Ozone Issues

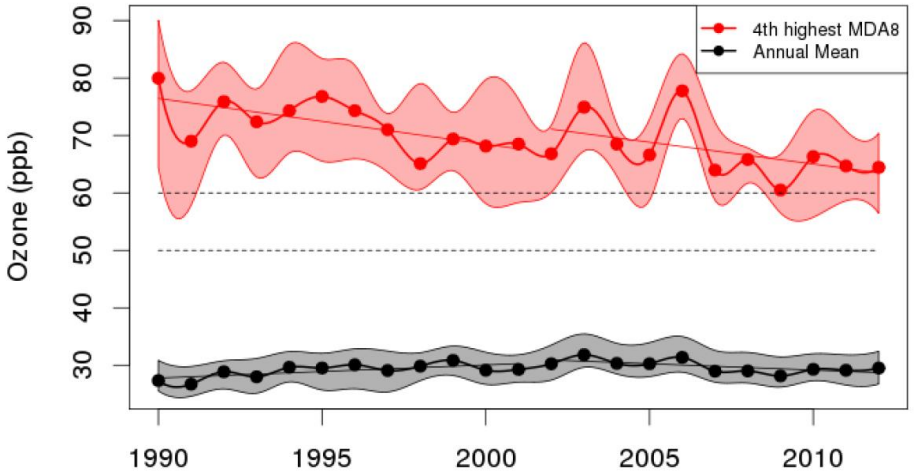
Current scientific knowledge and understanding about past and predicted future ozone trends

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

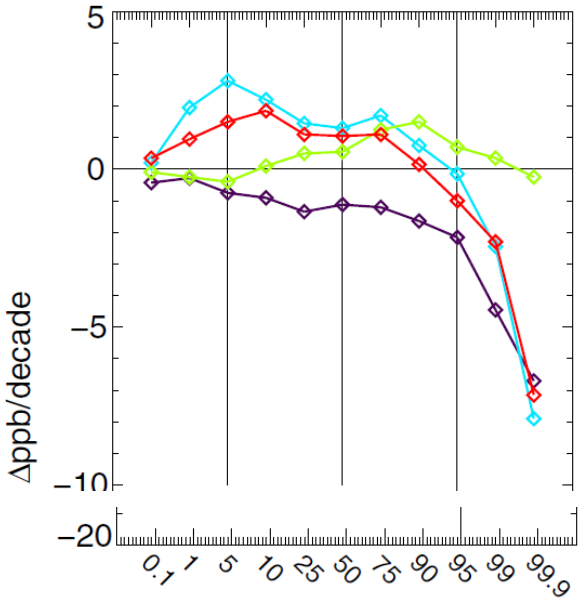
Convention on Long-range Transboundary Air Pollution
emep
Co - operative programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe
LRTAP
Long-range Transboundary Air Pollution

Ozone Trends

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

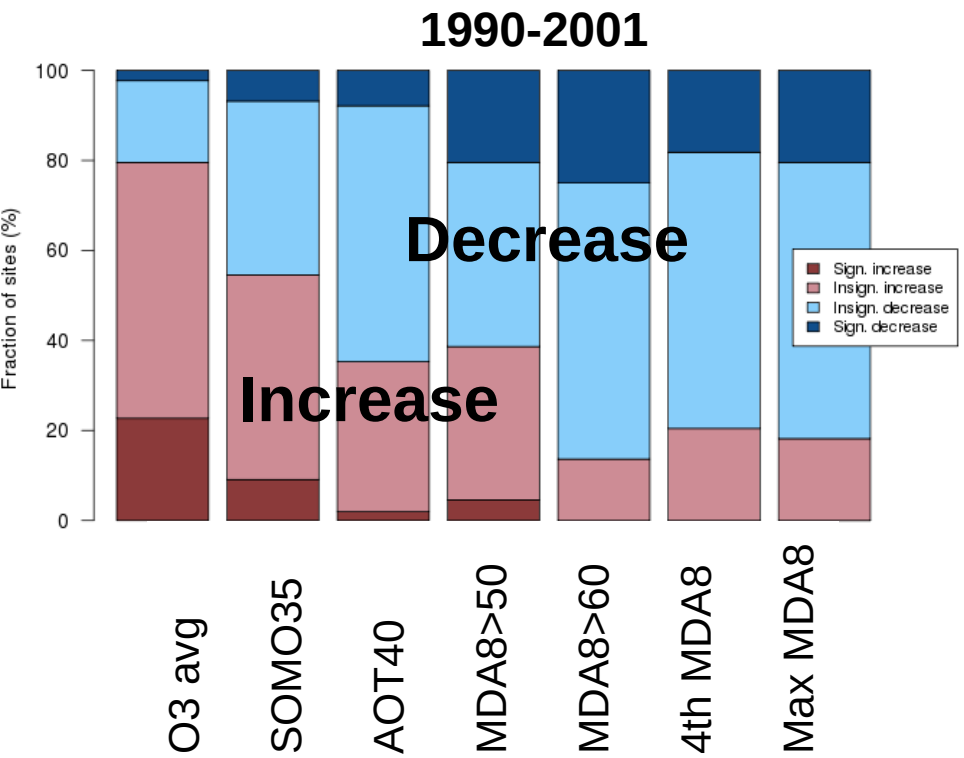


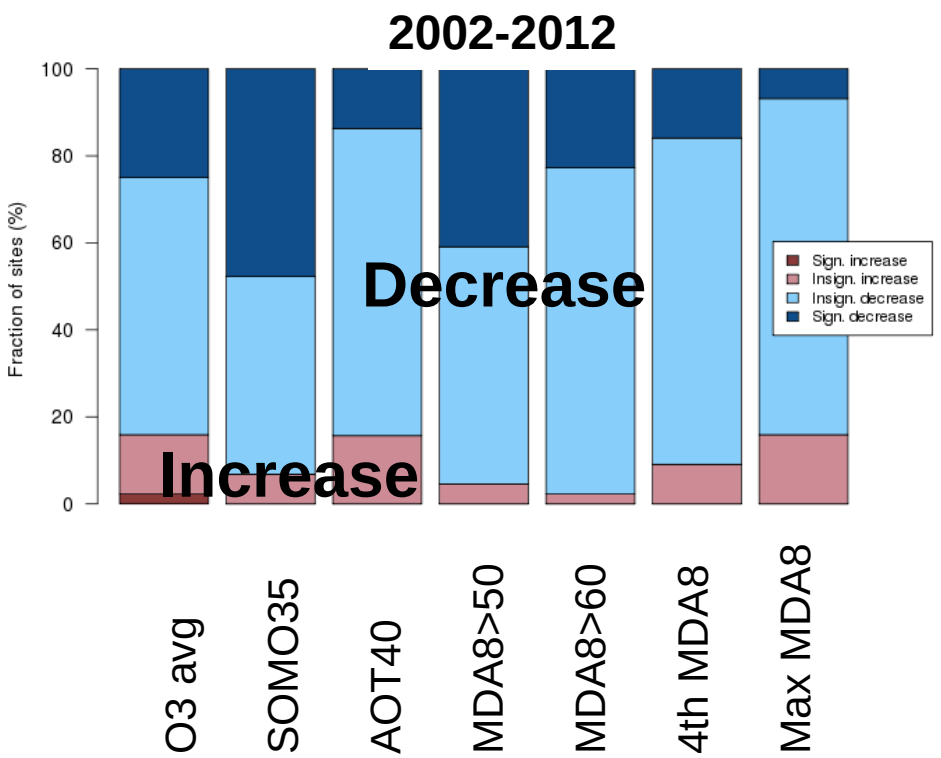
TFMM Trend Report, 2016
MDA8: daily max of 8hr running means



Simpson et al, 2014,
avg change in percentile
2000-2009 versus 1990-1999

Complexity of ozone trends: range of metrics & interannual variability





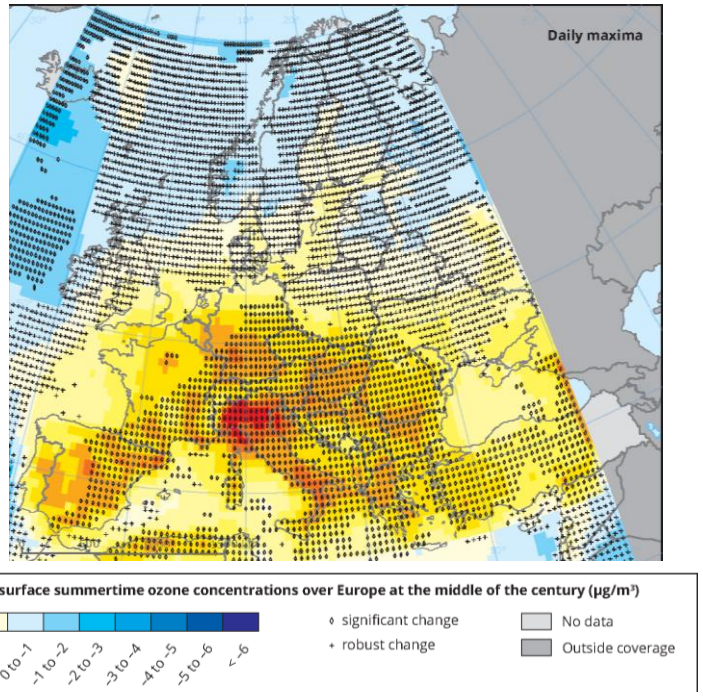
- More decreases in the 2000's compared to 1990's
- Different trends for metrics
- Still a lot of non-signif. Trends
  - 10 yrs is a short period

- Some substantial changes over 2002-2012:

SOMO35	-30%
AOT40	-37%
# days >50ppb	-47%
# days > 60ppb	-61%
4th highest MDA8	-10%

Future Evolution: Impact of Climate alone

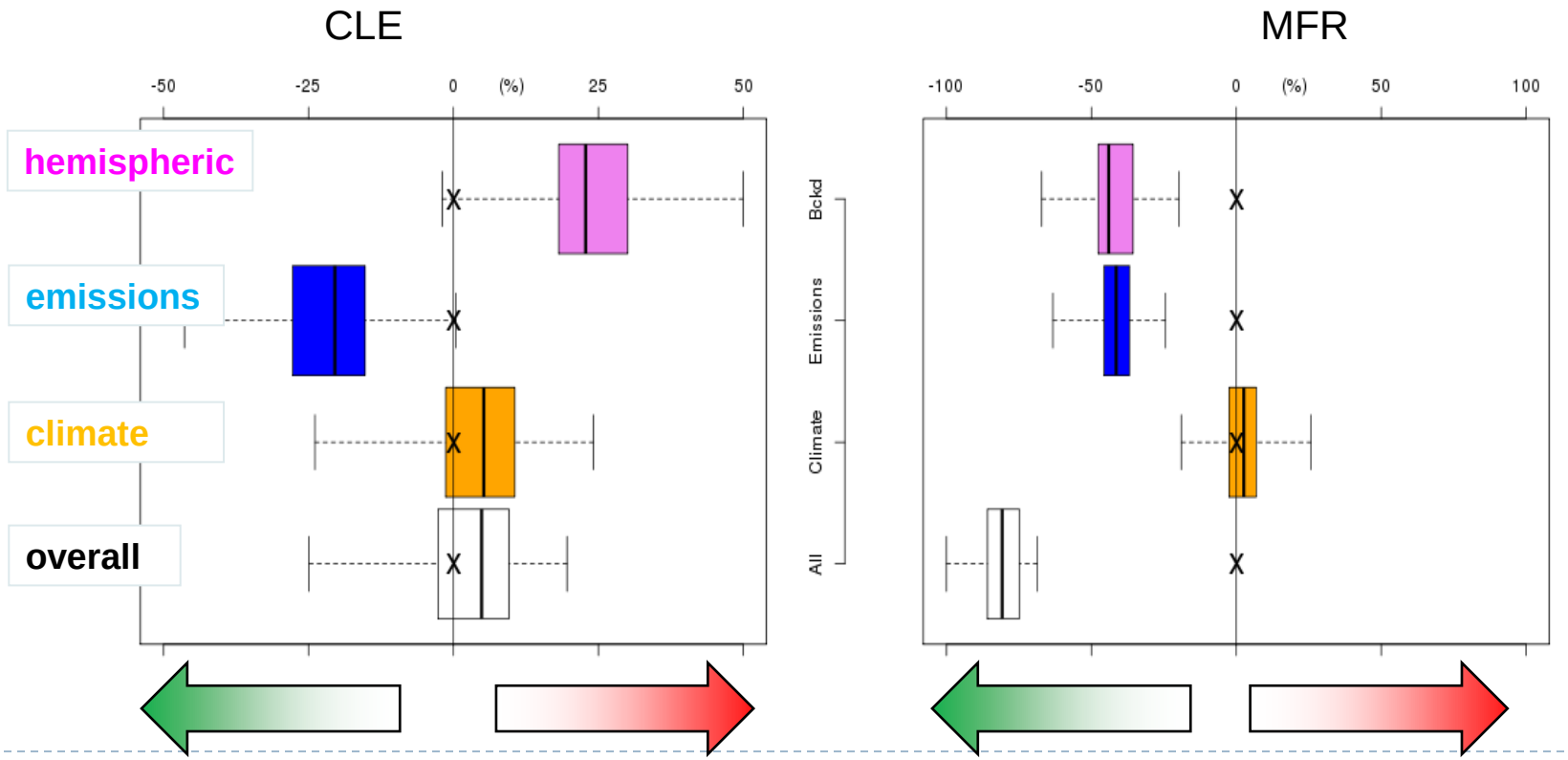
- Climate Penalty
  - Confirmed through meta-analysis accounting for multi-model uncertainties
  - A few ppb for JJA
  - Uncertainties remain for exposure metrics



http://www.eea.europa.eu/data-and-maps/indicators/air-pollution-by-ozone-2/assessment

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