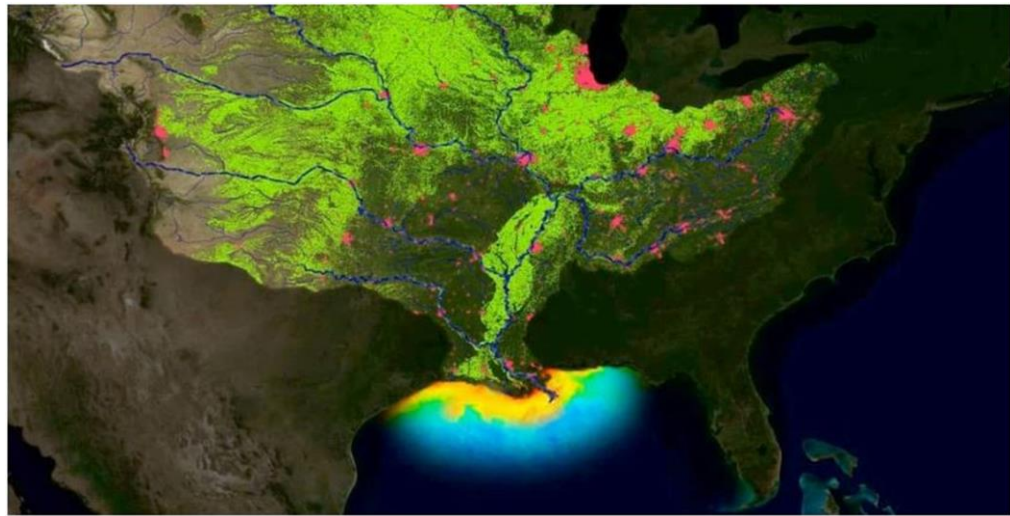


OBJECTIVE

To model and quantify spatially and temporally-resolved contributions to atmospheric nitrogen containing species deposition from major source sectors.



(Credit: NOAA.)
Largest Hypoxic or Dead zone in United States ^[1]



(Credit: Dr. Jennifer L. Graham, U.S.G.S.)
Fish death due to harmful algal blooms ^[2]

METHODOLOGY

Model: Comprehensive Air Quality Model with Extensions (CAMx) version 6.0

Resolution: 12km*12km horizontal grid

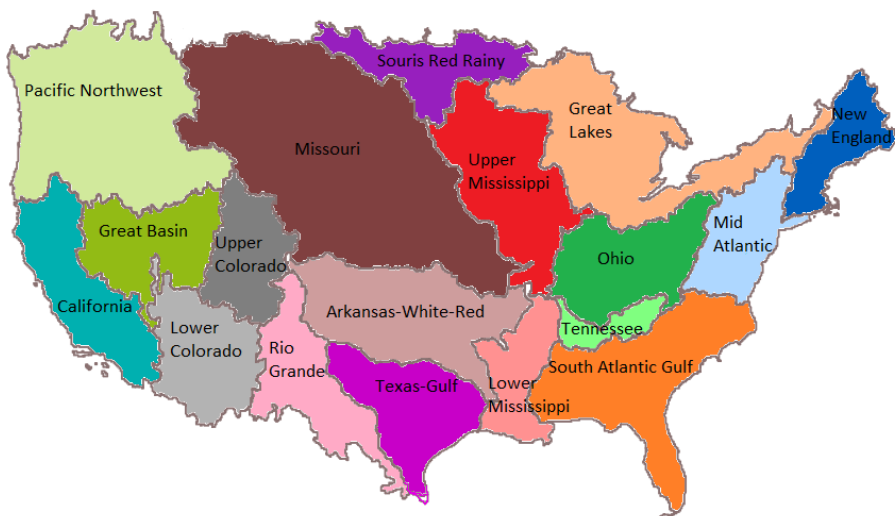
Inputs: United States Environmental Protection Agency's (USEPA) 2011 modeling platform

Time Period: 2011

Probing Tool: CAMx with PSAT (Particulate Source Apportionment Technology)

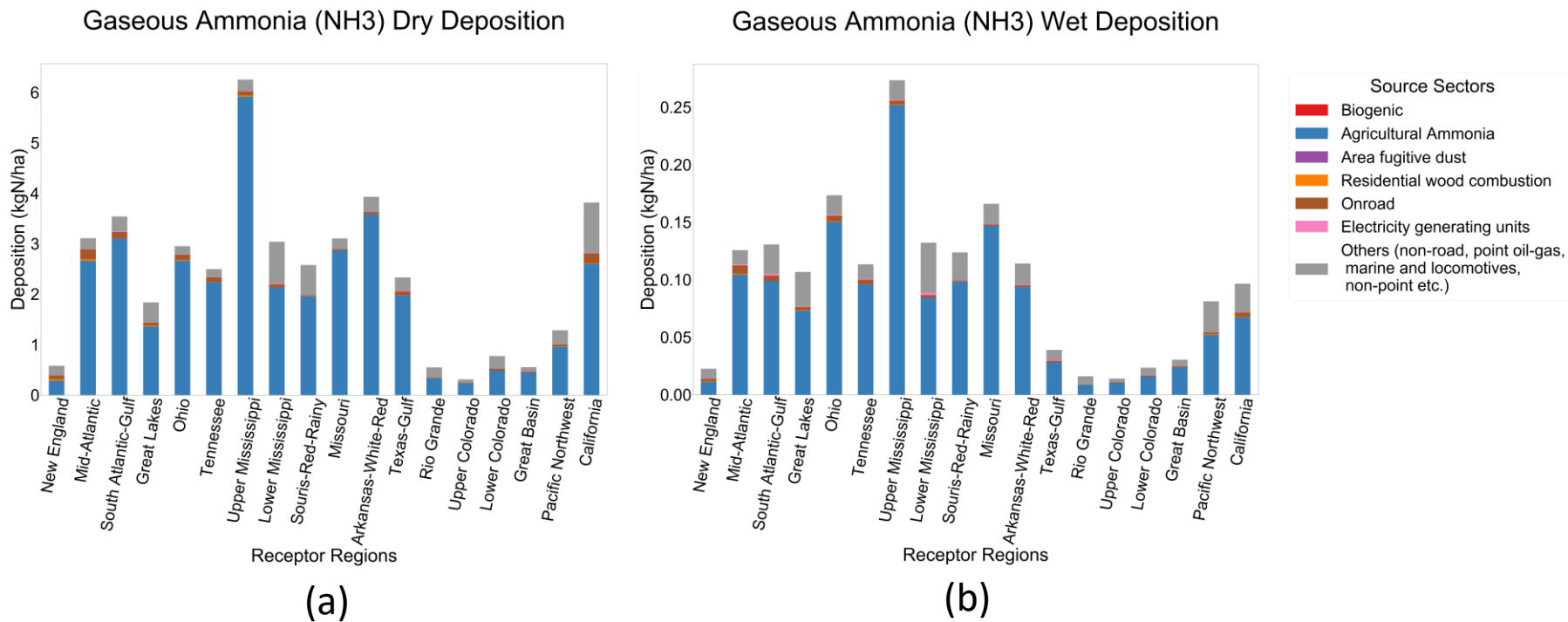
Mechanism: Carbon Bond 6 (CB6) with aerosol chemistry

Deposition Scheme: WESELY89 -- Wesely (1989) and Slinn and Slinn (1980)

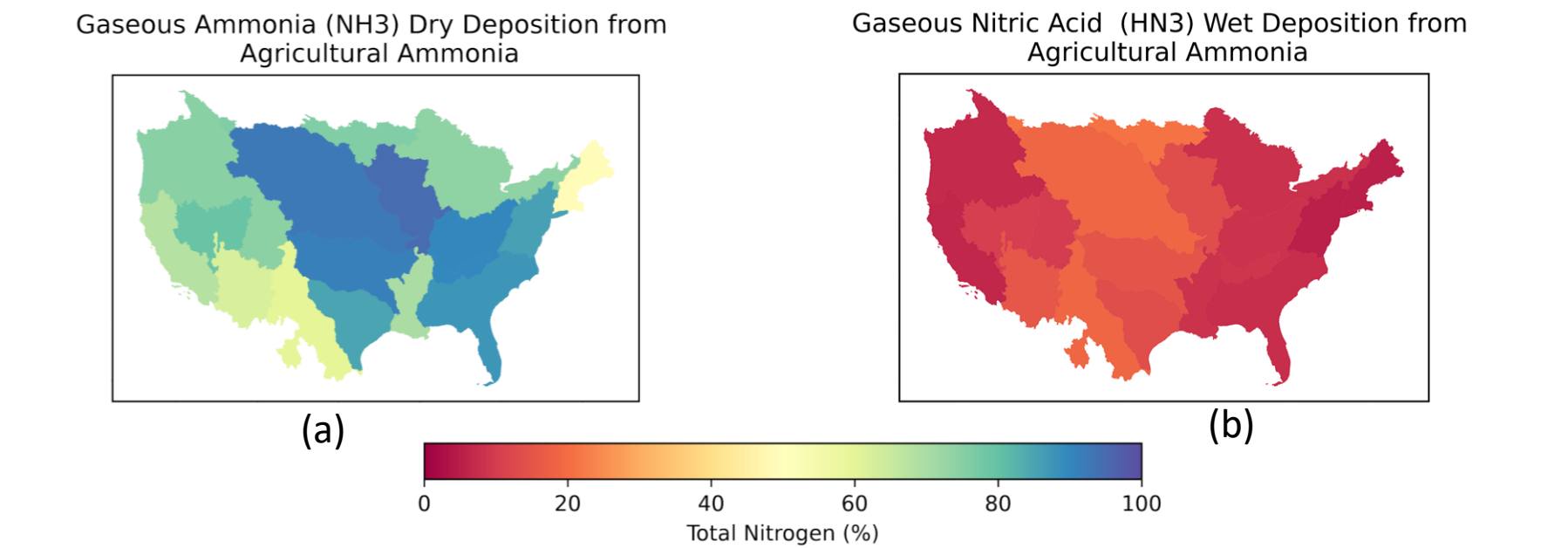


Water resource regions of the United States based on 2-digits hydrologic unit code (HUC 2)

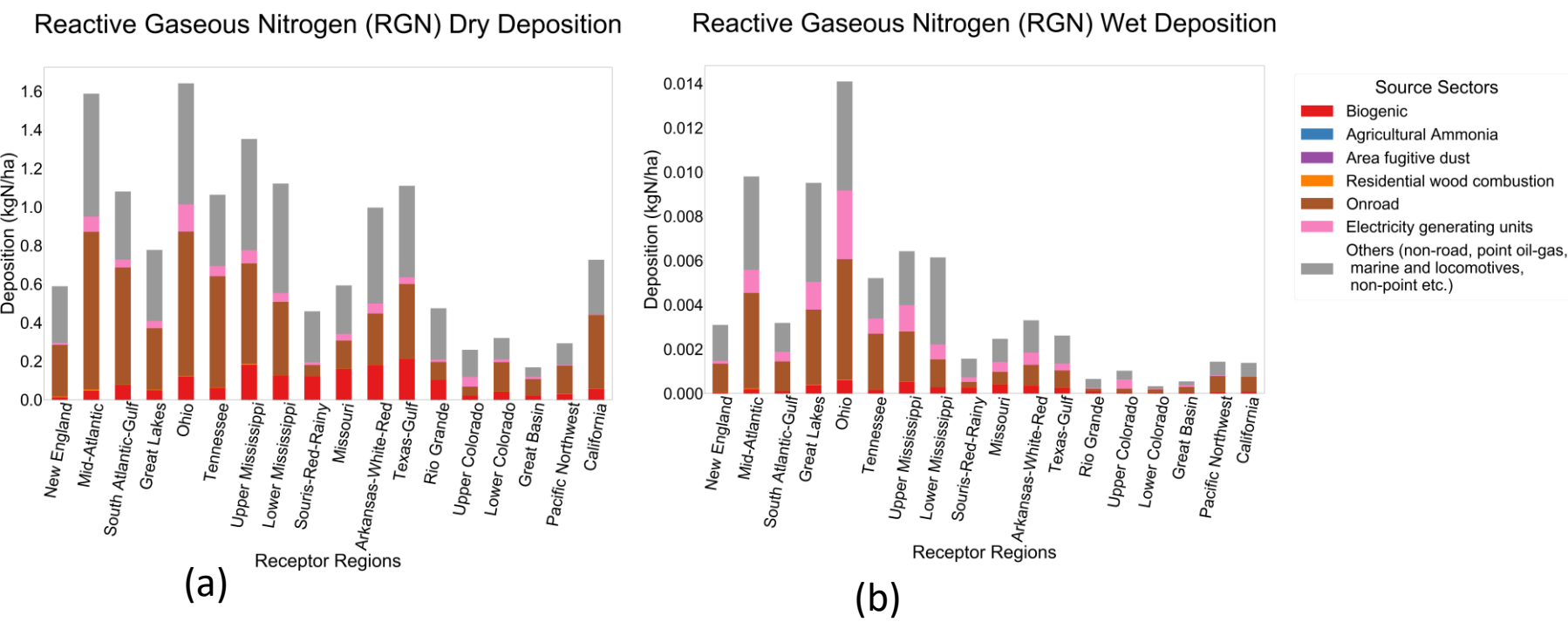
RESULTS



(a) Dry and (b) Wet deposition of gaseous ammonia species (NH_3)

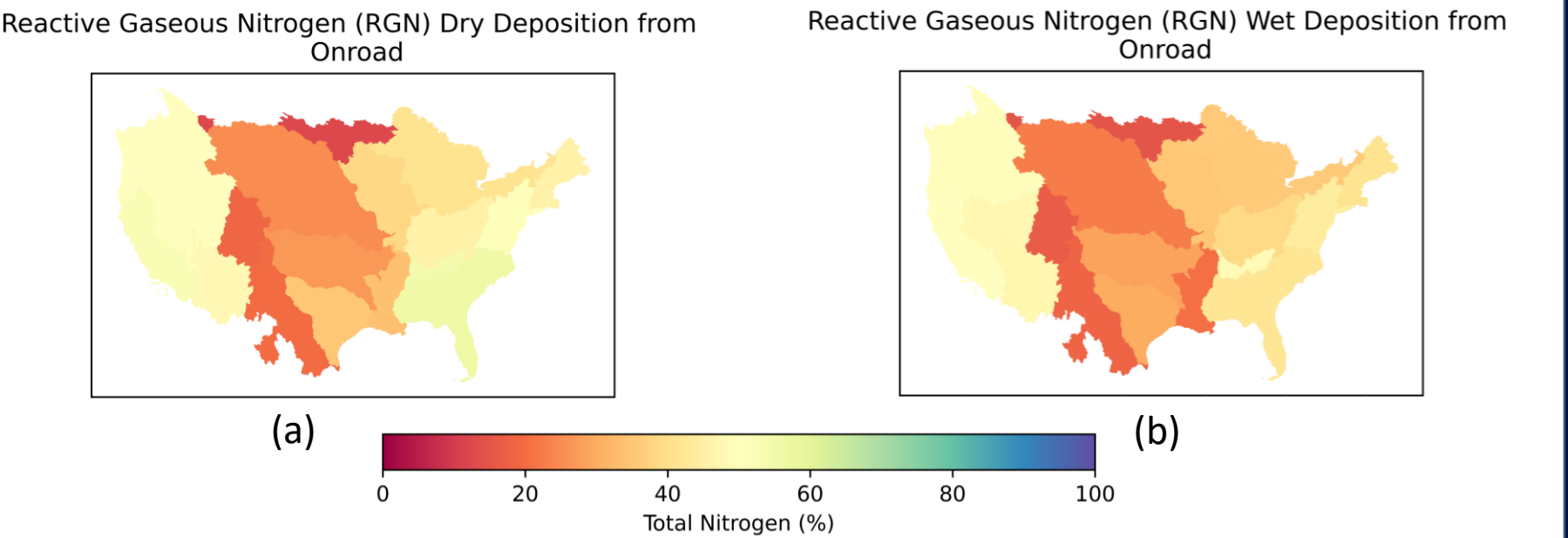


Gaseous ammonia (a) Dry and (b) Wet deposition from agricultural ammonia sector



(a) Dry and (b) Wet deposition of reactive gaseous nitrogen species (NO , NO_2 , NO_3 , HONO , and N_2O_5)

RESULTS



Reactive gaseous nitrogen (a) Dry and (b) Wet deposition from onroad sector

CONCLUSIONS

- The **Upper Mississippi** region experiences the highest gaseous ammonia dry and wet deposition where the dominant sector is **agricultural ammonia (more than 90 percent contribution of total nitrogen)** due to its higher fertile lands and agricultural activities. A little contribution from onroad sector is found.
- Based on the estimates, the Ohio and Mid Atlantic regions receive higher nitrogen from reactive gaseous nitrogen dry and wet deposition from onroad and electricity generating units due to their high onroad vehicles and industrial activities.

REFERENCES

- [1]. *Hypoxia Research Programs*. National Oceanic and Atmospheric Administration, <https://coastalscience.noaa.gov/research/stressor-impacts-mitigation/habhrca/hypoxia-program/>. October 9 2019
- [2]. Graham, Dr. Jennifer L., *Harmful Algal Blooms*. United States Geological Survey. <https://www.usgs.gov/media/images/harmful-algal-blooms-7>. October 9 2019

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