



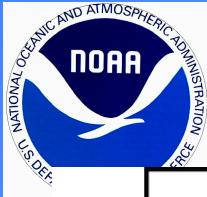
# In-mixing from ExTL with trace gases



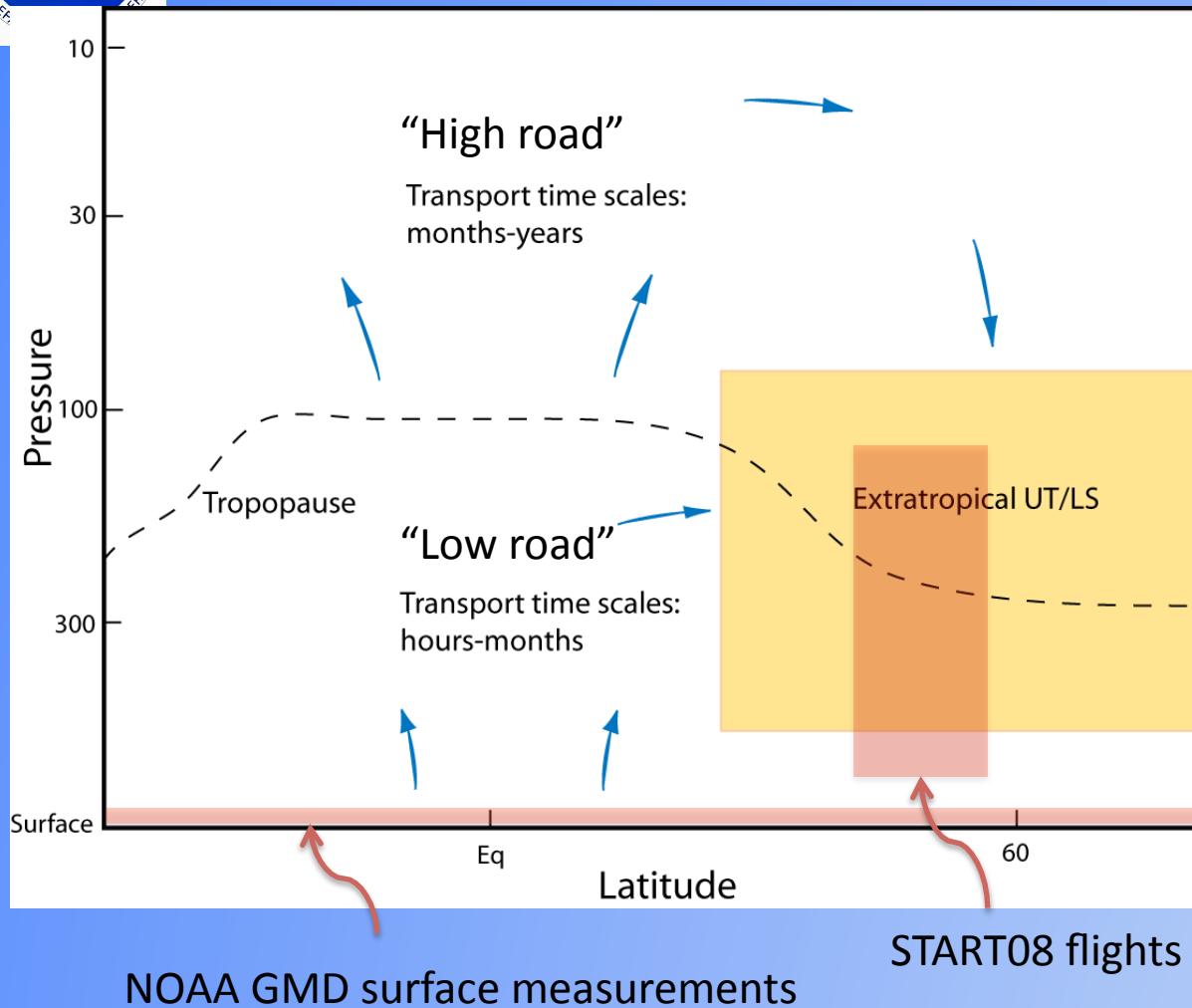
NCAR/NSF  
GV

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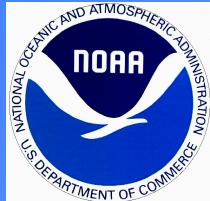
# Introduction



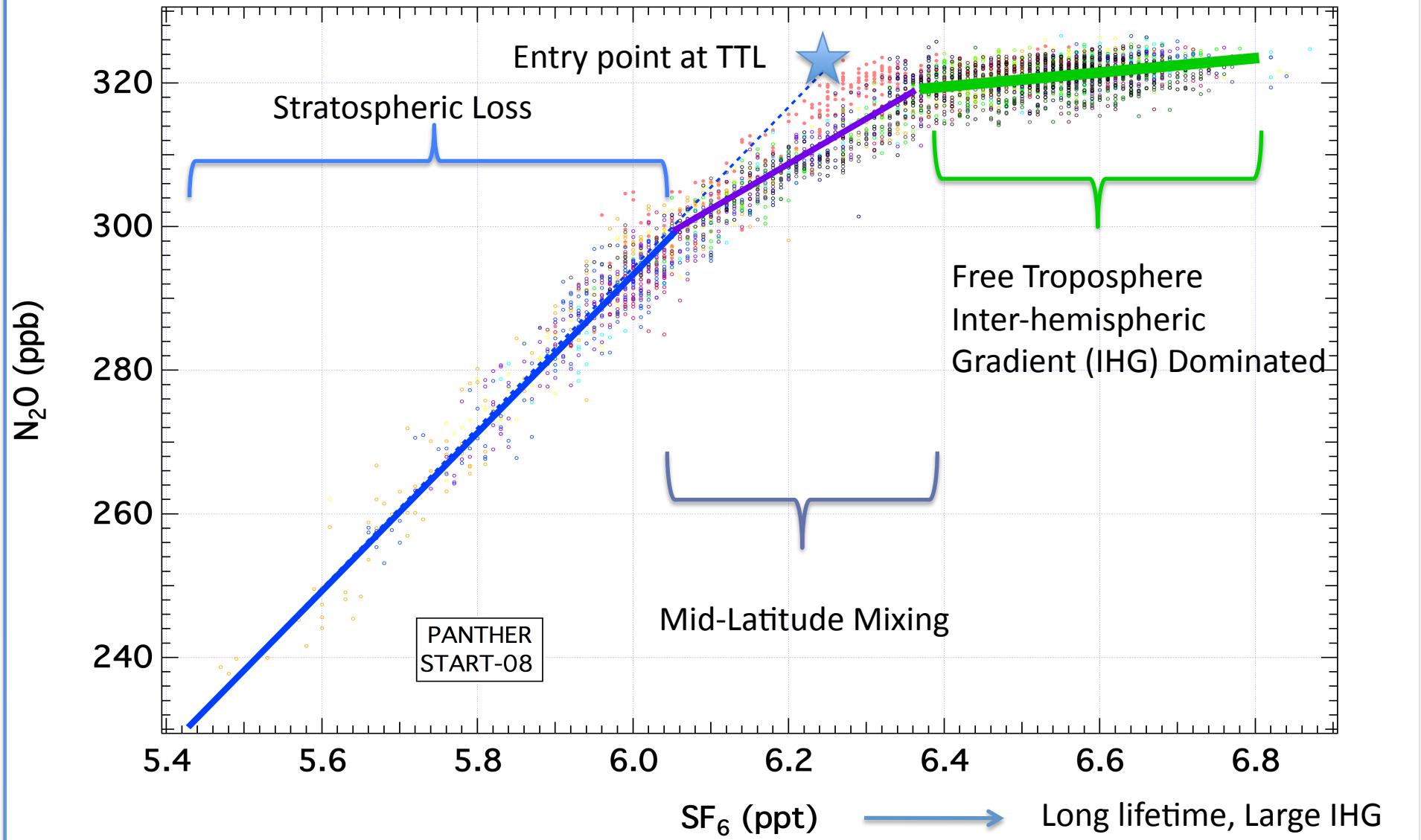
UT/LS region is a complex mixture of air transported over many different time scales and from different regions.

## Goal of this work:

Use in situ trace gas measurements from START08 and surface stations to determine transport time scales and source regions of air in the extratropical UT/LS.



# Mixing Regions

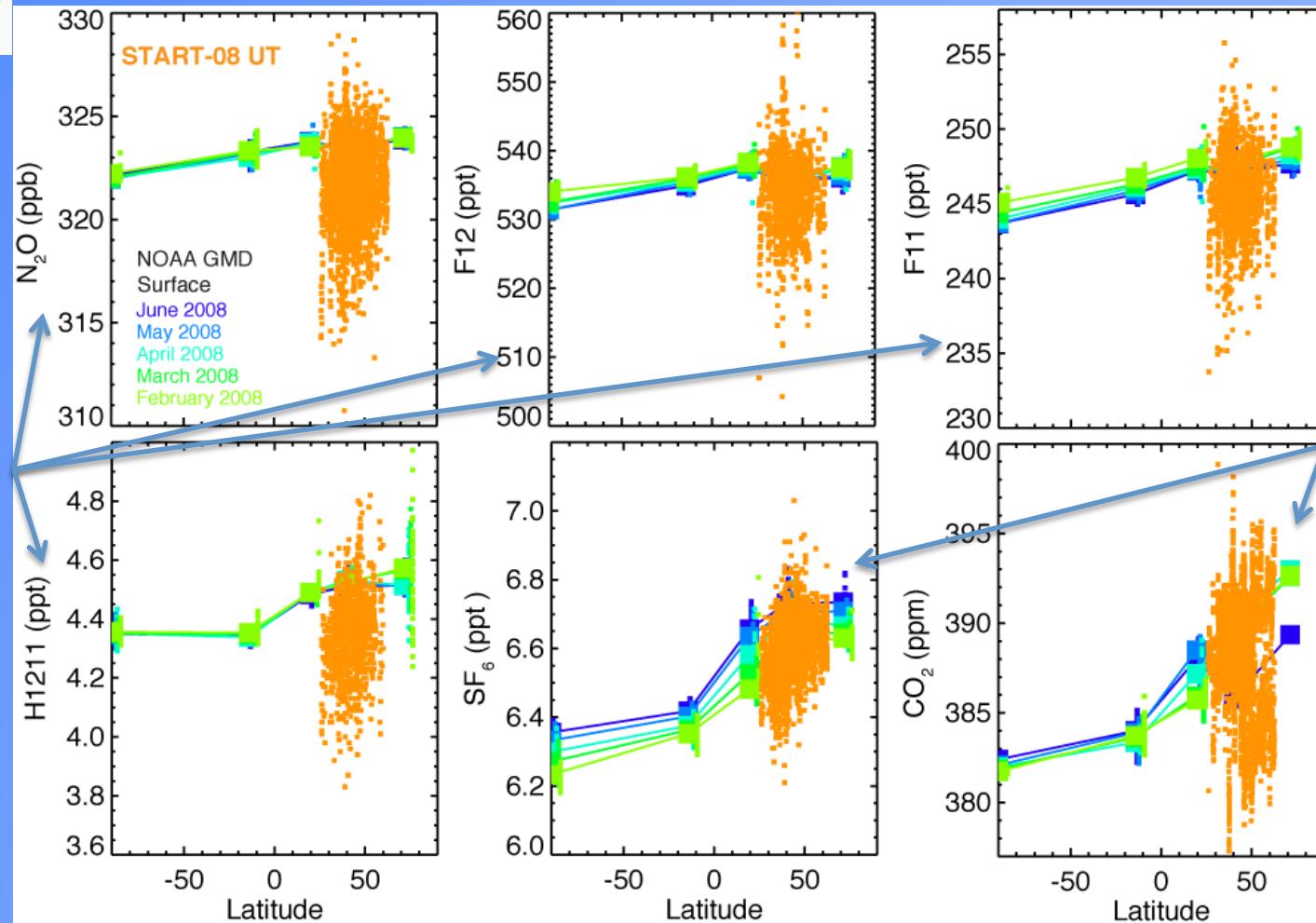




# Surface and Free Tropospheric Tracer Gradients



Photolytic tracers - can determine where the air has been, "high road" tracers



"Age" tracers – can determine transport time scales and surface latitude origins, once "high road" part has been removed.



## Summary of UT transport

- START08 dataset is unique and valuable for studying the origins of air transported into the extratropical UT.
- The gradient of the trace gas in the free troposphere is combination of the mixing of the “low road” and “high road”.
- Eric Ray and Fred Moore have attempted to quantify the transport times and the stratospheric contribution. Work is in progress...
- More to come by including CO<sub>2</sub> and other tracers and especially the HIPPO dataset.