



Monitoring the NO_x Emissions for the EC National Emissions Ceiling Directive using Satellite Remote Sensing

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The EC National Emissions Ceiling directive (NECD) requires all 27 member states of the European Union to report information annually concerning emissions and projections for four main air pollutants: sulphur dioxide (SO₂), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs) and ammonia (NH₃). These pollutants harm both human health and the environment by contributing to formation of ozone and particulate matter and by causing acidification and eutrophication. To help protect human health and the environment, the NECD sets pollutant-specific and legally binding emission ceilings for each of these pollutants and for each EU member state, which must be met by 2010 and thereafter. The member states report the total emissions for the four main air pollutants based on bottom-up inventories. The most recent NECD status report of 2009 shows that for the NO_x emissions 11 of the 27 member exceed the emission ceiling, while for the other three pollutants only a few exceedances are reported.

In addition to bottom-up inventories on which the NECD is based, the NO_x emissions can also be estimated from satellite observations. The use of satellite remote sensing has several advantages, including: A single instrument and retrieval method can be applied for all the regions, thus the results can be compared directly; Emissions based on satellite data are representative for the actual conditions, whereas inventories always lagging behind; High-quality satellite data is readily available and the effort for deriving the emissions is limited.

In this contribution we present estimates of the NO_x emissions for the EU member states for the period 2005 - 2010 based on observations of the Ozone Monitoring Instrument (OMI). The emissions are derived from the monthly mean NO₂ concentrations in combination with estimates of the NO₂ lifetime based on temperature information. First results indicate that the method is in good agreement with the bottom-up estimates for most EU member states. We will present the trend in the NO_x emissions for selected EU member states for the period 2005-2010 and compare them with the NECD reports and ceilings.