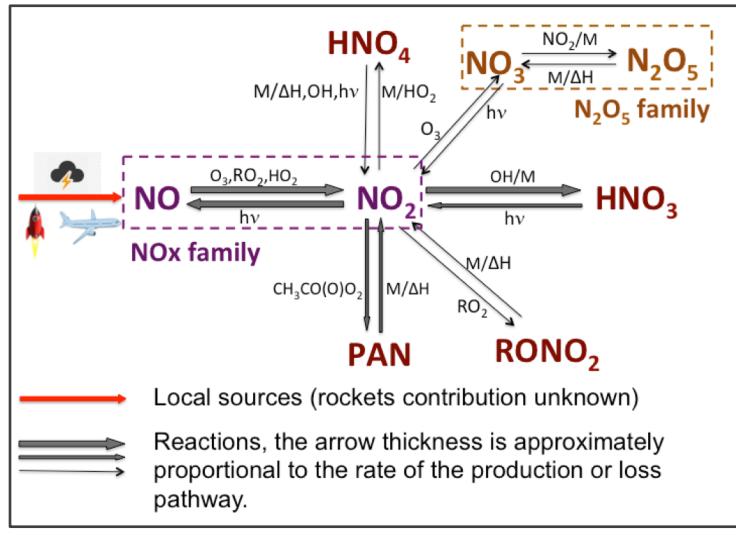


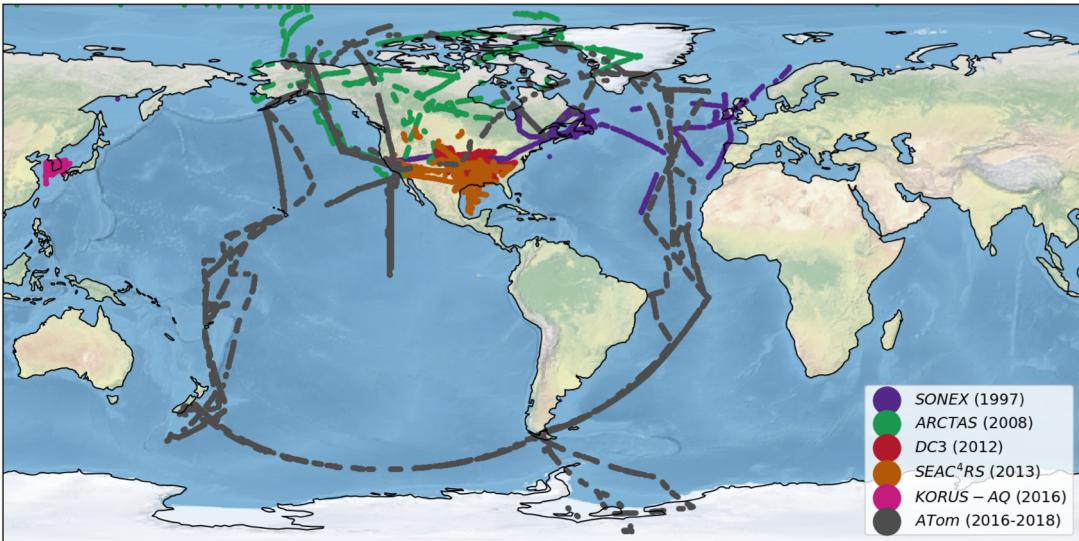
## Introduction

- UT NO<sub>y</sub> → global climate, air quality, the oxidizing capacity of the atmosphere.
- Large **uncertainties exit in models**  
(Stevenson et al., 2013)



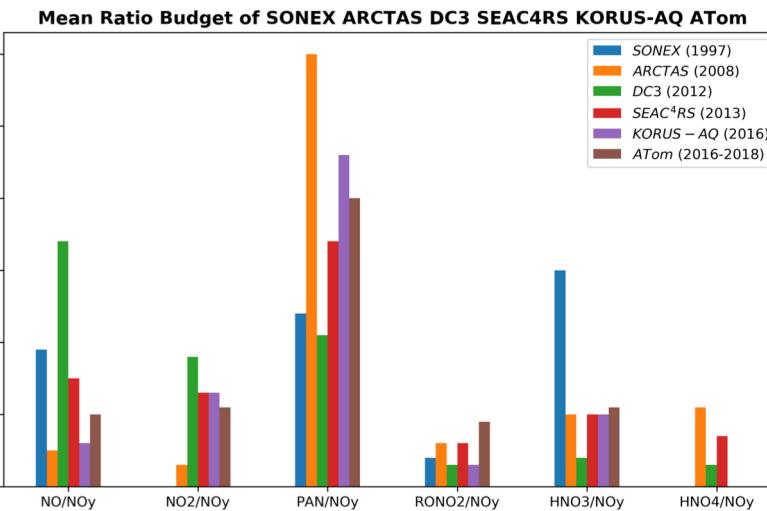
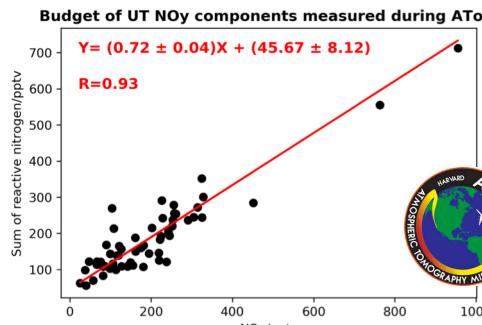
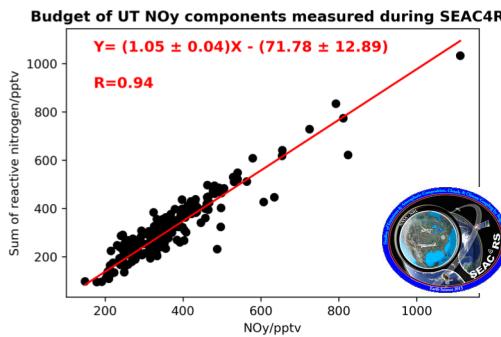
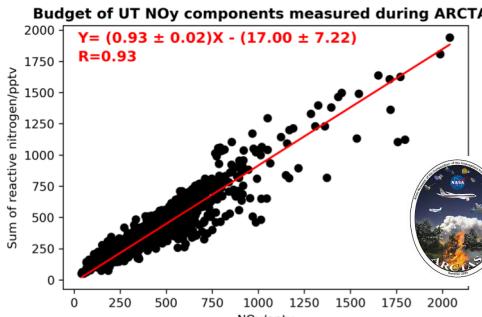
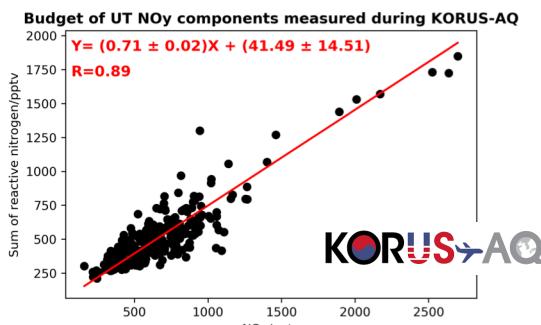
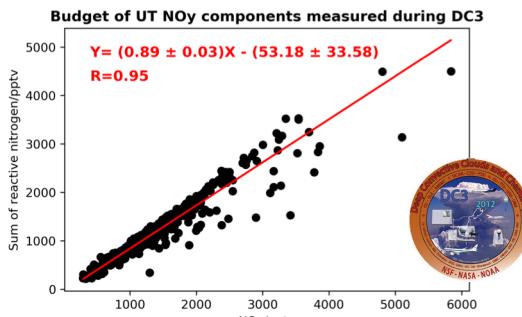
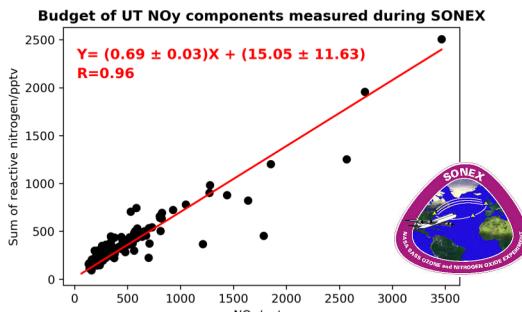
- We use **NASA DC8** aircraft observations to improve understanding global UT NO<sub>y</sub>

## Methodology



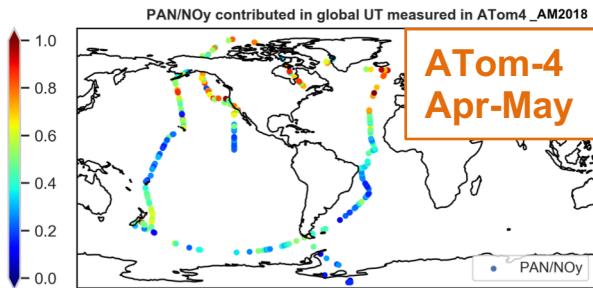
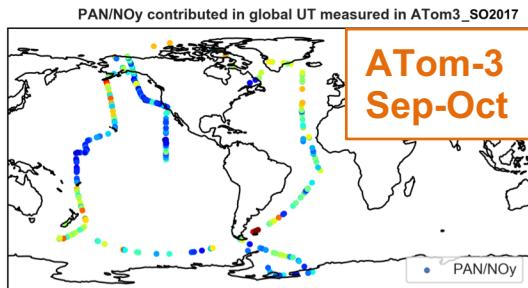
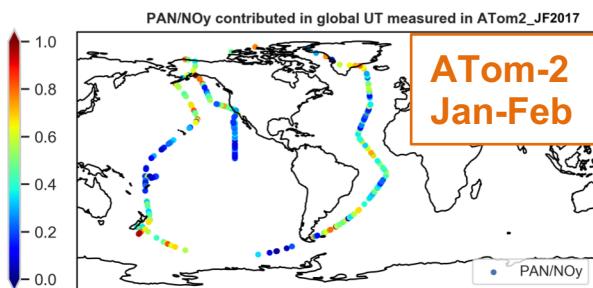
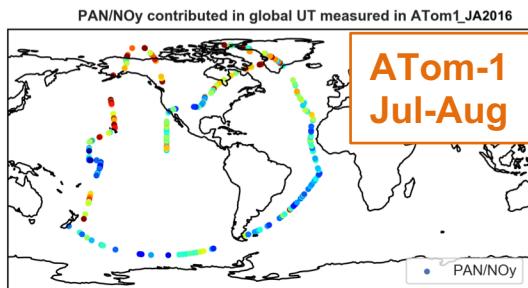
- NASA DC8 sampling in the UT (450-180 hPa) provides global coverage
- We filter our stratospheric influence using the **ratio of O<sub>3</sub>-to-CO > 1.25 mol mol<sup>-1</sup>** (Hudman et al., 2007; Marais et al., 2018)

# Results: Budget of UT NO<sub>y</sub> Components during DC8 Campaigns from SONEX (1997) to ATom (2016-2018)

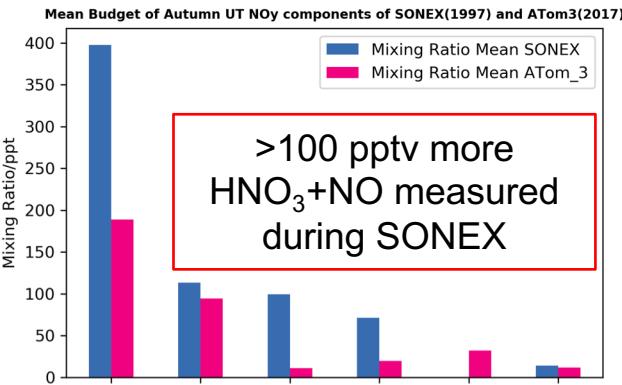
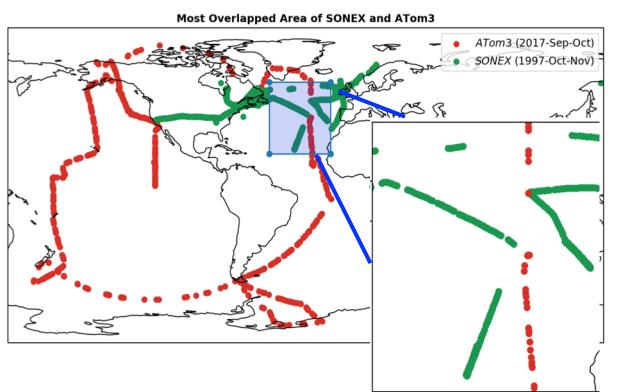


- Most (near 100%) of the UT NO<sub>y</sub> budget can be explained by a handful of measurements (NO<sub>x</sub>, PAN, HNO<sub>3</sub>, HNO<sub>4</sub>, RONO<sub>2</sub> and N<sub>2</sub>O<sub>5</sub>).
- Dominance of PAN is 40% for ATom, 46% for KORUS-AQ, 36% for SEAC<sup>4</sup>RS and 57% for ARCTAS.

# Results: Large Spatial Variability in PAN's Contribution to NO<sub>y</sub>



# Comparison of ATom-3 and SONEX



>100 pptv more  
HNO<sub>3</sub>+NO measured  
during SONEX

## Concluding Remarks and Next Steps

1. In the North Atlantic, HNO<sub>3</sub> dominates during SONEX (1997), but PAN dominates for coincident ATom-3 observations possibly due to changes in anthropogenic emissions.
2. Next steps will be to compare ATom to other coincident campaigns, compare DC8 and MOZAIC NO<sub>y</sub>, and run GEOS-Chem to assess our state of our understanding of global UT NO<sub>y</sub>.

## References

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[https://ghrc.nsstc.nasa.gov/home/sites/default/files/cutler\\_dc8.pdf](https://ghrc.nsstc.nasa.gov/home/sites/default/files/cutler_dc8.pdf)
- Hudman et al., 2007, doi:10.1029/2006jd007912
- Marais et al., 2018, doi:10.5194/acp-18-17017-2018
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