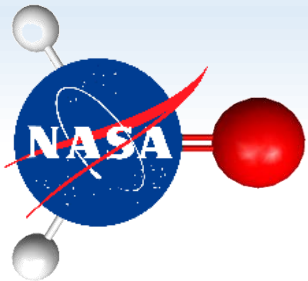


Source Characterization of WINTER Formaldehyde

Josh DiGangi, Glenn Wolfe, Jason St. Clair, & Tom Hanisco
NASA Langley/Goddard

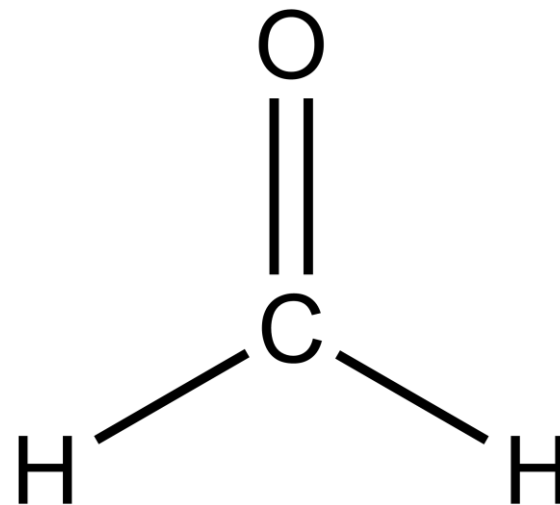
WINTER Science Team Meeting
09/17/2015

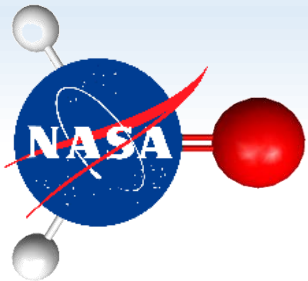


Formaldehyde (HCHO)



- Formed in oxidation of nearly all VOCs
- Short lifetime (hours)
- Can be used as a local tracer of total VOC oxidation
- Major source is photochemical, but primary emissions can be important in boundary layer



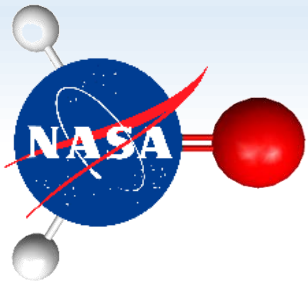


In Situ Airborne Formaldehyde (ISAF)

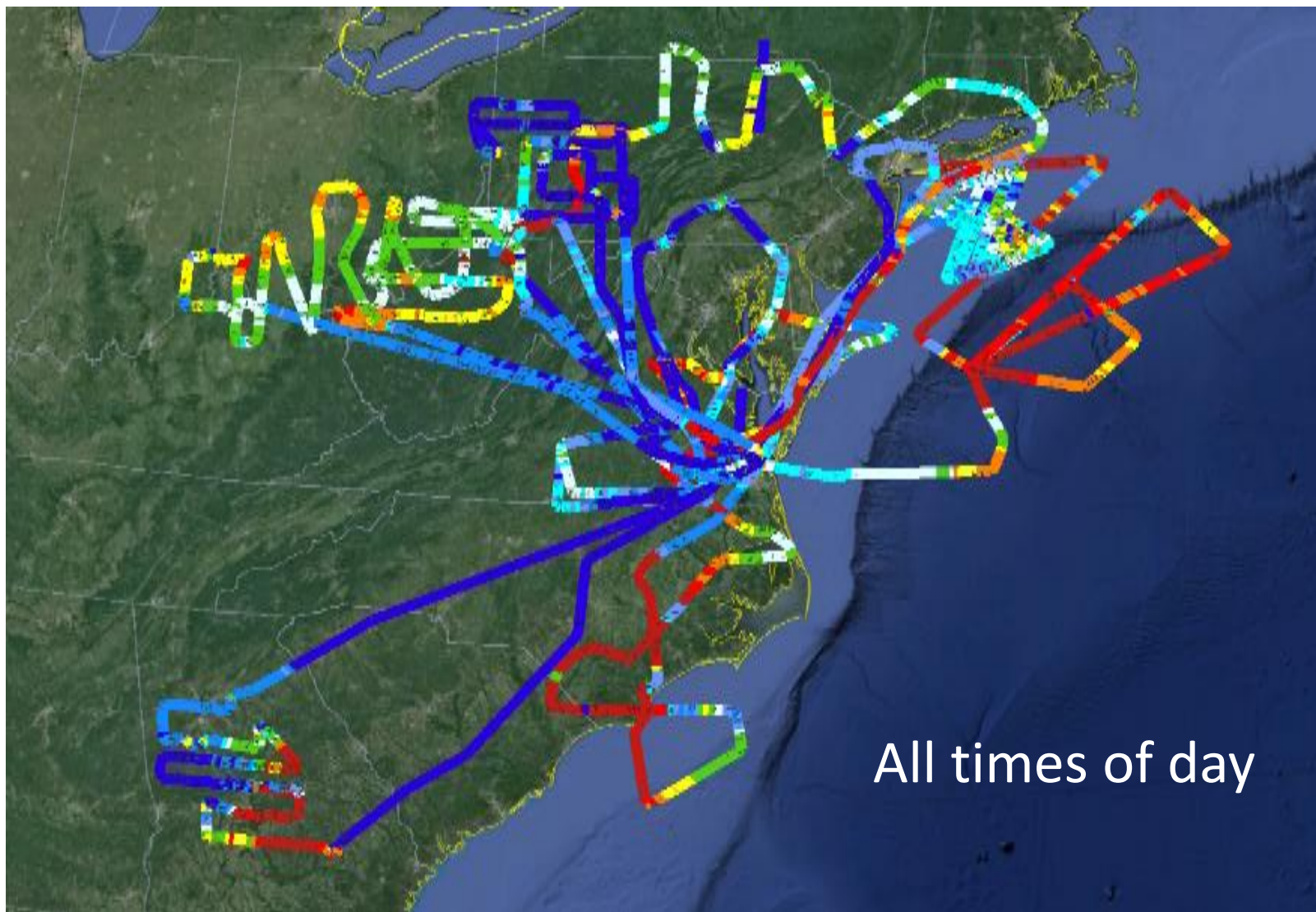


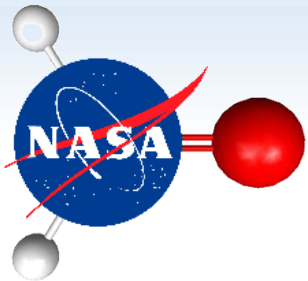
- Laser-induced fluorescence detection
- WINTER instrument stats
 - Precision: ~ 20 ppt (1σ)
 - Accuracy: $\pm 10\% + 10$ pptv
 - $> 90\%$ data coverage

Picture here

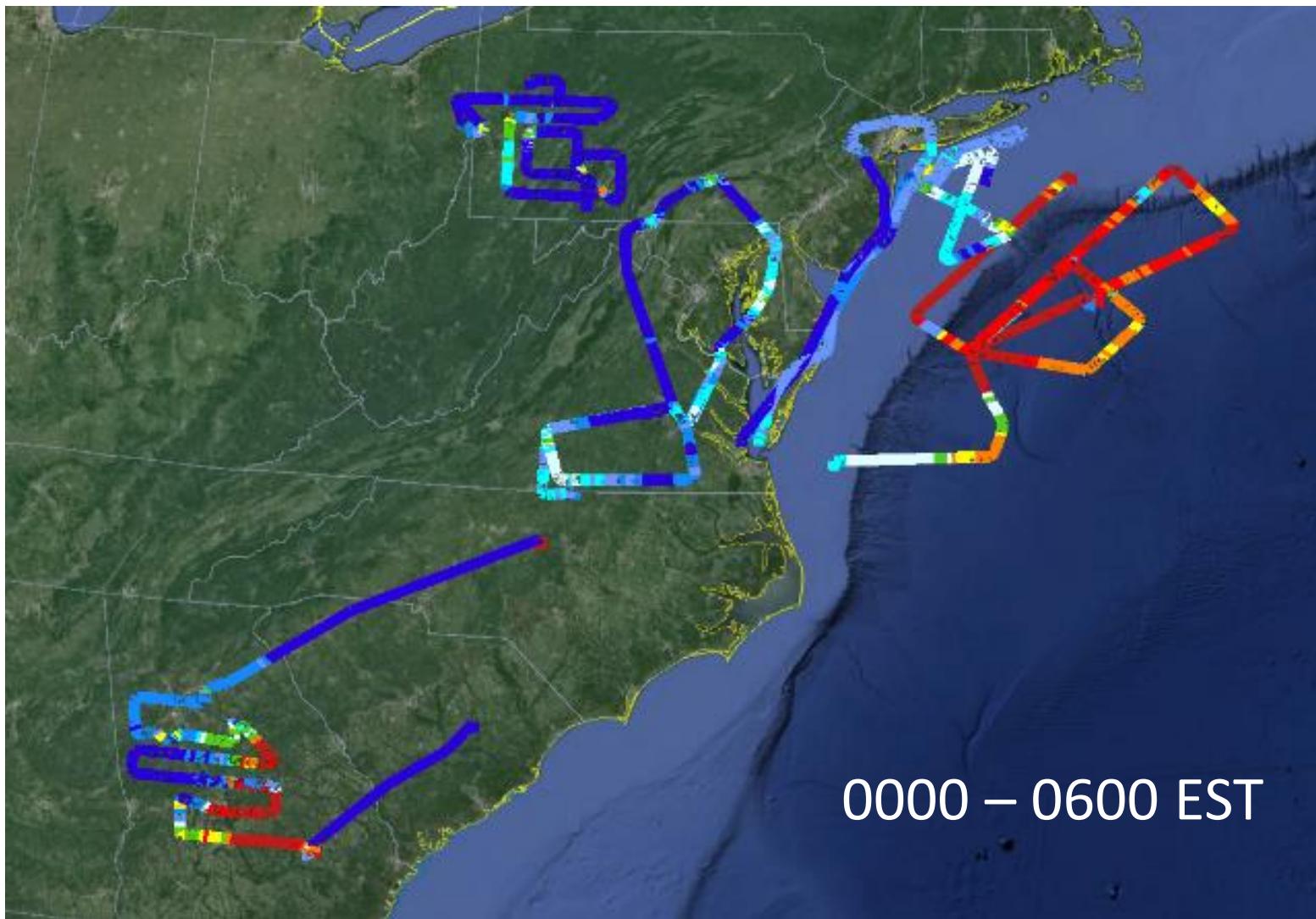


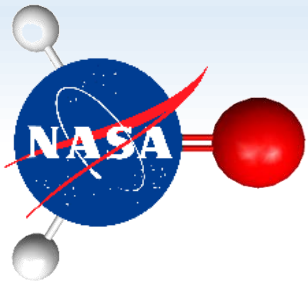
WINTER HCHO Overview



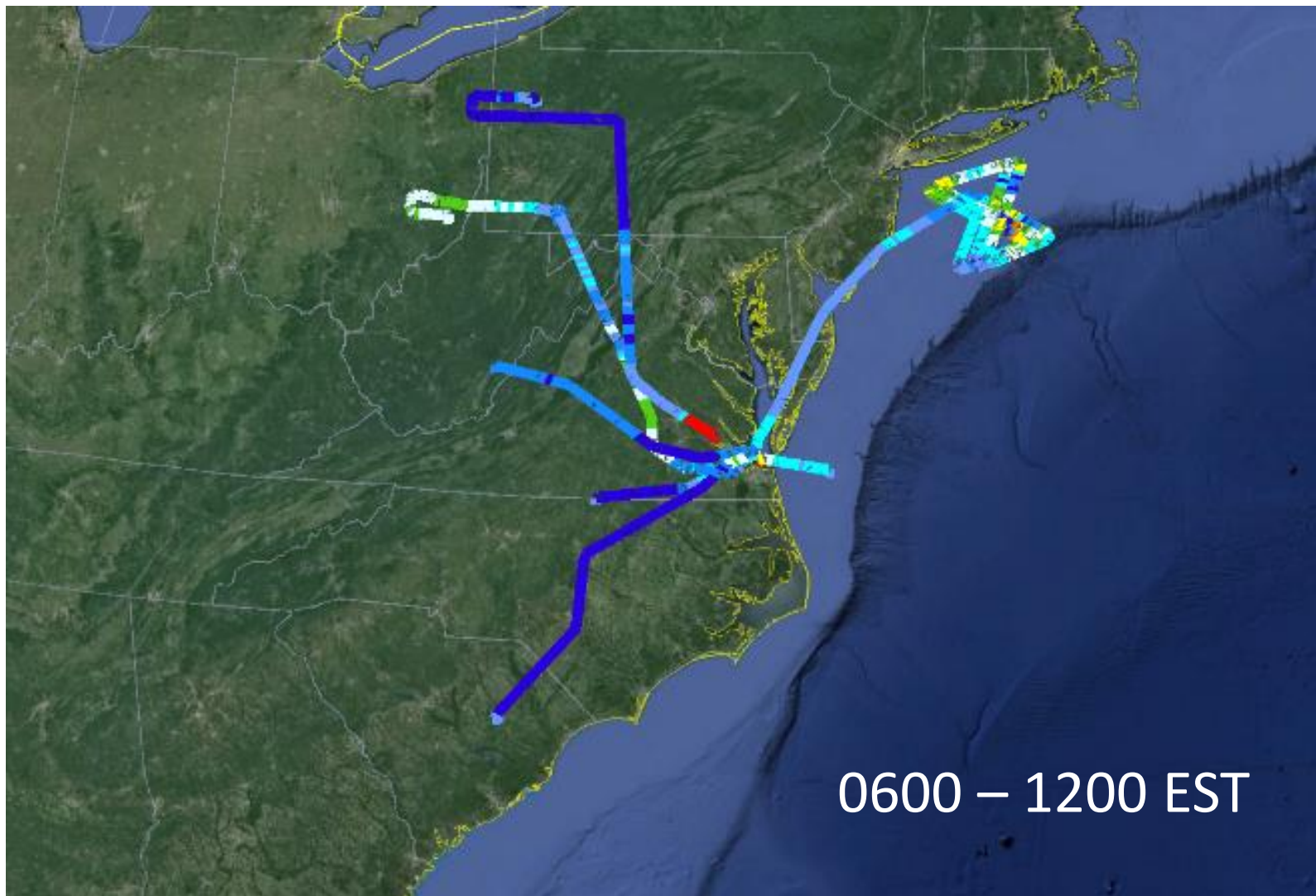


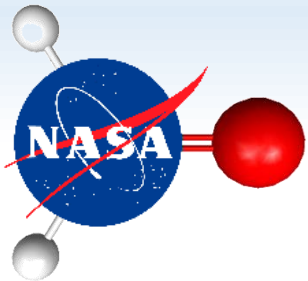
WINTER HCHO Overview



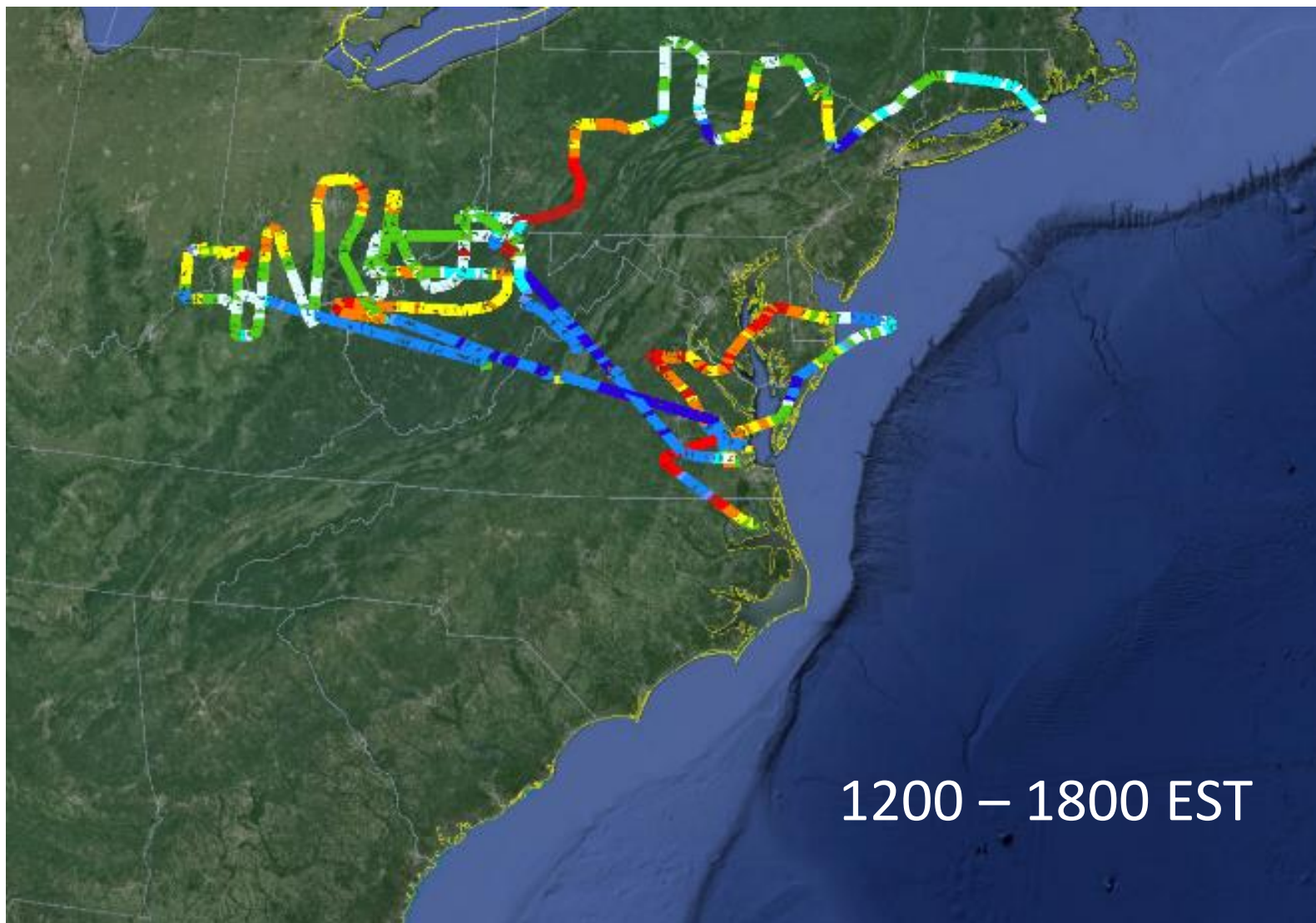


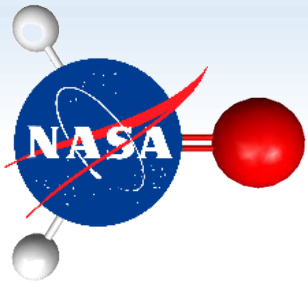
WINTER HCHO Overview



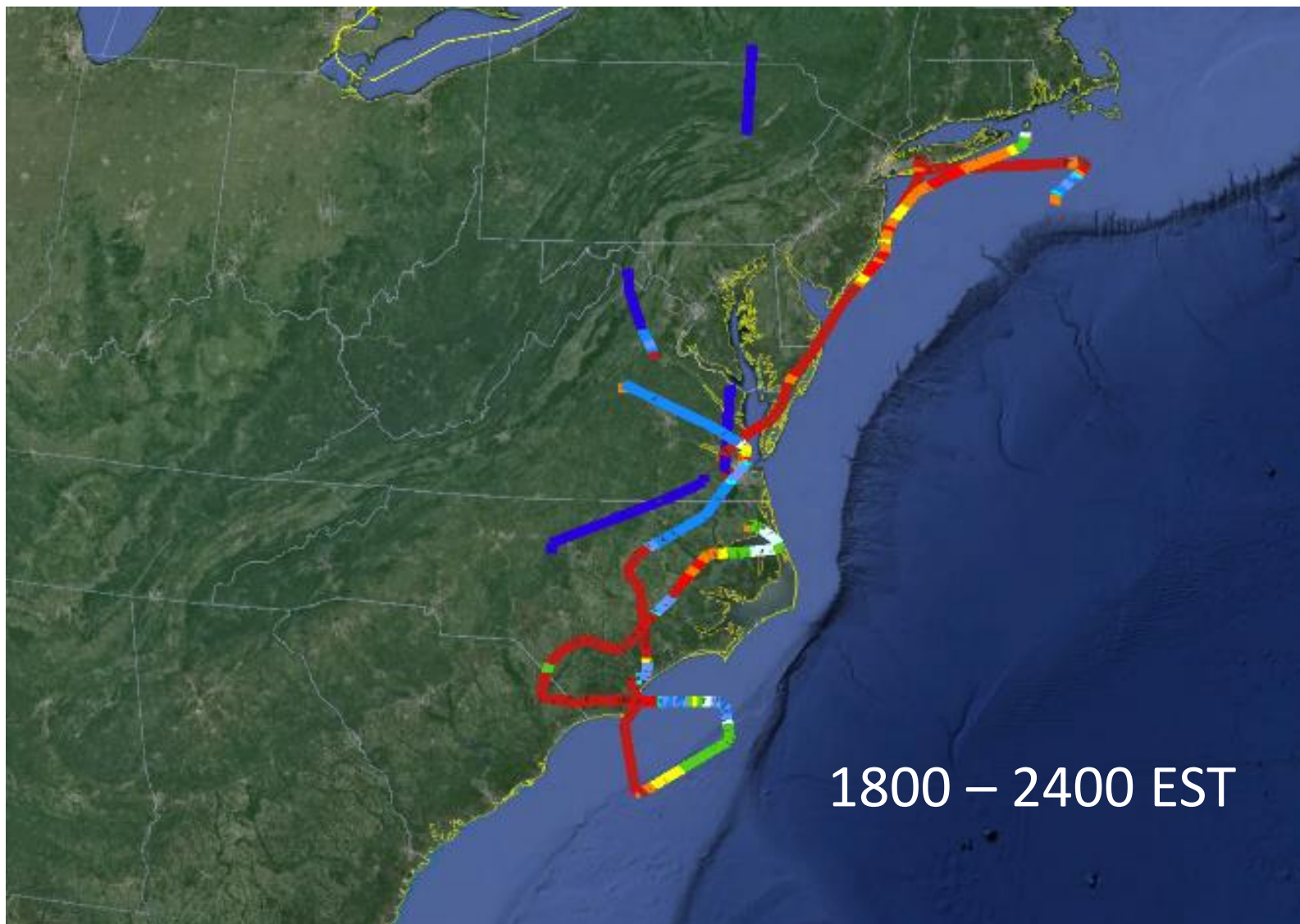


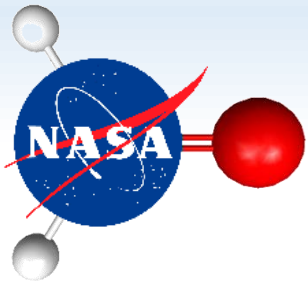
WINTER HCHO Overview



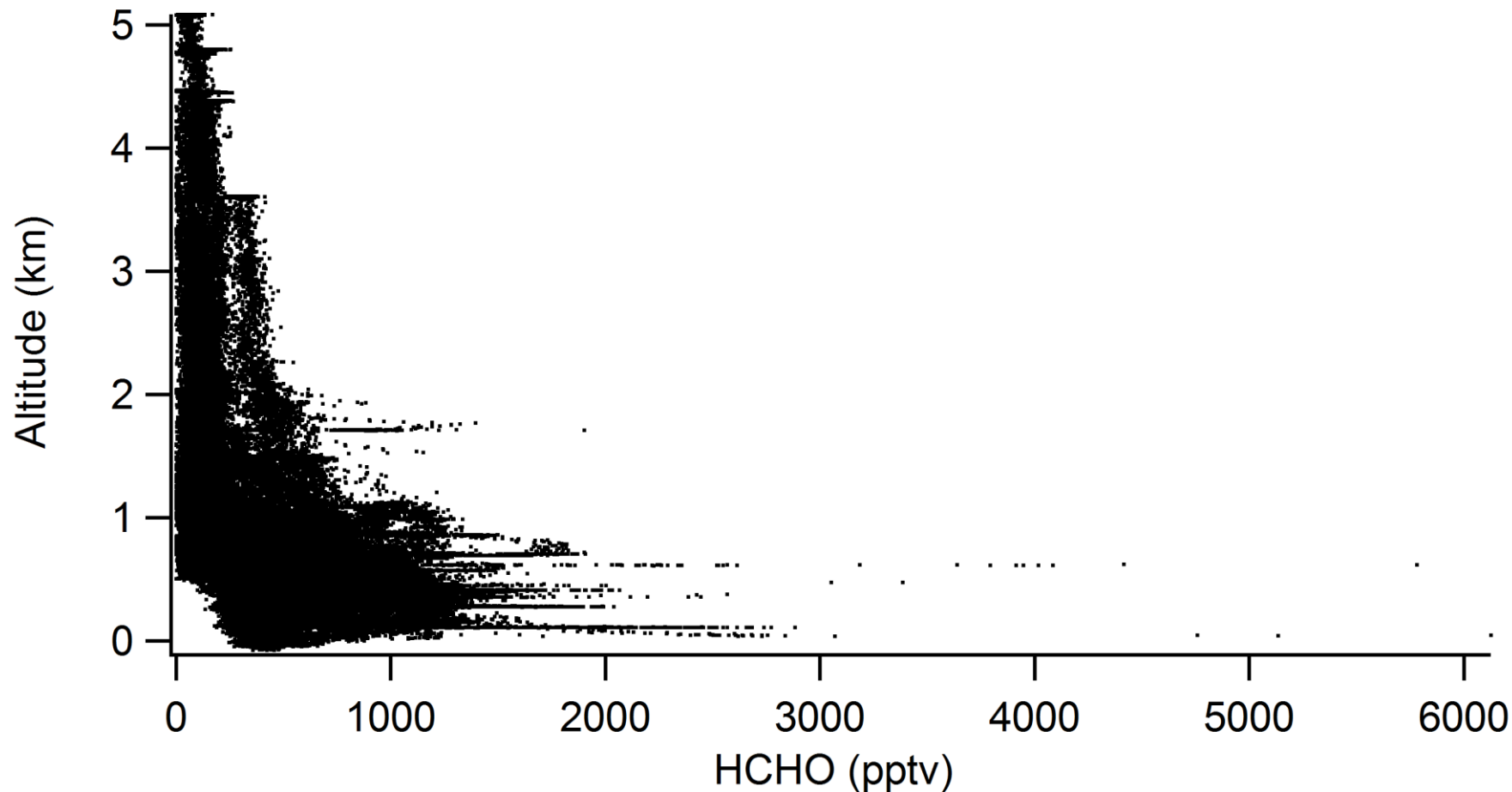


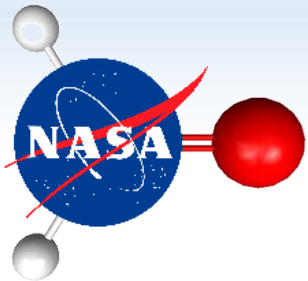
WINTER HCHO Overview



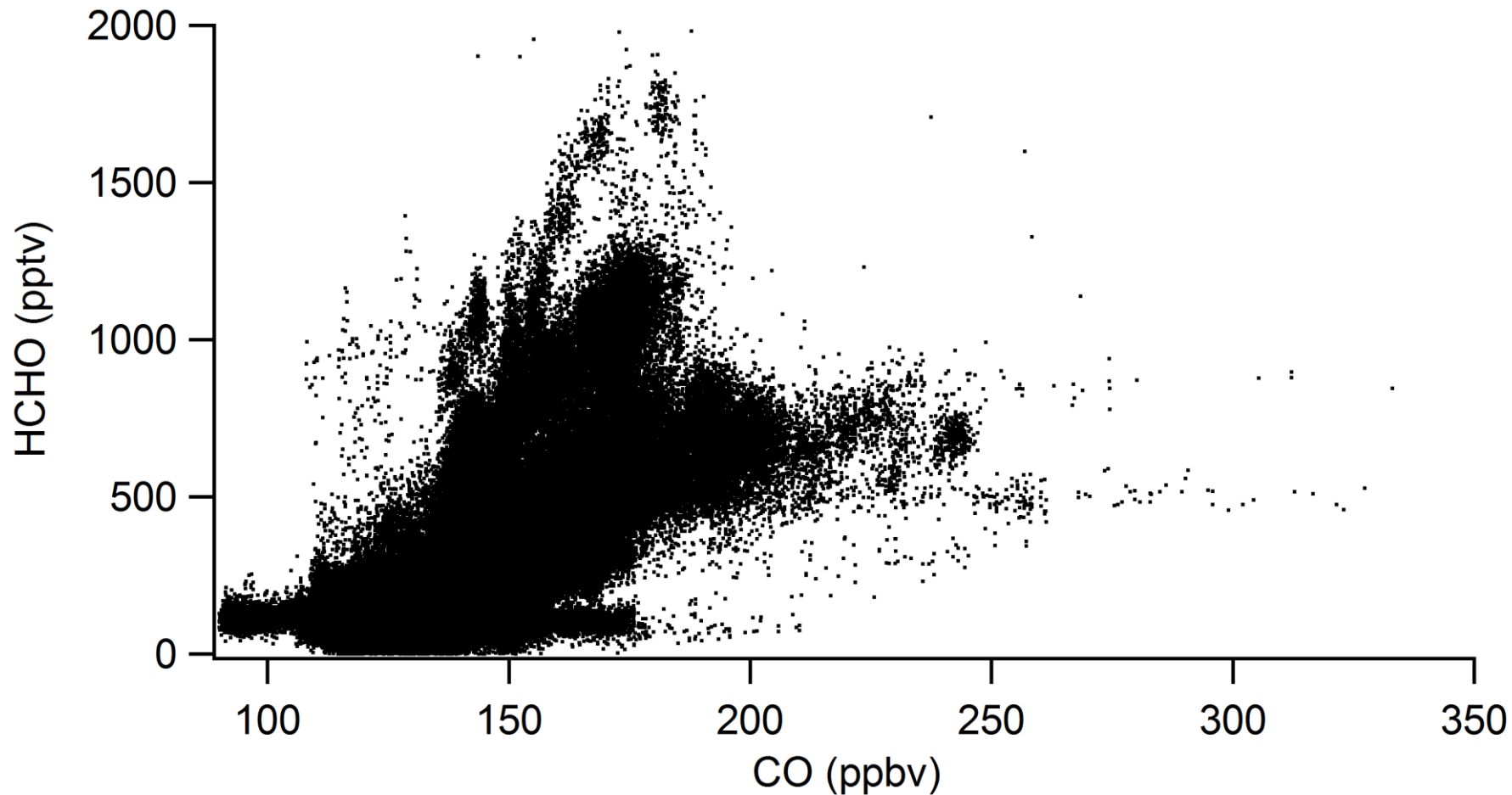


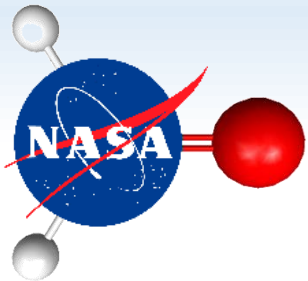
HCHO Vertical Variability



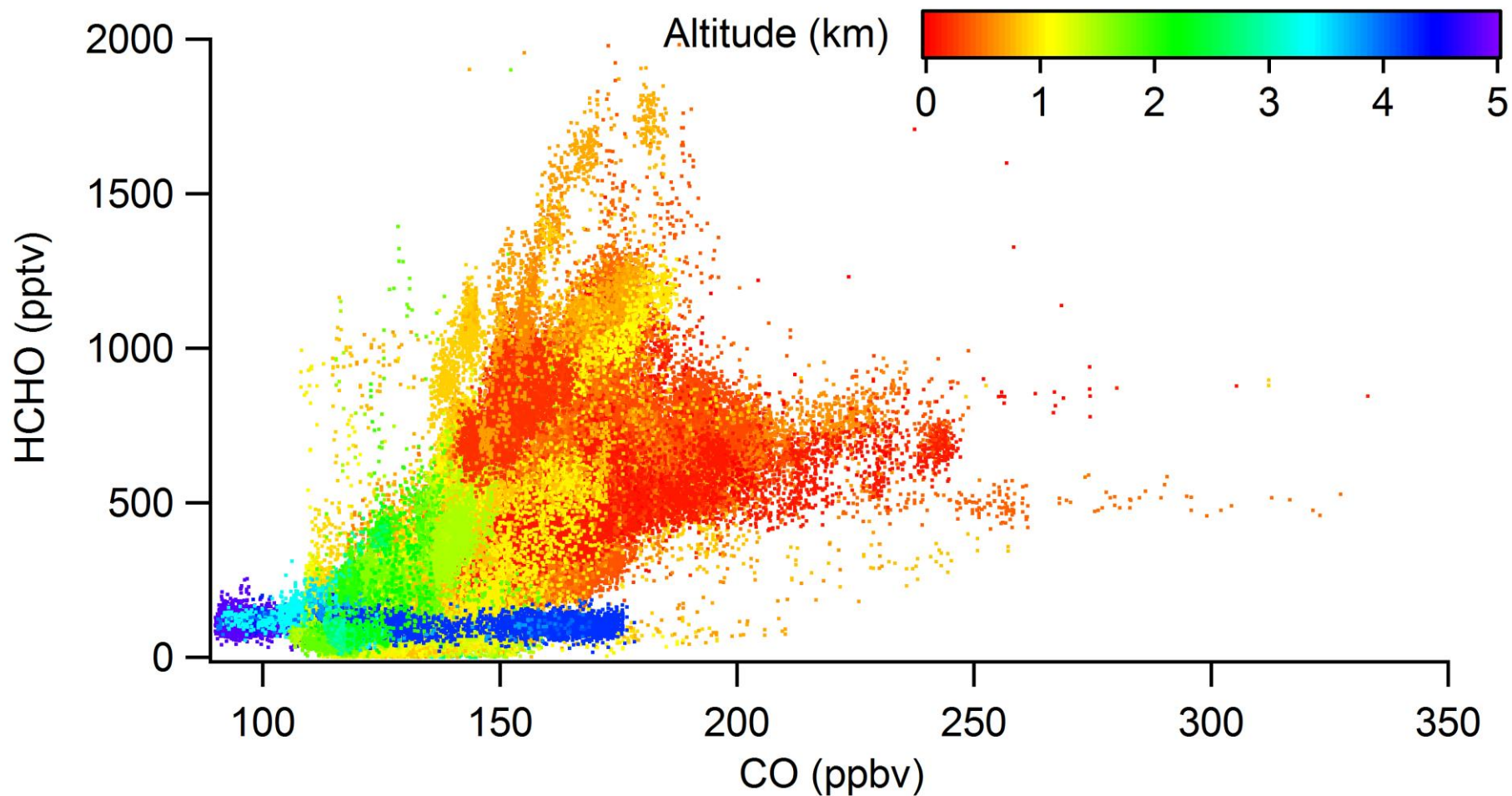


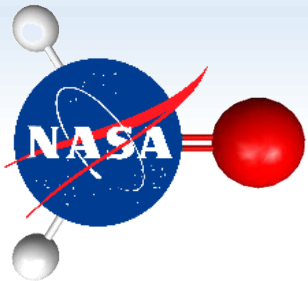
WINTER HCHO vs CO



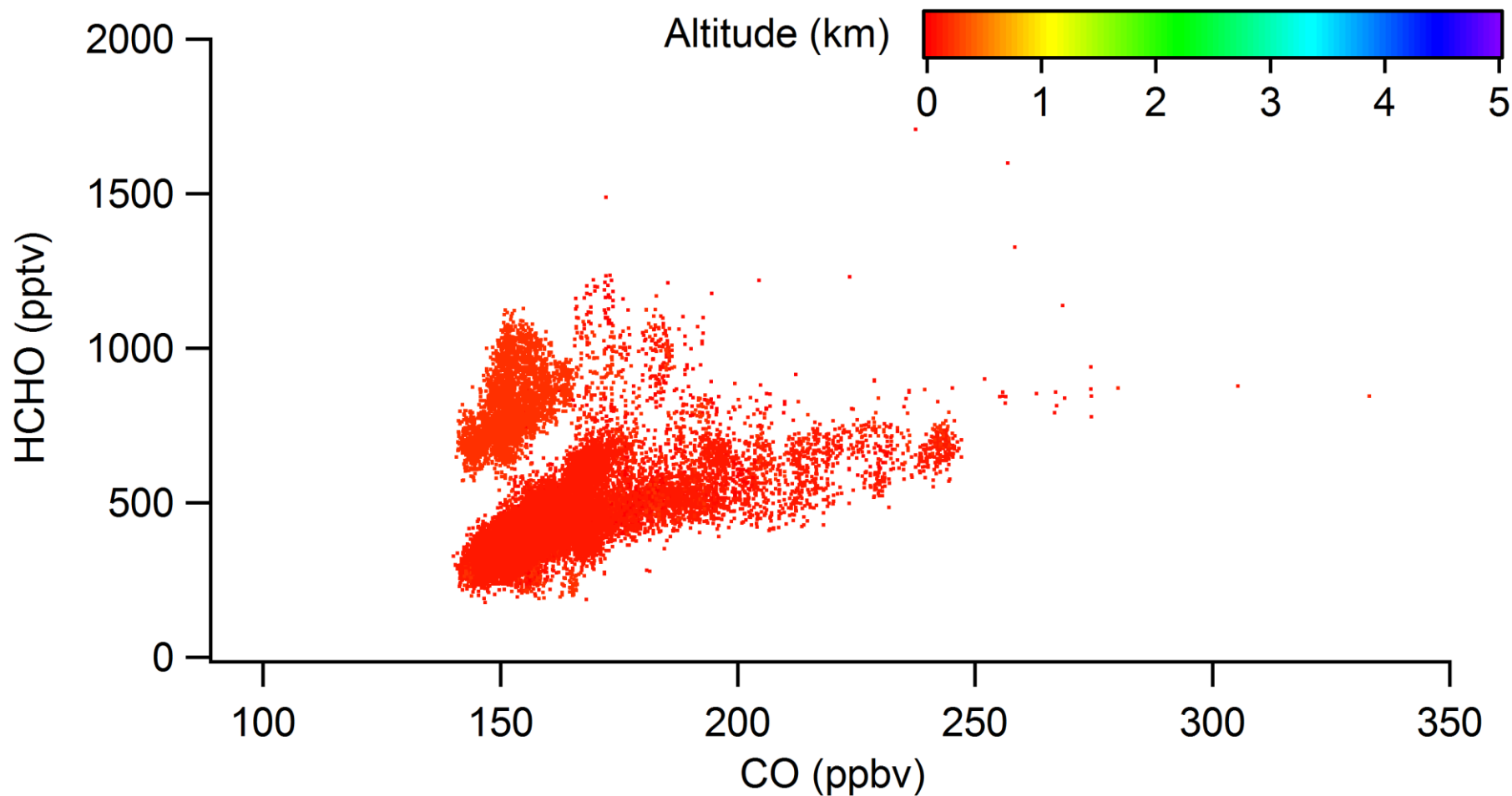


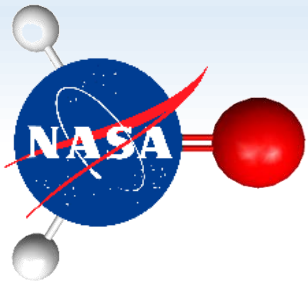
WINTER HCHO vs CO



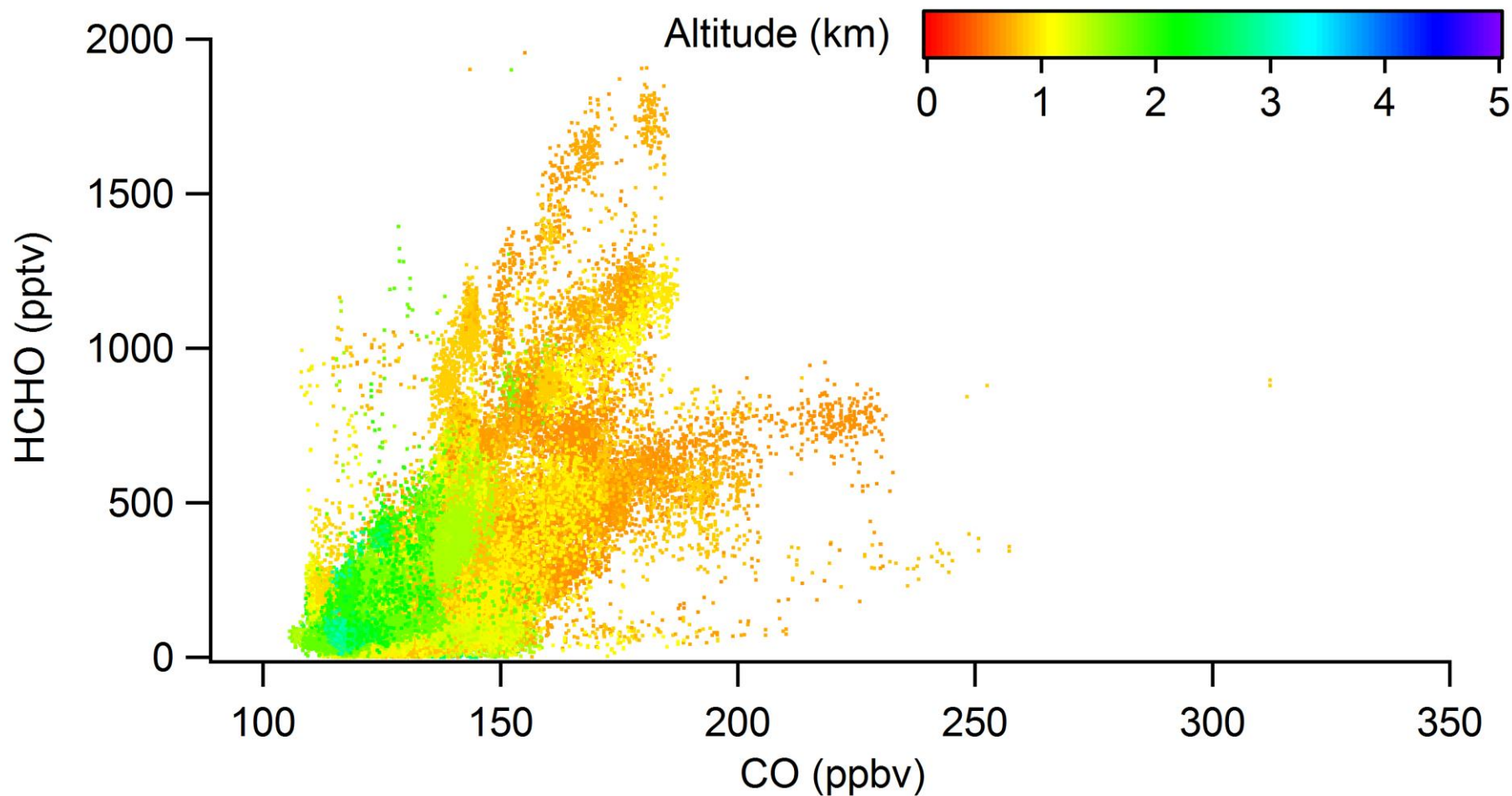


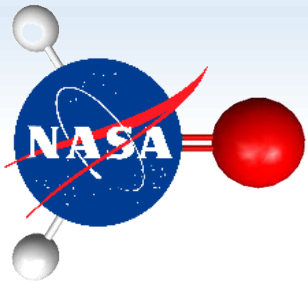
Altitude < 0.5 km



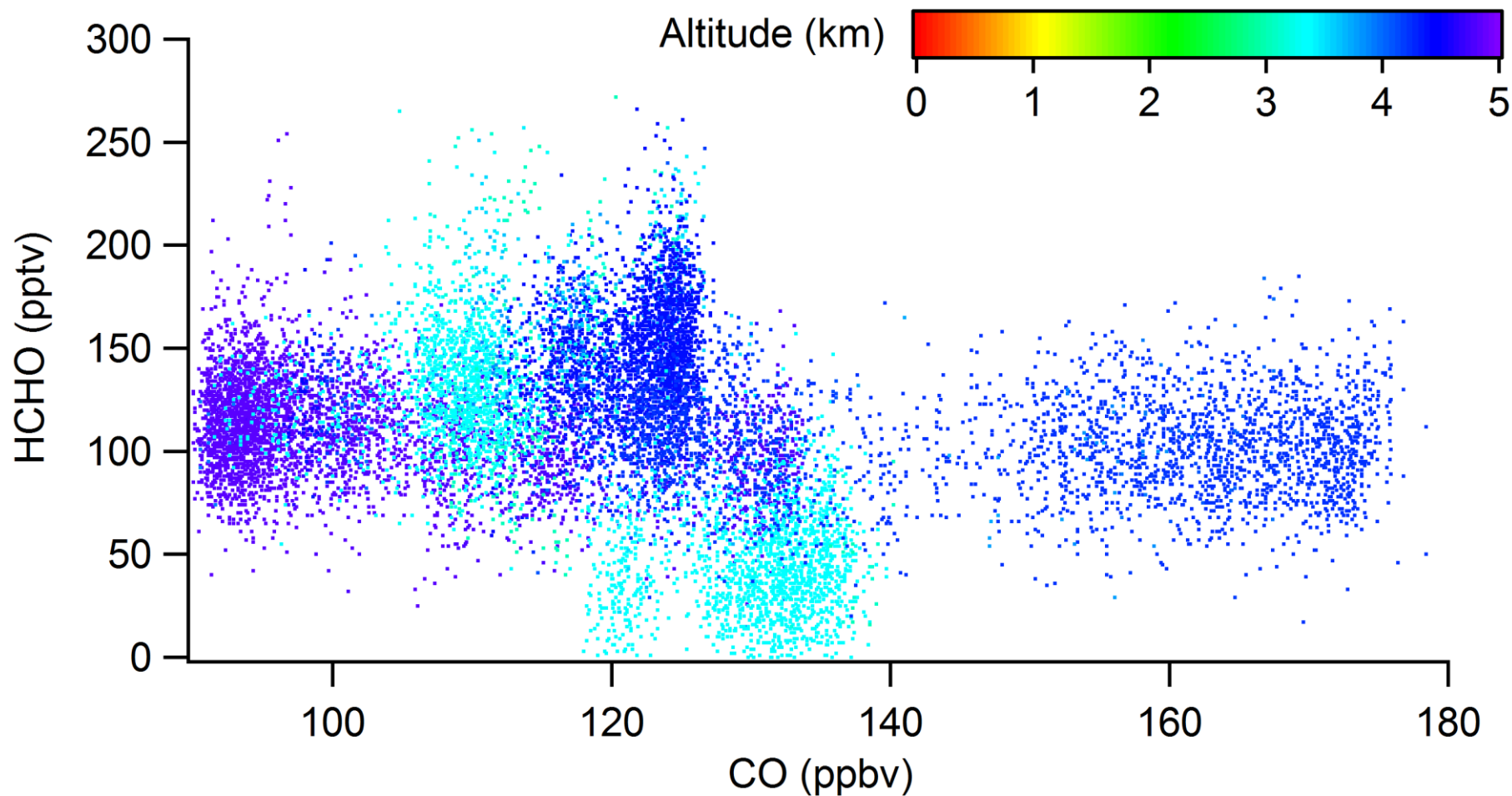


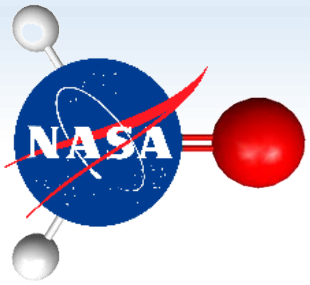
$0.75 \text{ km} < \text{Altitude} < 3 \text{ km}$





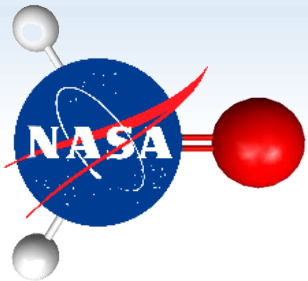
Altitude > 3 km



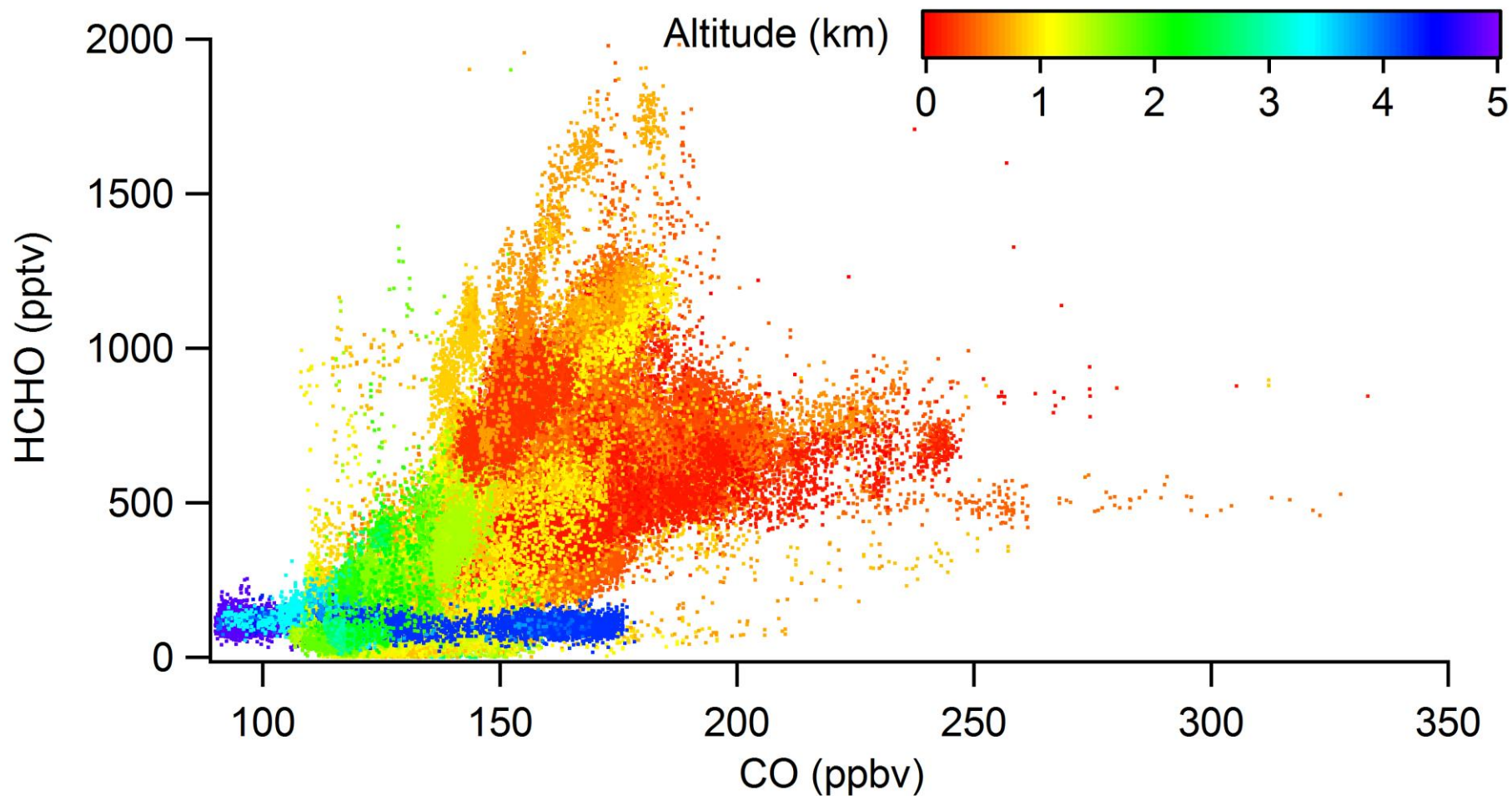


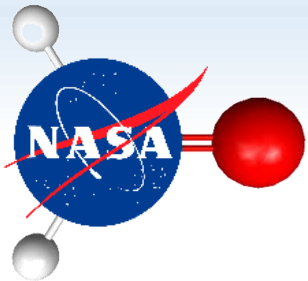
ARCTAS Campaign



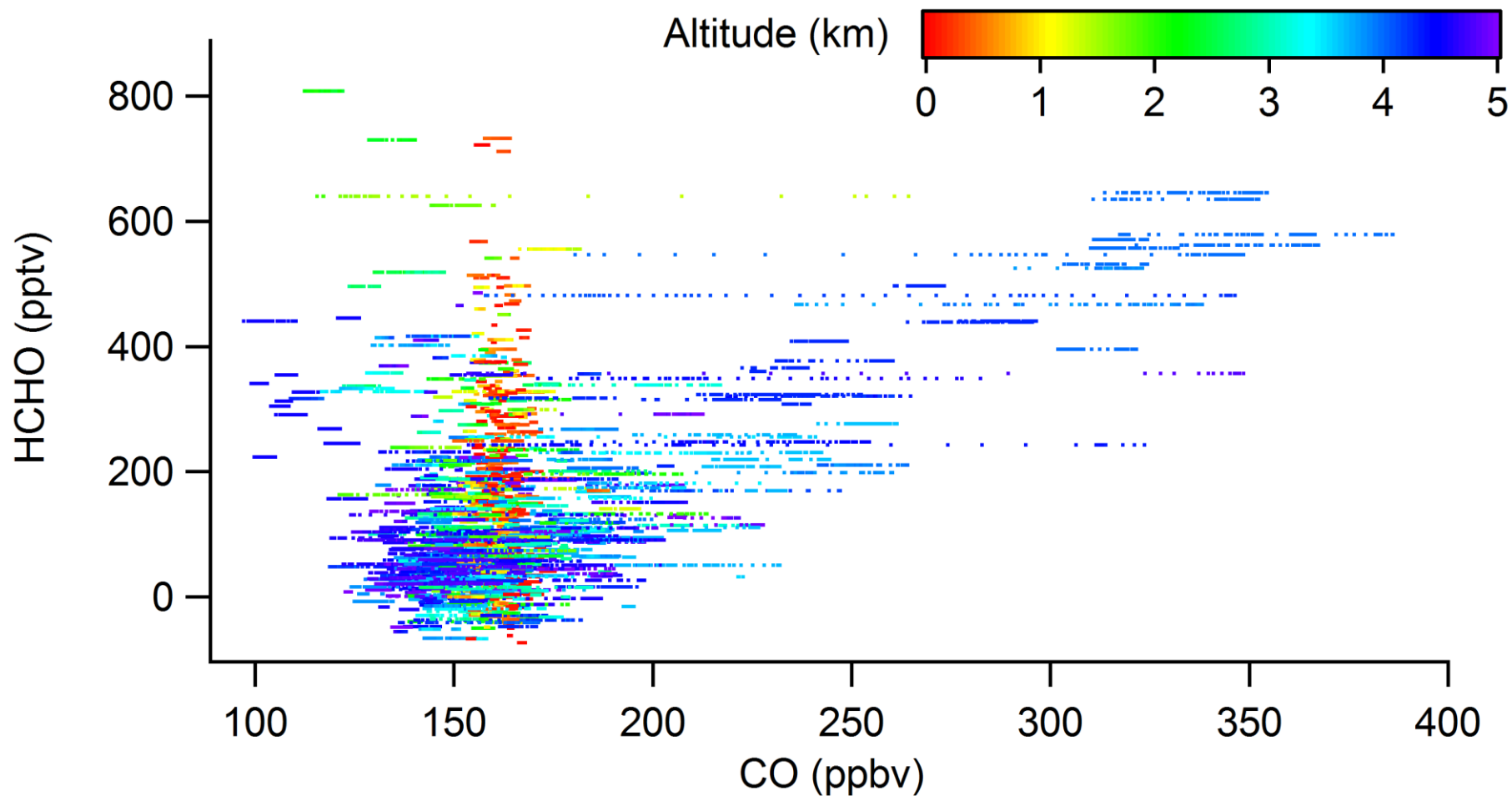


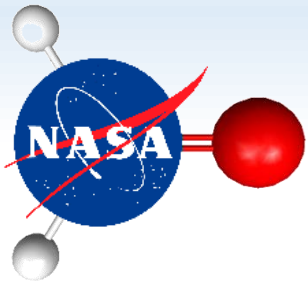
WINTER HCHO vs CO



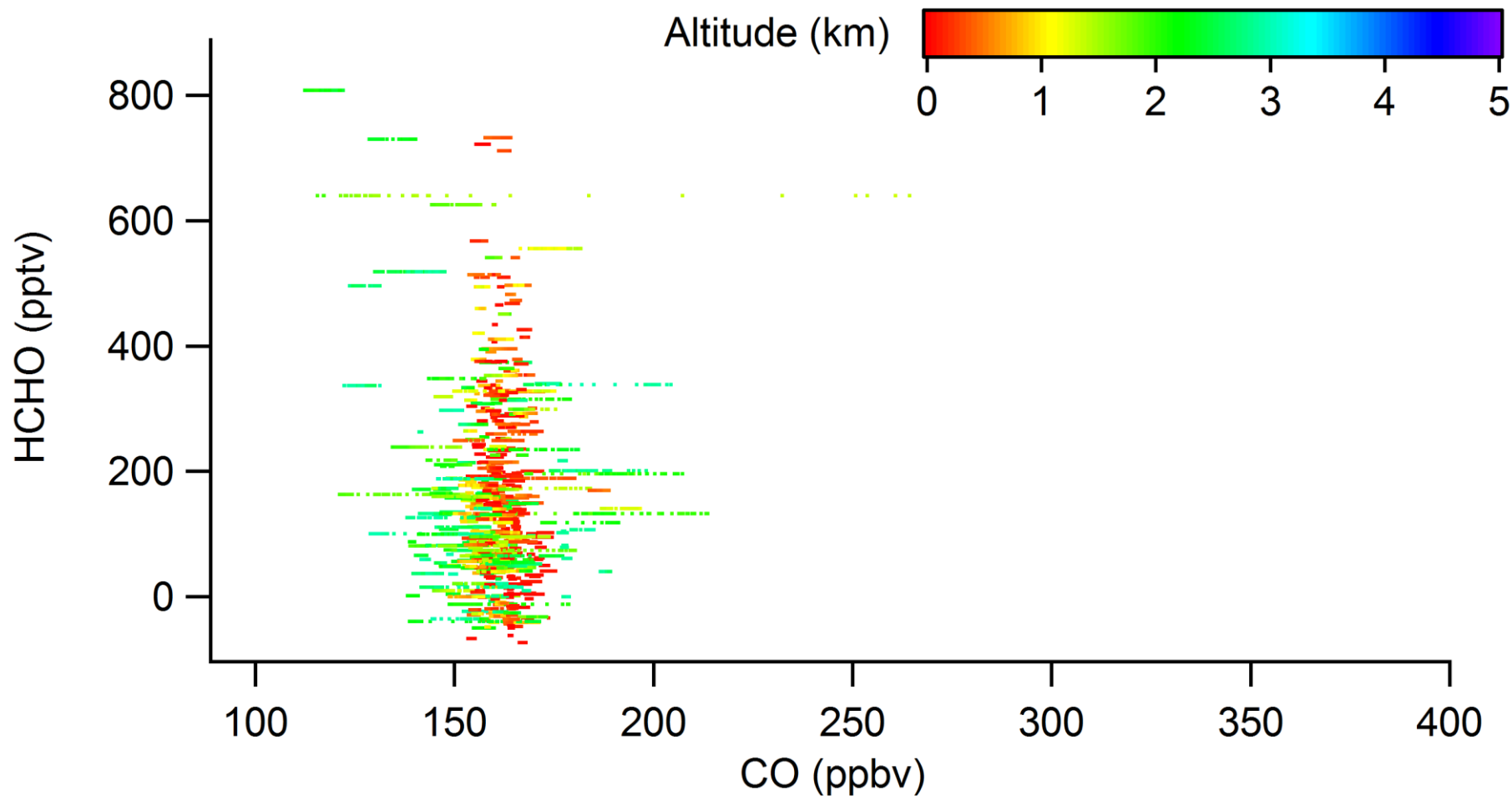


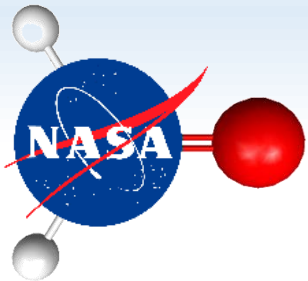
ARCTAS HCHO vs CO



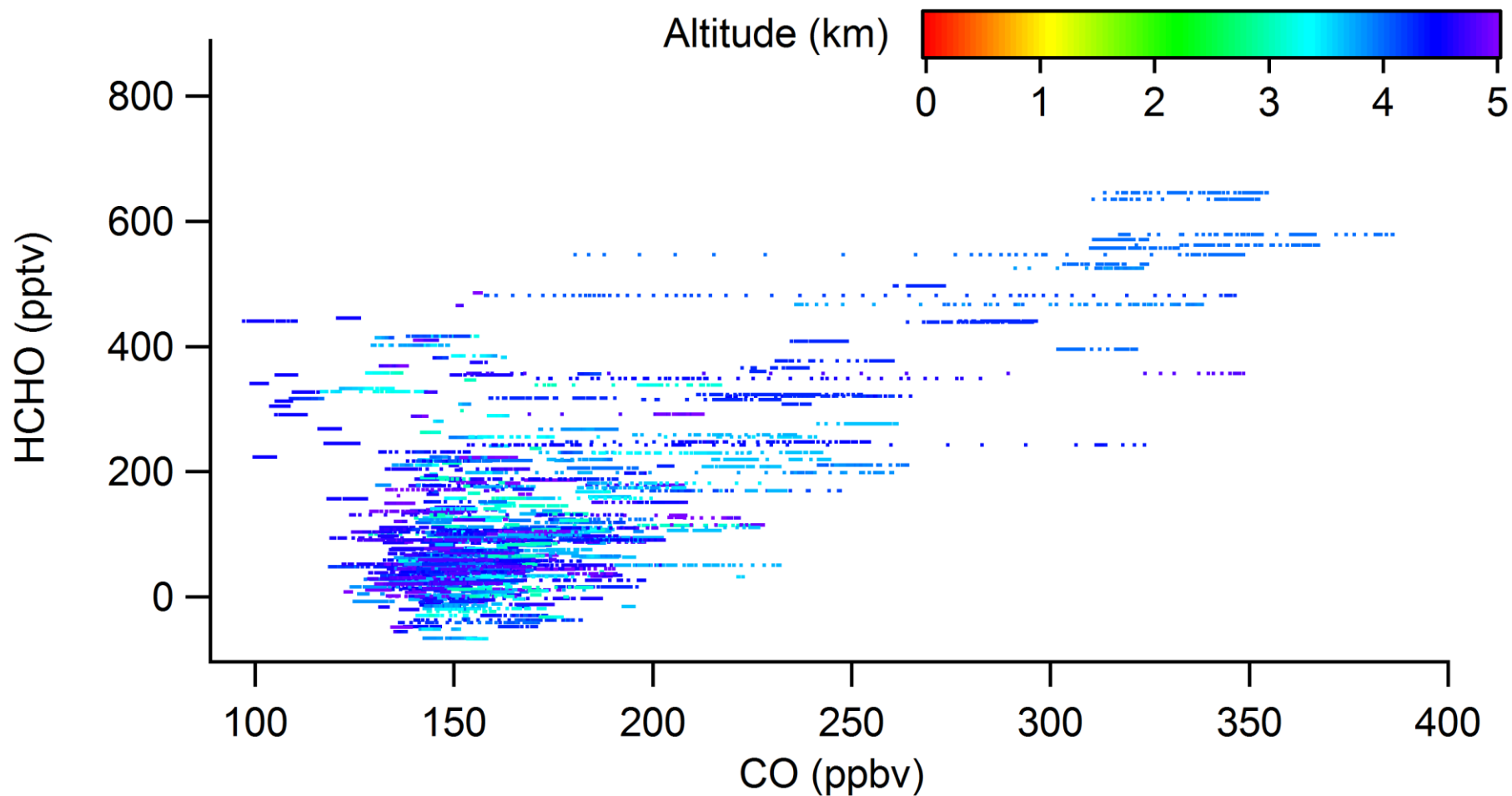


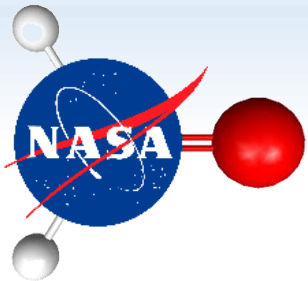
Altitude < 3 km





Altitude > 3 km





Conclusions



- Free troposphere HCHO concentrations typically very constant (and low)
- Large BL enhancements observed in/downwind of urban and large power generation centers
- FT air did not correlate with CO as observed during ARCTAS
- Future effort will focus on determining sources of HCHO enhancements