# Migrating from HITRAN 08 To _____

- We agreed to explore possibly move to a managed linelist (ATM) from a straight adoption of HITRAN:
  - Needs a manager(!),
  - May need explanation when comparing with other retrievals e.g. satellites,
  - **Will have more consistent, more accurate retrievals less susceptible to systematic errors and spurious interfering species issues locally and site to site.**
- Try to test both ATM and HIT 16
- As HITRAN may improve there would be a convergence with ATM (in theory) especially for target gas features within retrieval windows.

# IRWG Linelist Migration

## Outline or *reasonable* target for an IRWG linelist

- Use a 'managed' list
- Lines used are about ± 10cm$^{-1}$ around the retrieval windows
  - This would be a managed region
- Target features would be HITRAN (likely 2016 but not necessarily)
  - ie. from published data
  - Retain coherence with band
- Interfering species
  - May contain edited parameters
  - May be Inserted / Removed lines

*Based on our fitting needs*

- Available publicly
  - Attributed a DOI
- For practical needs a gas parameter list is otherwise HIT16 or ATM from 500 – 20000cm-1
- Revisited as better parameters arise by species

# IRWG Linelist Migration

- Dec 2019
  - D/L HITRAN16
  - Obtained an interim ATM list from Geoff here called ATM18 but earlier then list currently available (Geoff described yesterday).
  - Then both parsed for mid-IR NDACC observations,
  - Put in format for (sfit) hbin input format (similar as for PROFFIT),
  - Updated and included pseudolines, removed obsolete lists. Added some documentation,
  - Available at https://wiki.ucar.edu/display/sfit4/November+2018+Pre-Release

# IRWG Linelist Migration

Volunteers for initial test

| | |
|---|---|
| CH4: | Ralf, test with Thikonov, Jim with OE |
| O3: | Ivan/Jim |
| CO: | Ivan/Jim |
| HNO3: | Nicolas Jones |
| N2O: | Minqiang |
| HCN: | Maria |
| HCl: | Manu |
| HF: | Maxime Prignon |
| ClONO2: | Manu |
| C2H6: | Manu |
| --- | --- |
| *H2CO:* | *Corinne* |
| *OCS:* | *Ivan/Jim : OCS study used HIT2012* |

Focus on 10 species for initial evaluation

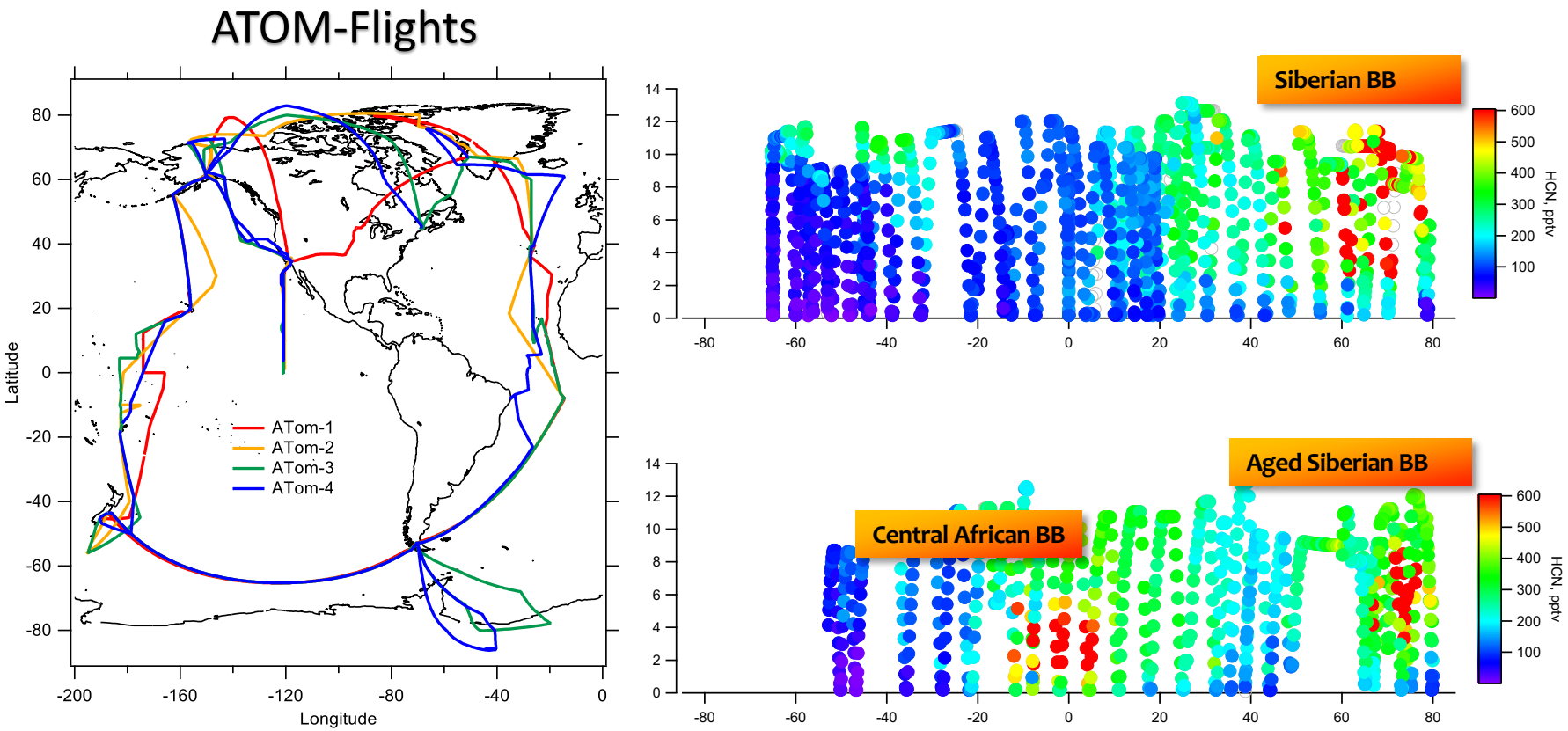
**Every group will need to test and respond at some (near) stage.**

# IRWG Linelist Migration

- **Testing HITRAN 2016 by means of sensitivity studies is an important and key step within the IRWG.**
- **Sometimes, it is clear whether new line parameters improve the retrievals, primarily by means of fit quality.**
- **In some cases, it is not straightforward, or even new line parameters might worsen the fit?.**
- **In any case, validation of retrievals is an important step.**
- **What approach should be followed to know whether HITRAN 16 is an improvement?**
- **Aircraft measurements can potentially offer a validation tool. In this case, we propose using global observations during the ATOM and HIPPO field campaigns. Both campaigns offer the following:**
  - **In-situ observations profiling from near surface to about 12 km (only tropospheric gases?)**
  - **Cover pole to pole observations.**
  - **Avoid bias due to different instrument (same instrument is used)**

# IRWG Linelist Migration

## ATom Deployments, Flights




IRWG: O3, HNO3, N2O, CO, CH4, HCN
Others: HCOOH, NO2, NO, SF6, $CFCl_3$, $CF_2Cl_2$, OCS, H2O, CO2

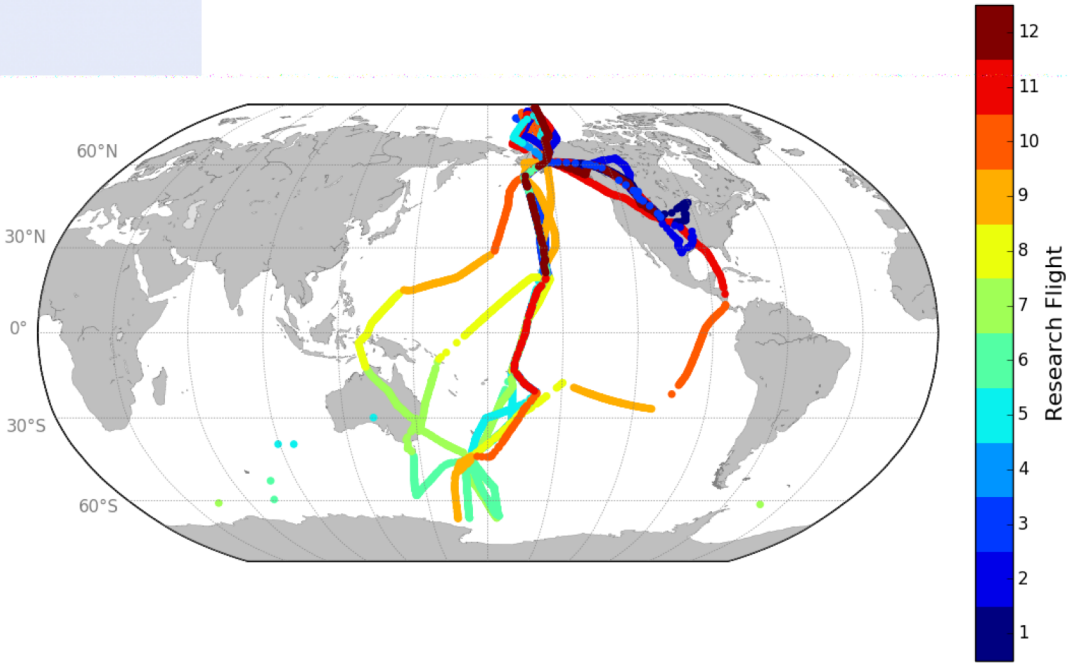
MLO, LDR, BLD, TAB, EUR, IZN, TOR, EUR

# IRWG Linelist Migration

## HIAPER Polo-to-Pole Observations (G-V NSF/NCAR aircraft)

HIAPER Pole-to-Pole Observations

I - January 7, 2009 to January 31, 2009
II -October 26, 2009 to December 19, 2009
III - March 20, 2010 to April 20, 2010
IV - May 31, 2011 to July 15, 2011
V - August 14, 2011 to September 15, 2011




IRWG: O3, N2O, CO, CH4
Others: SF6, $CFCl_3$, $CF_2Cl_2$, OCS, H2O, CO2

MLO, LDR, WLG, BLD