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Industrial and agricultural ammonia point sources unveiled from space

Martin Van Damme (1), Lieven Clarisse (1), Whitburn Simon (1), Hurtmans Daniel (1), Clerbaux Cathy (1,2), and Coheur Pierre-François (1)

(1) Université libre de Bruxelles (ULB), Spectroscopie de l'Atmosphère, Service de Chimie Quantique et Photophysique, Brussels, Belgium, (2) LATMOS/IPSL, UPMC Univ. Paris 06 Sorbonne Universités, UVSQ, CNRS, Paris, France

Ammonia (NH3) is presently high on the political agendas, mainly because it severely deteriorates air quality through particulate matter formation, affecting human health and reducing life expectancy. In this work, we use IASI satellite retrieved NH3 measurement to identify, categorise and quantify world's NH3 emission hotspots. In particular, using a spatial oversampling technique, we present a nine-year average, enabling us to identify over 200 agricultural and industrial hotspots with associated point sources. More than half relate directly to fertilizer industry, but also other industrial sectors emerge as major emitters of NH3. While calculated satellite-based emissions over large source regions are generally in line with what is reported in bottom-up emission inventories, our results suggest a drastic underestimation of point sources, in particular of industrial and agricultural origin. Using IASI to track NH3 emission changes, temporal analysis revealed rapid shifts in anthropogenic activities, such as the opening or closure of industrial plants. These results demonstrate that using NH3 satellite data can be hugely beneficial for improving conventional bottom-up emission inventories.