



Reductions in nitrogen oxides over Europe driven by environmental policy and economic recession

P. Castellanos (1) and K.F. Boersma (1,2)

(1) Netherlands (castellanos.patricia@gmail.com), (2) Eindhoven University of Technology, Fluid Dynamics Lab

We present a trend analysis of tropospheric NO_2 for the time period of 2004-2010 over Europe. Necessary for monitoring pollution abatement strategies, NO_2 trends analyses are often based on surface networks, which suffer from poorly quantified NO_2 biases and spatial representativity issues inherent to the standard monitoring method. Space based NO_2 trends are unbiased and self-consistent, but over Europe they have not been as obvious as those observed over North America and East Asia. In this work we exploit the daily NO_2 column observations from the Ozone Monitoring Instrument (OMI) in order to isolate long-term (timescales greater than one year) variability in NO_2 over Europe using a time-series separation technique. In general, we find between 2005 and 2008, 1-5% per year declines in NO_2 concentration in many polluted regions (e.g. Germany, Netherlands, Belgium, Italy, Spain). In 2009, NO_2 almost exclusively decreased over Europe at a rate of 5-10% per year, coinciding with the abrupt decrease in industrial production and construction prompted by the global economic crisis. Thus by the end of 2010, we find substantial reductions in NO_2 concentrations of at least 20% throughout Europe. These reductions are as much the result of temporary reductions prompted by the 2008-2009 global economic recession, as of European NO_x emission controls. Our results demonstrate that realistic concentration pathways of NO_2 do not follow simple linear trends, but reflect a compilation of environmental policy and economic activity.