Regional traffic-related air quality indicator – a work in progress

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Outline

- Purpose of indicator
- Monitoring design
- First year results
- Traffic data gaps
- Future enhancements
Purpose of indicator

Outcome:
Reduced harmful emissions from transport

Measure:
Concentrations of harmful transport generated pollutants
One station not representative

Nitrogen dioxide
Carbon monoxide
Black carbon
PM10
PM2.5
Ozone (new)

Wellington CBD site
Network design: indicator?

Reference station (normalised)
## Network design: sites

<table>
<thead>
<tr>
<th>Site classification</th>
<th>Number of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban background</td>
<td>7</td>
</tr>
<tr>
<td>Roadside</td>
<td>11</td>
</tr>
<tr>
<td>Peak</td>
<td>11</td>
</tr>
<tr>
<td>Special character</td>
<td>3</td>
</tr>
</tbody>
</table>

32 sites (GWRC 20 + NZTA 12)

Wellington city
Wellington (outer)
Lower Hutt
Upper Hutt
Porirua
Kapiti/Otaki
Masterton

Tube micro-sites
Some results

Wellington city
Some results: relative concentrations

- Urban background: 2 x
- Roadside: 3 x
- Peak: 3 x
Trends – Upper Hutt (urban background)
Trends – Basin Reserve (peak)
Traffic data gap (attribution)

- “Data discovery phase”
- Regional data (emissions based on activity data) using NZTA model
- Finely-grained site-specific traffic data
  - RAMM data
  - SCATS (intersection)
  - Google Maps API (speed)
  - TomTom (speed)
Sensor colocation

Aeroqual
NO2
PM10
PM2.5
O3I

NEC
PM10
PM2.5
PM1
NO$_2$ colocation Aeroqual

1-hour aggregated diurnal profile

1-hour NO$_2$, $R^2 = 0.74$
Future enhancements?

Stage 1

Reference monitoring site:
NO₂ (incl. passive), BC, traffic data

Micro monitoring sites:
Passive NO₂ at mix of roadside, peak and urban background locations (~30 sites)

Stage 2

Co-located traffic data at key micro monitoring sites & finer resolution CO/NOx ‘low-cost’ sensors

Stage 3

Portable BC at key micro sites – (waiting on technology and $)
Acknowledgements

Darren Li – inventor of the tube changing stick