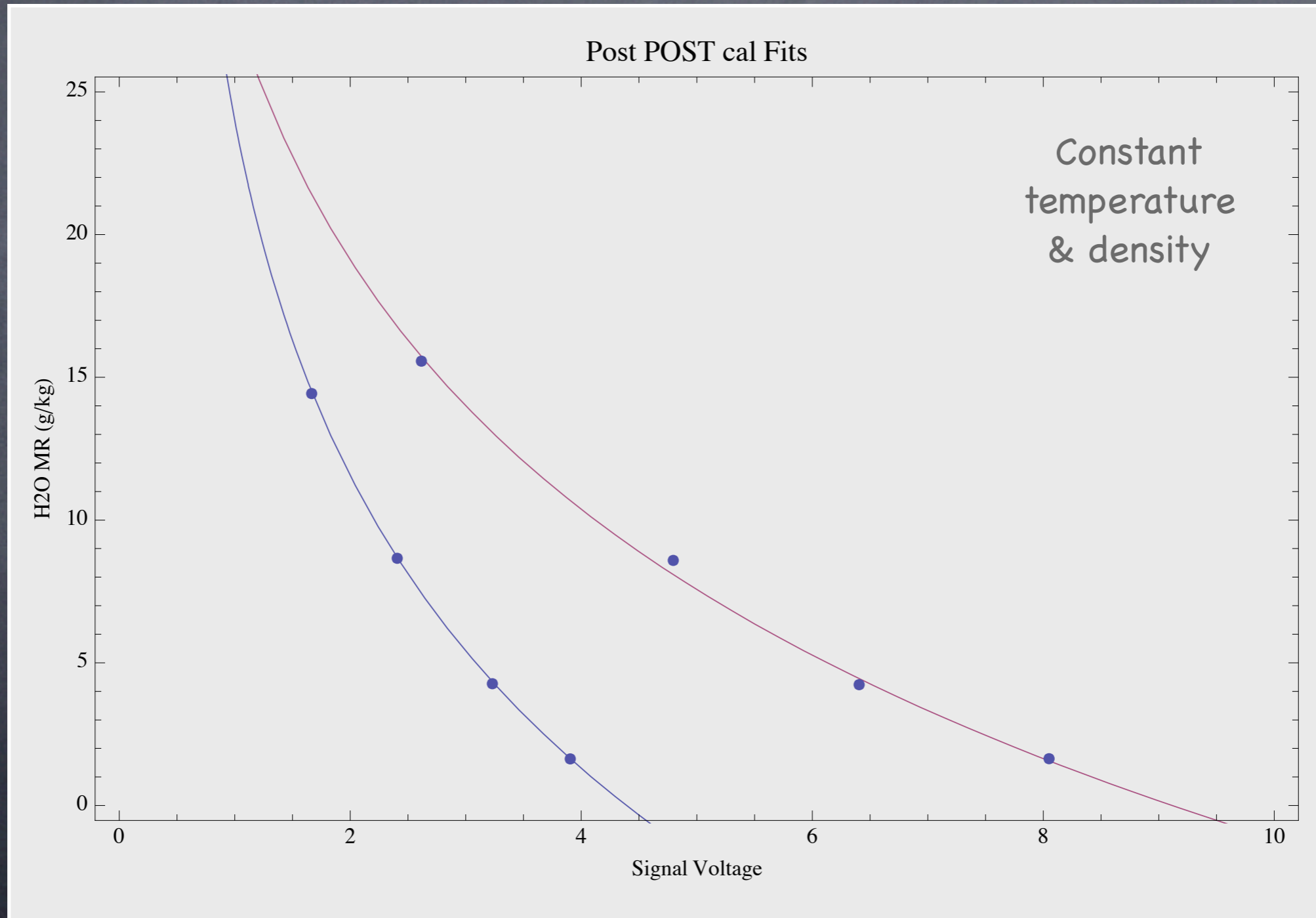


# NCAR Fast UV Hygrometer

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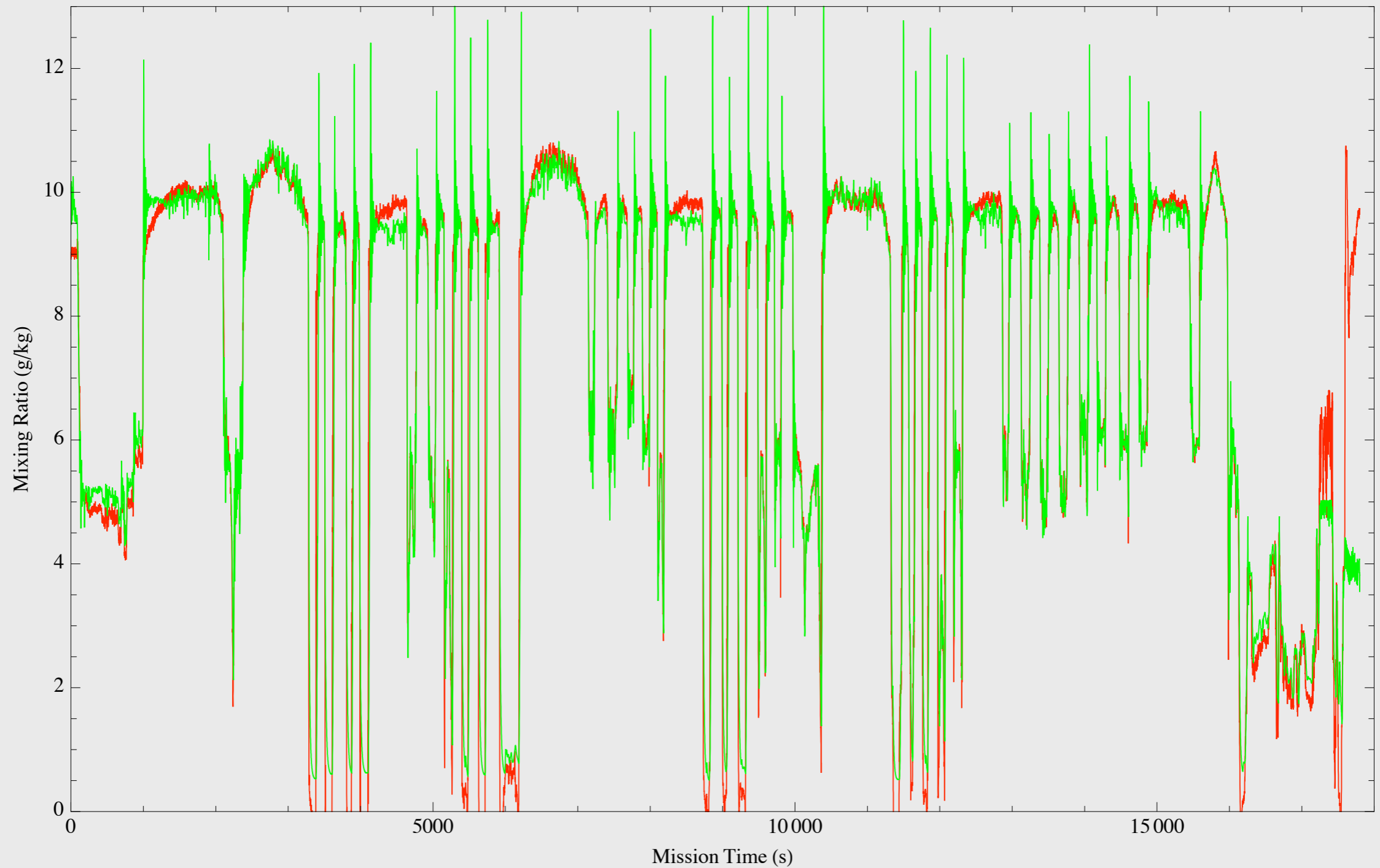
- Prototype to replace old technology Lyman-alpha absorption hygrometers
- >100 Hz sample exchange rate.
- Analog output recorded at 100 samples/second.
- Single beam – no internal reference
- Fit to match chilled mirror mixing ratio

# POST post-project calibration, Before and after window cleaning.



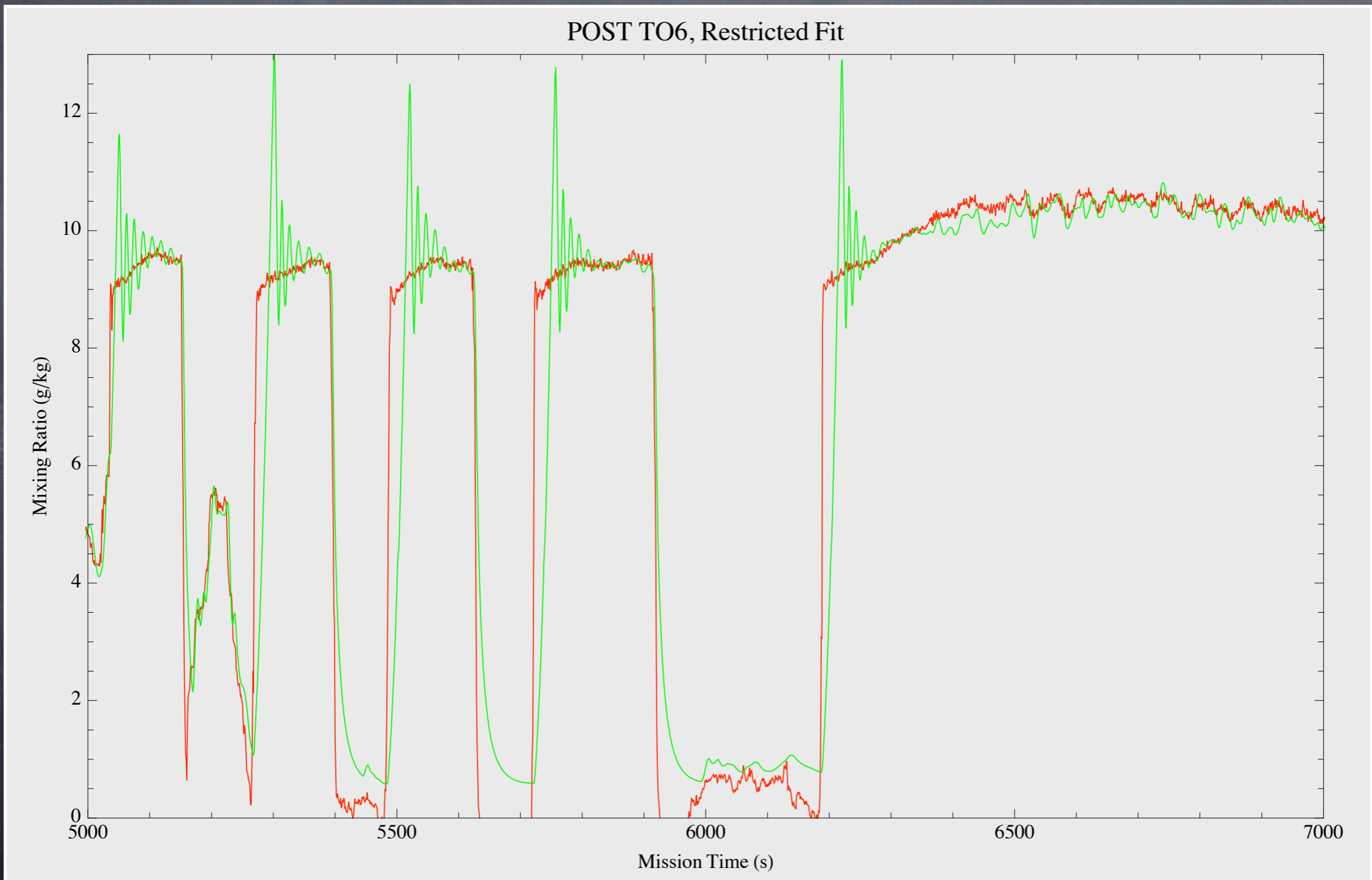
- Water vapor response coefficient fixed by post-POST calibration.
- Fit to chilled mirror mixing ratio takes out pressure and temperature dependent atmospheric absorption ( $O_2$ ,  $CO_2$ ), window contamination, time and temperature drift.

POST TO6, Full Fit



Green is chilled mirror  
Red is UV hygrometer

- Optimized for moderate and higher mixing ratio.
- Fit sometimes undershoots at low mixing ratio.



# Issues

- Unknown (but short) delay through ~30 cm sample line.
- Offset jumps start occurring on flight 10
  - As much as  $\pm 1$  g/kg
- 60 Hz interference during T017
  - Appears at 40 Hz because of aliasing by 100 sample/second digitization

# Data Output

- Variable name MRLA3
- Output at 100 sample per second
- No averaging
- Accuracy typically 0.2 g/kg (to chilled mirror) above a few g/kg.
- Noise typically 0.05 g/kg rms



# Digital Imagery

- Forward and side-looking cameras on Twin Otter
- Images recorded at 1 Hz
- Combine forward and side images with time-matched cabin data
- Compile into movie