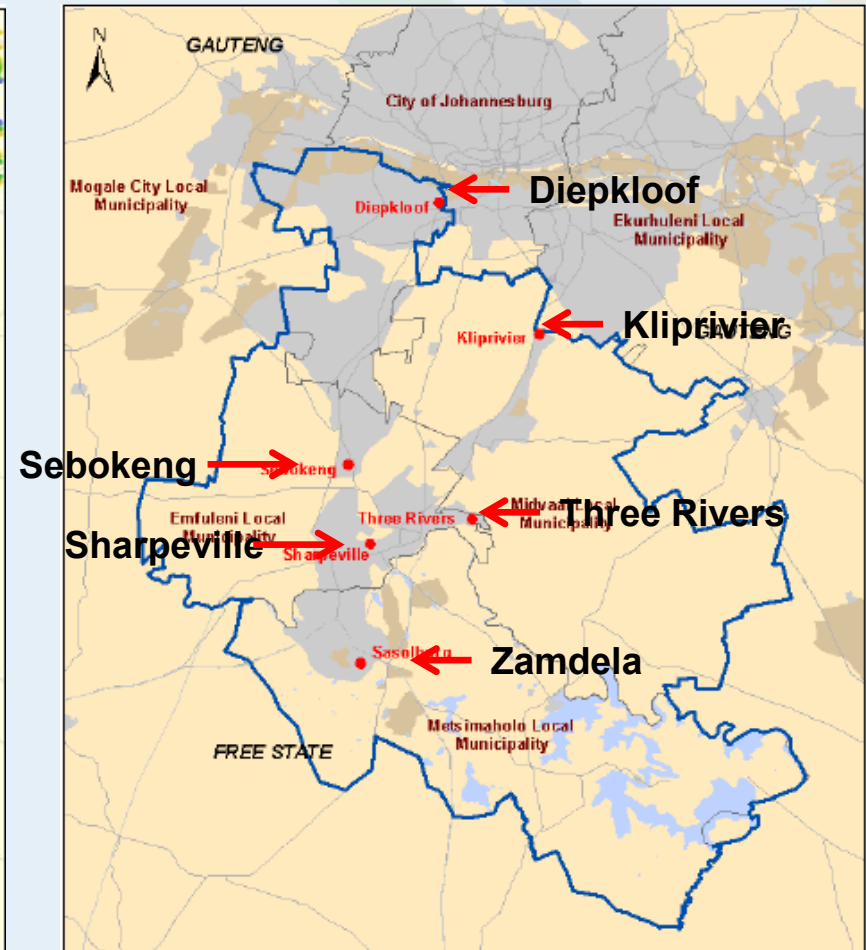
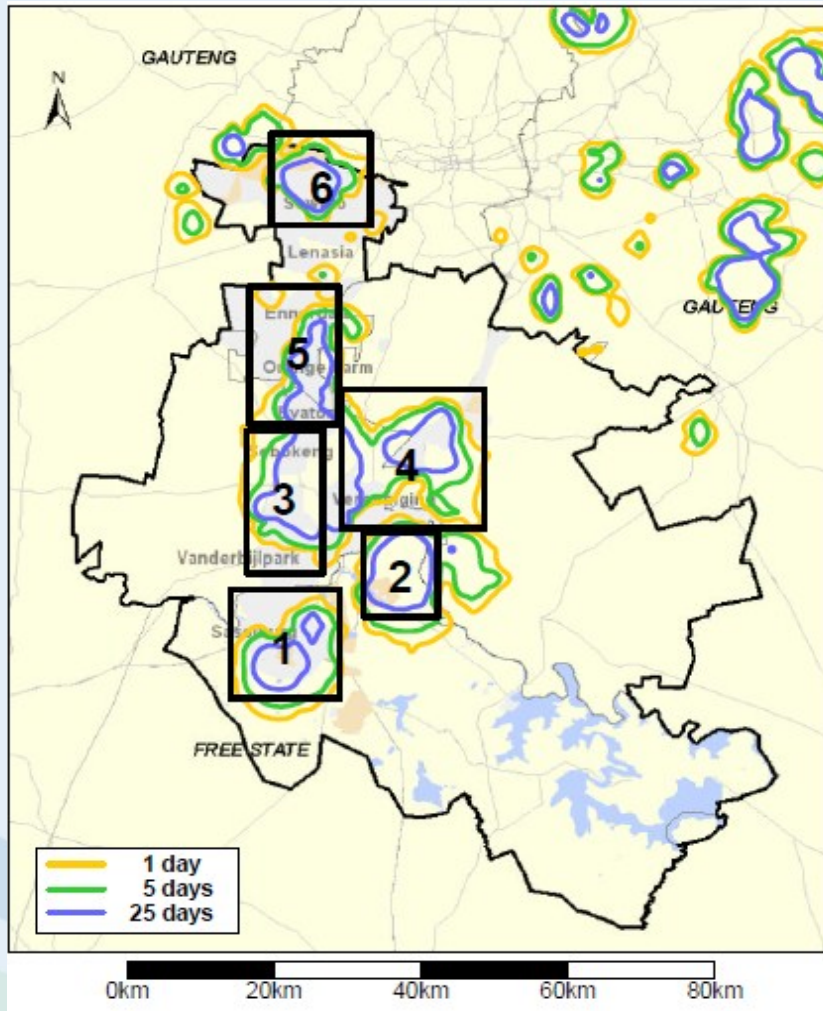


# Ambient Air Quality Monitoring in the Vaal Priority Area

Gregor Feig, Xolile Ncipha, Cheledi Tshehla, Desmond Mabaso,  
Lunga Ngcukana, Beverley Barnes, Seneca Naidoo, Njabulo Masuku

29 October 2012

# Location of Monitoring Stations



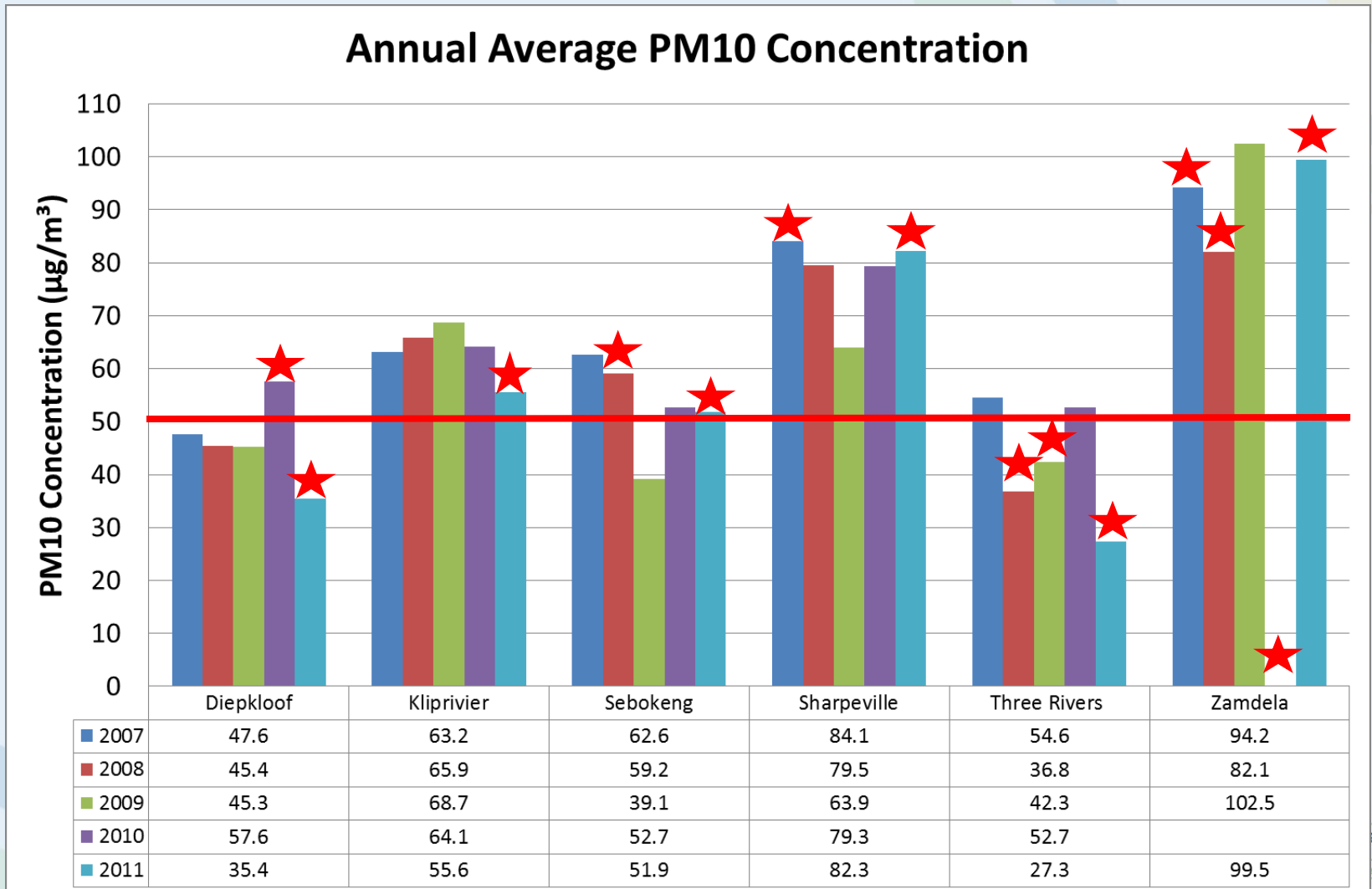
# Major Pollutant Sources

- Diepkloof
  - Residential, Traffic, Mining, Industrial
- Sharpeville
  - Residential, Domestic Burning, Industrial
- Sebokeng
  - Residential, Domestic Burning, Industrial
- Three Rivers
  - Residential, Power Generation
- Zamdela
  - Residential, Industry, Domestic Burning
- Kliprivier
  - Industrial, Traffic

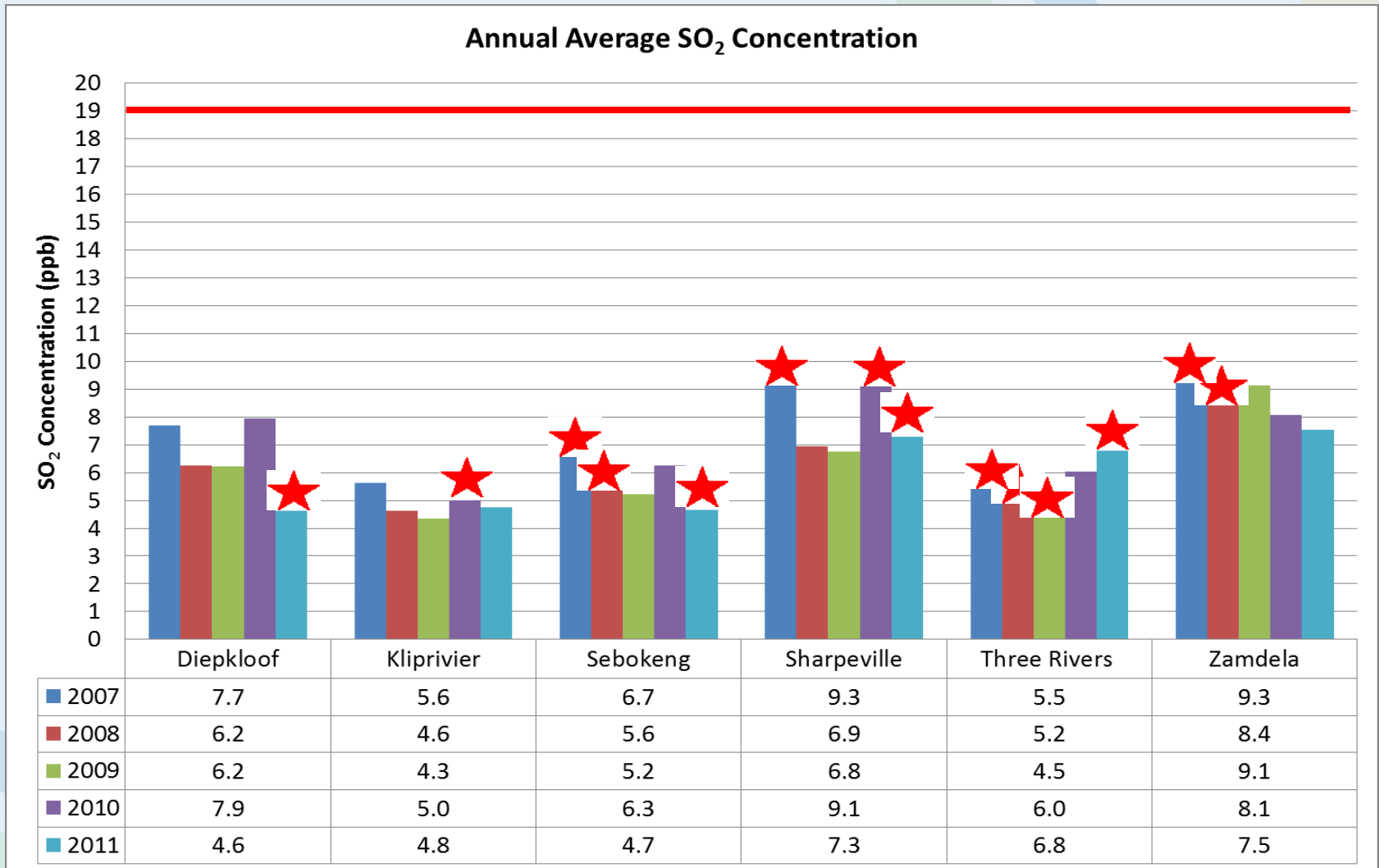
# Instrumentation

	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	O <sub>3</sub>	NO <sub>x</sub>	CO	Met	BC
Diepkloof	✓	✓	✓	✓	✓	✓	✓	
Sharpeville	✓	✓	✓	✓	✓	✓	✓	
Sebokeng	✓	✓	✓	✓	✓	✓	✓	
Three Rivers	✓	✓	✓	✓	✓	✓	✓	
Zamdela	✓	✓	✓	✓	✓	✓	✓	✓
Kliprivier	✓	✓	✓	✓	✓	✓	✓	

# PM<sub>10</sub> Concentration 2007-2011



# SO<sub>2</sub> Concentration 2007-2011



# Activities August 2011- September 2012

# Instrument and Data Status



# Instrument Status

29 October 2012	O <sub>3</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	BC	BTX
Kliprivier	Working	Working	Working	Working	Working	Working	N/A	Working
Three Rivers	Working	Working	Working	Working	Working	Working	N/A	Working
Sharpeville	Working	Not-Working	Working	Working	Working	Working	N/A	Working
Sebokeng	Working	Working	Working	Working	Working	Working	N/A	Working
Diepkloof	Working	Working	Working	Working	Working	Working	N/A	Working
Zamdela	Working	Working	Working	Working	Working	Working	Working	Working

# External Instrument Calibration

	O <sub>3</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO	BTX	Met
Kliprivier	✓	✓	✓	✓	✓	✓
Three Rivers	✓	✓	✓	✓	✓	✓
Sharpeville	✓	✓	✓	✓	✓	✓
Sebokeng	✓	✓	✓	✓	✓	✓
Diepkloof	✓	✓	✓	✓	✓	✓
Zamdela	✓	✓	✓	✓	✓	✓

# Data Availability October 2011-September 2012

	Zamdela	Sebokeng	Sharpeville	Three Rivers	Kliprivier	Diepkloof	Month Average
October	82.1	-	70.1	-	93.9	78.6	54.1
November	81.4	-	82.6	-	74.2	57.8	49.3
December	76.6	-	79.1	-	74.3	72.2	50.4
January	24.7	-	49.0	-	89.4	69.1	38.7
February	76.2	63.7	61.9	58.4	85.5	76.5	70.3
March	98.9	63.0	82.1	76.3	92.7	94.4	84.6
April	99.5	65.1	82.6	82.6	94.7	92.5	86.7
May	97.2	82.7	81.7	92.2	95.9	91.0	90.1
June	80.8	92.5	73.0	99.6	99.0	90.5	89.2
July	86.8	88.3	82.6	78.6	98.4	97.2	88.7
August	80.5	89.3	94.9	97.5	74.9	99.3	89.4
September	88.0	66.7	70.4	67.3	92.4	90.3	80.0
<b>Station Average</b>	<b>81.0</b>	<b>50.8</b>	<b>75.9</b>	<b>52.0</b>	<b>88.8</b>	<b>84.1</b>	<b>72.6</b>

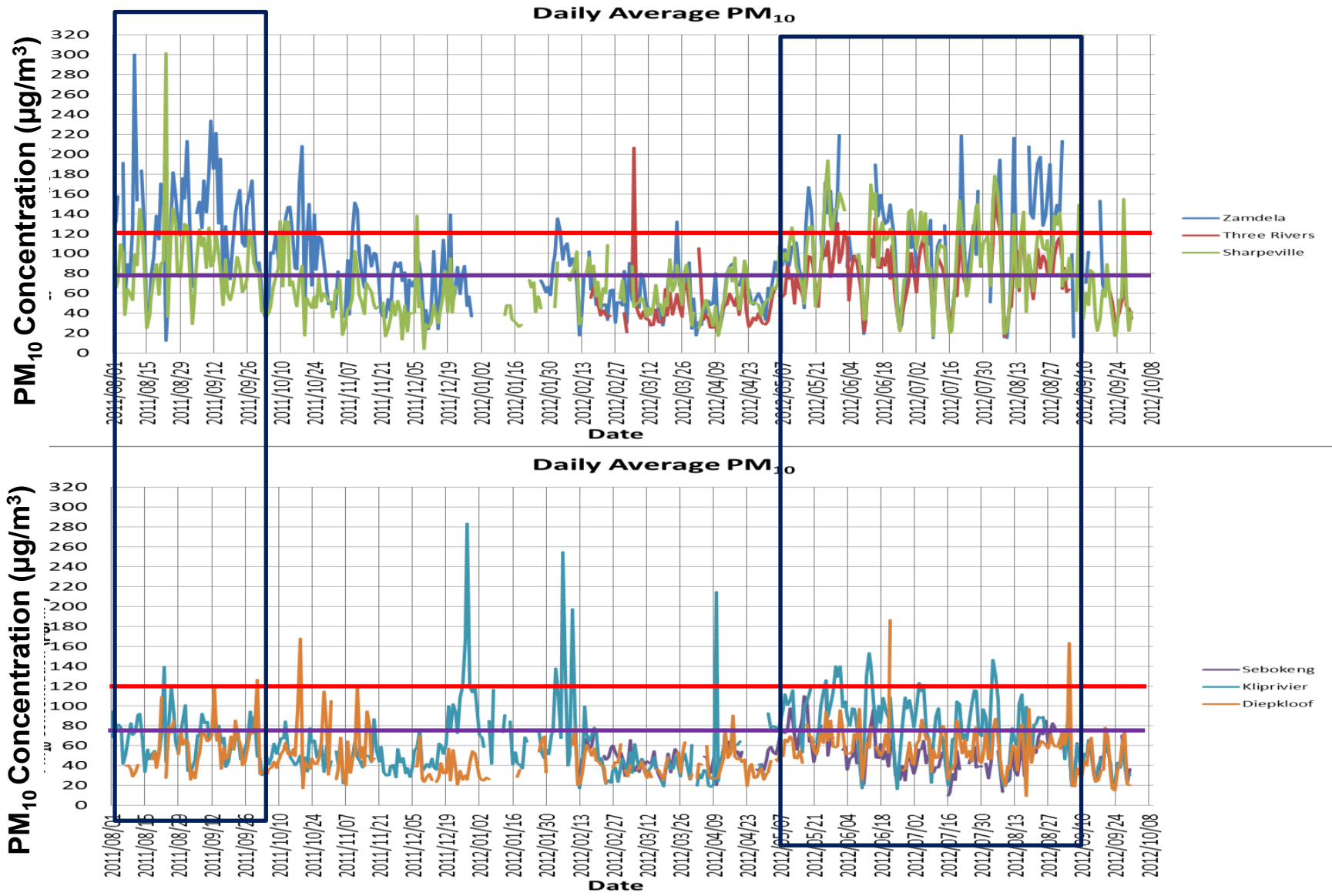
# Compliance with Ambient Air Quality Standards

# Exceedances October 2011- September 2012

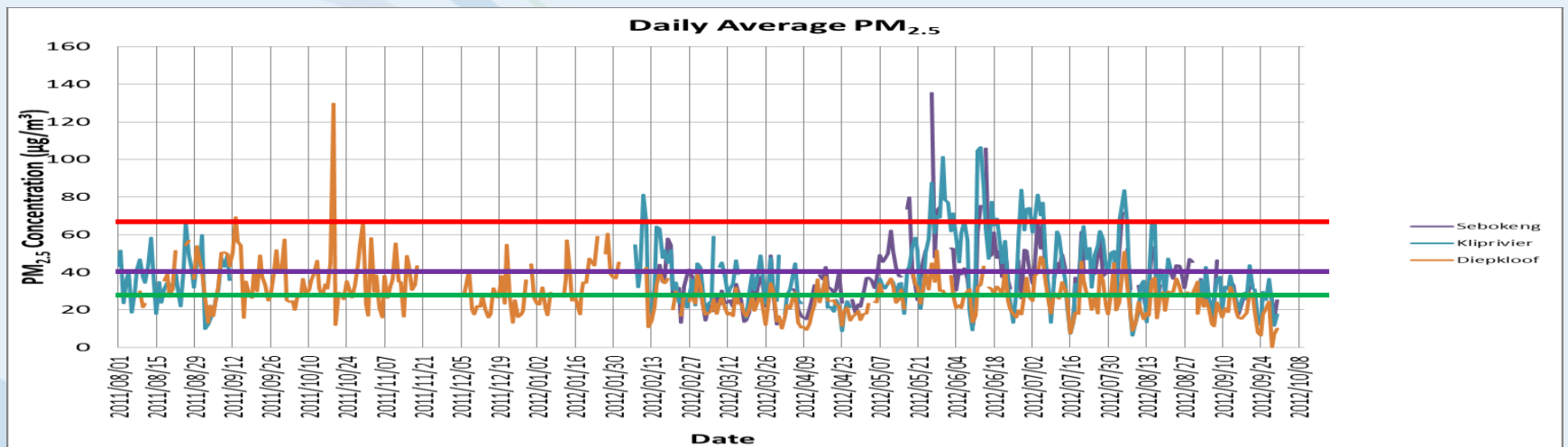
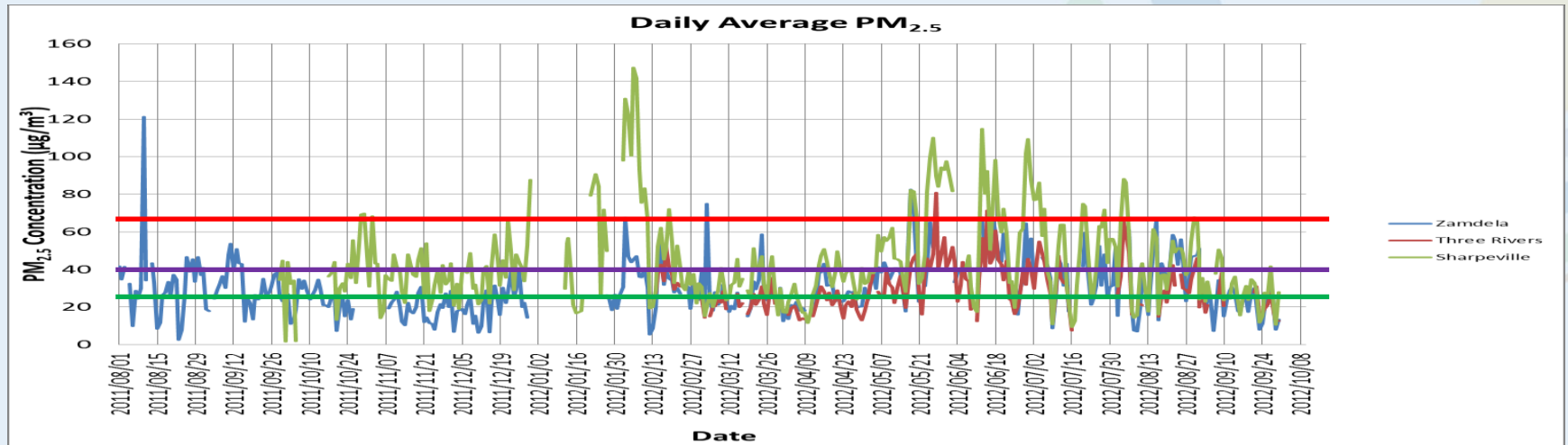
	PM <sub>10</sub> (24 hour)	PM <sub>2.5</sub> (24 Hour)	SO <sub>2</sub> (10 Minute)	SO <sub>2</sub> (Hour)	SO <sub>2</sub> (24 Hour)	NO <sub>2</sub> (Hour)	O <sub>3</sub> (8 hour)	CO (8 Hour)
Number allowed	4	4	526	88	4	88	11	11
Zamdela	<b>64</b>	<b>10</b>	32	14	1	0	8	0
Three Rivers	<b>7</b>	3	0	2	0	0	5	0
Sharpeville	<b>38</b>	<b>55</b>	10	6	0	0	<b>67</b>	0
Sebokeng	1	<b>11</b>	0	1	0	0	9	0
Kliprivier	<b>22</b>	<b>30</b>	0	0	0	4	<b>30</b>	0
Diepkloof	4	2	0	0	0	0	2	0

# Time Series Pollutant Concentrations

# PM<sub>10</sub> Daily



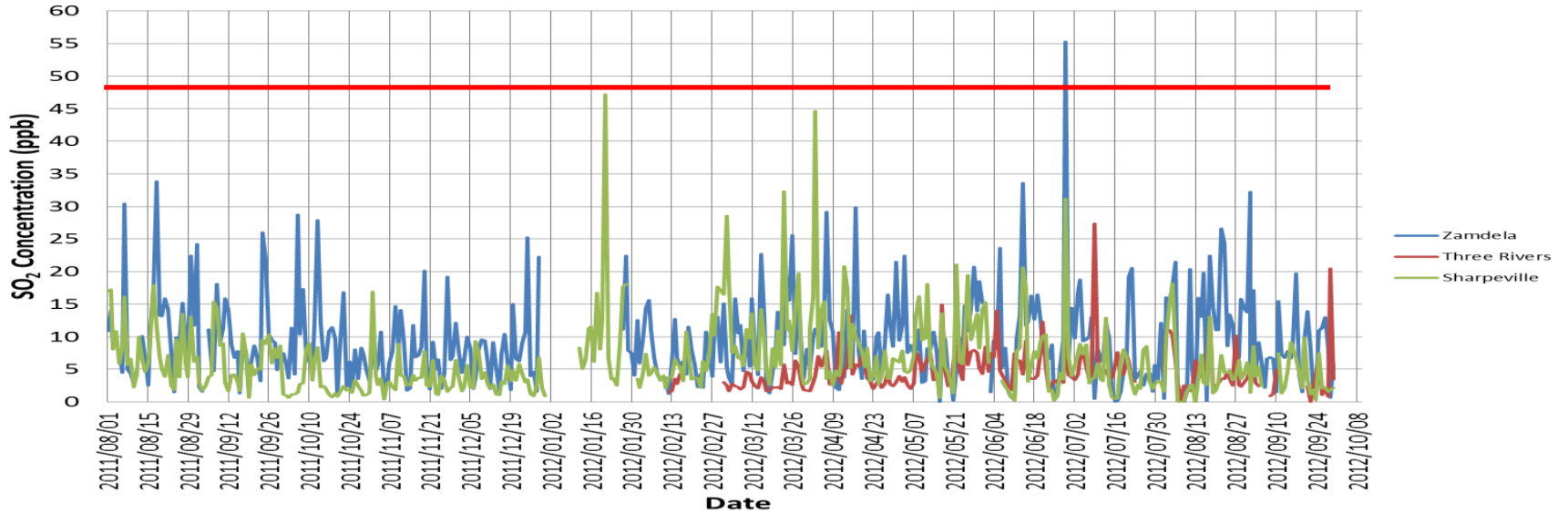
# PM<sub>2.5</sub> Daily



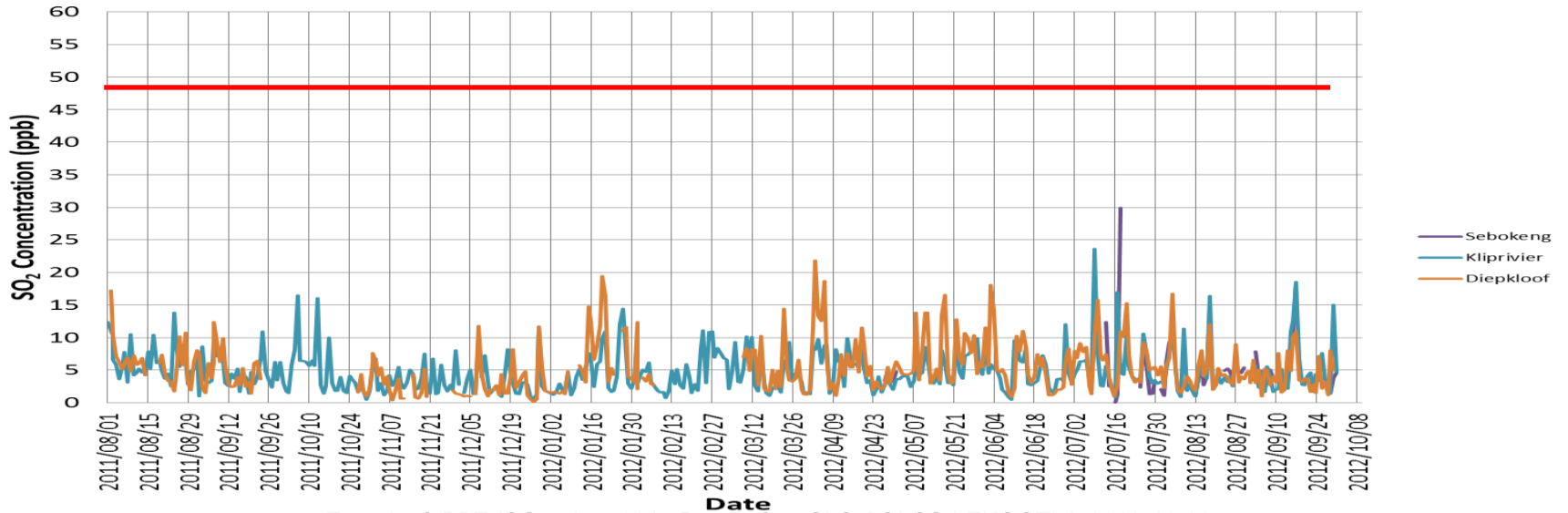


# SO<sub>2</sub> Daily

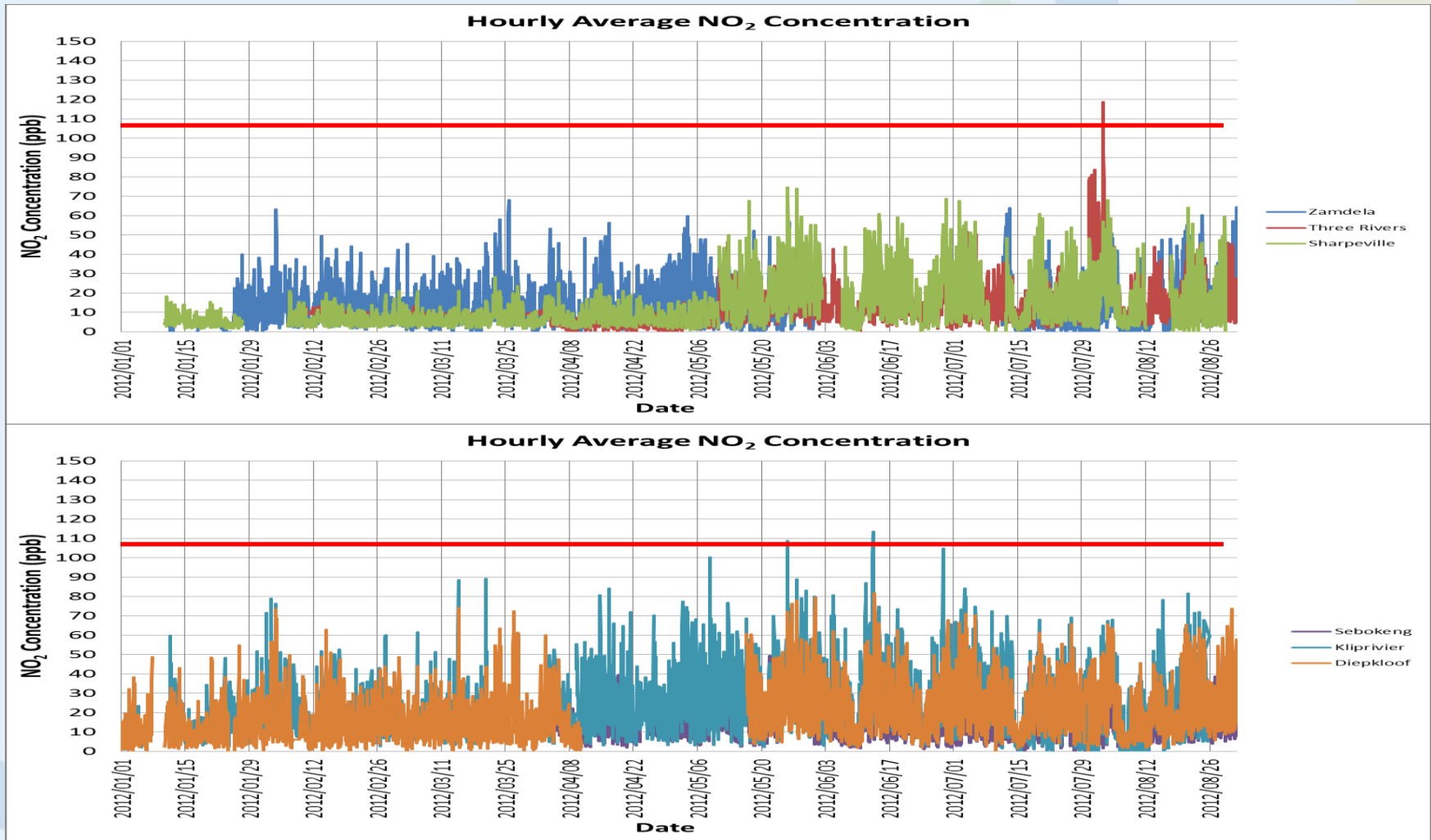
Daily Average SO<sub>2</sub>



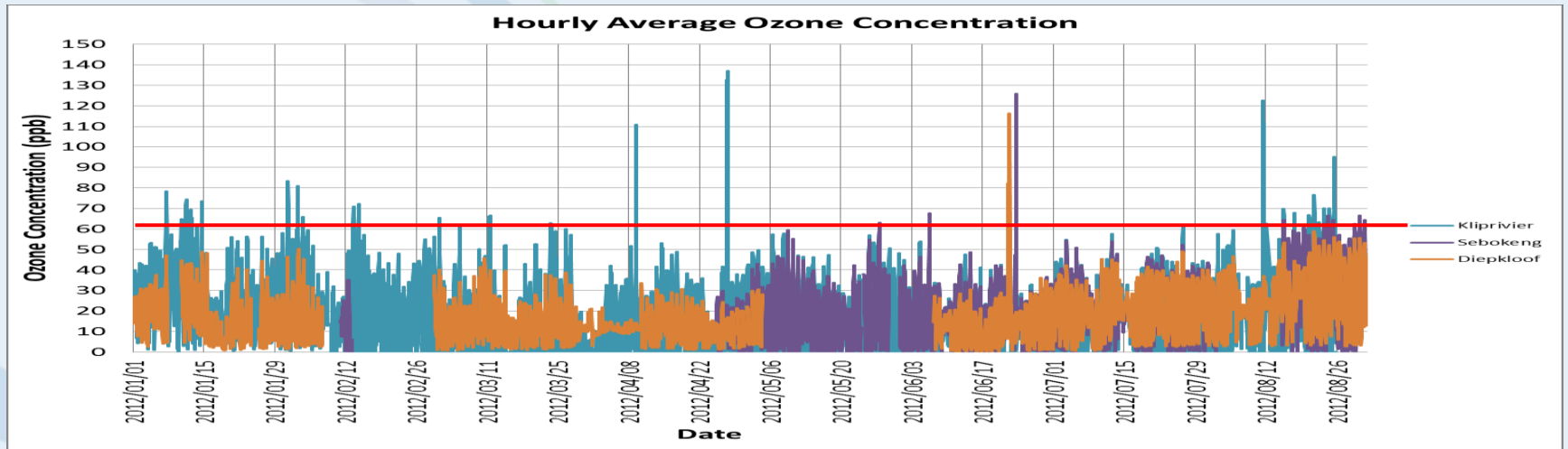
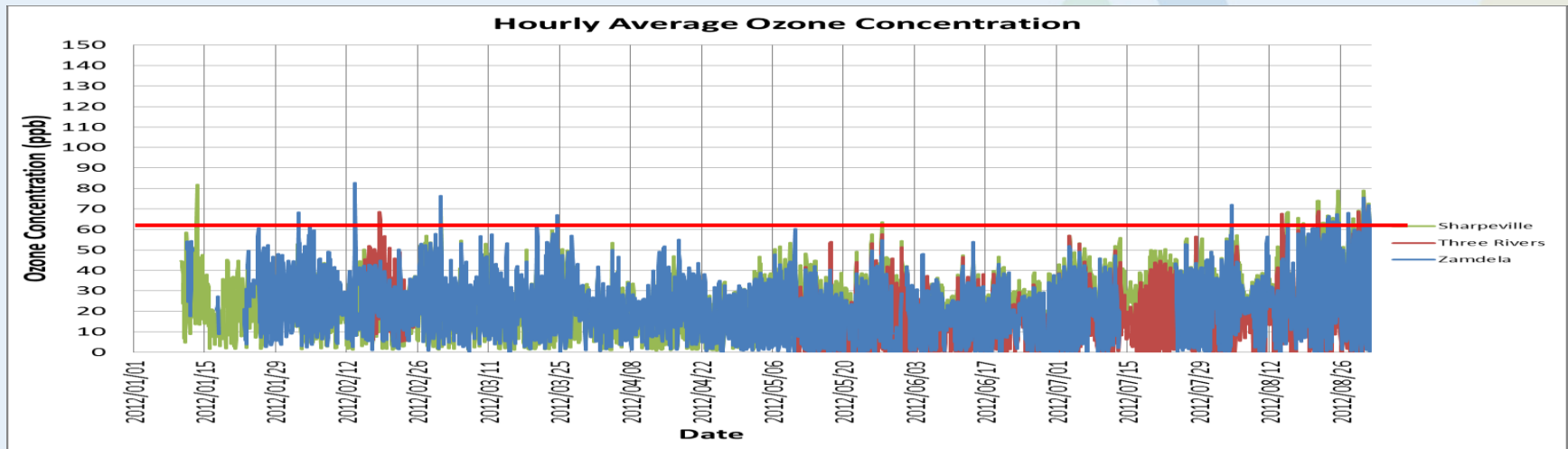
Daily Average SO<sub>2</sub>



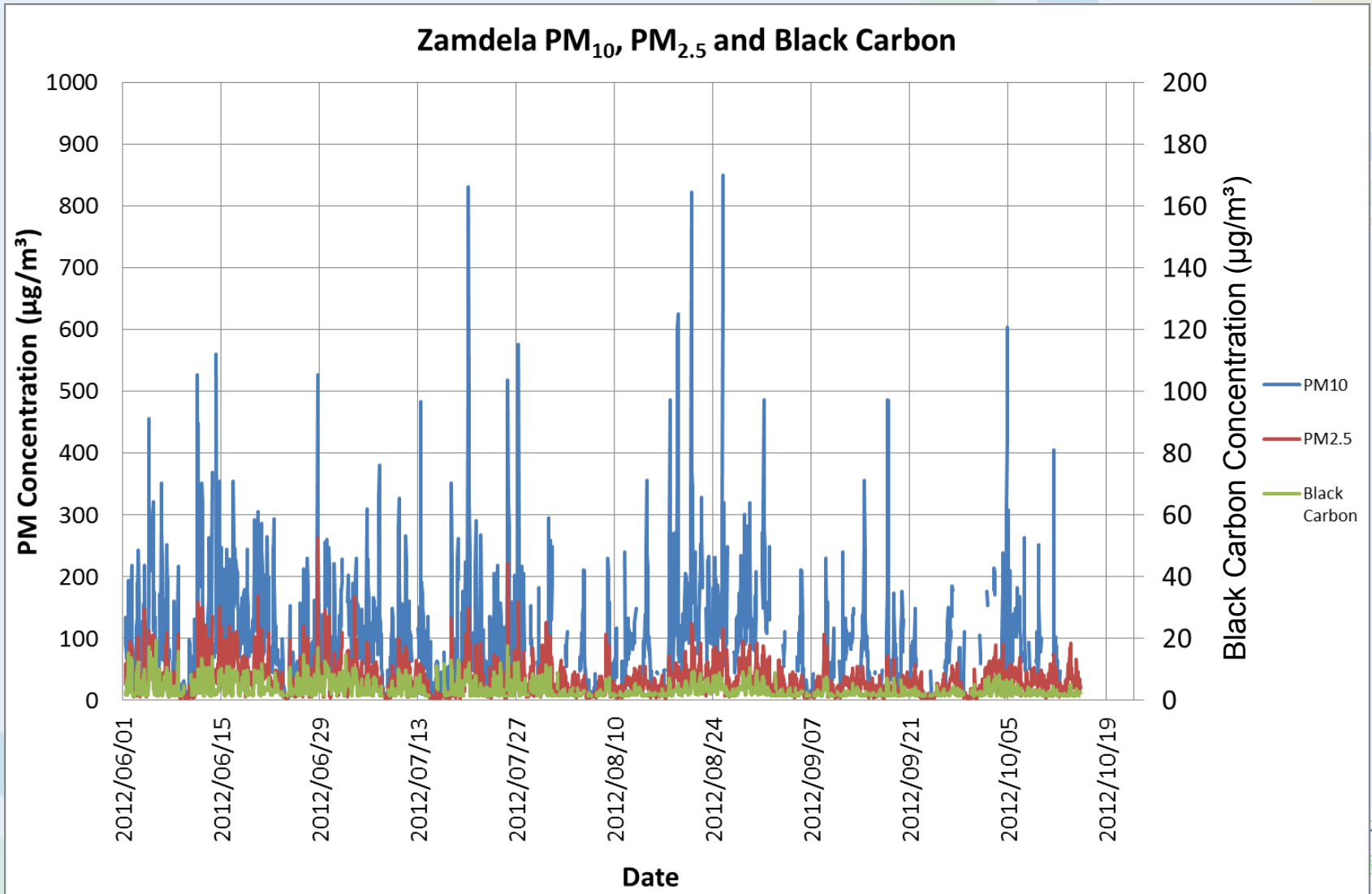
# Hourly Average NO<sub>2</sub>



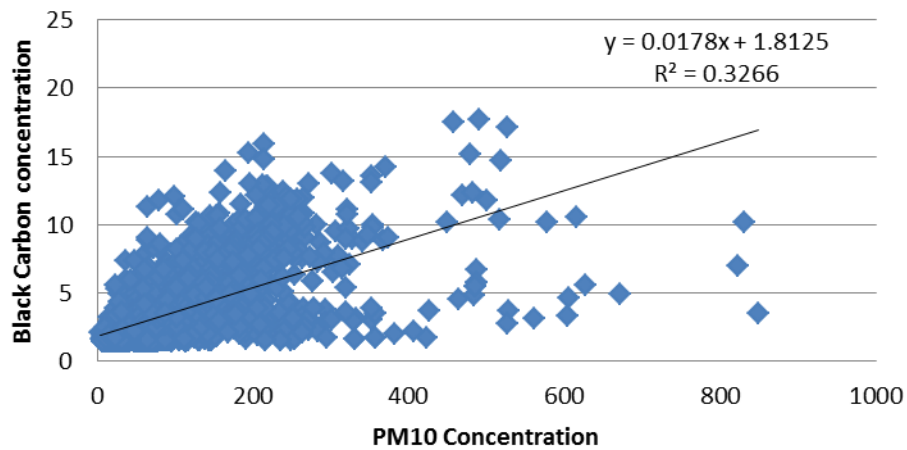
# Hourly Average Ozone



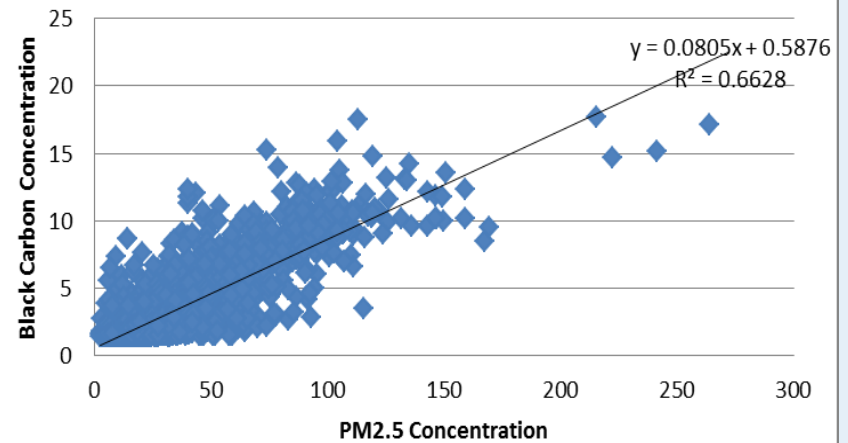
# PM10, PM2.5, Black Carbon



### PM10 to BC



### PM2.5 to BC



# Conclusion

- Data availability in the Vaal is improving: there is a sharpening of technical aspects , and improved service delivery
- Pollutants of concern are  $PM_{10}$ ,  $PM_{2.5}$  and Ozone
  - When the PM standards get stricter many of the stations will be in exceedance of the NAAQS for a large portion of the year
- $SO_2$ ,  $NO_2$  and CO are less of a concern



Questions?

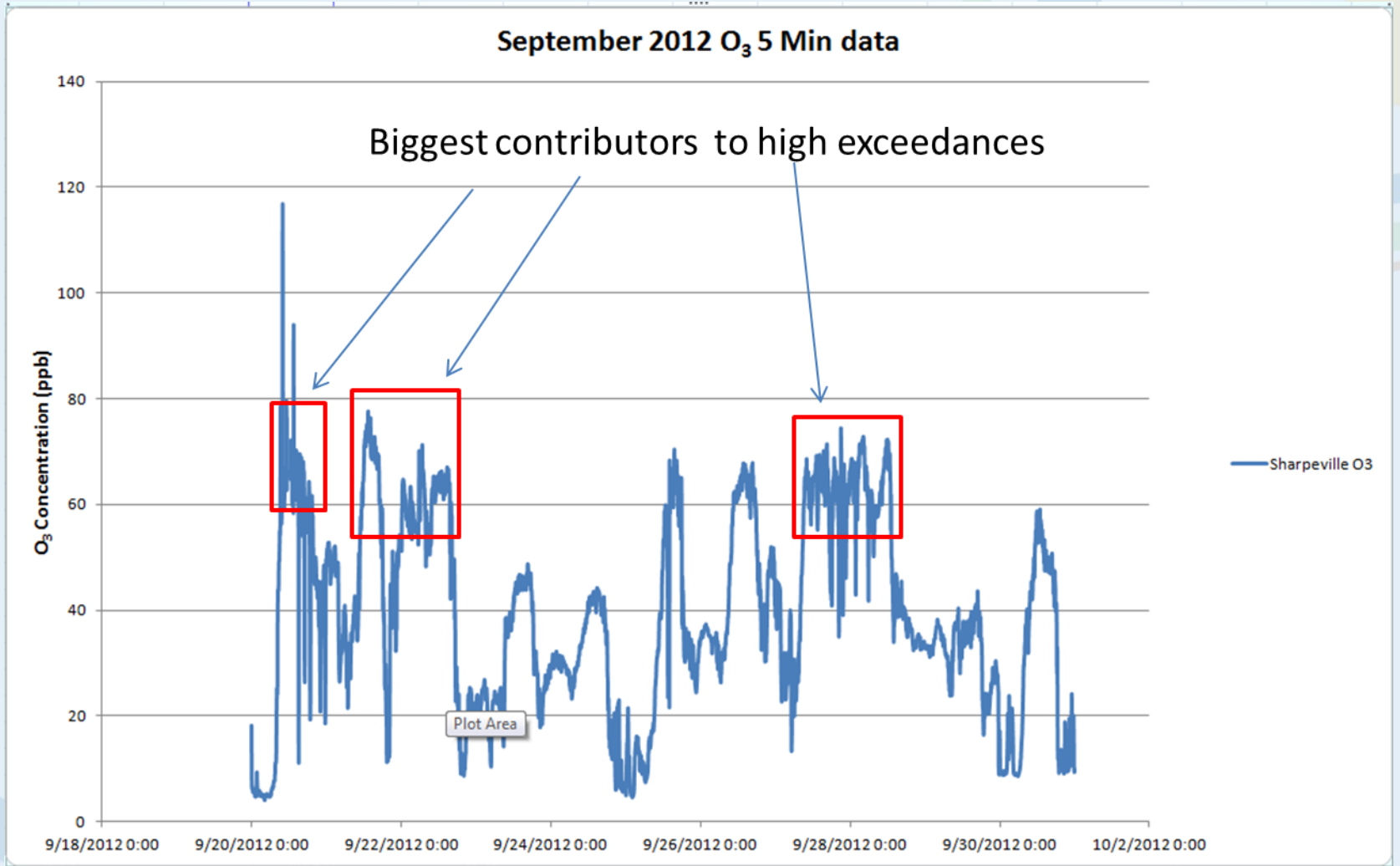


Comments?

# Other Activities for 2012/2013

- Take-over of Highveld Network in 2013
- Purchase of Black Carbon Instruments for Vaal Network



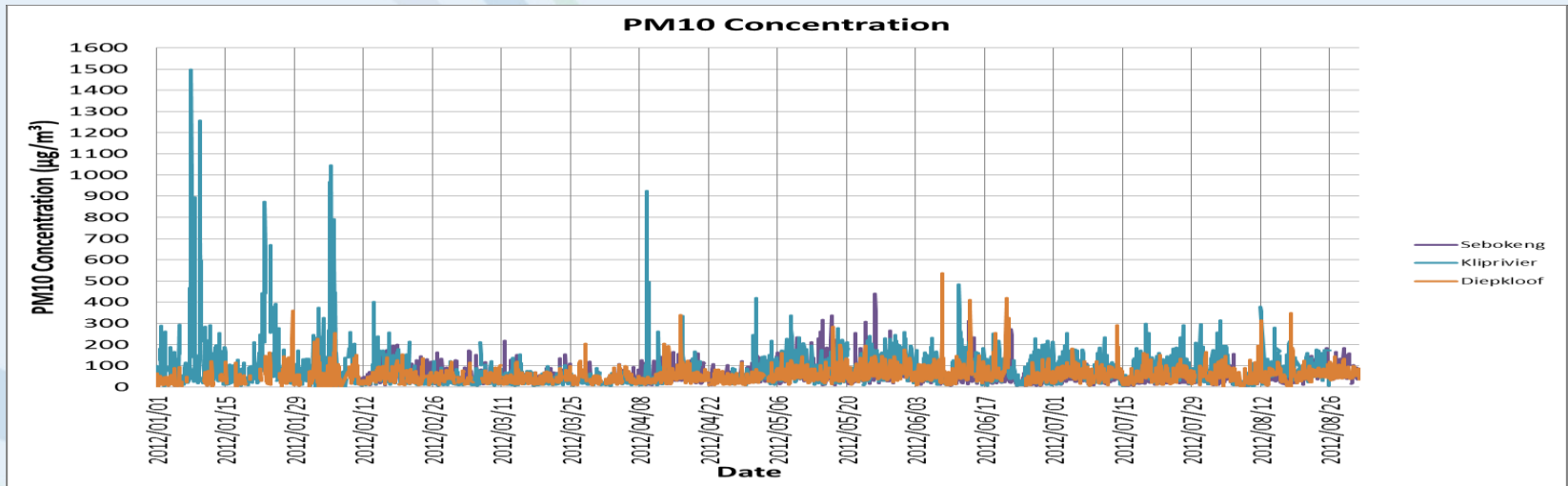
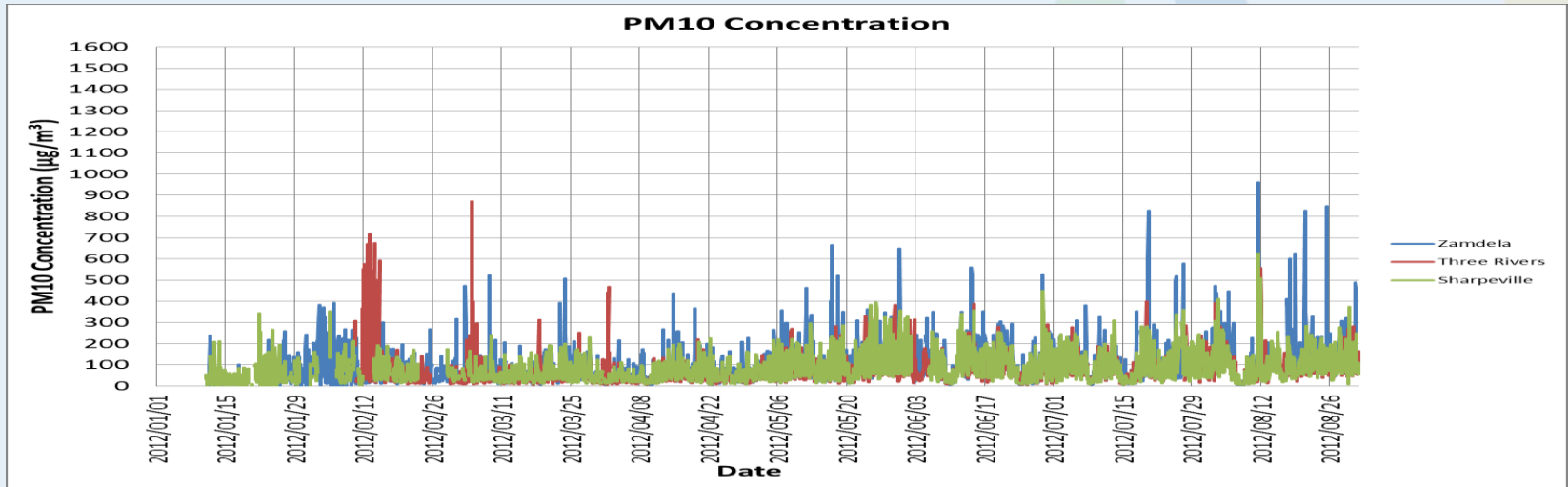




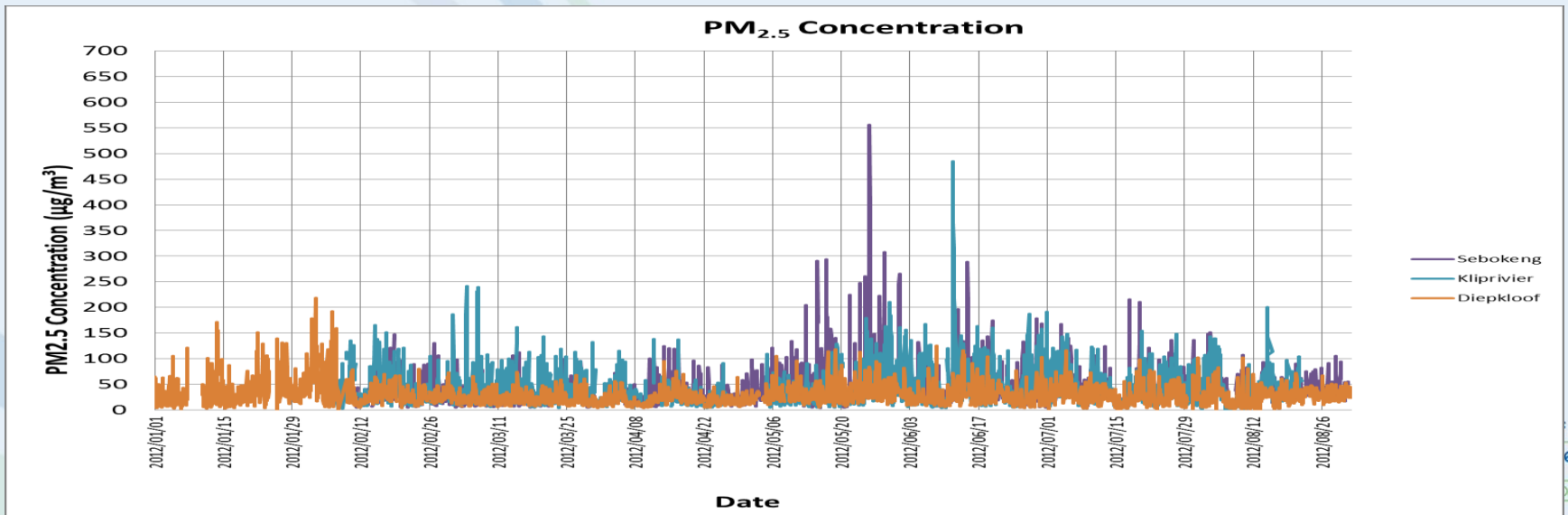
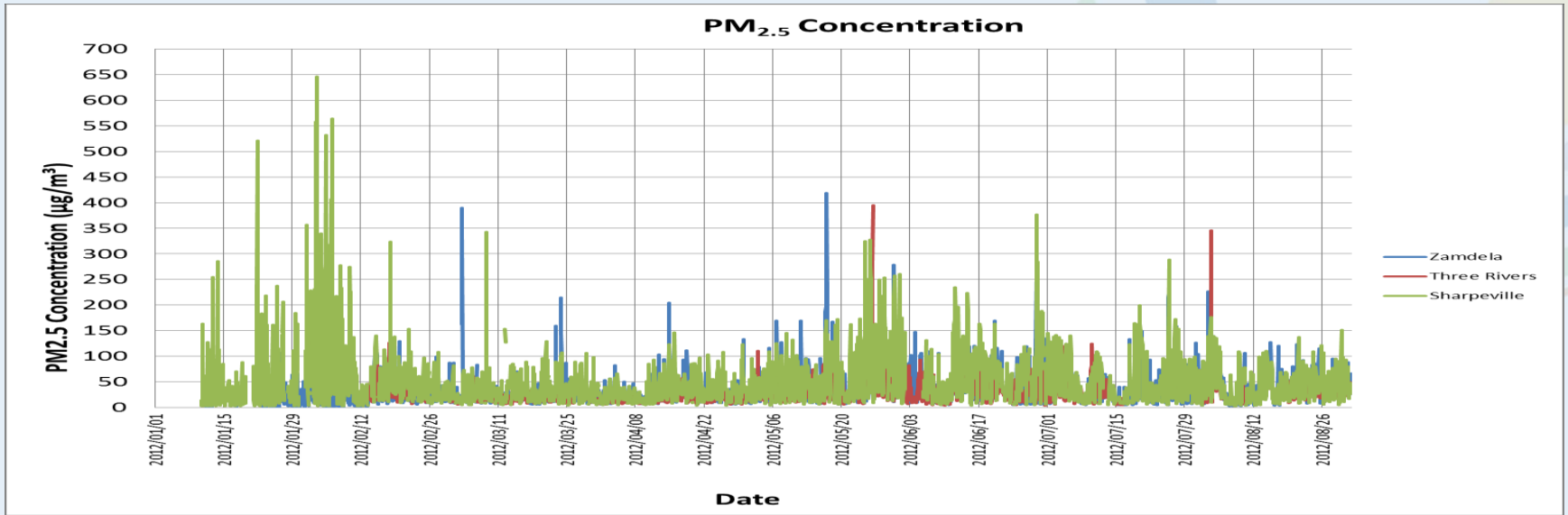




# PM<sub>10</sub>



# PM<sub>2.5</sub>



# Data Availability

	Zamdela	Sebokeng	Sharpeville	Three Rivers	Kliprivier	Diepkloof	Average
August	77.3	-	54.0	-	88.6	66.1	47.6
September	80.4	-	55.9	-	93.4	84.0	52.3
October	82.1	-	70.1	-	93.9	78.6	54.1
November	81.4	-	82.6	-	74.2	57.8	49.3
December	76.6	-	79.1	-	74.3	72.2	50.4
January	24.7	-	49.0	-	89.4	69.1	38.7
February	76.2	63.7	61.9	58.4	85.5	76.5	70.3
March	98.9	63.0	82.1	76.3	92.7	94.4	84.6
April	99.5	65.1	82.6	82.6	94.7	92.5	86.7
May	97.2	82.7	81.7	92.2	95.9	91.0	90.1
June	80.8	92.5	73.0	99.6	99.0	90.5	89.2
July	86.8	88.3	82.6	78.6	98.4	97.2	88.7
August	80.5	89.3	94.9	97.5	74.9	99.3	89.4
September	88.0	66.7	70.4	67.3	92.4	90.3	80.0
<b>Average (oct 2011-</b>	81	50.8	75.9	52.0	88.8	82.8	69.4