Agricultural NH₃ emissions estimated with Earth observations & GEOS-Chem

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Satellite-derived ammonia emissions at fine scales (monthly, 10 km)

Top-down ammonia emissions derived with a mass-balance approach



Bottom-up emissions total **199 Gg** and so are 27-49% less than top-down values

Spatial distribution of top-down and bottom-up emissions

Comparison of emissions in spring (fertilizer use) and summer (large discrepancies)



Largest differences are in July over locations dominated by dairy cattle farming

Differences in seasonality of top-down and bottom-up emissions



Bottom-up emissions

to June [%] Change relative to June [%] N. Ireland N. England 28.9 Gg 60 28.4 Gg 60 19.3 Gg 64.0 Gg 30 30 Change relative -30 -30 36.4 Gg 45.3 Gg -60 -60 N. England Apr May Jun Jul Sep Aug Mar Sep Mar May Jun Jul Aug Apr Change relative to June [%] Change relative to June [%] SE UK SW UK 60 60 124 Gg 91.7 Gg 30F 30 131 Go 62.1 Gg -30 -30 - Top-down (IASI) 66.0 Gg Top-down (CrIS) 93.2 Gg -60 -60 Bottom-up Mar Apr May Jun Jul Aug Sep Jul Sep Mar Apr May Jun Aug

Month-to-month variability in NH₃ plotted relative to June

Summer July peak in the top-down emissions missing in the bottom-up emissions peak (Bias in the satellite data? Real and due to warm temperature or farming practices?)

Additional details and Acknowledgements

For more details: Visit Poster No. AMIGO-16A

See the recently accepted paper: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021JD035237

For data access:

Data are available for download from the UCL Data Repository:

https://doi.org/10.5522/04/14566635

Questions?

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