Pinpointing Nitrogen Oxide Emissions from Space

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Abstract

Satellite observations of nitrogen dioxide (NO₂) have been shown to provide valuable information on the location and strength of NOx emissions, but spatial resolution is limited by horizontal transport and smearing of temporal averages due to changing wind fields. In this study, we map NOx emissions on high spatial resolution from TROPOMI observations of NO₂ combined with wind fields, based on the continuity equation. The divergence of horizontal fluxes proves to be highly sensitive for point sources like exhaust stacks. Thus NOx emissions from individual power plants can be clearly resolved and quantified even on top of considerably high urban pollution from the Saudi-Arabian capital city Riyadh. This allows us to catalog NOx emissions from power plants and other point sources globally.