



## **Rapid economic growth leads to boost in NO<sub>2</sub> pollution over India, as seen from space**

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Over the past decades, the Indian economy has been growing at an exceptional pace. This growth was induced and accompanied by a strong increase of the Indian population. Consequently, traffic, electricity consumption, and industrial production have soared over the past decades, leading to a strong increase in fuel consumption and thus pollutant emissions.

Nitrogen oxides (NO+NO<sub>2</sub>) are a major component of anthropogenic air pollution, playing key part in reaction cycles leading to the formation of tropospheric ozone. They are mainly emitted by the combustion of fossil fuels; other sources include production by lightning, biomass burning, and microbial activity in soils.

Since the mid-1990s, space-borne measurements of tropospheric nitrogen dioxide (NO<sub>2</sub>) have been conducted by the GOME, SCIAMACHY, GOME-2, and OMI instruments. These instruments perform hyperspectral measurements of scattered and reflected sunlight. Their measurements are then analyzed using differential optical absorption spectroscopy (DOAS) to yield vertically integrated columnar trace gas abundances.

Here, we will present the results of 20 years of NO<sub>2</sub> measurements over the Indian subcontinent. After showing the spatial distribution of NO<sub>2</sub> pollution over India, we will present time series for individual states and urban agglomerations. These time series will then be related to various indicators of economic development. Finally, we will highlight several instances where single industrial pollution sources and their development can clearly be identified from the NO<sub>2</sub> maps and estimate their NO<sub>2</sub> emissions.