

## Appendix D Figures and Tables for Windsor

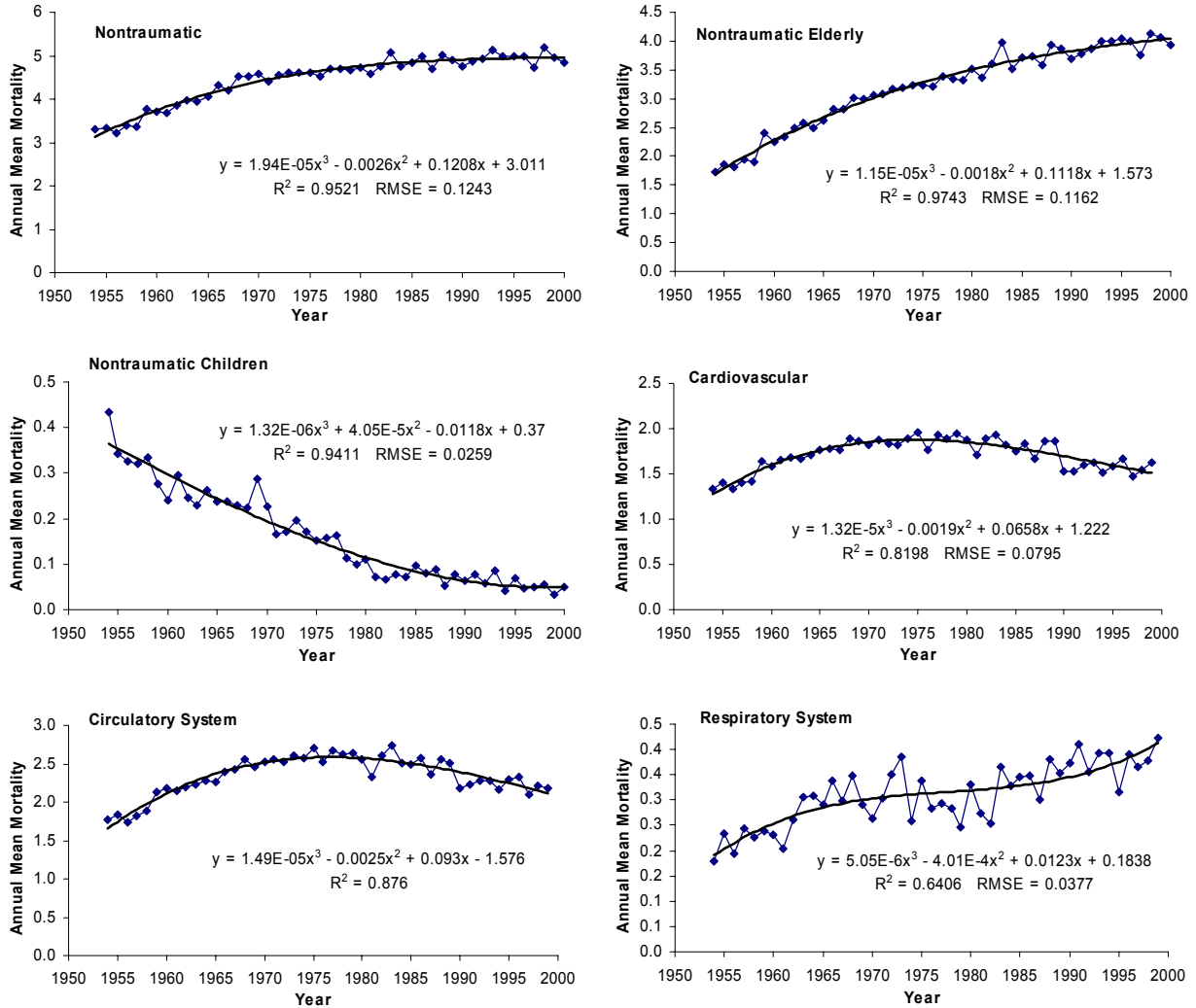


Figure 3. Inter-annual mortality trends (baseline I) in Windsor

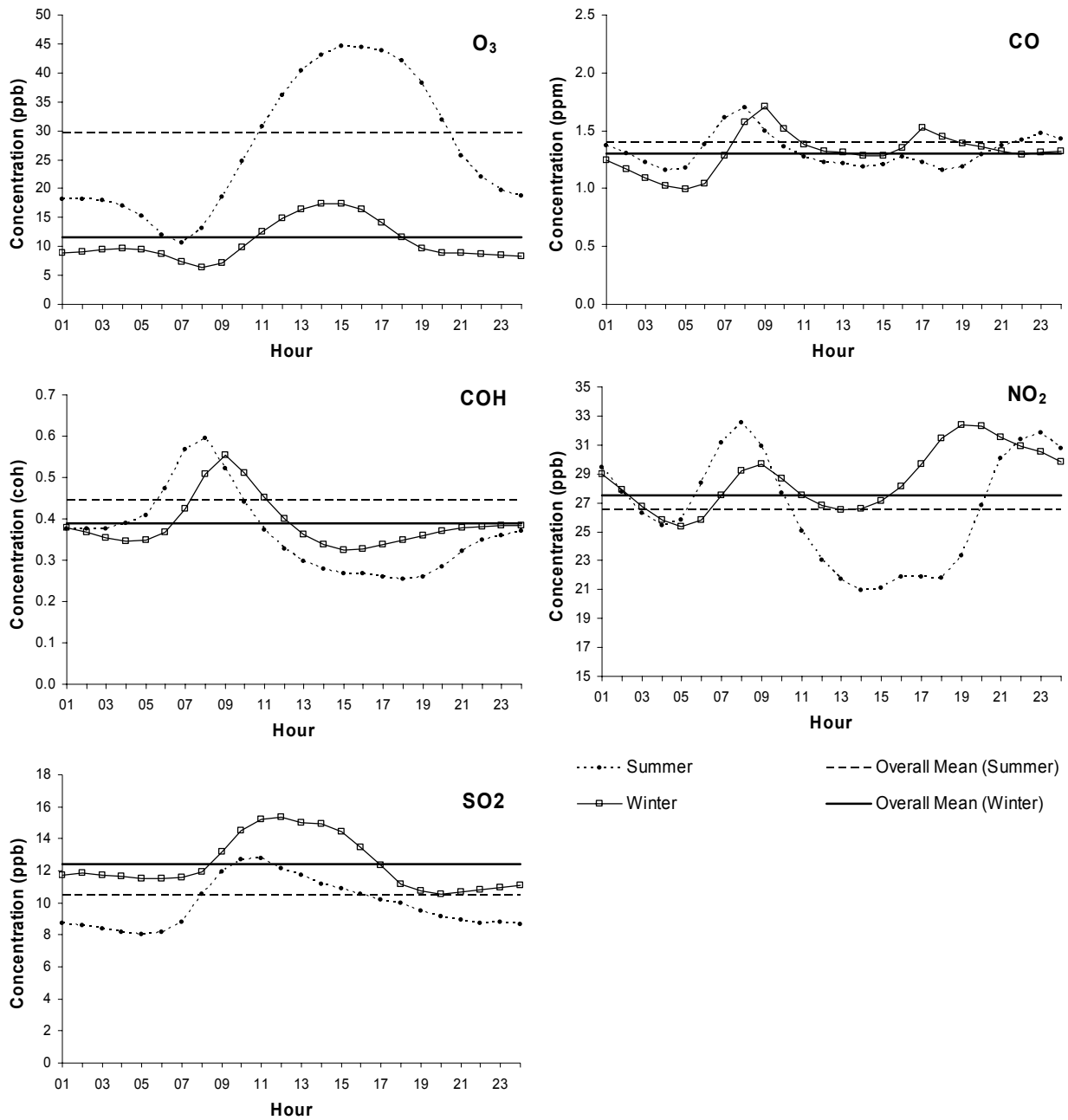


Figure 6. Hourly mean air pollution concentrations at local standard time (LST) in Windsor ( $O_3$ : 1980–2000, COH: 1974–96, rest of pollutants: 1974–2000)

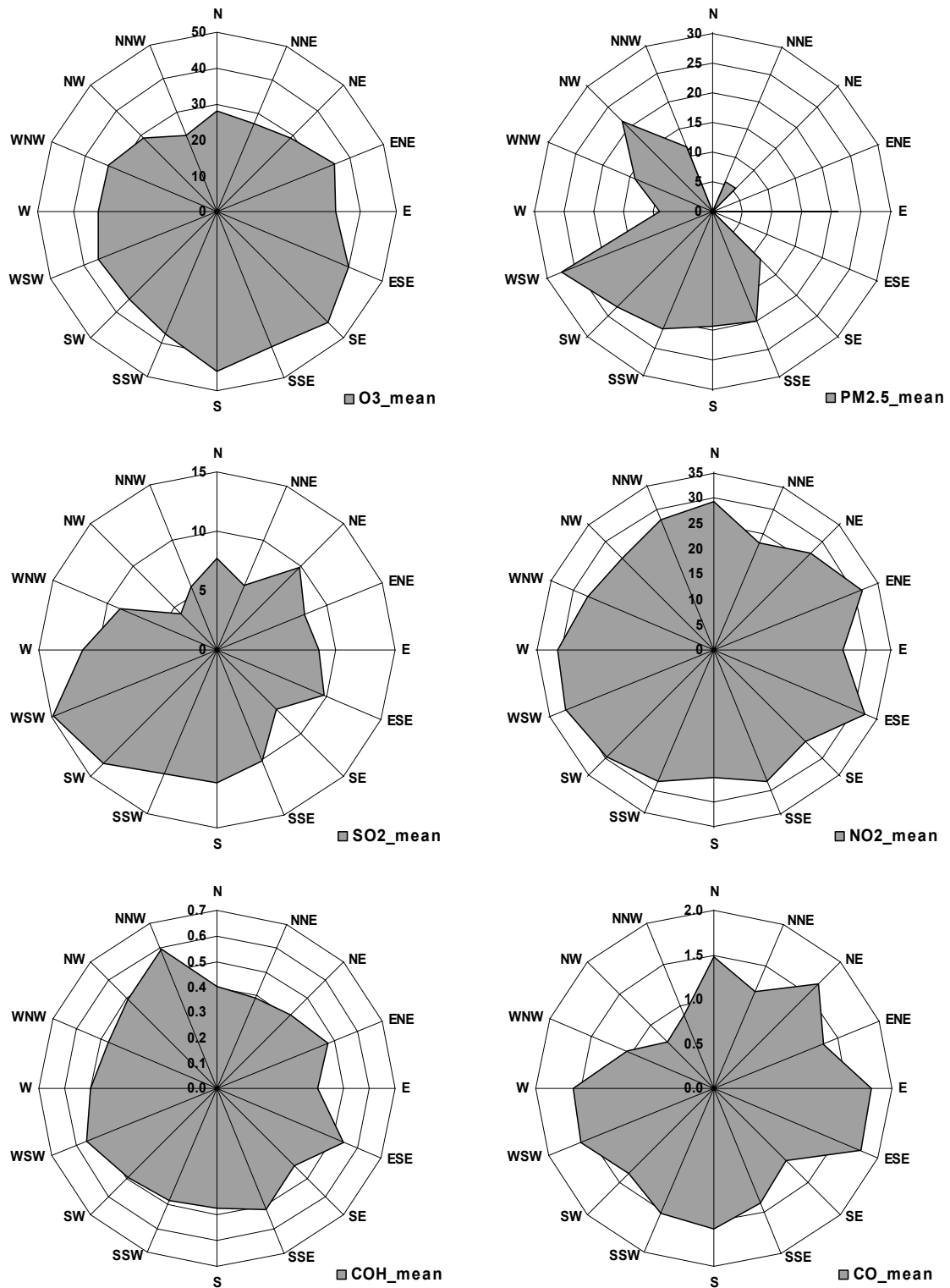


Figure 26. Mean daily air pollution concentrations as a function of corresponding surface wind direction for each of the pollutants within hot weather types in Windsor

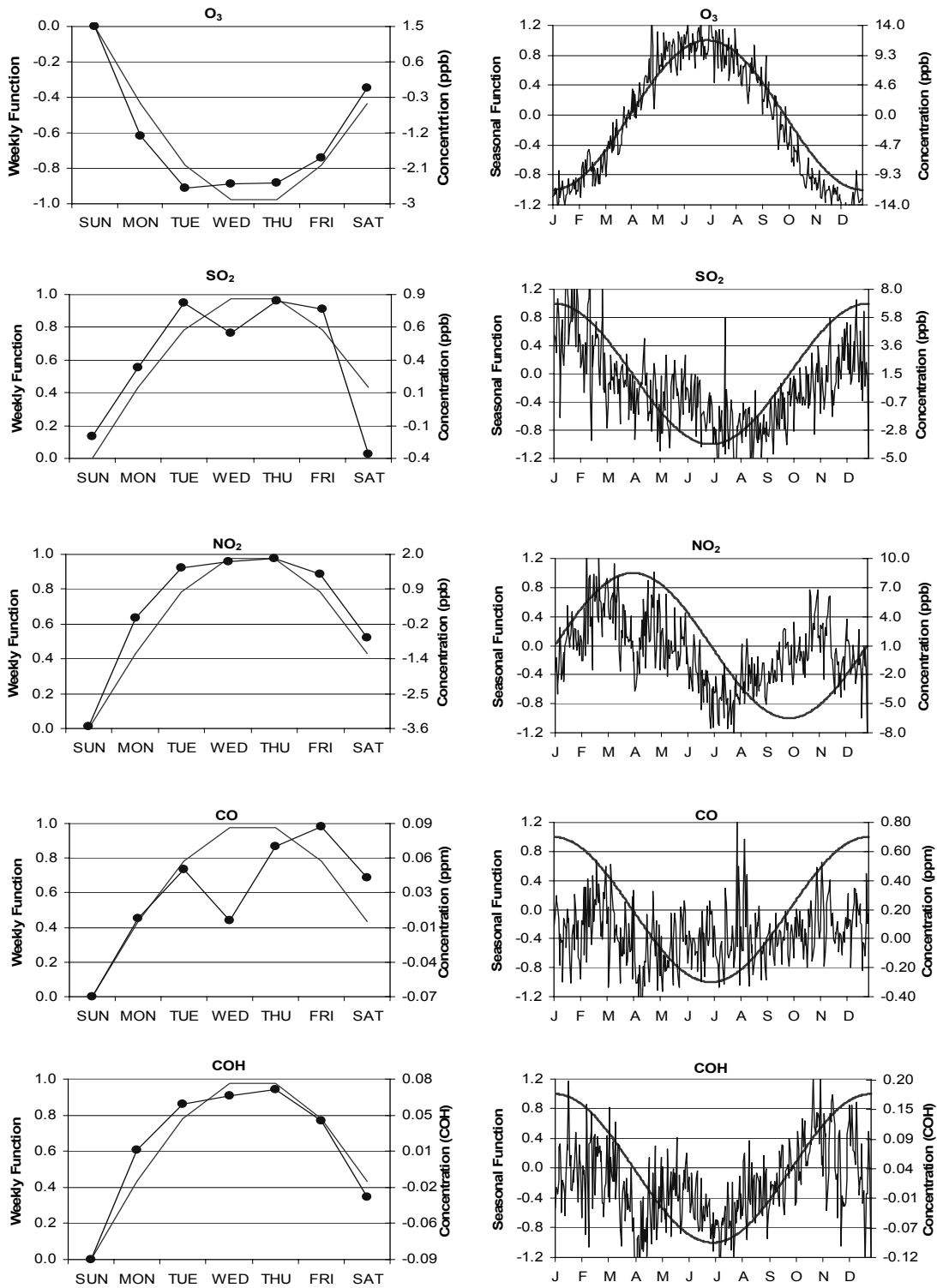


Figure 27. Weekly (left panel) and seasonal (right panel) variations of air pollution concentrations in Windsor [blue lines are mean air pollution concentrations during the study period (CO, NO<sub>2</sub>, and SO<sub>2</sub>: 1974–2000; O<sub>3</sub>: 1980–2000; COH: 1974–1996); smooth lines represent seasonal and weekly *sine/cosine* functions used as predictors for air pollution prediction]

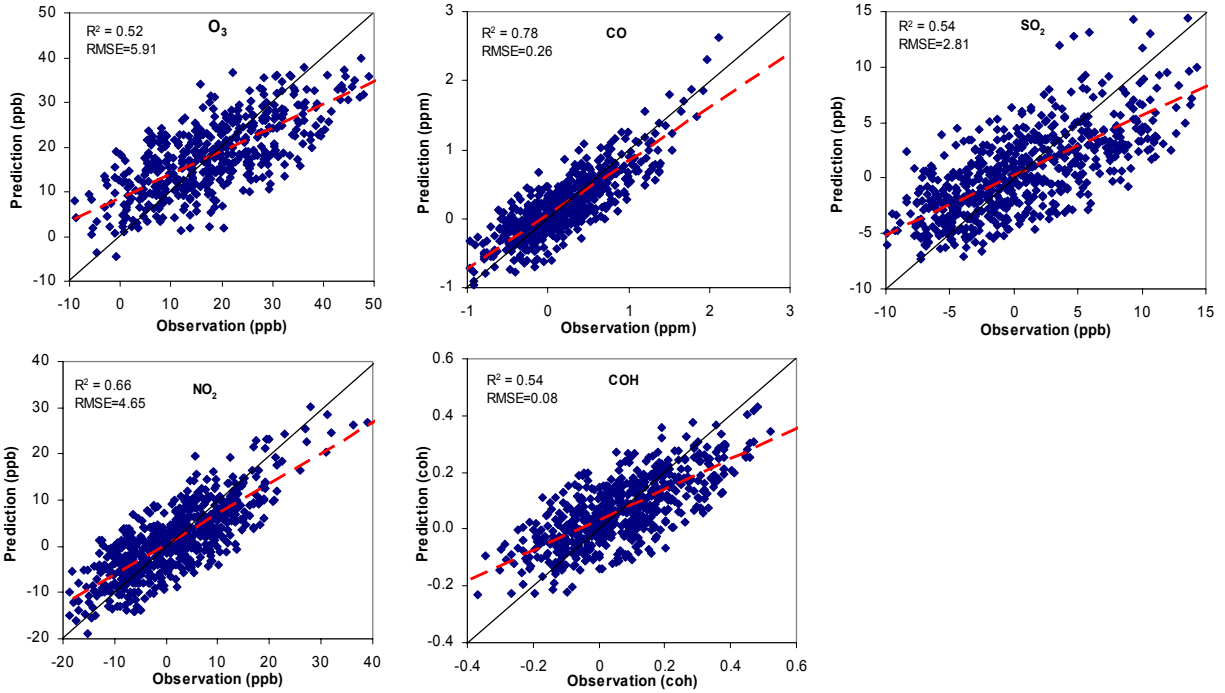


Figure 30. Developmental dataset: relationships between observed daily mean air pollution concentrations and predicted values for the hot weather types in Windsor (dashed line represents a regression line and solid line is a perfect fit from best-fit linear regression)

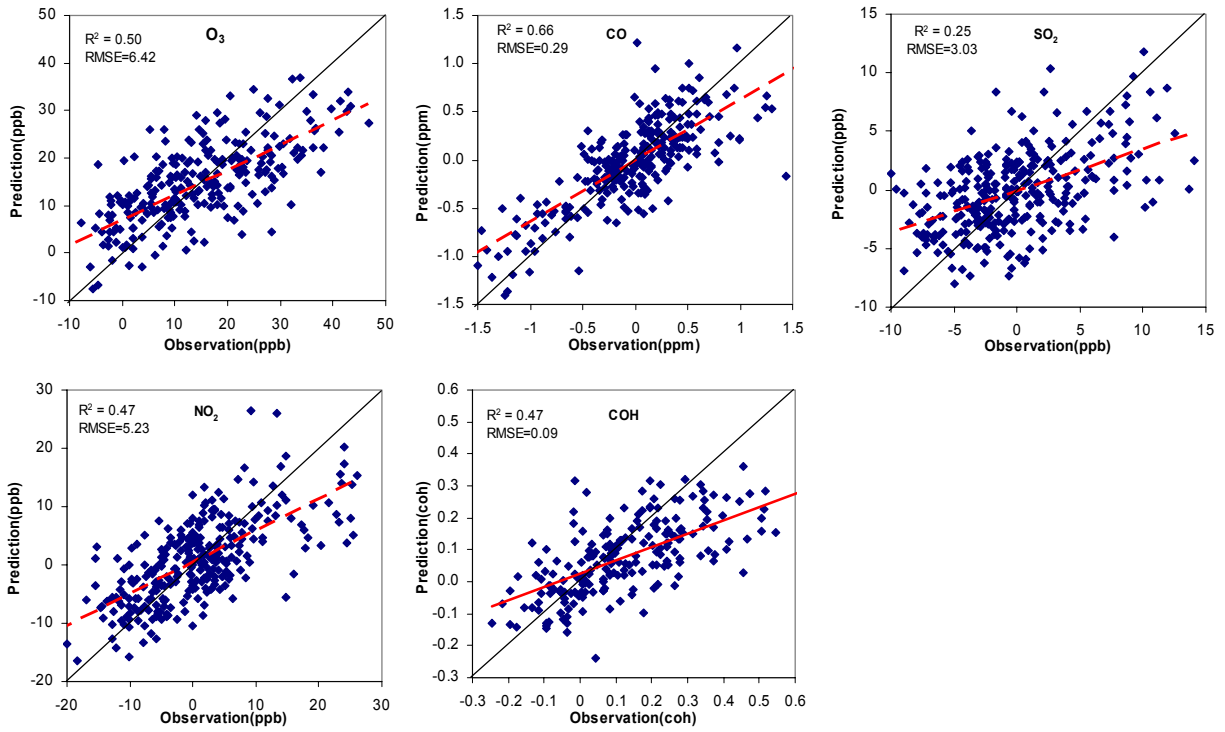


Figure 31. Validation dataset: relationships between observed daily mean air pollution concentrations and predicted values for the hot weather types in Windsor (dashed line represents a regression line and solid line is a perfect fit from best-fit linear regression)

Table 7. Loadings of variables on the first five principal components for both seasons in Windsor

| Air mass indicator                | LST         | Component |       |       |       |       |
|-----------------------------------|-------------|-----------|-------|-------|-------|-------|
|                                   | Time (hour) | 1         | 2     | 3     | 4     | 5     |
| <b>Summer</b>                     |             |           |       |       |       |       |
| Air temperature                   | 0300        | 0.89      | 0.17  | -0.20 | -0.25 | 0.11  |
|                                   | 0900        | 0.89      | 0.34  | -0.02 | -0.13 | -0.01 |
|                                   | 1500        | 0.84      | 0.41  | 0.09  | -0.10 | -0.08 |
|                                   | 2100        | 0.89      | 0.34  | 0.00  | -0.03 | -0.03 |
| Dew point temperature             | 0300        | 0.89      | 0.16  | -0.24 | -0.21 | 0.11  |
|                                   | 0900        | 0.92      | 0.19  | -0.20 | -0.07 | 0.07  |
|                                   | 1500        | 0.91      | 0.18  | -0.21 | 0.05  | 0.06  |
|                                   | 2100        | 0.89      | 0.29  | -0.15 | 0.09  | 0.01  |
| Sea-level air pressure            | 0300        | -0.26     | 0.80  | 0.15  | 0.35  | 0.23  |
|                                   | 0900        | -0.34     | 0.85  | 0.16  | 0.20  | 0.27  |
|                                   | 1500        | -0.40     | 0.81  | 0.12  | 0.02  | 0.36  |
|                                   | 2100        | -0.43     | 0.70  | 0.12  | -0.15 | 0.43  |
| West-east scalar wind             | 0300        | 0.13      | -0.24 | 0.51  | -0.42 | 0.36  |
|                                   | 0900        | 0.29      | -0.43 | 0.61  | -0.27 | 0.31  |
|                                   | 1500        | 0.31      | -0.47 | 0.60  | -0.14 | 0.21  |
|                                   | 2100        | 0.29      | -0.44 | 0.48  | -0.05 | 0.08  |
| South-north scalar wind           | 0300        | 0.53      | -0.26 | 0.35  | 0.30  | 0.17  |
|                                   | 0900        | 0.47      | -0.17 | 0.34  | 0.62  | 0.01  |
|                                   | 1500        | 0.43      | 0.01  | 0.40  | 0.66  | -0.10 |
|                                   | 2100        | 0.25      | 0.20  | 0.38  | 0.54  | -0.19 |
| Total cloud cover                 | 0300        | 0.05      | -0.44 | -0.46 | 0.01  | 0.26  |
|                                   | 0900        | 0.05      | -0.44 | -0.49 | 0.27  | 0.37  |
|                                   | 1500        | 0.04      | -0.43 | -0.39 | 0.36  | 0.42  |
|                                   | 2100        | 0.08      | -0.31 | -0.33 | 0.48  | 0.25  |
| Eigenvalue                        |             | 7.93      | 4.65  | 2.82  | 2.27  | 1.29  |
| Explained variance (%)            |             | 33.02     | 19.38 | 11.76 | 9.46  | 5.39  |
| Cumulative variance explained (%) |             | 33.02     | 52.40 | 64.16 | 73.62 | 79.01 |
| <b>Winter</b>                     |             |           |       |       |       |       |
| Air temperature                   | 0300        | 0.90      | 0.12  | -0.01 | -0.30 | 0.15  |
|                                   | 0900        | 0.93      | 0.20  | 0.06  | -0.21 | 0.07  |
|                                   | 1500        | 0.87      | 0.31  | 0.24  | -0.17 | -0.03 |
|                                   | 2100        | 0.90      | 0.29  | 0.17  | -0.01 | 0.00  |
| Dew point temperature             | 0300        | 0.91      | 0.12  | -0.06 | -0.26 | 0.13  |
|                                   | 0900        | 0.95      | 0.17  | -0.01 | -0.14 | 0.09  |
|                                   | 1500        | 0.94      | 0.23  | 0.03  | 0.01  | 0.03  |
|                                   | 2100        | 0.90      | 0.31  | 0.08  | 0.08  | 0.02  |
| Sea-level air pressure            | 0300        | -0.38     | 0.72  | 0.28  | 0.31  | 0.20  |
|                                   | 0900        | -0.47     | 0.74  | 0.32  | 0.11  | 0.28  |
|                                   | 1500        | -0.54     | 0.66  | 0.29  | -0.10 | 0.39  |
|                                   | 2100        | -0.53     | 0.51  | 0.24  | -0.29 | 0.44  |
| West-east scalar wind             | 0300        | -0.20     | -0.45 | 0.42  | -0.37 | 0.33  |
|                                   | 0900        | -0.07     | -0.61 | 0.47  | -0.38 | 0.30  |
|                                   | 1500        | 0.00      | -0.71 | 0.43  | -0.29 | 0.15  |
|                                   | 2100        | 0.02      | -0.71 | 0.28  | -0.12 | 0.01  |
| South-north scalar wind           | 0300        | 0.38      | -0.34 | 0.43  | 0.33  | 0.19  |
|                                   | 0900        | 0.36      | -0.27 | 0.54  | 0.54  | 0.05  |
|                                   | 1500        | 0.27      | -0.09 | 0.64  | 0.58  | -0.08 |
|                                   | 2100        | 0.12      | -0.01 | 0.61  | 0.48  | -0.10 |
| Total cloud cover                 | 0300        | 0.15      | -0.30 | -0.49 | 0.04  | 0.36  |
|                                   | 0900        | 0.24      | -0.26 | -0.51 | 0.32  | 0.41  |
|                                   | 1500        | 0.18      | -0.24 | -0.45 | 0.44  | 0.41  |
|                                   | 2100        | 0.20      | -0.14 | -0.35 | 0.53  | 0.29  |
| Eigenvalue                        |             | 8.22      | 4.28  | 3.20  | 2.46  | 1.34  |
| Explained variance (%)            |             | 34.23     | 17.85 | 13.34 | 10.24 | 5.59  |
| Cumulative variance explained (%) |             | 34.23     | 52.08 | 65.42 | 75.65 | 81.25 |

Table 8. Daily mean standardized O<sub>3</sub> concentration and frequency of high O<sub>3</sub> level in Windsor

| Synoptic Type                |             |                              | O <sub>3</sub> Concentration Level |                   |                              |                               |                   |                              |                               |                   |                              |                               |
|------------------------------|-------------|------------------------------|------------------------------------|-------------------|------------------------------|-------------------------------|-------------------|------------------------------|-------------------------------|-------------------|------------------------------|-------------------------------|
| Type                         | Days        | Freq.(%) <sup>1</sup><br>(a) | Mean<br>(ppb)                      | 1 Std. Above Mean |                              |                               | 2 Std. Above Mean |                              |                               | 3 Std. Above Mean |                              |                               |
|                              |             |                              |                                    | Days              | Freq.(%) <sup>2</sup><br>(b) | Ratio <sup>3</sup><br>(b)/(a) | Days              | Freq.(%) <sup>2</sup><br>(c) | Ratio <sup>3</sup><br>(c)/(a) | Days              | Freq.(%) <sup>2</sup><br>(d) | Ratio <sup>3</sup><br>(d)/(a) |
| <b>1</b>                     | <b>178</b>  | <b>2.37</b>                  | <b>39.50</b>                       | <b>149</b>        | <b>12.10</b>                 | <b>5.11</b>                   | <b>64</b>         | <b>17.83</b>                 | <b>7.53</b>                   | <b>17</b>         | <b>29.31</b>                 | <b>12.38</b>                  |
| <b>2</b>                     | <b>278</b>  | <b>3.70</b>                  | <b>37.08</b>                       | <b>204</b>        | <b>16.57</b>                 | <b>4.48</b>                   | <b>111</b>        | <b>30.92</b>                 | <b>8.36</b>                   | <b>20</b>         | <b>34.48</b>                 | <b>9.33</b>                   |
| <b>3</b>                     | <b>347</b>  | <b>4.61</b>                  | <b>27.16</b>                       | <b>201</b>        | <b>16.33</b>                 | <b>3.54</b>                   | <b>60</b>         | <b>16.71</b>                 | <b>3.62</b>                   | <b>9</b>          | <b>15.52</b>                 | <b>3.36</b>                   |
| <b>4</b>                     | <b>236</b>  | <b>3.14</b>                  | <b>19.85</b>                       | <b>92</b>         | <b>7.47</b>                  | <b>2.38</b>                   | <b>23</b>         | <b>6.41</b>                  | <b>2.04</b>                   | <b>2</b>          | <b>3.45</b>                  | <b>1.10</b>                   |
| 5                            | 134         | 1.78                         | 4.60                               | 16                | 1.30                         | 0.73                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 6                            | 91          | 1.21                         | 6.72                               | 15                | 1.22                         | 1.01                          | 1                 | 0.28                         | 0.23                          | 0                 | 0.00                         | 0.00                          |
| <b>7</b>                     | <b>126</b>  | <b>1.68</b>                  | <b>20.03</b>                       | <b>55</b>         | <b>4.47</b>                  | <b>2.67</b>                   | <b>9</b>          | <b>2.51</b>                  | <b>1.50</b>                   | <b>0</b>          | <b>0.00</b>                  | <b>0.00</b>                   |
| 8                            | 198         | 2.63                         | 0.98                               | 21                | 1.71                         | 0.65                          | 2                 | 0.56                         | 0.21                          | 0                 | 0.00                         | 0.00                          |
| 9                            | 81          | 1.08                         | 0.46                               | 3                 | 0.24                         | 0.23                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| <b>10</b>                    | <b>90</b>   | <b>1.20</b>                  | <b>26.21</b>                       | <b>46</b>         | <b>3.74</b>                  | <b>3.12</b>                   | <b>14</b>         | <b>3.90</b>                  | <b>3.26</b>                   | <b>4</b>          | <b>6.90</b>                  | <b>5.76</b>                   |
| <b>11</b>                    | <b>159</b>  | <b>2.11</b>                  | <b>16.56</b>                       | <b>57</b>         | <b>4.63</b>                  | <b>2.19</b>                   | <b>13</b>         | <b>3.62</b>                  | <b>1.71</b>                   | <b>0</b>          | <b>0.00</b>                  | <b>0.00</b>                   |
| <b>12</b>                    | <b>74</b>   | <b>0.98</b>                  | <b>23.08</b>                       | <b>35</b>         | <b>2.84</b>                  | <b>2.89</b>                   | <b>12</b>         | <b>3.34</b>                  | <b>3.40</b>                   | <b>0</b>          | <b>0.00</b>                  | <b>0.00</b>                   |
| <b>13</b>                    | <b>156</b>  | <b>2.07</b>                  | <b>14.53</b>                       | <b>49</b>         | <b>3.98</b>                  | <b>1.92</b>                   | <b>5</b>          | <b>1.39</b>                  | <b>0.67</b>                   | <b>0</b>          | <b>0.00</b>                  | <b>0.00</b>                   |
| 14                           | 97          | 1.29                         | 1.23                               | 6                 | 0.49                         | 0.38                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 15                           | 293         | 3.90                         | -0.14                              | 13                | 1.06                         | 0.27                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 16                           | 121         | 1.61                         | 0.95                               | 2                 | 0.16                         | 0.10                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 17                           | 119         | 1.58                         | -4.63                              | 1                 | 0.08                         | 0.05                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 18                           | 231         | 3.07                         | -4.31                              | 13                | 1.06                         | 0.34                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 19                           | 201         | 2.67                         | -14.19                             | 2                 | 0.16                         | 0.06                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 20                           | 353         | 4.69                         | -10.73                             | 16                | 1.30                         | 0.28                          | 1                 | 0.28                         | 0.06                          | 0                 | 0.00                         | 0.00                          |
| 21                           | 127         | 1.69                         | -15.76                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 22                           | 241         | 3.21                         | -23.34                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 23                           | 289         | 3.84                         | -20.35                             | 1                 | 0.08                         | 0.02                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 24                           | 120         | 1.60                         | -13.36                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 25                           | 186         | 2.47                         | -18.03                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 26                           | 91          | 1.21                         | -13.94                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 27                           | 90          | 1.20                         | -15.58                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 28                           | 74          | 0.98                         | -21.25                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 29                           | 113         | 1.50                         | -15.06                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 30                           | 108         | 1.44                         | -15.30                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 31                           | 250         | 3.32                         | -16.34                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 32                           | 241         | 3.21                         | -11.72                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 33                           | 166         | 2.21                         | -14.61                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 34                           | 108         | 1.44                         | -13.75                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 35                           | 81          | 1.08                         | -10.76                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 36                           | 106         | 1.41                         | -14.61                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 37                           | 84          | 1.12                         | -16.51                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 38                           | 82          | 1.09                         | -17.52                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| 39                           | 71          | 0.94                         | -15.29                             | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          | 0                 | 0.00                         | 0.00                          |
| <b>Sub-total<sup>4</sup></b> | <b>2534</b> | <b>33.69</b>                 | <b>25.82</b>                       | <b>1137</b>       | <b>92.36</b>                 | <b>2.74</b>                   | <b>354</b>        | <b>98.61</b>                 | <b>2.93</b>                   | <b>58</b>         | <b>100.00</b>                | <b>2.97</b>                   |
| <b>Total<sup>5</sup></b>     | <b>6191</b> | <b>82.33</b>                 | <b>-1.10</b>                       | <b>997</b>        | <b>80.99</b>                 | <b>0.98</b>                   | <b>315</b>        | <b>87.75</b>                 | <b>1.07</b>                   | <b>52</b>         | <b>89.66</b>                 | <b>1.09</b>                   |

- <sup>1</sup> Represents percentage occurrence of the weather type.
- <sup>2</sup> Represents percentage frequency of the days with one, two, and three standard deviations above the overall mean O<sub>3</sub> concentration within a particular weather type.
- <sup>3</sup> Ratio of percentage occurrence of the high O<sub>3</sub> concentration events over the percentage occurrence of the weather type. A ratio greater than one indicates that a larger proportion of days in the weather type possess higher O<sub>3</sub> concentration levels than would be expected.
- <sup>4</sup> Represents the sum of the **bold** figures and some small weather types that are most associated with high O<sub>3</sub> concentration levels, but not shown in this table.
- <sup>5</sup> Represents the sum of the 36 weather types.

Table 9. Weather types associated with air pollution concentrations in Windsor

| Weather Type | Days (%)   | Weather Type       | CO, NO <sub>2</sub> , SO <sub>2</sub> : 1974–2000<br>COH: 1974–1996<br>O <sub>3</sub> : 1980–2000 |                 |                 |     |    |
|--------------|------------|--------------------|---|-----------------|-----------------|-----|----|
|              |            |                    | O <sub>3</sub>  | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 1            | 404 (2.35) | Hot1/AP            | O <sub>3</sub>  | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 2            | 696 (4.06) | Hot2/AP            | O <sub>3</sub>  | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 3            | 743 (4.33) | Hot3/AP            | O <sub>3</sub>  |                 | NO <sub>2</sub> | COH | CO |
| 4            | 501 (2.92) | AP-O <sub>3</sub>  | O <sub>3</sub>  |                 |                 | COH | CO |
| 5            | 318 (1.85) | AP-CO              |   |                 | NO <sub>2</sub> | COH | CO |
| 6            | 241 (1.40) | AP-O <sub>3</sub>  | O <sub>3</sub>  |                 |                 |     |    |
| 7            | 291 (1.70) | AP-O <sub>3</sub>  | O <sub>3</sub>  | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 8            | 414 (2.41) | Other              |   |                 |                 |     |    |
| 9            | 185 (1.08) | Other              |   |                 |                 |     |    |
| 10           | 197 (1.15) | AP-O <sub>3</sub>  | O <sub>3</sub>  |                 |                 |     |    |
| 11           | 316 (1.84) | AP-O <sub>3</sub>  | O <sub>3</sub>  |                 |                 |     |    |
| 12           | 184 (1.07) | AP-O <sub>3</sub>  | O <sub>3</sub>  | SO <sub>2</sub> |                 |     | CO |
| 13           | 344 (2.01) | AP-O <sub>3</sub>  | O <sub>3</sub>  |                 |                 |     |    |
| 14           | 222 (1.29) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 |     |    |
| 15           | 595 (3.47) | Other              |   |                 |                 |     |    |
| 16           | 308 (1.80) | AP-NO <sub>2</sub> |   |                 | NO <sub>2</sub> |     |    |
| 17           | 256 (1.49) | AP-NO <sub>2</sub> |   |                 | NO <sub>2</sub> |     |    |
| 18           | 581 (3.39) | AP-COH             |   |                 | NO <sub>2</sub> | COH | CO |
| 19           | 443 (2.58) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 |     |    |
| 20           | 745 (4.34) | AP-COH             |   |                 | NO <sub>2</sub> | COH | CO |
| 21           | 284 (1.66) | AP-CO              |   |                 |                 |     | CO |
| 22           | 496 (2.89) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 | COH |    |
| 23           | 582 (3.39) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 | COH | CO |
| 24           | 298 (1.74) | Other              |   |                 |                 |     |    |
| 25           | 421 (2.45) | AP-CO              |   | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 26           | 218 (1.27) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 |     |    |
| 27           | 230 (1.34) | AP-NO <sub>2</sub> |   | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 28           | 176 (1.03) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 |     |    |
| 29           | 237 (1.38) | Cold/AP            |   | SO <sub>2</sub> | NO <sub>2</sub> | COH |    |
| 30           | 241 (1.40) | AP-NO <sub>2</sub> |   | SO <sub>2</sub> | NO <sub>2</sub> | COH | CO |
| 31           | 563 (3.28) | Other              |   |                 |                 |     |    |
| 32           | 506 (2.95) | Other              |   |                 |                 |     |    |
| 33           | 335 (1.95) | Cold/AP            |   | SO <sub>2</sub> | NO <sub>2</sub> |     | CO |
| 34           | 234 (1.36) | Cold/AP            |   | SO <sub>2</sub> | NO <sub>2</sub> | COH |    |
| 35           | 210 (1.22) | Cold/AP            |   |                 | NO <sub>2</sub> |     |    |
| 36           | 288 (1.68) | Other              |   |                 |                 |     |    |
| 37           | 227 (1.32) | Cold/AP            |   | SO <sub>2</sub> | NO <sub>2</sub> | COH |    |
| 38           | 198 (1.15) | Other              |   |                 |                 |     |    |
| 39           | 197 (1.15) | AP-SO <sub>2</sub> |   | SO <sub>2</sub> |                 |     |    |

Table 16. Summary of robust stepwise regression models for daily mean air pollution concentrations within the hot weather group in Windsor

| <b>O<sub>3</sub> (Ozone)</b> |                             |                    |  |                              |                            |                  |
|------------------------------|-----------------------------|--------------------|--|------------------------------|----------------------------|------------------|
| <b>Step</b>                  | <b>Variable</b>             | <b>Coefficient</b> | <b>PCA Weather Variable Description</b>  | <b>Partial R<sup>2</sup></b> | <b>Model R<sup>2</sup></b> | <b>Pr &gt; F</b> |
|                              | Intercept                   | 8.632              |  |                              |                            |                  |
| 1                            | Previous day O <sub>3</sub> | 0.330              |  | 0.284                        | 0.284                      | <.0001           |
| 2                            | Prin1                       | 1.619              | Surface: Sea-level pressure, Daily mean dewpoint depression<br>850 hPa: Inter-diurnal temperature change | 0.069                        | 0.353                      | <.0001           |
| 3                            | Prin5                       | 3.123              | Daily mean temperature difference (1000-850 hPa)   | 0.065                        | 0.418                      | <.0001           |
| 4                            | Prin2                       | 1.452              | Daily mean temperature at surface, 850, and 500 hPa  | 0.036                        | 0.454                      | <.0001           |
| 5                            | Cosine of Julian day        | -8.548             |  | 0.013                        | 0.467                      | 0.0005           |
| 6                            | Prin11                      | -2.410             | Daily mean meridional wind at 850 (-) and 500 hPa  | 0.012                        | 0.479                      | 0.0011           |
| 7                            | Prin4                       | -1.218             | Daily mean temperature at 850(-) and 500 hPa (-)   | 0.011                        | 0.490                      | 0.0014           |
| 8                            | Prin3                       | 1.078              | Daily mean meridional wind at 850 and 500 hPa  | 0.011                        | 0.501                      | 0.0013           |
| 9                            | Sine of day-week            | -3.462             |  | 0.010                        | 0.511                      | 0.0016           |
| 10                           | Prin8                       | -1.223             | Daily mean surface wind speed  | 0.006                        | 0.517                      | 0.0181           |
| 11                           | Prin12                      | 1.831              | Daily mean zonal wind at 850 (-) and 500 hPa   | 0.004                        | 0.521                      | 0.0393           |

| <b>CO (Carbon monoxide)</b> |                      |                    |   |                              |                            |                  |
|-----------------------------|----------------------|--------------------|---|------------------------------|----------------------------|------------------|
| <b>Step</b>                 | <b>Variable</b>      | <b>Coefficient</b> | <b>PCA Weather Variable Description</b>       | <b>Partial R<sup>2</sup></b> | <b>Model R<sup>2</sup></b> | <b>Pr &gt; F</b> |
|                             | Intercept            | -0.102             |   |                              |                            |                  |
| 1                           | Previous day CO      | 0.801              |   | 0.764                        | 0.764                      | <.0001           |
| 2                           | Sine of day-week     | 0.119              |   | 0.005                        | 0.769                      | 0.0006           |
| 3                           | Prin3                | -0.022             | Daily mean meridional wind at 850 and 500 hPa | 0.003                        | 0.772                      | 0.0051           |
| 4                           | Prin11               | 0.050              | Daily mean meridional wind at 850 hPa(-)      | 0.002                        | 0.774                      | 0.0199           |
| 5                           | Prin13               | 0.074              | Inter-diurnal temperature change at 850 hPa   | 0.002                        | 0.776                      | 0.0241           |
| 6                           | Prin12               | 0.059              | Daily mean zonal wind at 850 (-) and 500 hPa  | 0.002                        | 0.778                      | 0.0286           |
| 7                           | Cosine of Julian day | -0.112             |   | 0.001                        | 0.779                      | 0.0447           |

(Table 16 continued)

| <b>NO<sub>2</sub> (Nitrogen Dioxide)</b> |                              |                    |   |                              |                            |                  |
|--|------------------------------|--------------------|---|------------------------------|----------------------------|------------------|
| <b>Step</b>                              | <b>Variable</b>              | <b>Coefficient</b> | <b>PCA Weather Variable Description</b>   | <b>Partial R<sup>2</sup></b> | <b>Model R<sup>2</sup></b> | <b>Pr &gt; F</b> |
|  | Intercept                    | -1.233             |   |                              |                            |                  |
| 1  | Previous day NO <sub>2</sub> | 0.640              |   | 0.569                        | 0.569                      | <.0001           |
| 2  | Prin3                        | -1.092             | Daily mean meridional wind at 850 and 500 hPa   | 0.020                        | 0.589                      | <.0001           |
| 3  | Prin7                        | 1.737              | Sea-level pressure  | 0.021                        | 0.610                      | <.0001           |
| 4  | Sine of day-week             | 4.011              |   | 0.016                        | 0.626                      | <.0001           |
| 5  | Prin1                        | 0.454              | Daily mean surface dewpoint depression<br>Inter-diurnal temperature change at 850 hPa<br>Daily mean zonal wind at 850 (-) and 500 hPa (-) | 0.008                        | 0.634                      | 0.0002           |
| 6  | Prin2                        | -0.564             | Daily mean temperature at surface, 850, and 500 hPa   | 0.006                        | 0.640                      | 0.0010           |
| 7  | Prin13                       | 2.226              | Inter-diurnal temperature change at 850 hPa   | 0.006                        | 0.646                      | 0.0010           |
| 8  | Prin5                        | 0.669              | Daily mean dewpoint depression at 925 hPa, Daily mean surface wind speed  | 0.005                        | 0.651                      | 0.0022           |
| 9  | Prin4                        | -0.476             | Daily mean temperature at 850(-) and 500 hPa (-)  | 0.003                        | 0.654                      | 0.0375           |
| 10                                       | Sine of Julian day           | 1.156              |   | 0.002                        | 0.656                      | 0.0440           |

| <b>SO<sub>2</sub> (Sulphur Dioxide)</b> |                              |                    |  |                              |                            |                  |
|---|------------------------------|--------------------|--|------------------------------|----------------------------|------------------|
| <b>Step</b>                             | <b>Variable</b>              | <b>Coefficient</b> | <b>PCA Weather Variable Description</b>  | <b>Partial R<sup>2</sup></b> | <b>Model R<sup>2</sup></b> | <b>Pr &gt; F</b> |
|   | Intercept                    | 0.729              |  |                              |                            |                  |
| 1                                       | Previous day SO <sub>2</sub> | 0.414              |  | 0.364                        | 0.364                      | <.0001           |
| 2                                       | Prin5                        | 1.743              | Daily mean dewpoint depression at 925 hPa  | 0.099                        | 0.463                      | <.0001           |
| 3                                       | Prin3                        | -0.578             | Daily mean meridional wind at 850 and 500 hPa  | 0.018                        | 0.481                      | <.0001           |
| 4                                       | Prin8                        | -0.916             | Daily mean surface wind speed  | 0.015                        | 0.496                      | <.0001           |
| 5                                       | Prin1                        | 0.315              | Surface: Sea-level pressure, Daily mean dewpoint depression<br>850 hPa: Inter-diurnal temperature change | 0.011                        | 0.507                      | <.0001           |
| 6                                       | Prin7                        | 0.648              | Sea-level pressure, Daily mean dewpoint depression at 925 hPa  | 0.009                        | 0.516                      | 0.0006           |
| 7                                       | Prin4                        | 0.416              | Daily mean temperature difference (1000-850 hPa)   | 0.008                        | 0.524                      | 0.0013           |
| 8                                       | Prin12                       | -1.083             | Daily mean zonal wind at 850(-) and 500 hPa  | 0.006                        | 0.530                      | 0.0032           |
| 9                                       | Prin13                       | 1.144              | Inter-diurnal temperature change at 850 hPa  | 0.006                        | 0.536                      | 0.0033           |

(Table 16 continued)

| COH (Coefficient of Haze) |                      |             |  |                        |                      |        |
|---------------------------|----------------------|-------------|--|------------------------|----------------------|--------|
| Step                      | Variable             | Coefficient | PCA Weather Variable Description   | Partial R <sup>2</sup> | Model R <sup>2</sup> | Pr > F |
|                           | Intercept            | 0.090       |  |                        |                      |        |
| 1                         | Previous day COH     | 0.397       |  | 0.323                  | 0.323                | <.0001 |
| 2                         | Sine of day-week     | 0.138       |  | 0.075                  | 0.398                | <.0001 |
| 3                         | Prin1                | 0.023       | Sea-level pressure, Daily mean dewpoint depression at surface and 925 hPa<br>Inter-diurnal temperature change at 850 hPa | 0.054                  | 0.452                | <.0001 |
| 4                         | Cosine of Julian day | 0.157       |  | 0.030                  | 0.482                | <.0001 |
| 5                         | Prin4                | -0.015      | Daily mean temperature at 850 (-) and 500 hPa(-)   | 0.012                  | 0.494                | 0.0001 |
| 6                         | Prin8                | -0.021      | Daily mean surface wind speed  | 0.010                  | 0.504                | 0.0004 |
| 7                         | Prin3                | -0.012      | Daily mean meridional wind at 850 and 500 hPa  | 0.010                  | 0.514                | 0.0003 |
| 8                         | Prin10               | 0.025       | Sea-level pressure   | 0.009                  | 0.523                | 0.0007 |
| 9                         | Prin13               | 0.031       | Daily mean zonal wind at 850 hPa   | 0.006                  | 0.529                | 0.0068 |
| 10                        | Prin7                | 0.014       | Sea-level pressure   | 0.004                  | 0.533                | 0.0154 |
| 11                        | Prin11               | 0.020       | Daily mean meridional wind at 850 hPa (-)  | 0.004                  | 0.537                | 0.0188 |

Note: Prin1 represents Principal Component 1; the sign (-) indicates a negative relationship between the weather variable and the principal component.