Karlsruhe Institute of Technology

Institute for Meteorology and Climate Research – Atmospheric Trace Gases and Remote Sensing

# Drift-corrected Trends and Periodic Variations in MIPAS IMK/IAA Ozone Measurements

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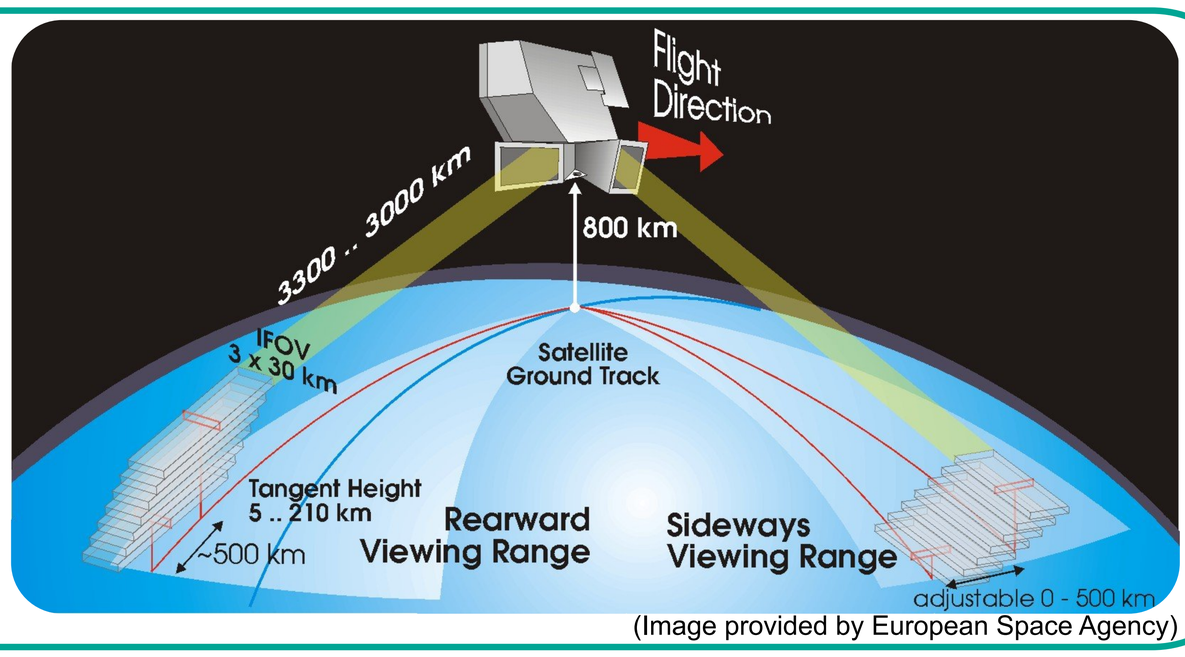
## Is the ozone layer recovering?

### MIPAS Envisat

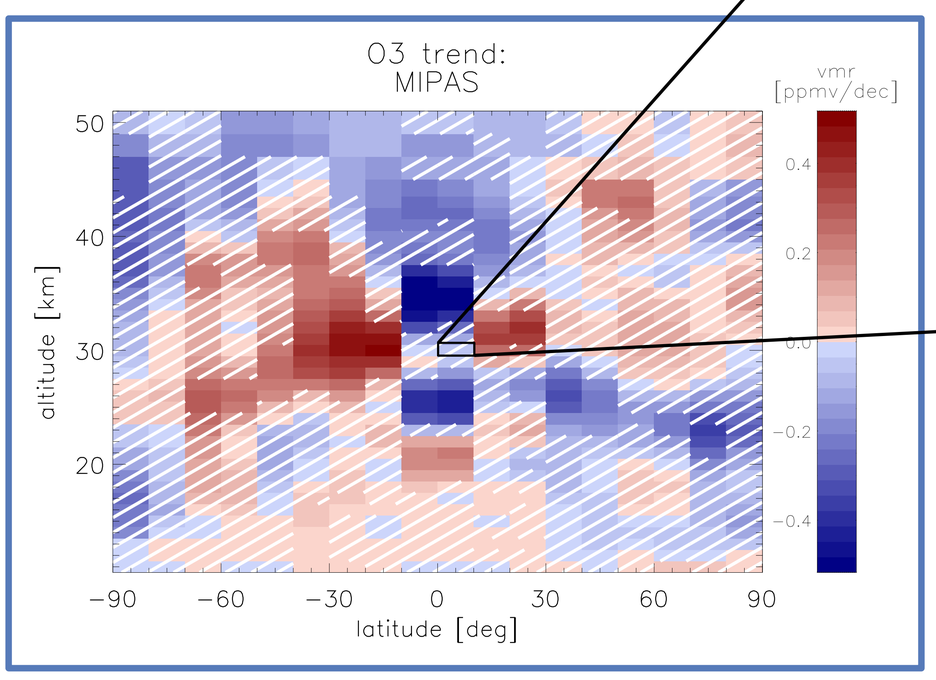
- Measurements from 2002 to 2012
- Data retrieved at KIT-IMK-ASF
- Limb view
  - Good altitude resolution
- Measured infrared emissions
  - Can measure day and night (e.g. in polar night)
  - Can‘t see through clouds

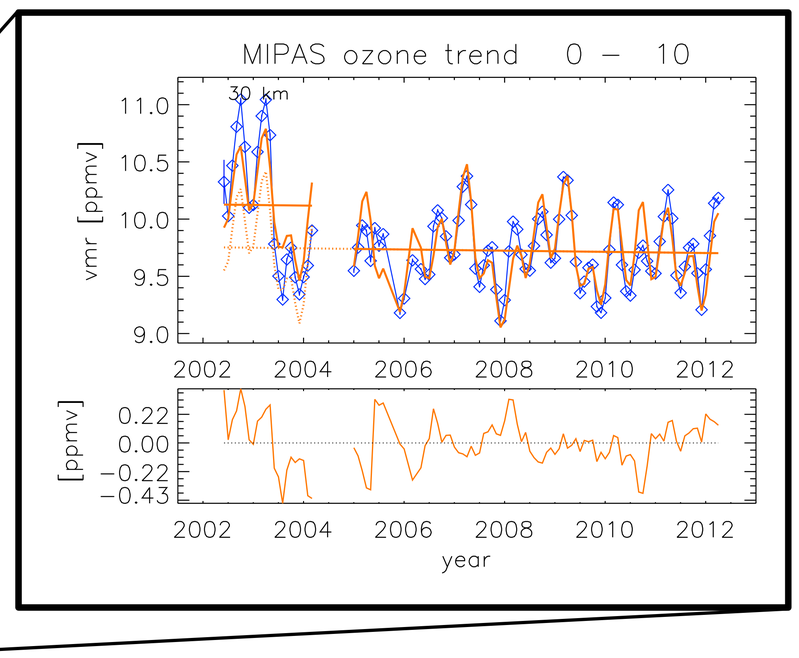



(Image provided by European Space Agency)

### Ozone trends

- Red: positive (up to +0.5ppmv/decade)
- Blue: negative (down to -0.5ppmv/decade)
- Hatched: insignificant trends



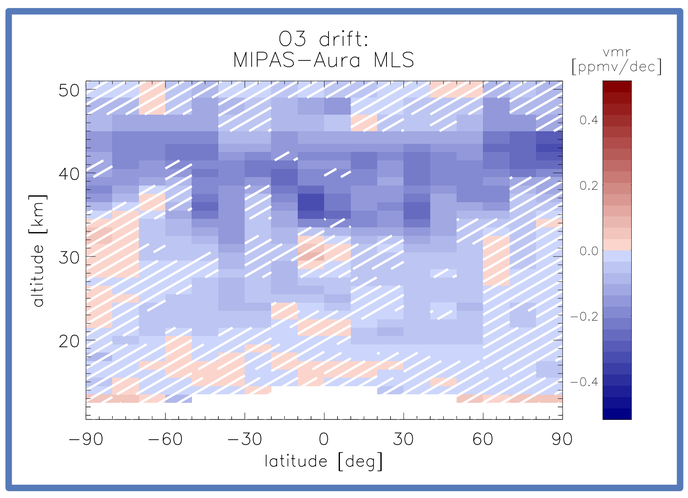

### Trends at 30km & 0°-10°N

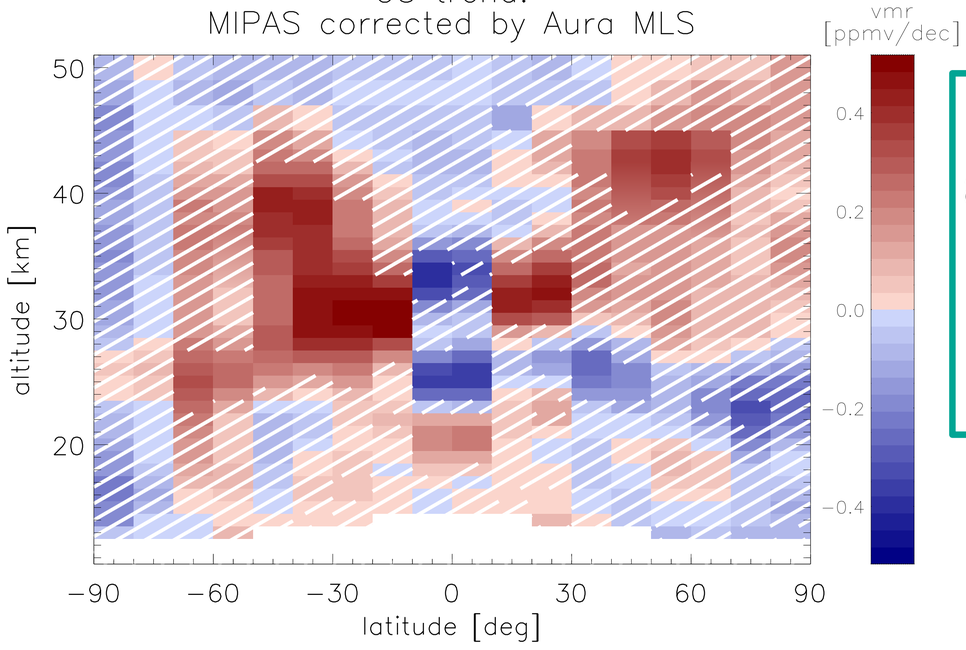
- Blue: Monthly mean data
- Orange: Trendfit
- Data gap & bias
- Quasi-biennial oscillation
- Semiannual oscillation

### Drift-corrected trends

- Red: positive (up to +0.55ppmv/decade)
- Blue: negative (down to -0.4ppmv/decade)
- Larger positive areas (significant)

### Uncertainty: Instrument drifts




**Good agreement with recent literature!**

(1) Eckert, E., von Clarmann, T., Kiefer, M., Stiller, G. P., Lossow, S., Glatthor, N., Degenstein, D. A., Froidevaux, L., Godin-Beekmann, S., Leblanc, T., McDermid, S., Pastel, M., Steinbrecht, W., Swart, D. P. J., Walker, K. A., and Bernath, P. F.: Drift-corrected trends and periodic variations in MIPAS IMK/IAA ozone measurements, Atmos. Chem. Phys. Discuss., 13, 17849-17900, doi:10.5194/acpd-13-17849-2013, 2013.