TRENDS OF OZONE IN EUROPE

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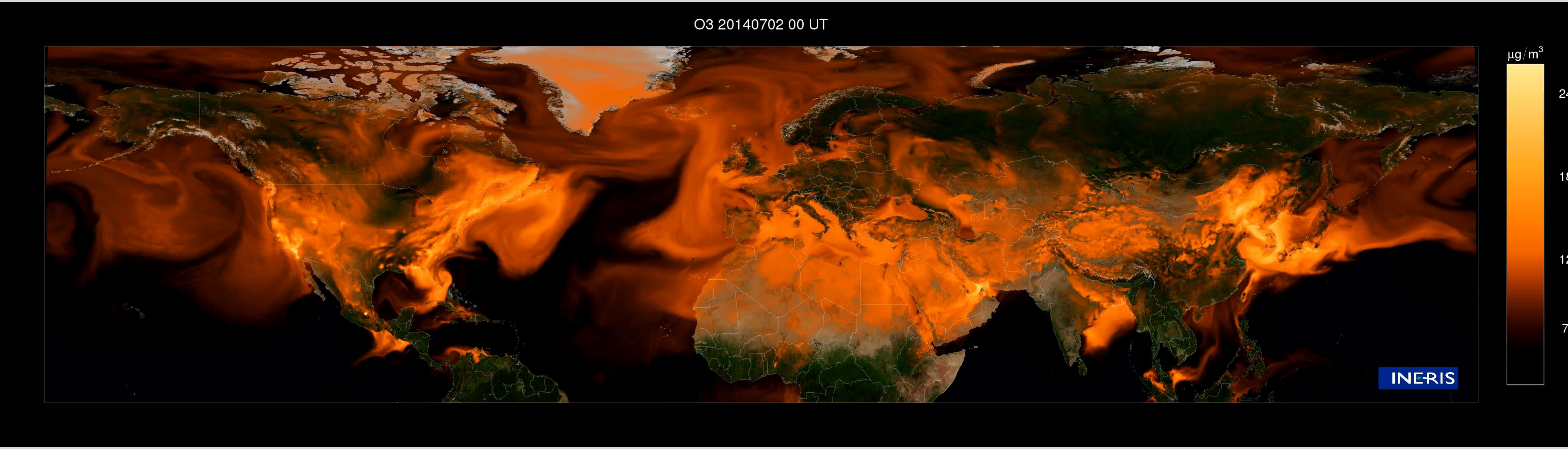
Joint EMEP SB & WGE, remote, Sept 14-17, 2020

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

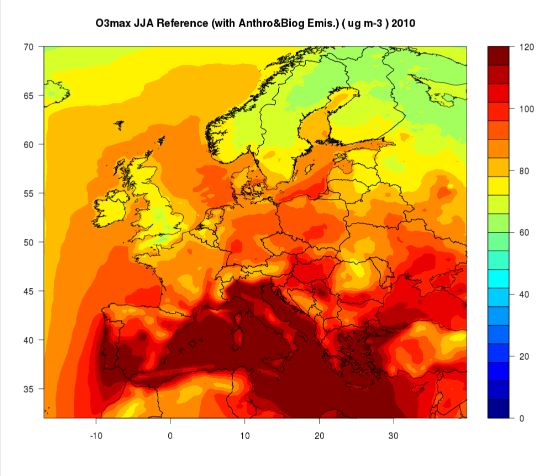
HEMISAIR?

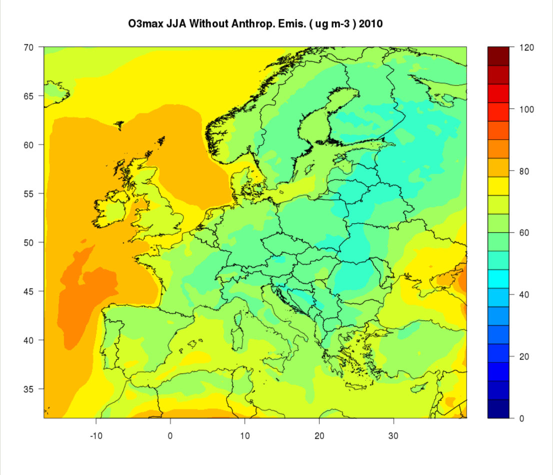


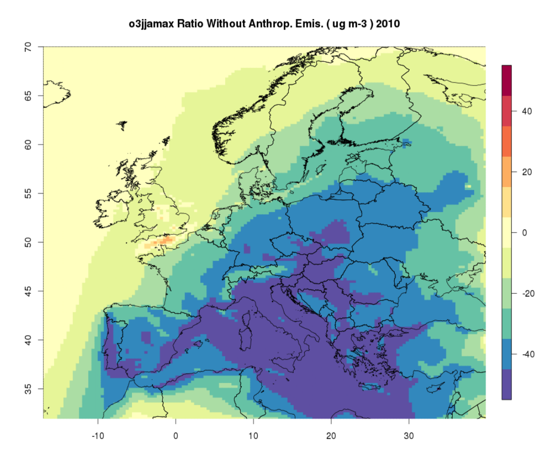
OZONE IN A « PRISTINE » ATMOSPHERE

Reference | No europ. anthrop emis. | Relative difference (%)

Average of summertime peaks

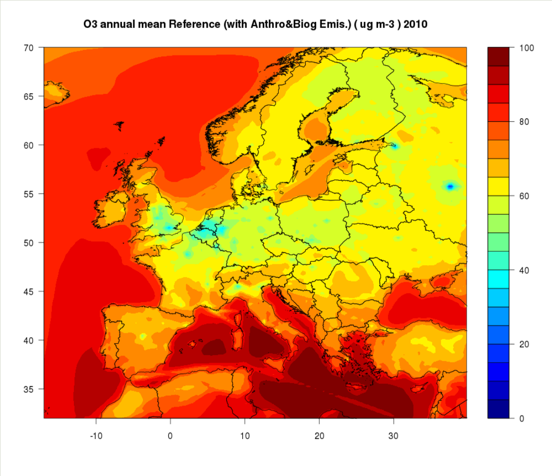


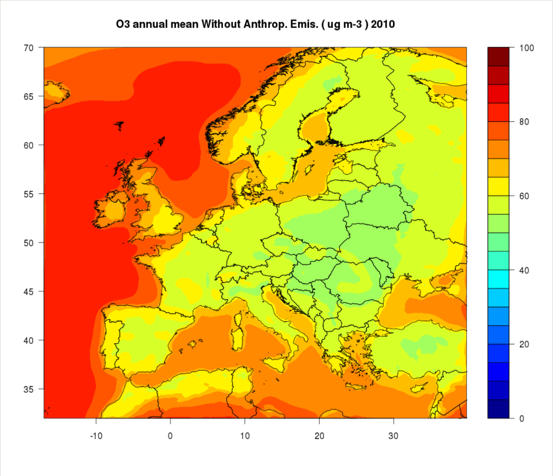


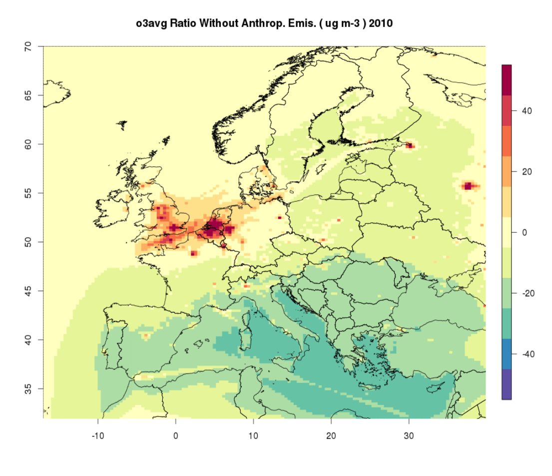


Widespread decrease, modulated by intercontinental transport

Annual Average





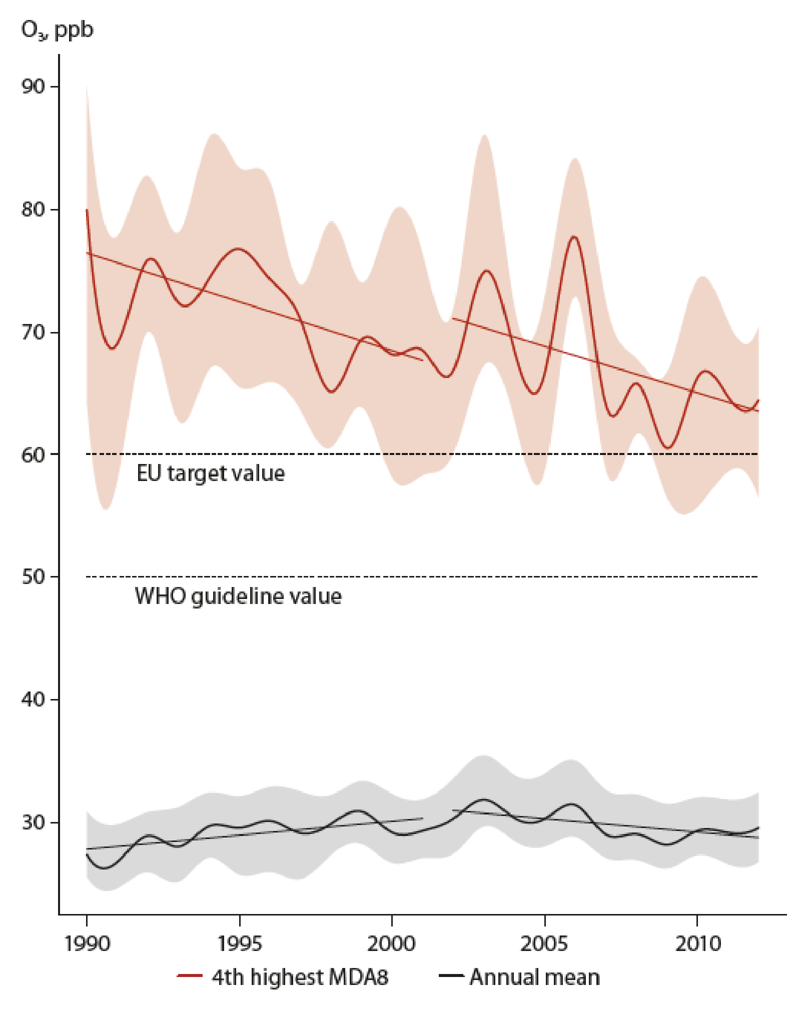


NOx titration impact

ETC/ACM Tech Report 2018/15

OZONE TRENDS

- CLRTAP 2016 Assessment Report
  - Trend between 1990 & 2012
  - Based on ~50 EMEP (background) sites
- Results
  - Ozone peaks : 10% decrease
  - Annual mean: Increase in the 1990s, no trend since then
- Confirmed in recent update (EEA/ETC)
  - 2000-2018 period, 800 sites (urban, suburban, rural)
  - rural sites: -10% ozone peaks, -3% Annual mean
  - Emission trends: NMVOC and NO_x : -47% and -54%

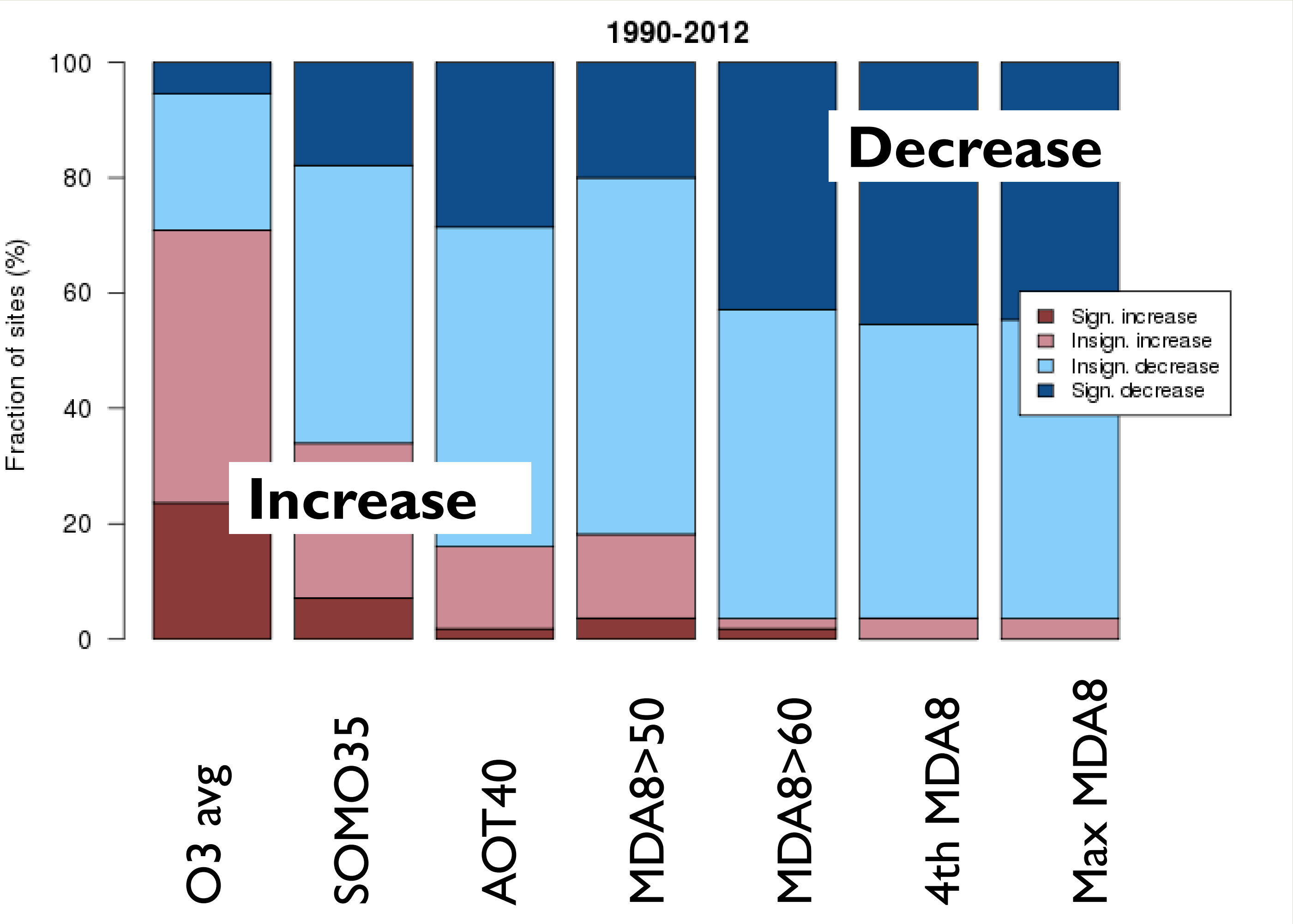


OZONE METRICS

Larger decrease for metrics accounting for high ozone levels

- The trends are statistically not significant at a large fraction of sites
  - Not large enough to exceed natural variability over such a relatively short period

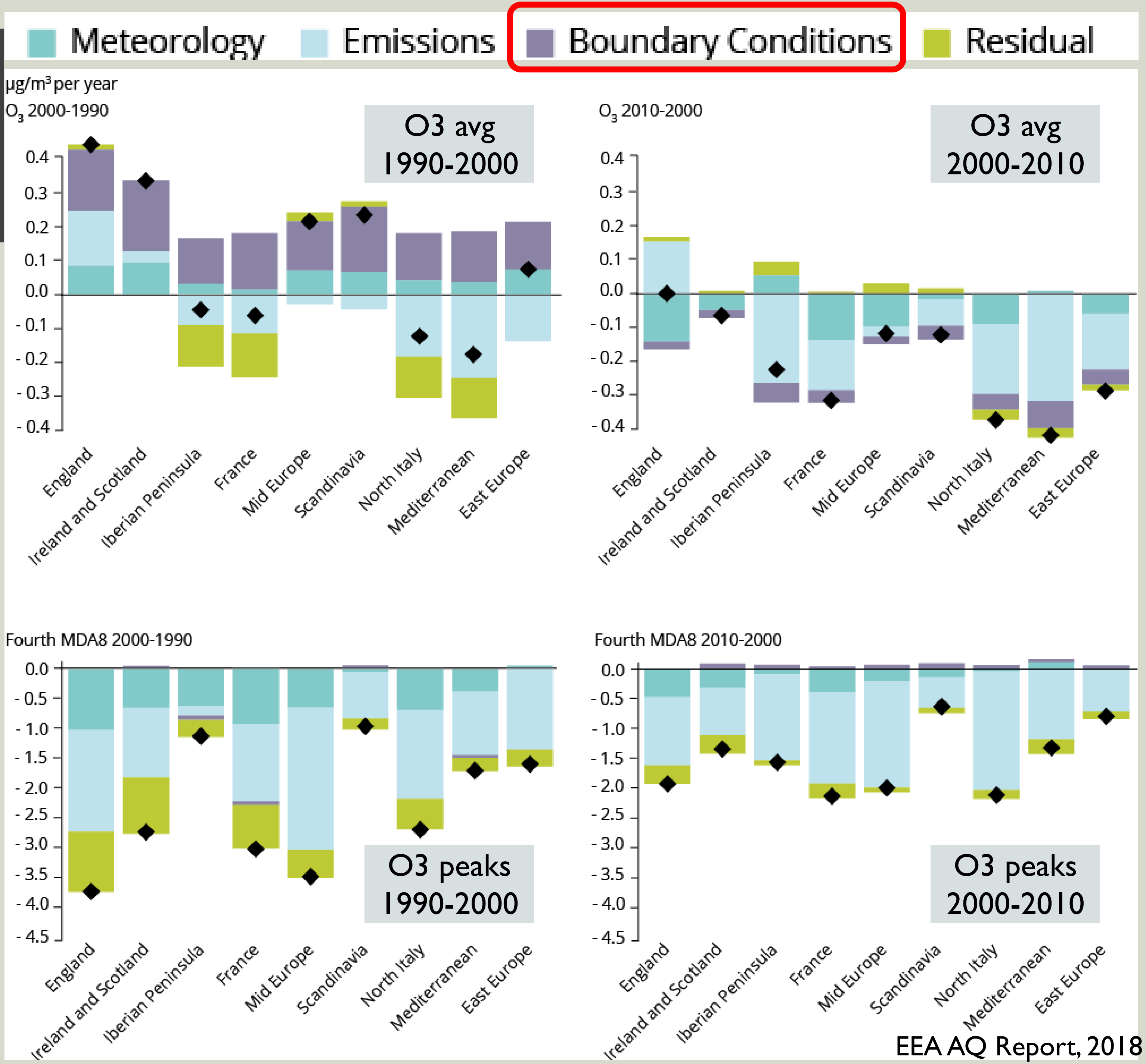
- Metrics sensitivity: important for vegetation/health exposure
  - PODY -15% / AOT40 -45% (1990/2010)
  - SOMO35: -7%, SOMO10: +4% (2000/2018)



EMEP/TFMM trend report, 2016

HEMISPHERIC CONTRIBUTIONS

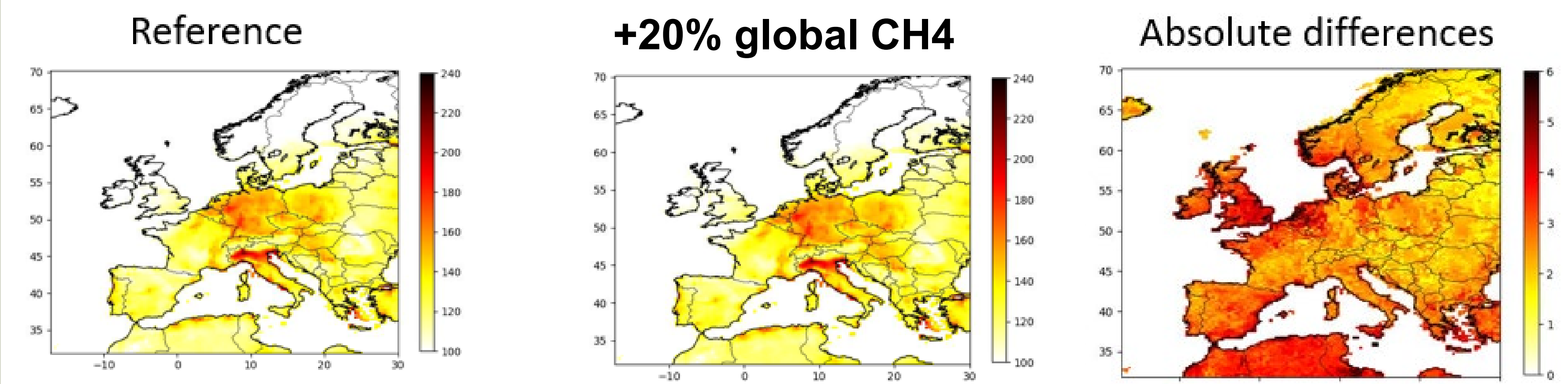
- Eurodelta-Trends
  - Decomposition of meteorology / emission / hemispheric
  - Hemispheric transport (purple) is important for ozone annual mean, especially in 1990s
  - But: CH4 was held fixed in these simulations



EEA AQ Report, 2018

METHANE & REGIONAL OZONE

- Methane has a strong impact on ozone peaks/hotspots, not only for tropospheric burden
- Illustration for 4DMA8:
  - Increase of 20% CH4 modelled at global scale C-IFS (CAMS)
  - Downscaled over Europe with CHIMERE (AQMEII setup)



KEY MESSAGES

- Assessing policy effectiveness for ozone requires careful consideration of metrics/scales
- The trends are limited considering the large reductions in precursors

  - Combination of
    - Non-linear chemistry (titration)
    - Meteorological variability (significance of trends)
    - Emission of short (NOx, VOC) and long (CH4) lived precursors

  => Global/regional/local scales