# Satellite-based products and tools to support quantification and attribution of background ozone

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In Collaboration with the South Coast Air Quality Management District
and California Air Resources Board

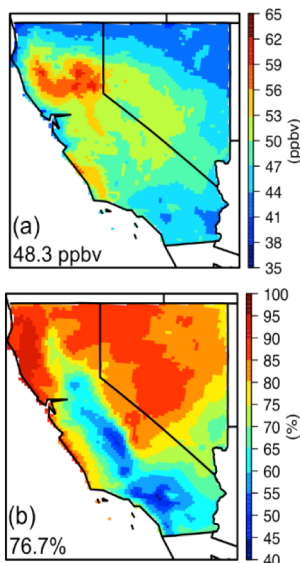**Background Ozone Limits the Achievable Health Benefits of Emissions Reductions.**
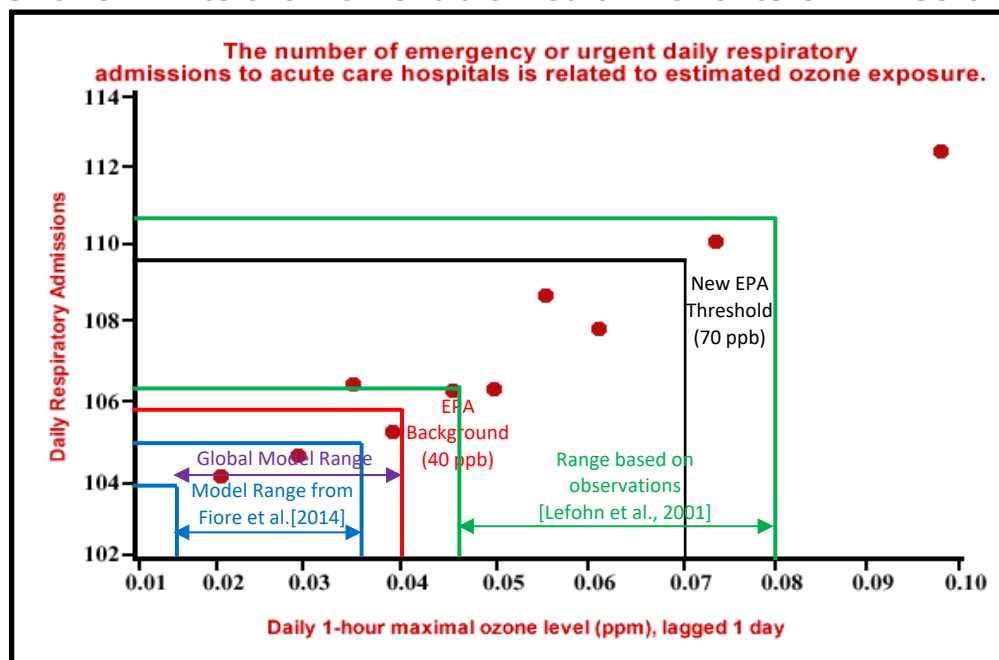

Adapted from
Burnett et al., 1994

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OMI+TES: Background Ozone was as high as 65 ppb during intense wildfires in 2006

Satellite Measurements of ozone and NO_2 have been successfully used with global and regional models to assess the processes that control background ozone
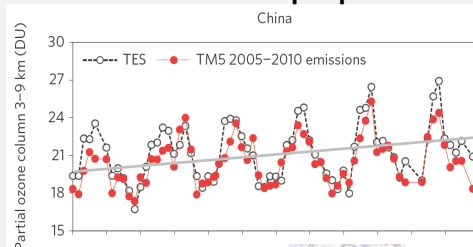
Wildfires: Regional Model with Emissions Inversion and Assimilated Boundary Conditions
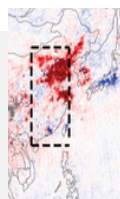

Huang et al., *JGR,* 2015
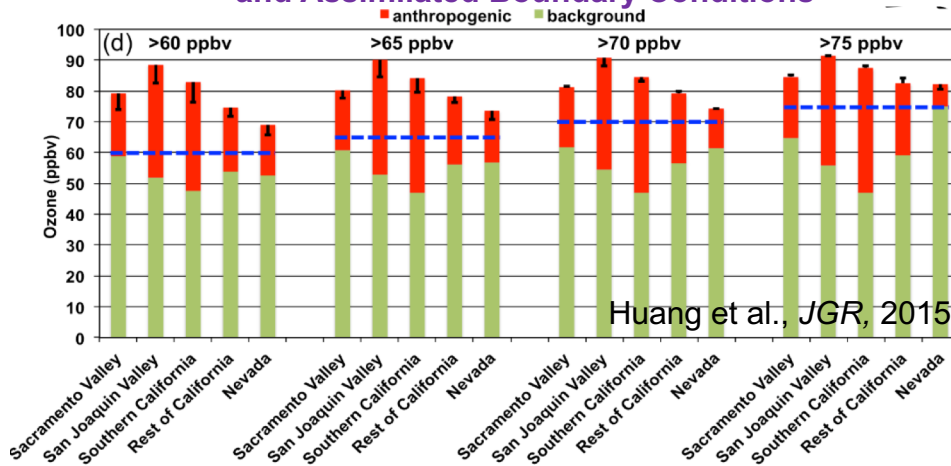
Long-Range Transport and Stratosphere-Troposphere Exchange: Global Model with Emissions Inversion and Stratospheric Correction

MLS: Temporary increase in downward transport from the stratosphere partly due to 2009-2010 El Nino.

Explains 50% of the ozone increase

Offset 57% of expected ozone decrease

TES: 7% Increase in mid-tropospheric ozone

TES: No change in mid-tropospheric ozone

Transport from China offset 43% of expected decrease

OMI: 21% increase in NO_x emissions. Explains 50% of the ozone increase.
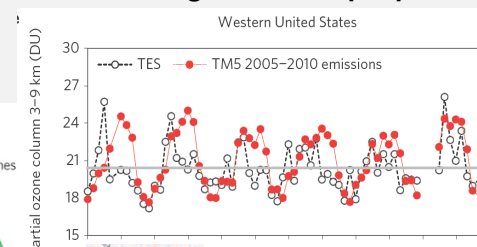
OMI: 21% decrease in NO_x emissions. Should have given a 2% decrease in ozone

Verstraeten et al., *Nature Geoscience,* 2015
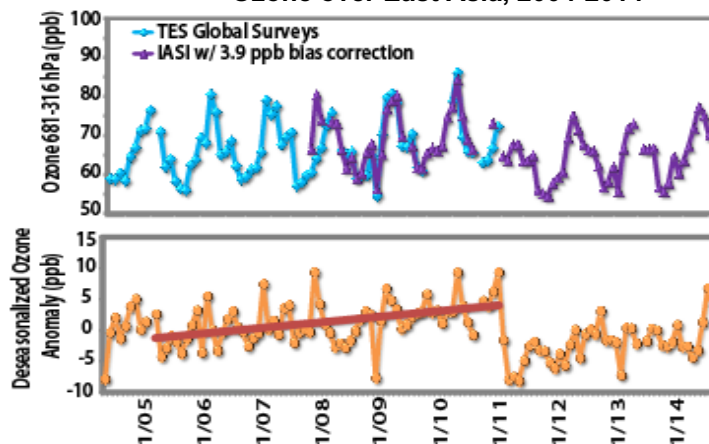
Analyze how background ozone has responded to changes in international emissions (particularly those from East Asia) as well as to natural variability in long-range transport and stratosphere-troposphere exchange over the past ~10 years.

Use assimilated satellite measurements to generate ozone lateral and upper boundary conditions for regional models.
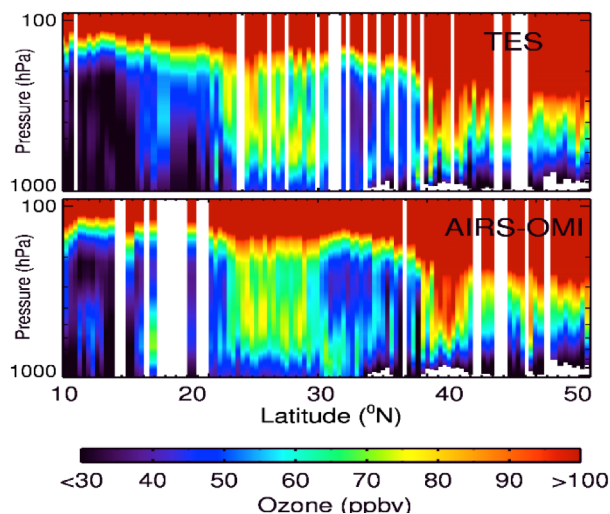
Generate regional maps of tropospheric ozone profiles to aid in exceptional event analysis.

Ozone over East Asia, 2004-2014