

Air Quality Monitoring and Forecasting In China

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The AMFIC project monitors and forecast tropospheric pollutants over China.

Satellite data, in situ measurements and model results are used to generate consistent air quality information over China. Some satellite products are provided operationally on the web on a daily basis: NO₂, SO₂, clouds, total ozone, others are processed to provide a data record for several years: Aerosol (optical depth), CO, CH₄, and formaldehyde.

A forecast service is running since the summer of 2008 and publicly accessible via internet (www.amfic.eu). The forecast service is performed by the regional chemical transport model CHIMERE, showing a 2-day forecast of major air pollutants for the important urban areas. A regional model AURORA for the Shenyang area is nested in CHIMERE to calculate different vegetation and emission scenarios.

Recently, we developed a new technique to estimate NO_x emissions in China with satellite observations of tropospheric NO₂. Observations of tropospheric NO₂ by satellite instruments OMI and GOME-2 have almost daily global coverage. To relate these observations to NO_x emissions, we implemented the regional model CHIMERE for the Eastern Chinese domain at a 0.25 degree resolution. Differences between simulated and observed concentrations provide information on how to adjust the emission inventory. In our method we solve the spatial relationship between NO₂ concentrations and NO_x emissions using a simplified, two-dimensional transport scheme. The calculation is fast compared to other techniques, enabling daily emission estimates on a 20 km resolution from satellite observations. We will present some first results using OMI and GOME-2 observations over East-China. Future research will concentrate on updating the Chinese NO_x emissions operationally, which will improve air quality forecasts for China. It will also be used to construct a long time series, which will give insight in the evolution of air quality and the effectiveness of air quality measures.