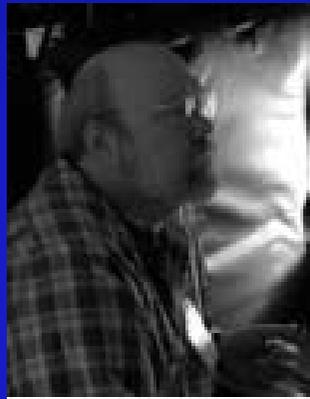
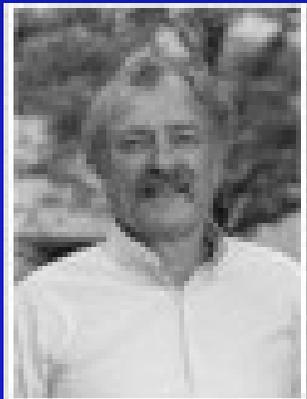


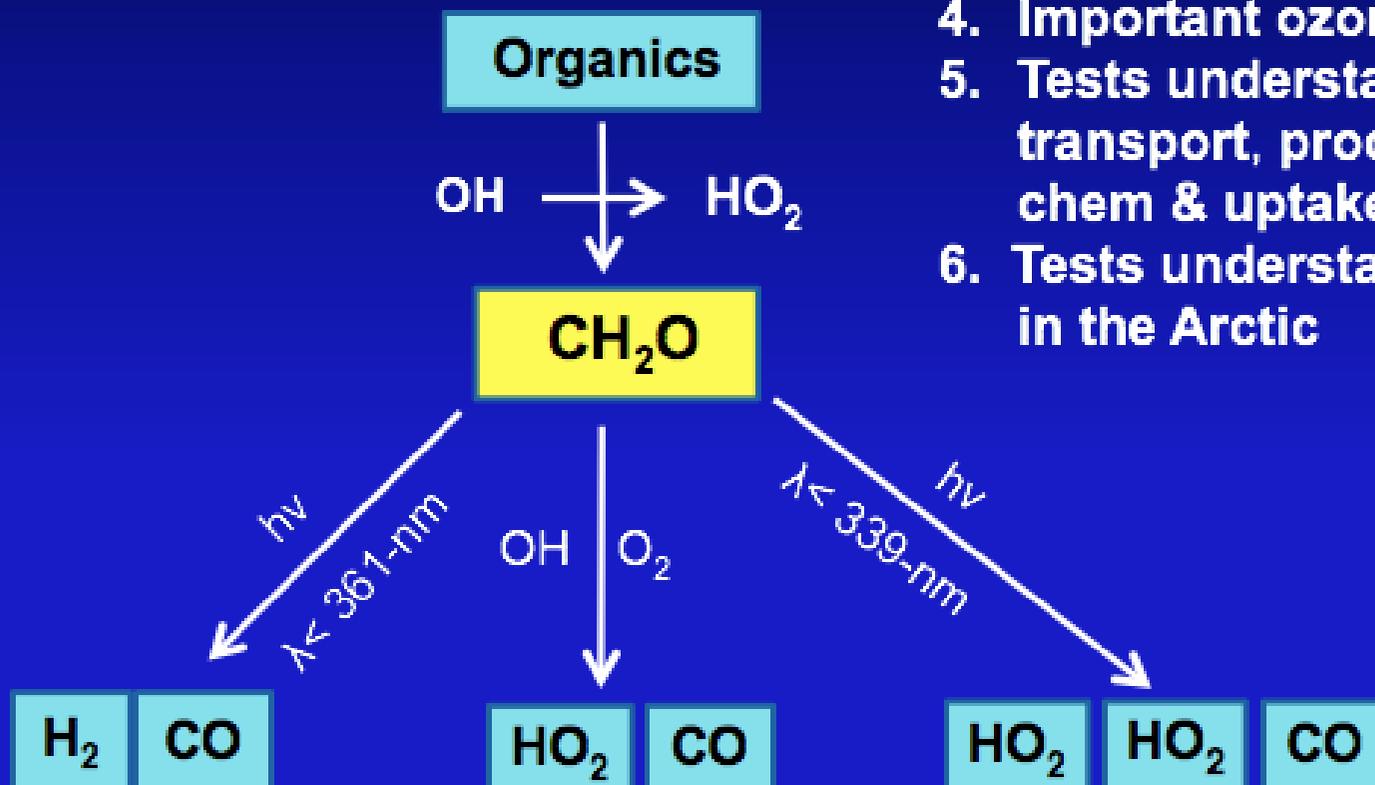
Measurements of Formaldehyde by Difference Frequency Absorption Spectroscopy (DFGAS)

Alan Fried, James Walega, Petter Weibring, & Dirk Richter
Earth Observing Laboratory
NCAR

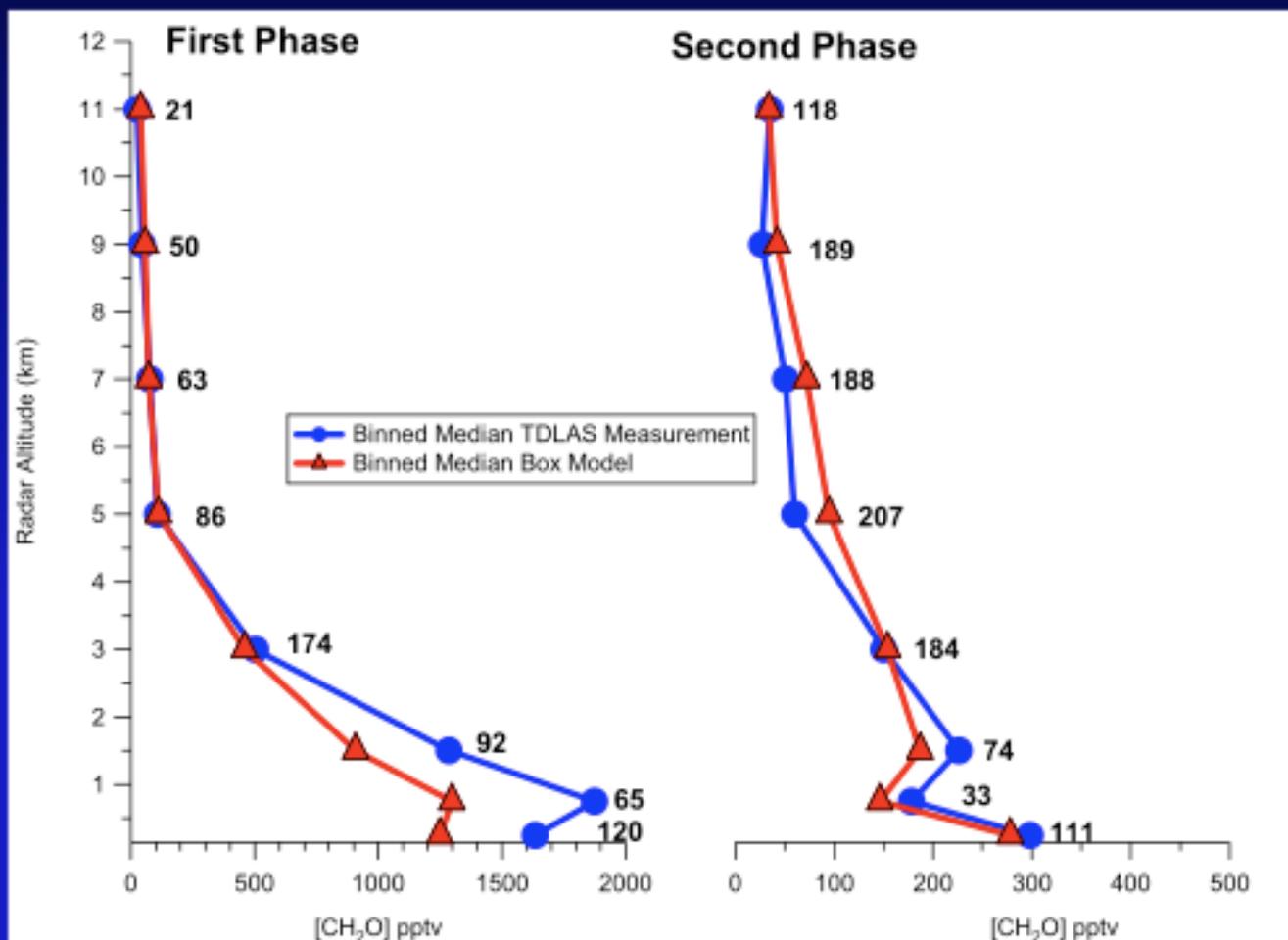


Formaldehyde in the Atmosphere

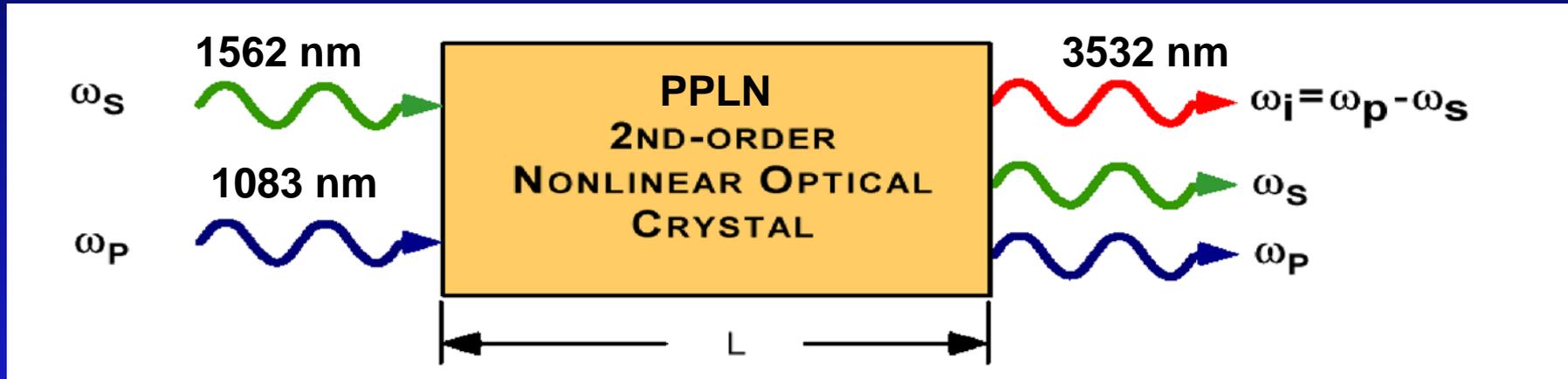
1. Indicator of HC activity
2. Test species in HC oxidation
3. Source of HO₂ and CO
4. Important ozone precursor
5. Tests understanding of convective transport, processing, liquid phase chem & uptake
6. Tests understanding of Br & Cl chem. in the Arctic



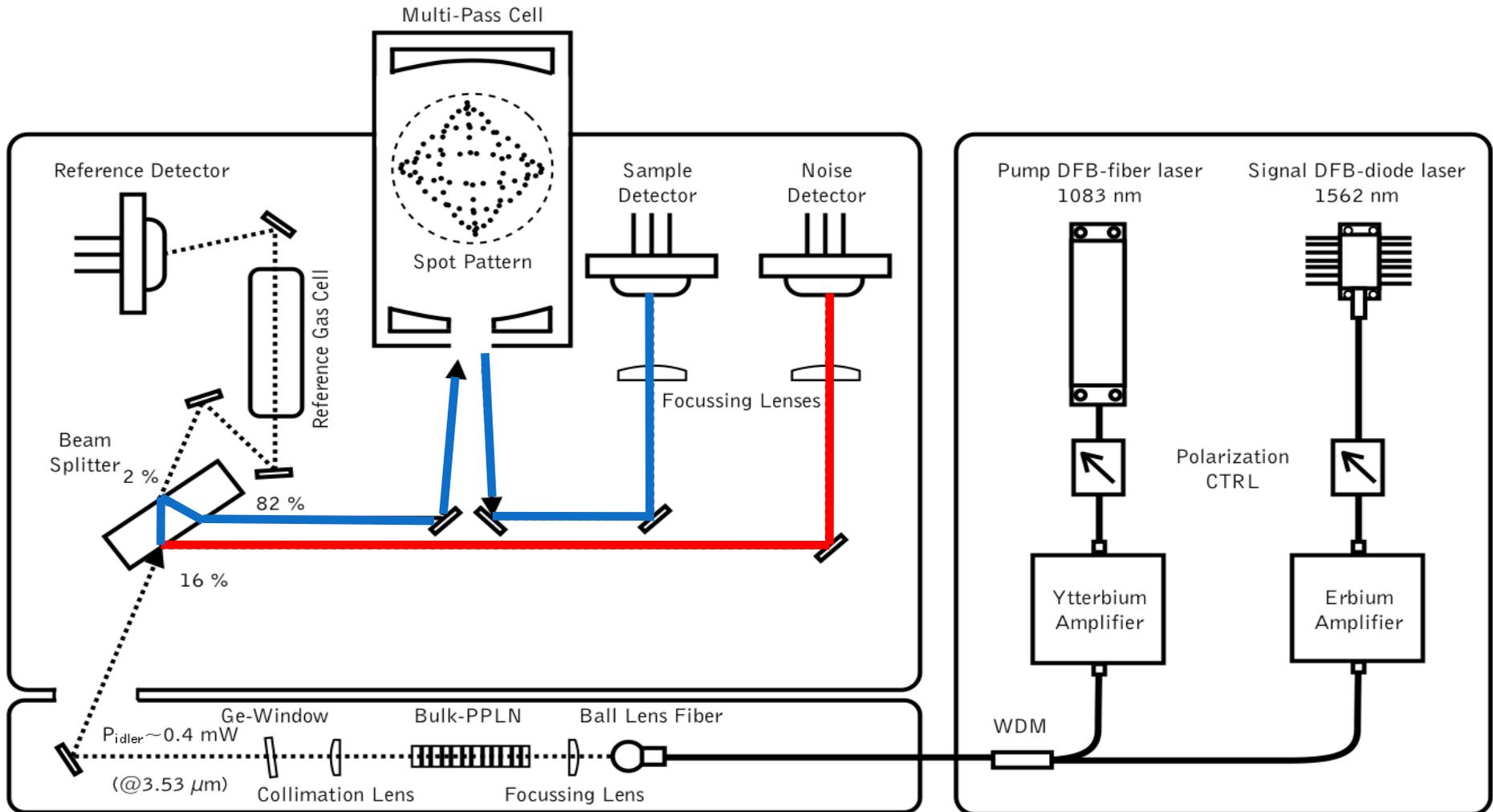
Formaldehyde Measurements – Box Model Comparisons During MIRAGE



Difference Frequency Generation



DFG Spectrometer



DFGAS on NASA DC-8 During ARCTAS

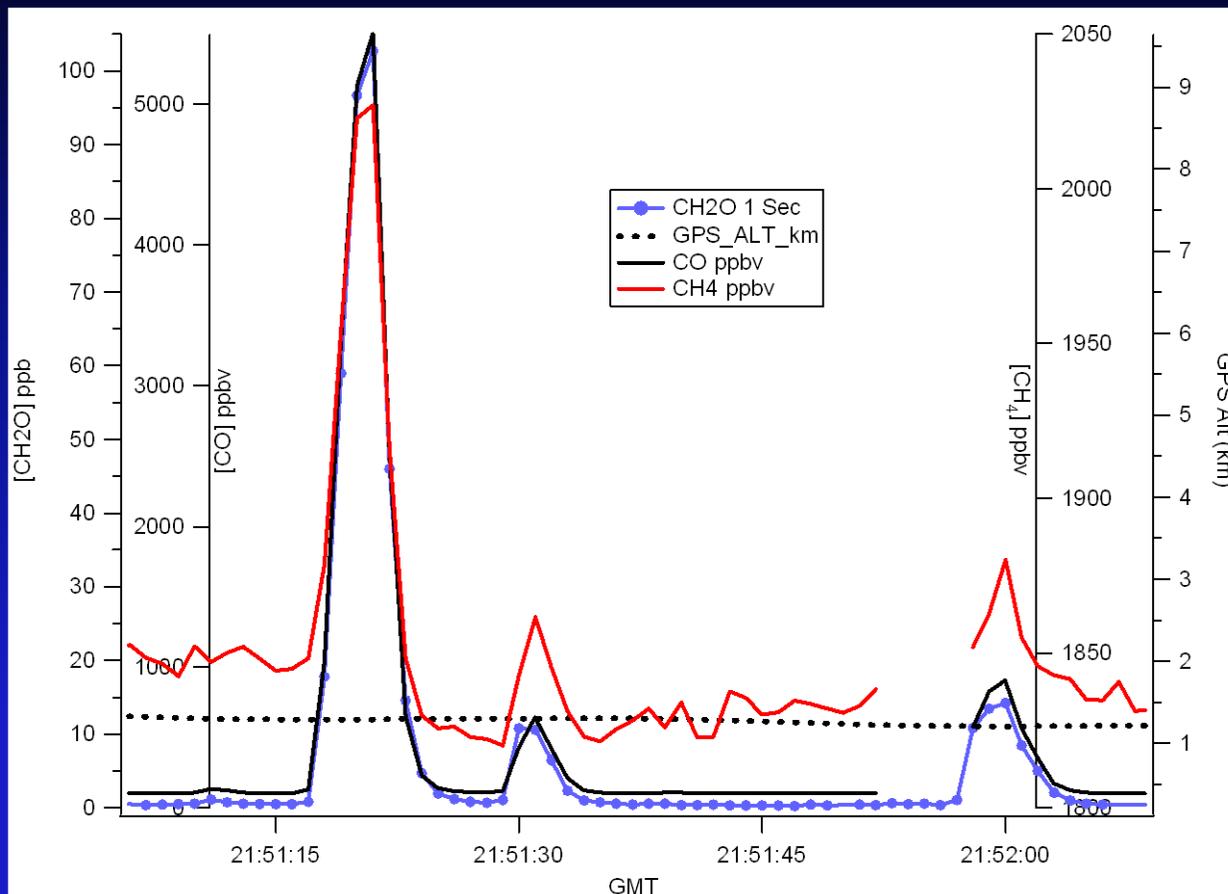


Once system running no optical adjustments (semi-autonomous)

1 Sec LOD (1σ) 60- 85 pptv

1 Min LOD (1σ) 11 – 15 pptv

Demonstration of Fast Instrument Response



Airborne DFG CH₂O, and DACOM CO, and CH₄ measurements in a Pyro-Convective plume during the summer ARCTAS phase

System Upgrades & Timeline

- **Pressure Control of Optical System – Early Next Year (Investigating Feasibility)**

Plans/Concerns for Integration

- System Location - Left side of aircraft
- Access to Front and Back of Inboard Rack
- Place onboard for AI air cylinder or Allowance for Use of Carbon Fiber Cylinder and small cylinder for MeOH
- Cover Over Inlet Probe at Night
- Temp Cabin Max 35 C

Flight Constraints - None

Data Analysis Plans

➤ Collaborations with NASA Modelers

- Continuation of Measurement-Model Comparisons
- Integrated Column Comparisons
- Continuation of Assessment of CH₂O Sources & Sinks
- Detailed Comparisons with Ground-Based Measurements
- Interesting to Carry Out Lagrangian Flight Patterns