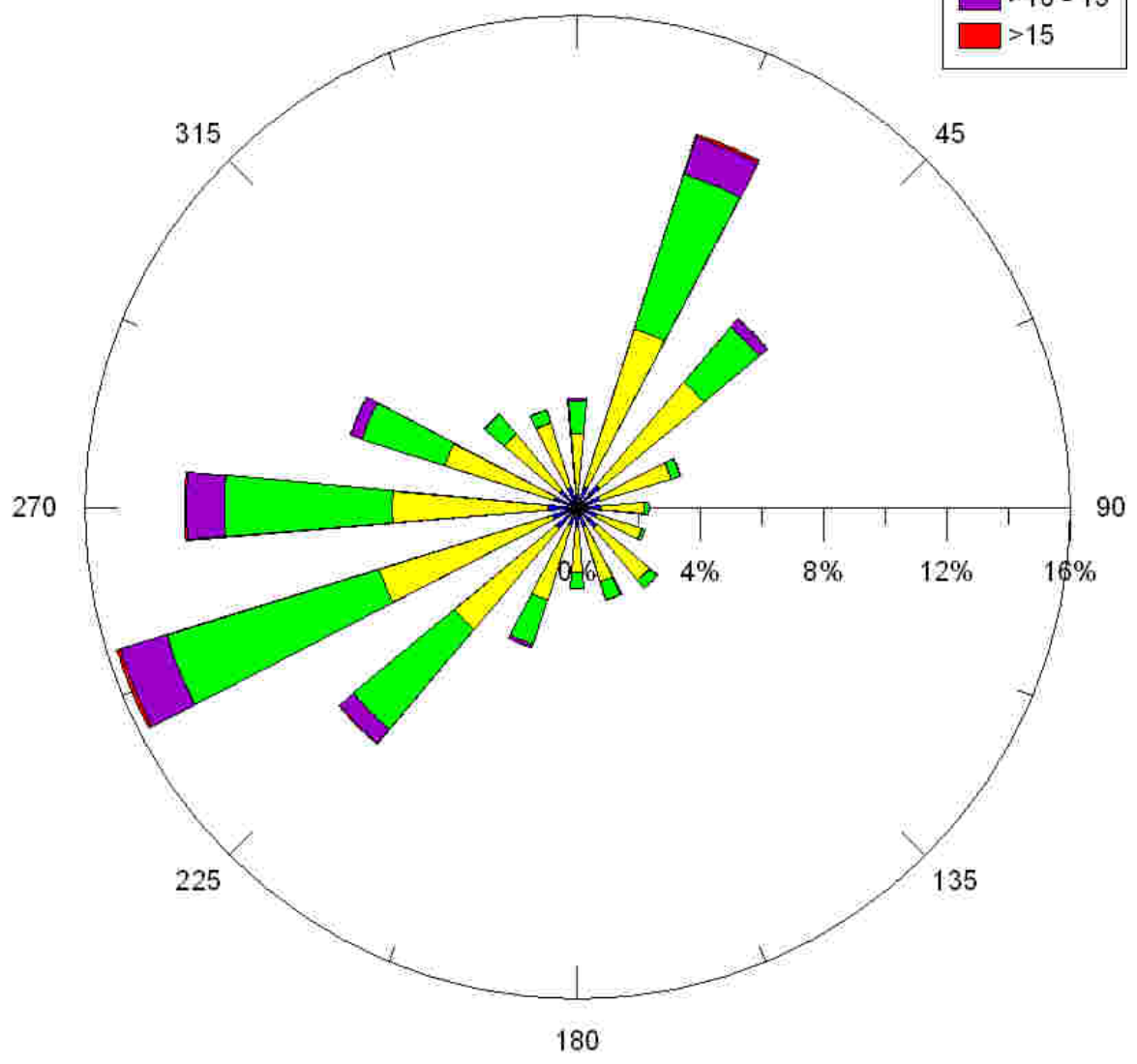
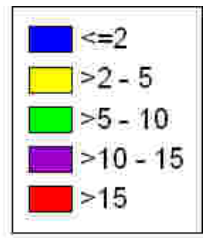
AZUSA
JANUARY 2008



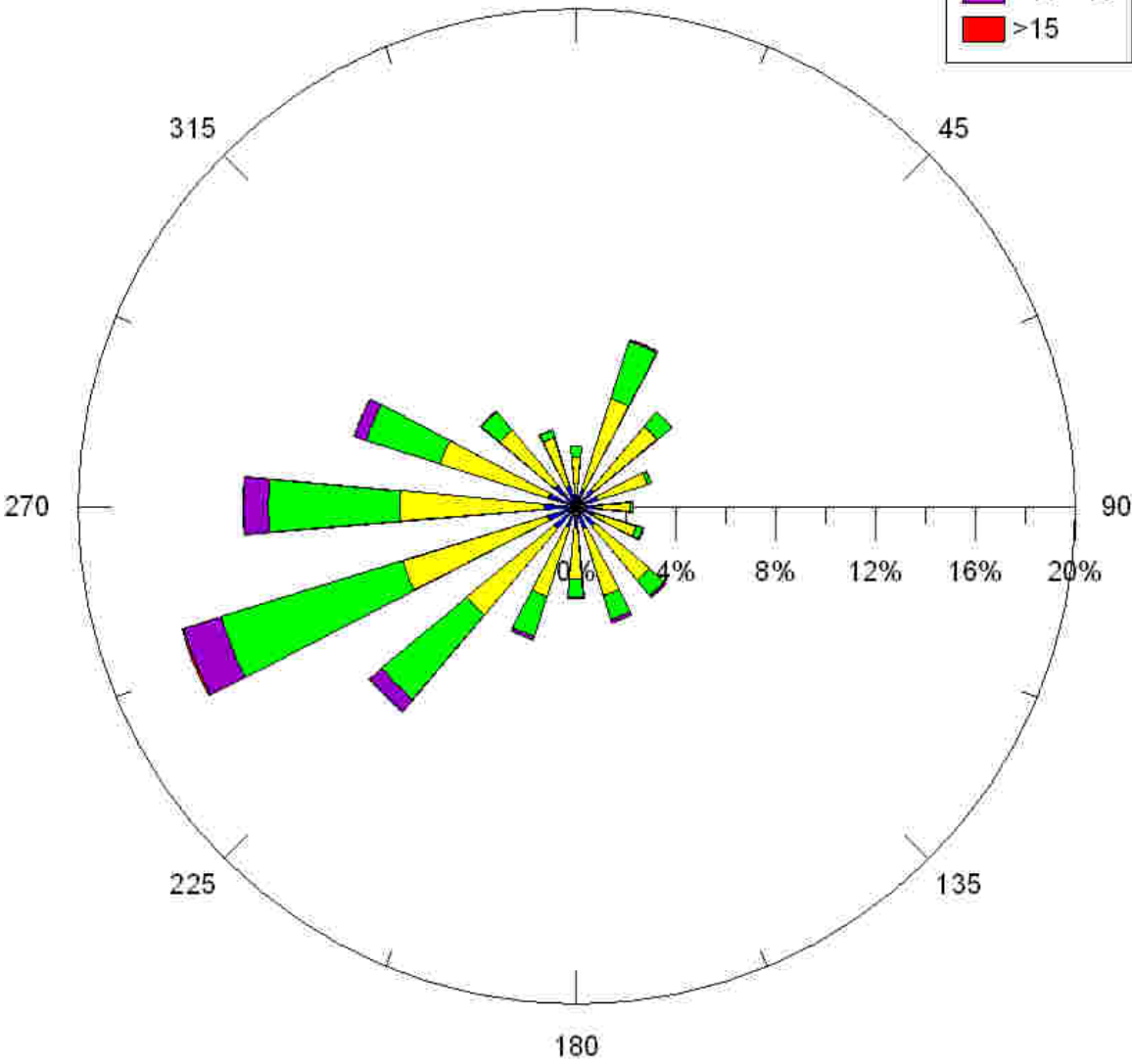
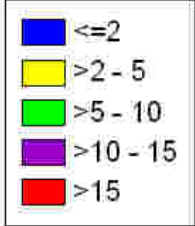
AZUSA
FEBRUARY 2008



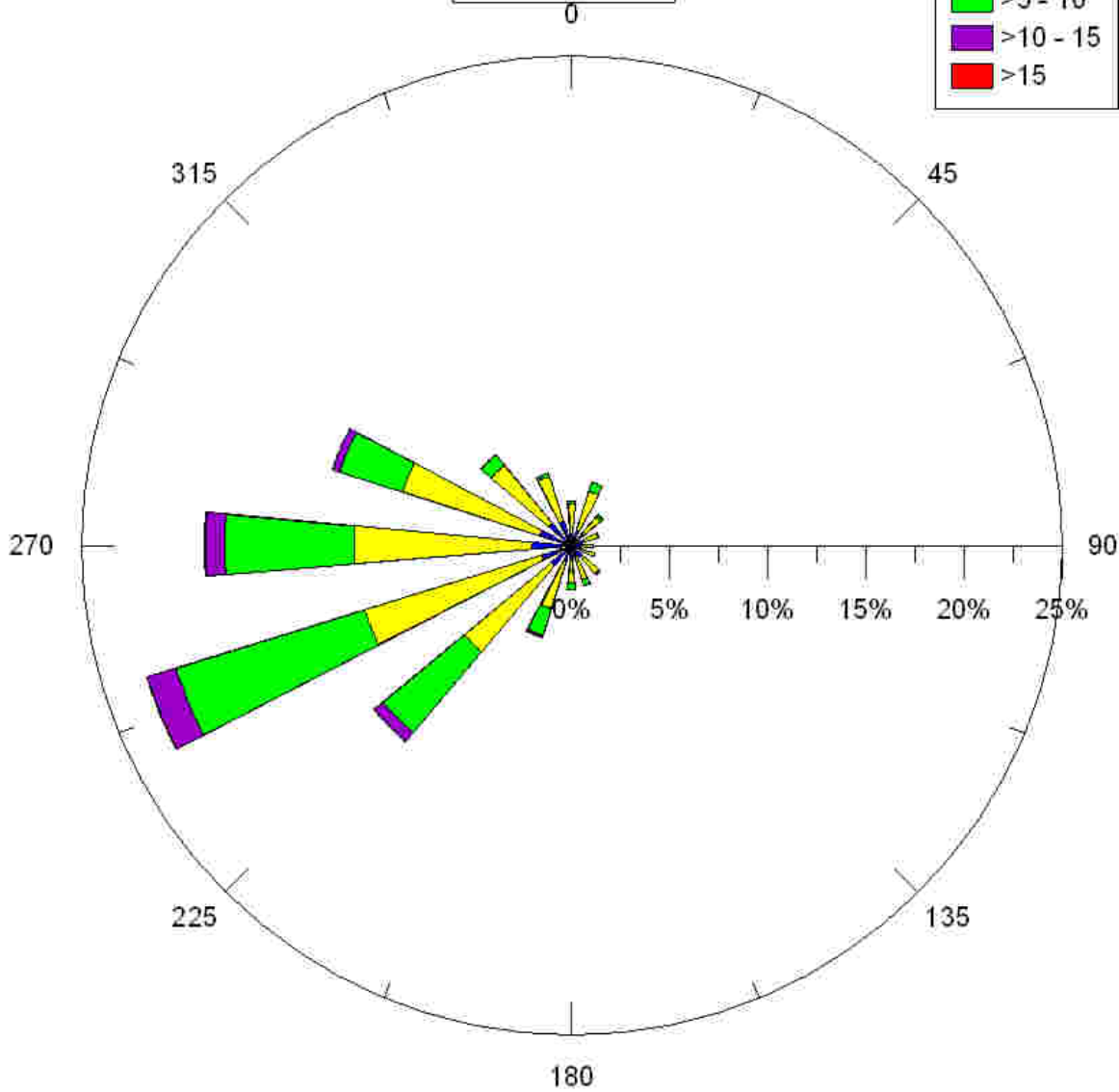
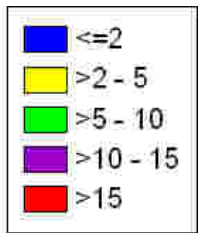
AZUSA
APRIL 2008



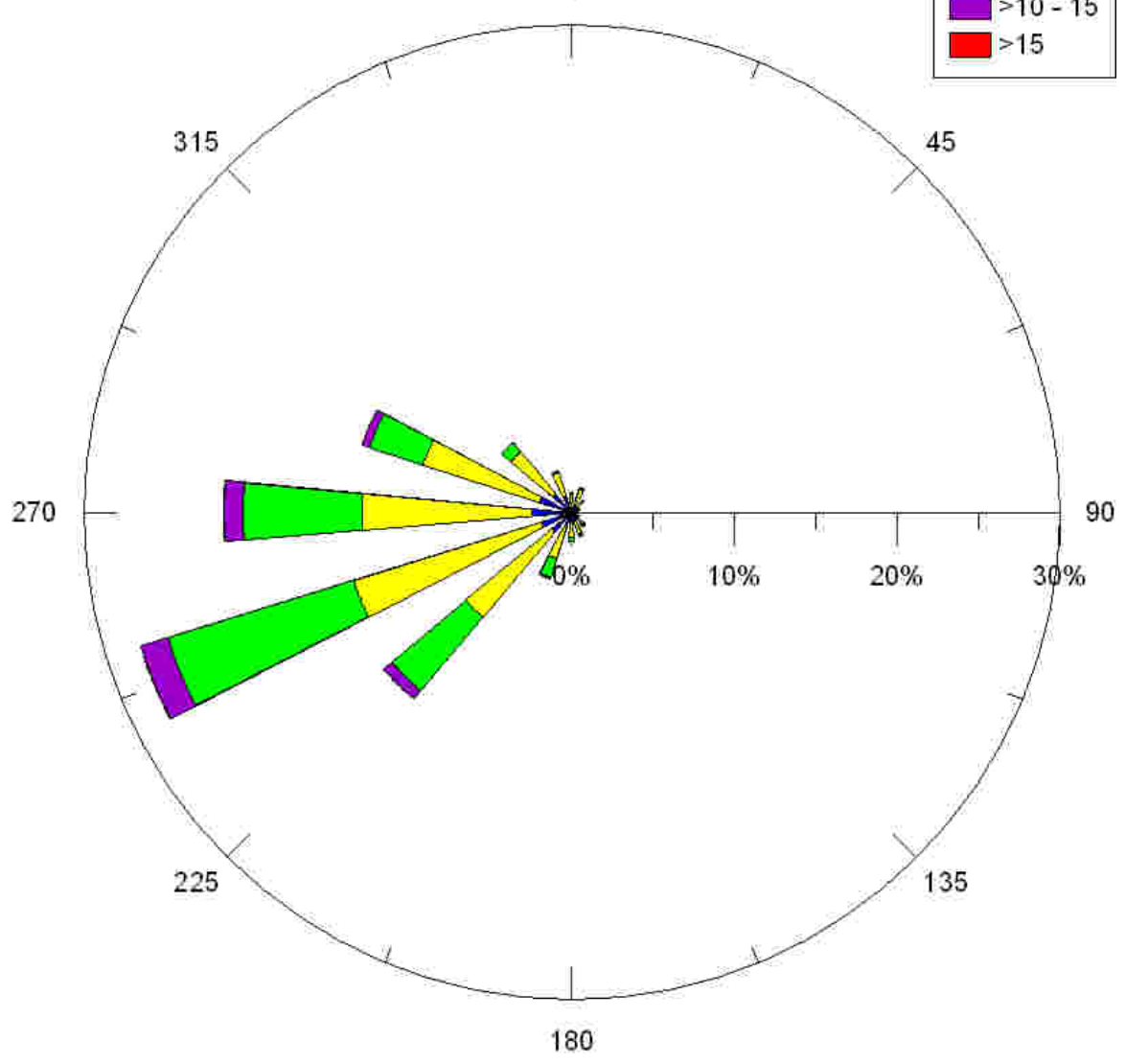
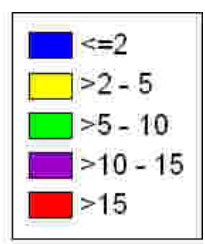
AZUSA
MAY 2008
0



AZUSA
JUNE 2008



AZUSA
JULY 2008



AZUSA
AUGUST 2008

