

## Atmospheric emissions of carbon monoxide from wildfires in Northern Eurasia and their impact on regional air composition in remote Central Siberia

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### Basic results

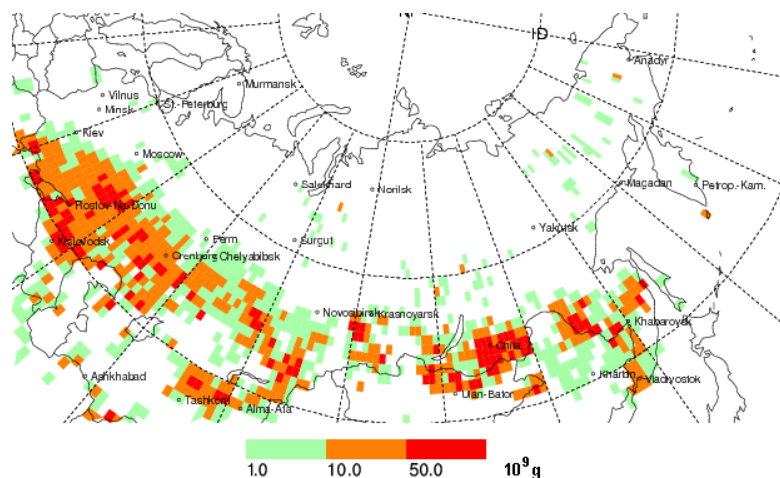
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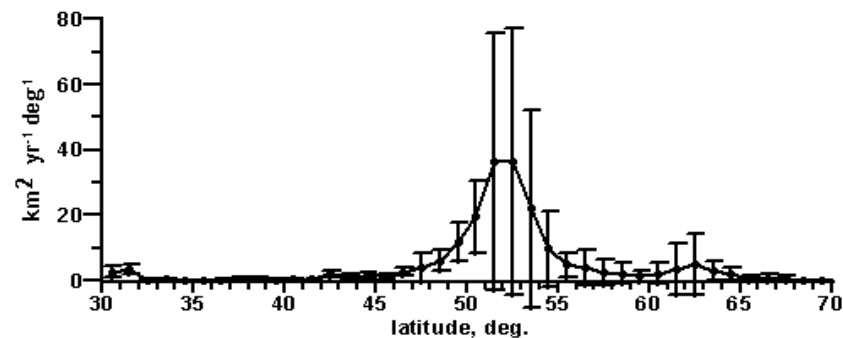
- The developed software allows calculating atmospheric emissions of reactive species and greenhouse gases from wildfires in Northern Eurasia and assimilating the emissions in numerical models (RAMS-HYPACT/CMAQ) for atmospheric transport and chemical transformation.
- Daily wildfire emissions at regular  $0.5^\circ$  grids were calculated for 2000–2008 fire seasons.
- First RAMS-HYPACT model simulations demonstrated regional effects of wildfires in 2007 fire season on air composition over Northern Eurasia.
- Regional effects of wildfire emissions in remote Central Siberia were estimated with the measurements of carbon monoxide (CO) concentrations at ZOTINO background station (Krasnoyarsk district) in 2007–2008.

## Distribution of burned areas and concomitant CO emissions

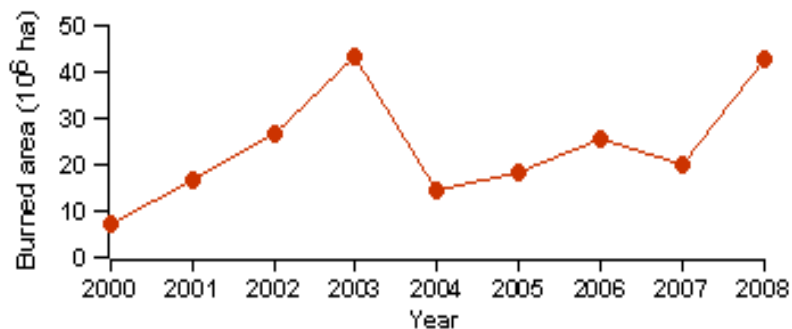
**Total burned areas for 2008**



**Mean ( $\pm \sigma$ ) forest burned areas in 1° latitude intervals for years 2000–2008**



**Total annual 2000–2008 CO emissions from Russian wildfires**

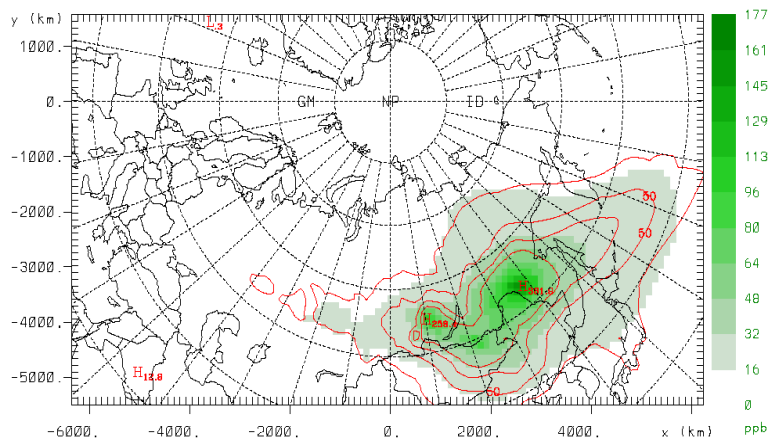


# Estimated effects of wildfire emissions on surface CO concentrations over Northern Eurasia:

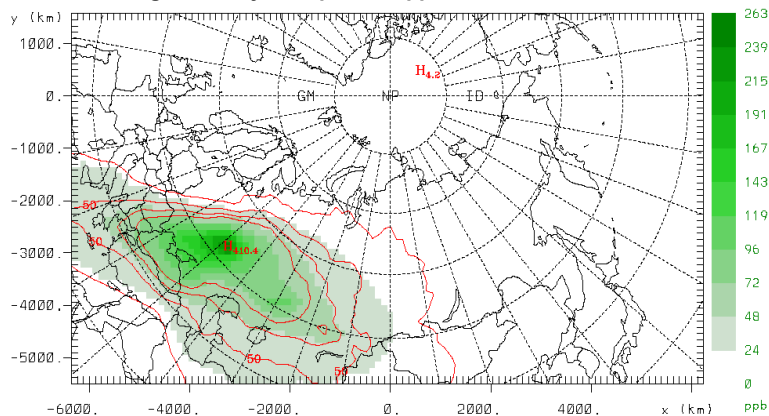
## Illustrative CO distributions from RAMS-HYPACT model

Monthly mean (green scale) and maximum 24h (red contours) surface concentrations

Fire source region: Far East  
 2008 April: daily CO up to 975 ppb

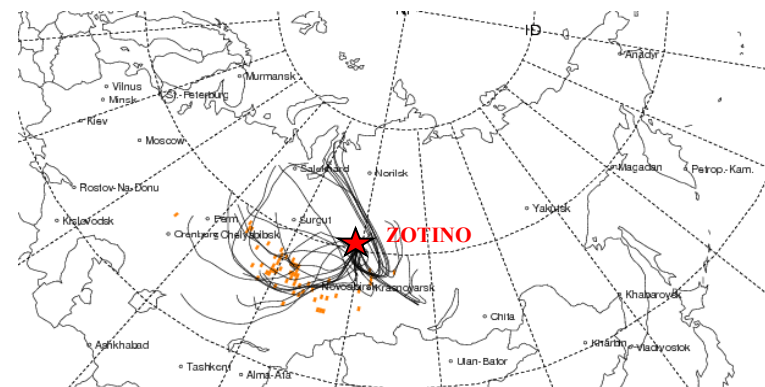


Fire source region: European Russia  
 2008 August: daily CO up to 410 ppb



## Trajectory-based contributions from wildfire and anthropogenic sources to CO concentrations at Zotino background observatory in central Siberia

Air transport trajectories (black lines) from wildfire sources (orange dots) towards Zotino observatory in 2008 fire season



Concentration enhancements of CO at Zotino station depending on duration of air transport from wildfire (left plot) and anthropogenic (right plot) sources

