Ozone Issues

Current scientific knowledge and understanding about past and predicted future ozone trends

Joint EMEP SB & WGE, Geneva Sept 13-16th 2016
Ozone Trends

- Main features
  - Decrease in peaks
  - Stagnation in background
  - Exposure metrics lie in the middle

TFMM Trend Report, 2016
MDA8: daily max of 8hr running means

Simpson et al, 2014, avg change in percentile
Complexity of ozone trends: range of metrics & interannual variability

- More decreases in the 2000’s compared to 1990’s
- Different trends for metrics
- Still a lot of non-signif. Trends
  - 10 yrs is a short period

Some substantial changes over 2002-2012:

<table>
<thead>
<tr>
<th>Metric</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOMO35</td>
<td>-30%</td>
</tr>
<tr>
<td>AOT40</td>
<td>-37%</td>
</tr>
<tr>
<td># days &gt;50ppb</td>
<td>-47%</td>
</tr>
<tr>
<td># days &gt; 60ppb</td>
<td>-61%</td>
</tr>
<tr>
<td>4th highest MDA8</td>
<td>-10%</td>
</tr>
</tbody>
</table>
Future Evolution: Impact of Climate alone

- Climate Penalty
  - Confirmed through meta-analysis accounting for multi-model uncertainties
  - A few ppb for JJA
  - Uncertainties remain for exposure metrics

Future Evolution: non-climate factors

- Future SOMO35 in Europe
  - Emissions based on Global Energy Assessment
  - The ozone climate penalty can be compensated by other LRT & Emissions

Colette et al, ACP 2013
Wrap-up

- **Observed past trends**
  - Main features
    - Decrease of peaks
    - Stagnation annual means
    - Still a majority of sites where trend is not significant
  - Open questions
    - Robustness of assessment over 10/20yrs
    - Decomposition of main driving factors (EuroDelta)
    - Trends in exposure proxies and impact studies

- **Future projections**
  - Main features
    - Well documented future projections for annual / summertime averages
  - Remaining knowledge gaps
    - Projection of exposure proxies
    - Consistency between global/regional models
    - Magnitude of driving factors emission/climate/hemispheric