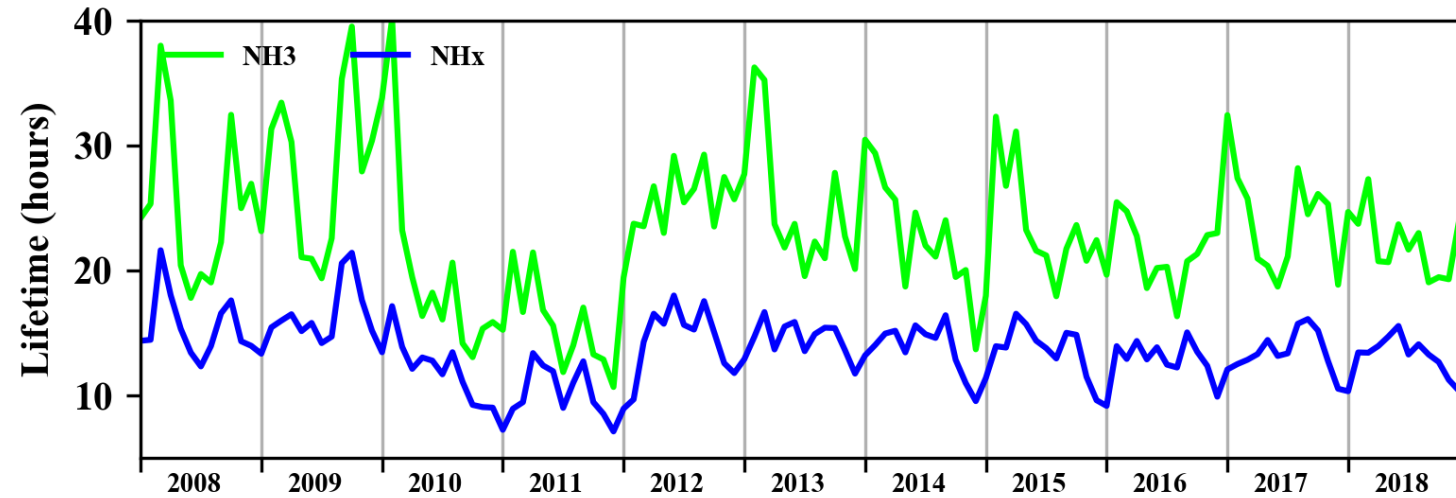


# Compare lifetime of $\text{NH}_3$ and $\text{NH}_x$

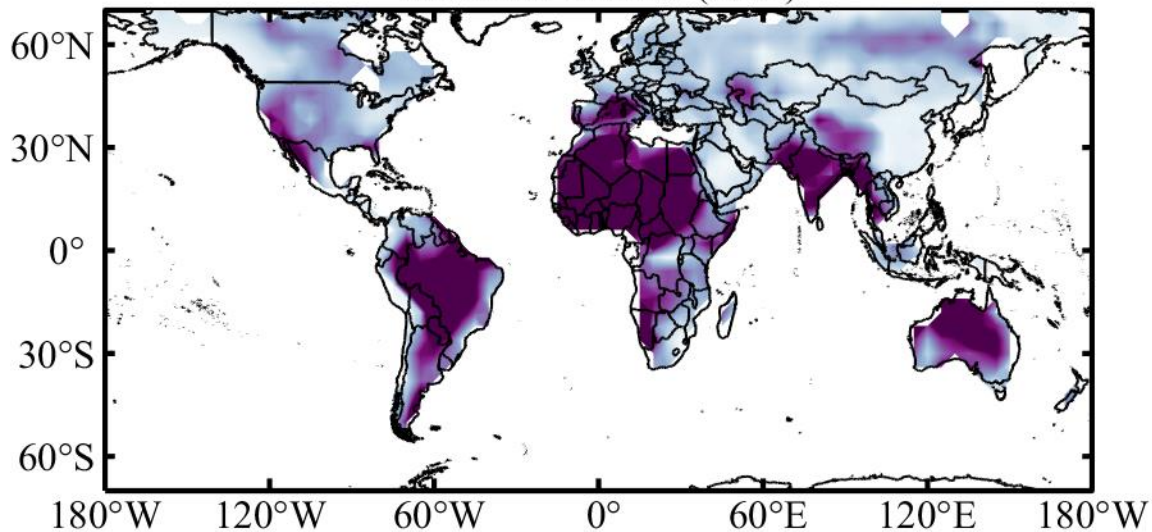
Zhenqi Luo 2021.11

# lifetime

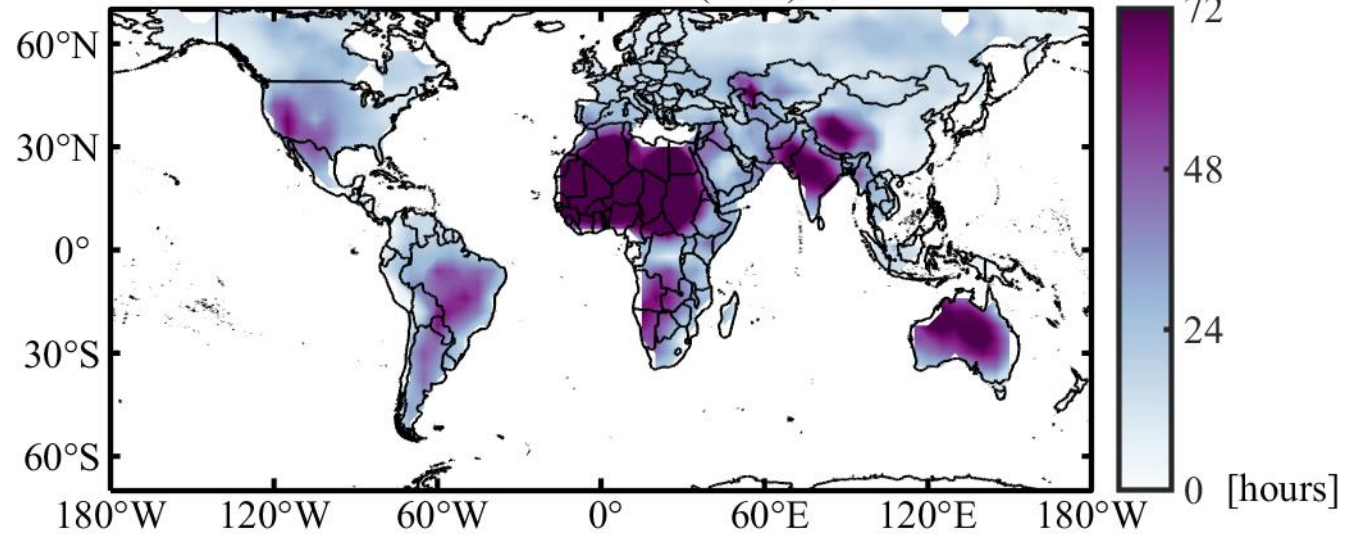
- $\tau_{NH_x} = \frac{C_{NH_3,mod}}{D_{NH_3,mod} + D_{NH_4^+}}$
- $\tau_{NH_3} = \frac{C_{NH_3,mod}}{D_{NH_3,mod} + L_{NH_3,mod}}$



Modelled lifetime ( $NH_3$ )



Modelled lifetime ( $NH_x$ )



# emission

- Emission with constant lifetime:

- $E = \frac{C_{NH_3,obs}}{12h}$

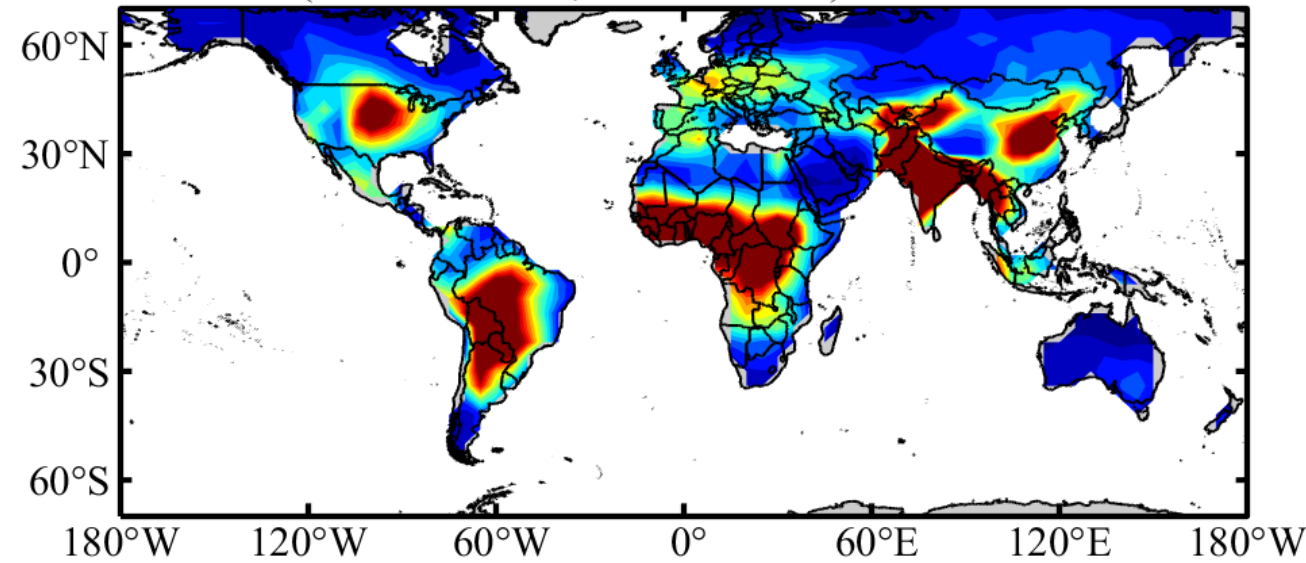
- Emission with NH3 lifetime:

- Without adjustment:  $E = \frac{C_{NH_3,obs}}{\tau_{NH_x}}$

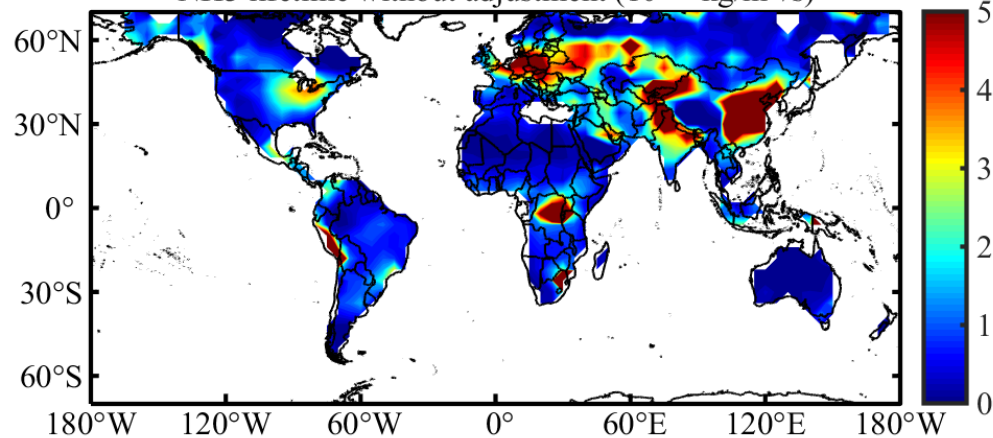
- With adjustment:  $E = E_{NH_3,obs} + \frac{C_{NH_3,obs} - C_{NH_3,mod}}{\tau_{NH_x}}$

Emission (IASI 0.01x0.01, lifetime = 12h)

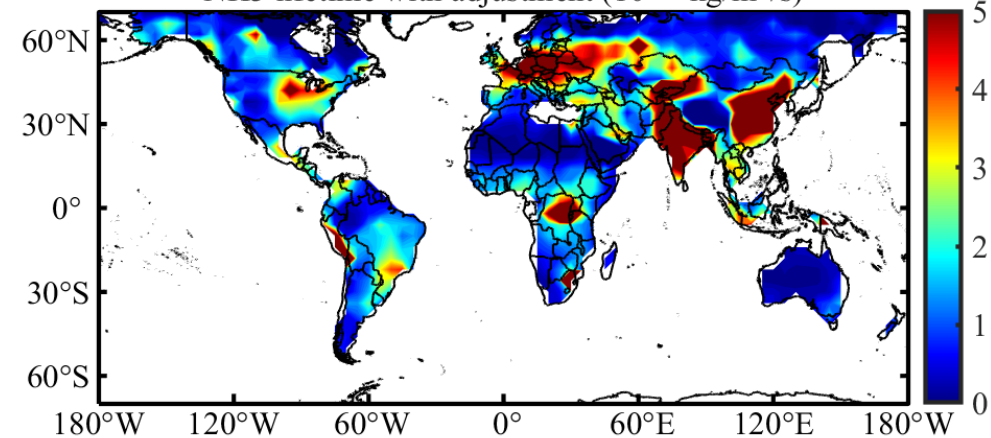
2008-2016



NH3 lifetime without adjustment ( $10^{-11}$  kg/m<sup>2</sup>/s)

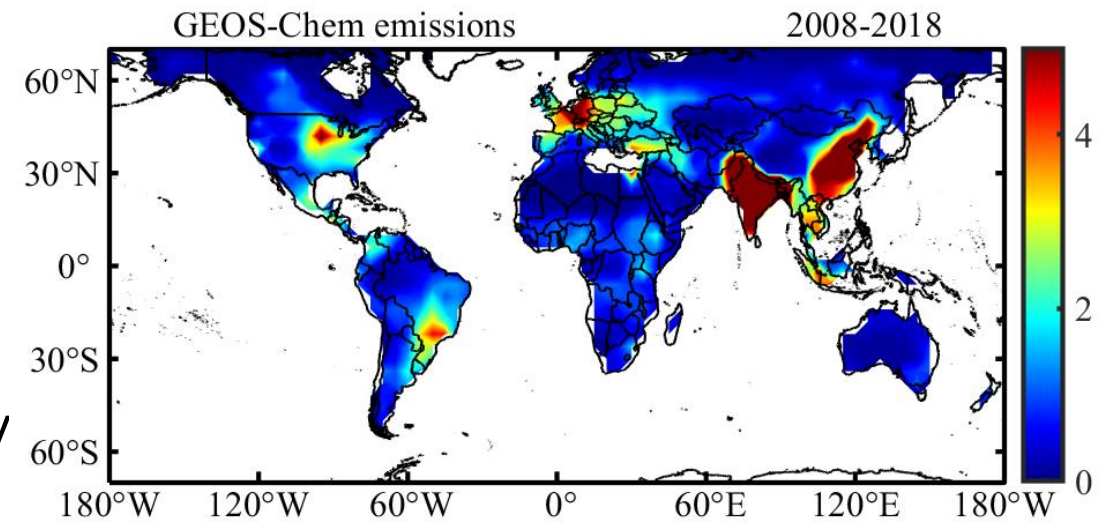


NH3 lifetime with adjustment ( $10^{-11}$  kg/m<sup>2</sup>/s)



# emission

- Emission from GEOS-Chem inventory



- Emission with NH3 lifetime:

- Without adjustment:  $E = \frac{C_{NH_3,obs}}{\tau_{NH_x}}$

- With adjustment:  $E = E_{NH_3,obs} + \frac{C_{NH_3,obs} - C_{NH_3,mod}}{\tau_{NH_x}}$

