

# Where are we with tropospheric ozone?

## Observations

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## Observations = measurements

- **why do we want to measure ozone?**
- **where .....**
- **how.....?**
- **how fast .....**
- **what can we do already?**

## Why?

- **understanding atmospheric chemical processes – laboratory, field**
- need for high precision, high time resolution, transportability
- simultaneous measurements of other (reacting) species

## Why?

- **understanding atmospheric chemical patterns – field**
- vertical and horizontal structure, time evolution
- short- to long-time averaging (hourly to seasonal)
- relevance to impacts (vegetation, human health)

## Why?

- **Comparison with model outputs**
- vertical and horizontal structure, time evolution
- short- to long-time averaging (hourly to seasonal)
- local to global scale – impact on climate forcing

## How?

- Real-time – spectroscopy, chemical, solid-state
- Integrating – active, passive sampling
- Receptor orientated (biomonitoring)

## Where?

Need for information on vertical structure

- Urban areas (high spatial heterogeneity)
- Sub-urban areas (ozone formation, human and plant exposure)

Need for information at receptor height

- Agriculture (estimating crop loss)
- Remote areas (risk to natural ecosystems)

## How fast?

- flux measurements -10Hz
- comparison with model outputs – hourly
- effects on vegetation – hourly to seasonal
- effects on human health – hourly to seasonal
- long-term trends and climate – annual to decadal



## What can we do already?

- flux measurements -10Hz; possible but high-input in post-processing
- high precision; UV absorption, range of precision and cost
- transportability; at expense of time resolution and precision
- low-cost for multiple deployment; range of options from UV to passive chemical monitoring

## What would we like?

- Referenced low-cost, low-power instrumentation for multiple deployment (hourly)
- High time resolution for aircraft and fluxes
- Small size for balloon/drone/personal use
- Ultra-cheap integrating methods, with capacity to record 'events'
- Ability to investigate regions where ozone changes rapidly (in space and time)
- .....