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### A global high-resolution emission inventory for ammonia

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## Abstract

A global emissions inventory for ammonia ( $\text{NH}_3$ ) has been compiled for the main known sources on a  $1^\circ \times 1^\circ$  grid, suitable for input to global atmospheric models. The estimated global emission for 1990 is about  $54 \text{ Tg N yr}^{-1}$ . The major sources identified include excreta from domestic animals ( $21.6 \text{ Tg N yr}^{-1}$ ) and wild animals ( $0.1 \text{ Tg N yr}^{-1}$ ), use of synthetic N fertilizers ( $9.0 \text{ Tg N yr}^{-1}$ ), oceans ( $8.2 \text{ Tg N yr}^{-1}$ ), biomass burning ( $5.9 \text{ Tg N yr}^{-1}$ ), crops ( $3.6 \text{ Tg N yr}^{-1}$ ), human population and pets ( $2.6 \text{ Tg N yr}^{-1}$ ), soils under natural vegetation ( $2.4 \text{ Tg N yr}^{-1}$ ), industrial processes ( $0.2 \text{ Tg N yr}^{-1}$ ), and fossil fuels ( $0.1 \text{ Tg N yr}^{-1}$ ). About half of the global emission comes from Asia, and about 70% is related to food production. The regions with highest emission rates are located in Europe, the Indian subcontinent, and China, reflecting the patterns of animal densities and type and intensity of synthetic fertilizer use. The overall uncertainty in the global emission estimate is 25%, while the uncertainty in regional emissions is much greater. As the

global human population will show considerable growth in the coming decades, food production and associated NH<sub>3</sub> emissions are likely to increase as well.

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