HIRDLS Current and Planned Data Deliveries

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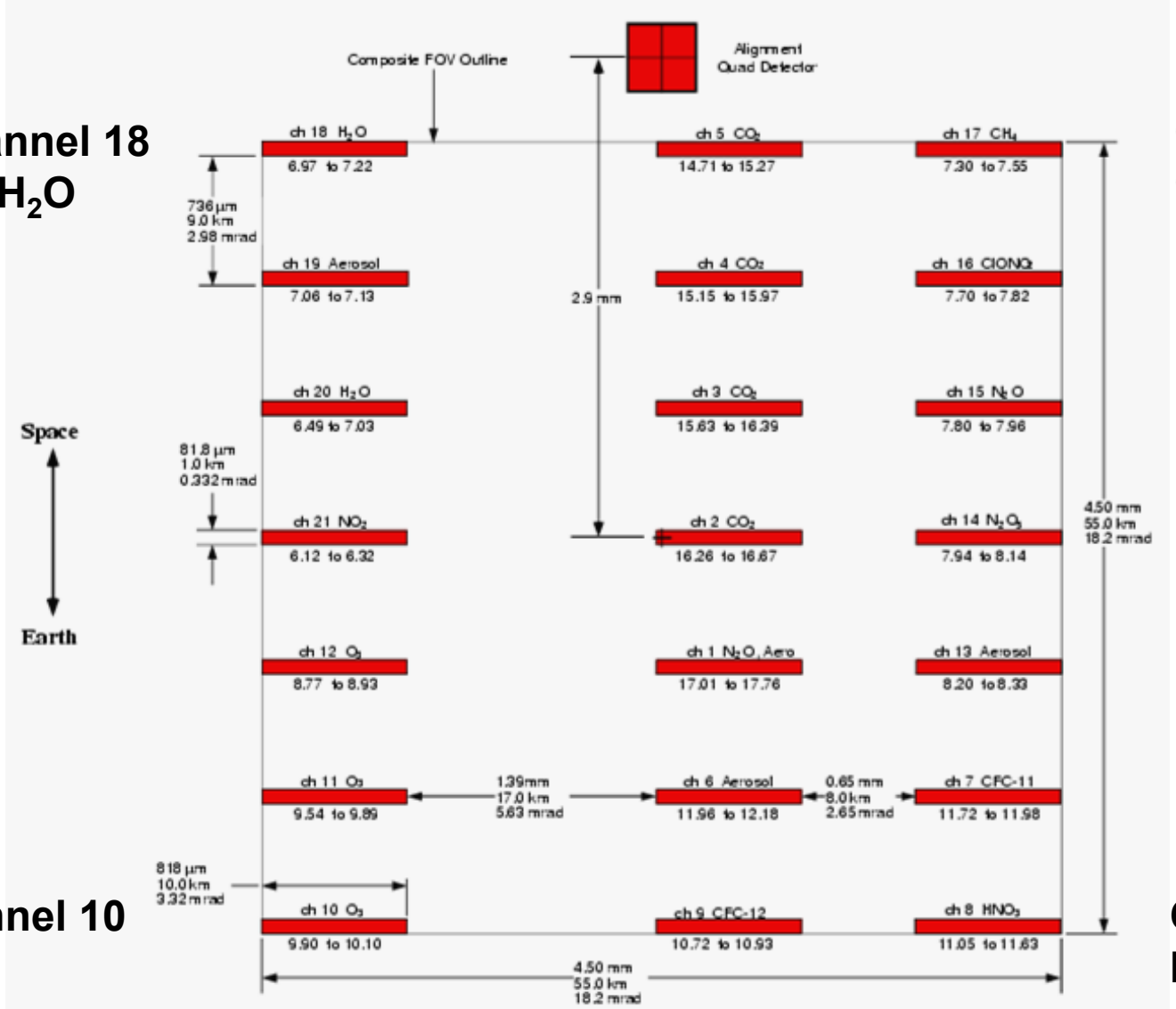
Getting and Using Science Data

- **This part will be concerned with answering user questions:**
  - **How do I get hold of the data? - BADC**
  - **Where are the data? - BADC**
  - **What user documentation is available?**
  - **What data are available?**
  - **How do I read the data?**
  - **What are the formats, contents and coverage?**
  - **What do the values mean?**
  - **What standards are followed?**
  - **What software/tools are available?**
  - **Where to go for help?**

HIRDLS Focal Plane Array Layout

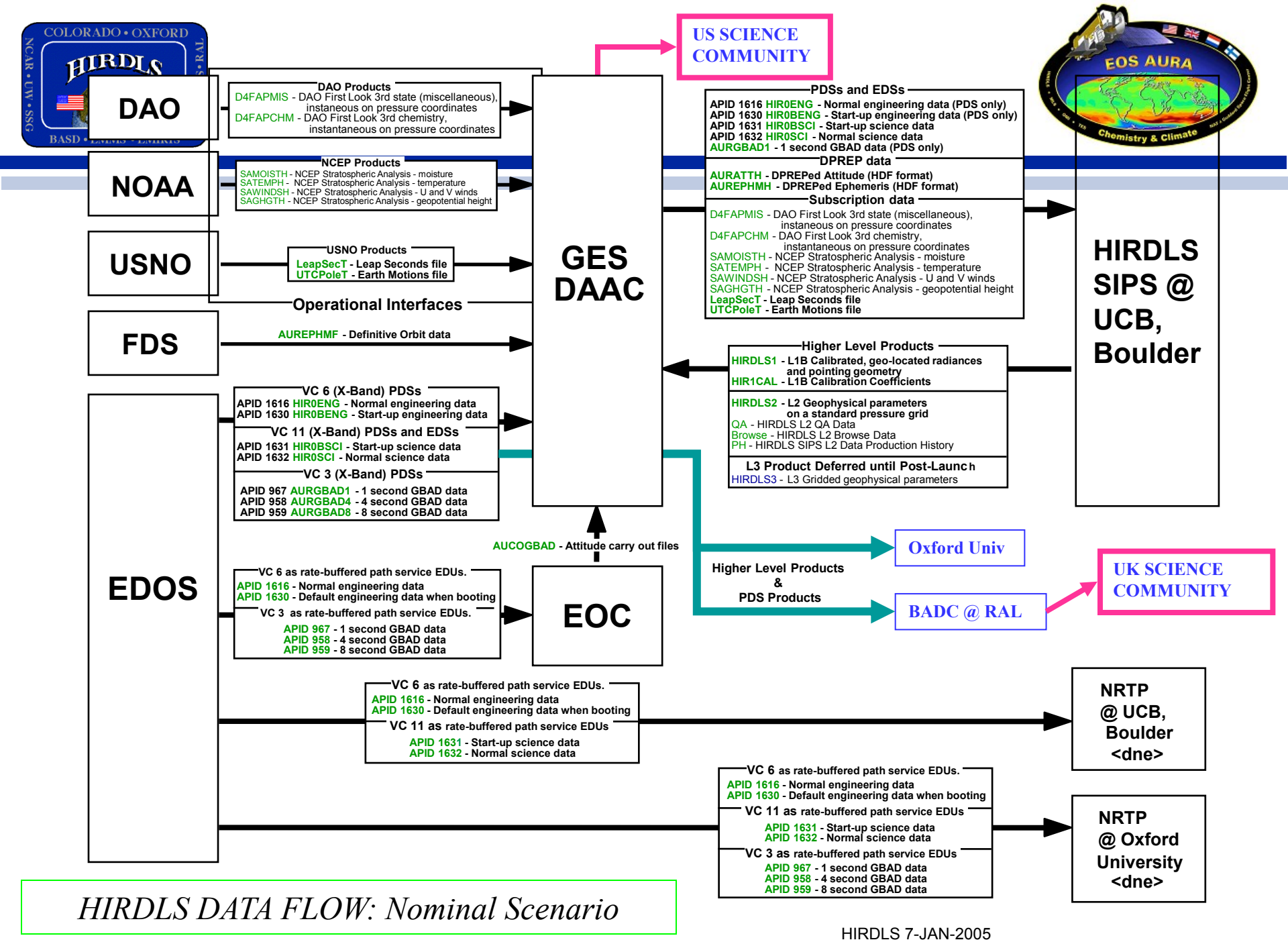
Channel 18
H_2O

Channel 17
CH_4



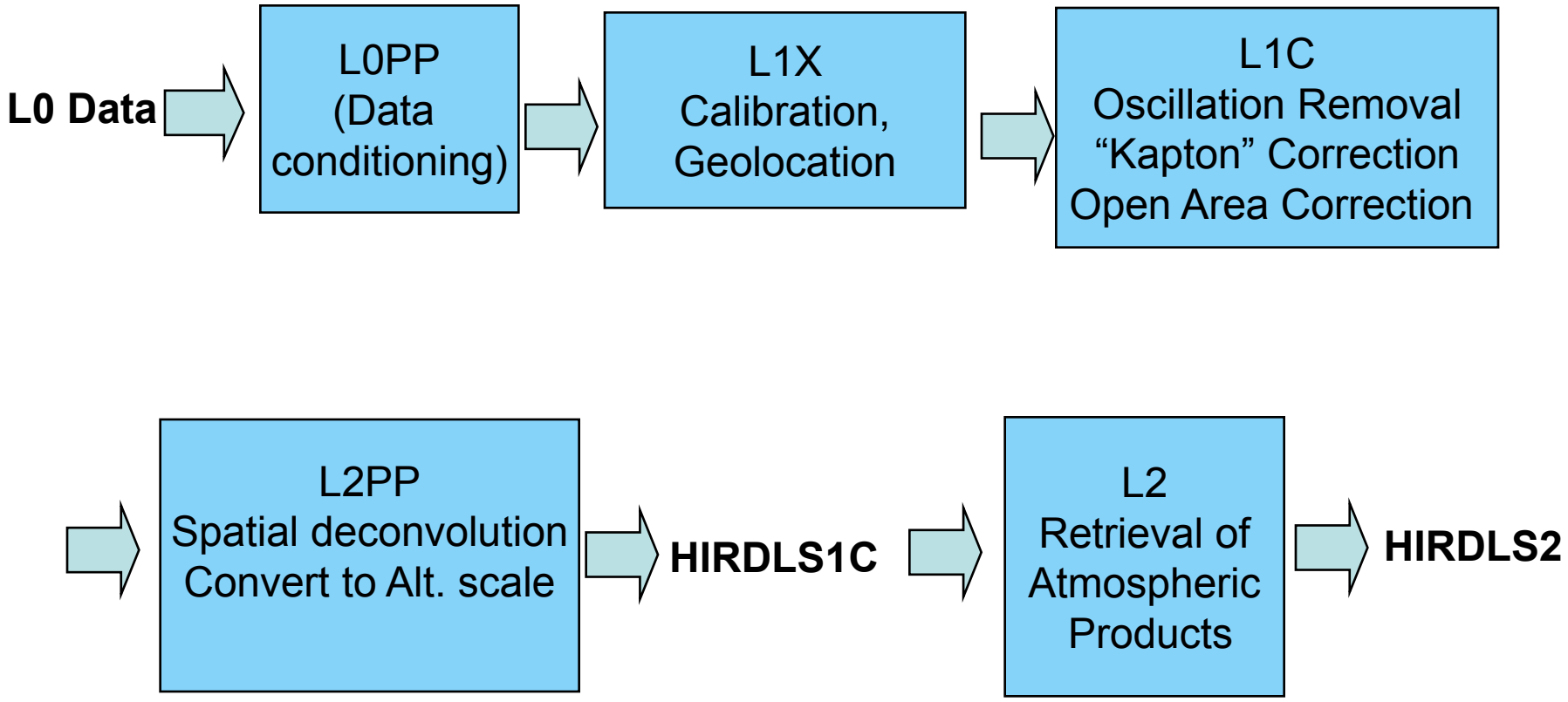
Channel 10
O_3

Channel 8
HNO_3



HIRDLS DATA FLOW: Nominal Scenario

Overview of HIRDLS Data Processing



Data Releases

- **Version 2.00 (First release was at the end of Jun 2006)**
  - **Delivered 27 days (May 4-31, 2006) of L2 data to BADC.**
  - **Includes Temperature, Ozone, Nitric Acid & Cloud top height.**

- **Internal processing remains experimental, for selected days of interest from each new software version.**
- **We do not yet plan for wholesale reprocessing.**
- **Next major release to BADC expected Jan '07.**

- **HIRDLS Documents at BADC on HIRDLS documentation page:**
  - **A short guide to the use and interpretation of V2.00 Level 2 data.**
  - **Data Description and Quality -- Version 2.00**

Scan Tables

- **HIRDLS instrument has used four different scan patterns (scan tables) since January 2005 (when the instrument was released to us from the anomaly review board), each one designed to allow us to compensate better for the obstruction.**
  - **ST 30 – January 21 ... April 28, 2005**
  - **ST 13 – April 28, 2005 ... April 24, 2006**
  - **ST 22 – April 24 ... May 4, 2006**
  - **ST 23 – May 4, 2006 ...**
- **Recent versions of the de-oscillation code have custom features for each scan table. Each of several recent experimental releases has added the ability to handle one more scan table.**

Version 2.00

- **Installed in June, 2006**
- **Handles only scan table 23.**
  - **ST 23 – May 4, 2006 - we have no plans to change the operational scan table.**
- **Delivered 27 days L2 data to BADC**
  - **All scan table 23**
  - **May 4 .. 31, 2006**
  - **except May 23 – pitch up**

Current Activity at the SIPS/SCF

- **Adding ability to process scan table 22 and 13 and 30.**
  - **ST 30 – January 21, 2005 ... April 28, 2005**
  - **ST 13 – April 28, 2005 ... April 24, 2006**
  - **ST 22 – April 24, 2006 ... May 4, 2006**
- **Adding improvements to cloud detection algorithms.**
- **Adding improvements to geolocation algorithms.**

- **Planning to release next version late October 2006 to include above improvements and for data period Jan 2006 to October 2006.**

Future Activity at the SIPS/SCF

- **Adding improvements to blockage emission algorithms.**
- **Adding improvements to open area fraction algorithms.**
  - **Expect to include remaining geophysical products.**

- **Planning to release further version around January 2007 (depending upon validation work) to include above improvements and for data period extending back to end January 2005 to date of delivery.**

How to read the data

- **Easiest of you have IDL v 6.1 (or 6.0 with appropriate patches).**
- **The most commonly used routine:**
  - **Get_aura.pro**
- **Essential reading material:**
  - **HDF-EOS Aura File Format Guidelines at http://www.eos.ucar.edu/hirdls/**
  - http://hdf.ncsa.uiuc.edu/HDF5/doc/Tools.html
    - h5dump enables the user to examine the contents of an HDF5 file and dump those contents, in human readable form, to an ASCII file.
  - http://hdf.ncsa.uiuc.edu/hdf-java-html/hdfview
    - The HDFView **is a visual tool for browsing and editing NCSA HDF4 and HDF5 files. Using HDFView, you can•**
      - view a file hierarchy in a tree structure
      - create new file, add or delete groups and datasets
      - view and modify the content of a dataset
      - add, delete and modify attributes
      - replace I/O and GUI components such as table view, image view and metadata view

Other sources

- **Maybe of interest (but only found Aura MLS)**
  - **http://www.openchannelsoftware.org/projects/Read_MLS_Level_2_Geophysical_P**

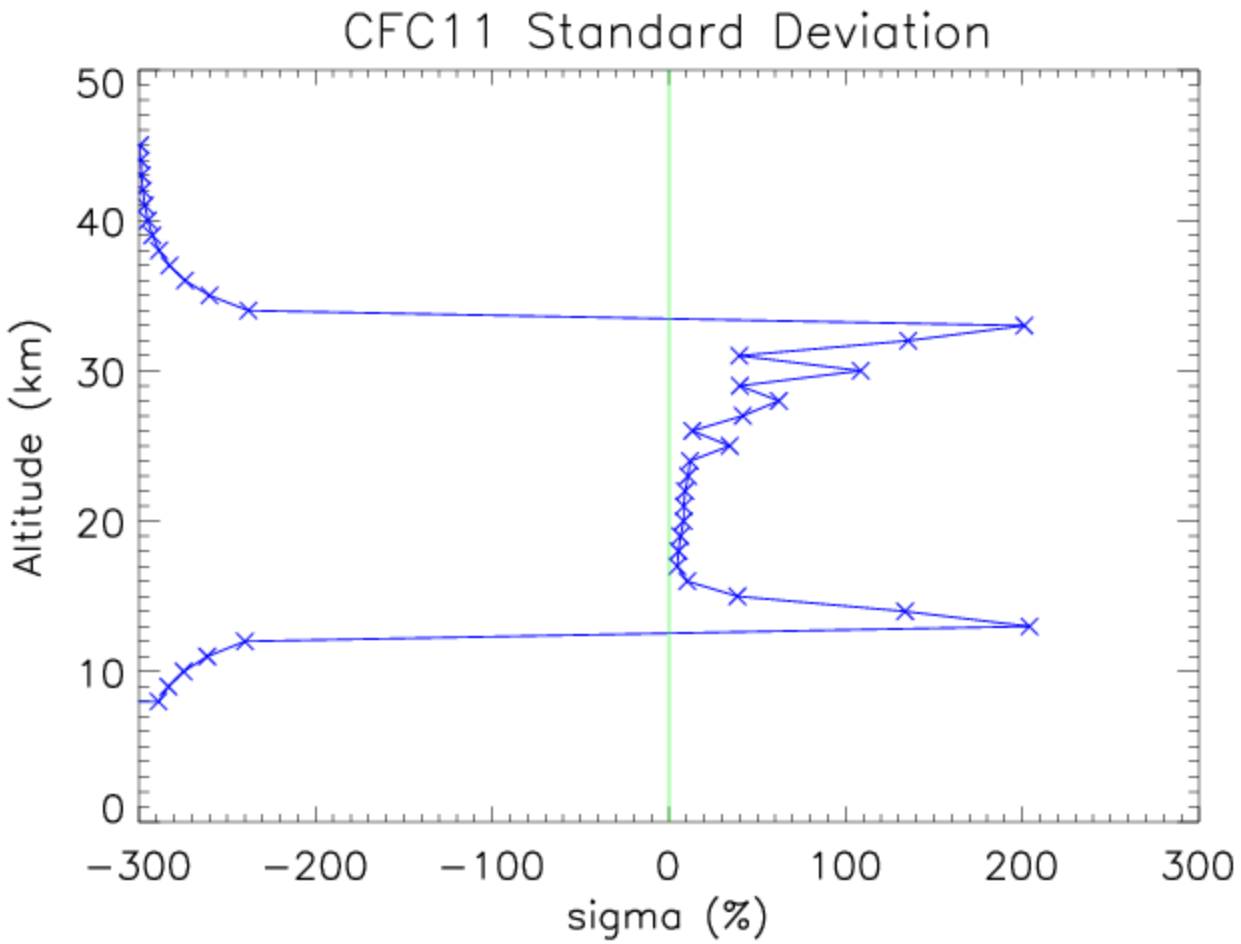
    Which is an IDL function for reading level 2 data from the Microwave Limb Sounder experiments (I did not sign up for this - since get_aura.pro serves our needs).

  - **For users who do not have an IDL license - IDL provides a method called 'virtual machine' where by routines can be pre-canned for a specified operating system and run as executable programs.**
  - **If you have any needs or questions please contact us:**
    - John Barnett 01865 272909; j.barnett1@physics.ox.ac.uk
    - Wendy Garland w.garland@rl.ac.uk
    - Chris Hepplewhite c.hepplewhite1@physics.ox.ac.uk

The Data

- **The NormChiSq is a single value per profile (currently has a fill value of ----------999)**
- **The Quality is a single value per profile (currently set to zero).**
- **The precision is a value per pressure level per profile.**
  - P = Q * $\sqrt{S_x^{ii}}$
    - The precision values are negative where the retrieved products are dominated by the a-priori.
    - If the standard deviation as derived from the available data is large (close to 212 %) the a-priori contribution is still very large.
    - In general one can choose to interpret std-devs of less than about 30% to be dominated by the HIRDLS measurement.

Precision


CFC11 Standard Deviation
Altitude (km)
50
40
30
20
10
0
−300
−200
−100
0
100
200
300
sigma (%)

Example data fields.


```
IDL> .compile ./get_aura
% Compiled module: HANDLEATTRIBUTE.
% Compiled module: HANDLEDATAFIELD.
% Compiled module: GET_AURA.
IDL> file='HIRDLS2_v2.02-c3_2006d132.he5'
IDL> r=get_aura(file,'O3',Ozone)
% Loaded DLM: HDF5.
IDL> help,Ozone
OZONE           FLOAT     = Array[145, 5550]
```

There are 145 pressure levels from 1000 mb to 0.001 mb and 25 levels per decade (6 decades x 24 layers).

And 5550 profiles retrieved on this day (24 hour period).

L2 data fields -1 of 4

macbeth(clh)% h5dump -H HIRDLS2_v2.02-c3_2006d132.he5 | grep DATASET | more

DATASET "10.8MicronCloudAerosolFlag" {

- DATASET "10.8MicronExtinction" {
- DATASET "10.8MicronExtinctionNormChiSq" {
- DATASET "10.8MicronExtinctionPrecision" {
- DATASET "10.8MicronExtinctionQuality" {
- DATASET "12.1MicronCloudAerosolFlag" {
- DATASET "12.1MicronExtinction" {
- DATASET "12.1MicronExtinctionNormChiSq" {
- DATASET "12.1MicronExtinctionPrecision" {
- DATASET "12.1MicronExtinctionQuality" {
- DATASET "17.4MicronCloudAerosolFlag" {
- DATASET "17.4MicronExtinction" {
- DATASET "17.4MicronExtinctionNormChiSq" {
- DATASET "17.4MicronExtinctionPrecision" {
- DATASET "17.4MicronExtinctionQuality" {
- DATASET "7.1MicronCloudAerosolFlag" {
- DATASET "7.1MicronExtinction" {
- DATASET "7.1MicronExtinctionNormChiSq" {
- DATASET "7.1MicronExtinctionPrecision" {
- DATASET "7.1MicronExtinctionQuality" {
- DATASET "8.3MicronCloudAerosolFlag" {
- DATASET "8.3MicronExtinction" {

L2 data fields -2 of 4

DATASET "10.8MicronCloudAerosolFlag" {

- DATASET "8.3MicronExtinctionNormChiSq" {
- DATASET "8.3MicronExtinctionPrecision" {
- DATASET "8.3MicronExtinctionQuality" {
- DATASET "CFC11" {
- DATASET "CFC11NormChiSq" {
- DATASET "CFC11Precision" {
- DATASET "CFC11Quality" {
- DATASET "CFC12" {
- DATASET "CFC12NormChiSq" {
- DATASET "CFC12Precision" {
- DATASET "CFC12Quality" {
- DATASET "CH4" {
- DATASET "CH4NormChiSq" {
- DATASET "CH4Precision" {
- DATASET "CH4Quality" {
- DATASET "ClONO2" {
- DATASET "ClONO2NormChiSq" {
- DATASET "ClONO2Precision" {
- DATASET "ClONO2Quality" {
- DATASET "CloudTopPressure" {
- DATASET "H2O" {
- DATASET "H2ONormChiSq" {

L2 data fields -3 of 4

DATASET "H2OPrecision" {
- DATASET "H2OQuality" {
- DATASET "HNO3" {
- DATASET "HNO3NormChiSq" {
- DATASET "HNO3Precision" {
- DATASET "HNO3Quality" {
- DATASET "N2O" {
- DATASET "N2O5" {
- DATASET "N2O5NormChiSq" {
- DATASET "N2O5Precision" {
- DATASET "N2O5Quality" {
- DATASET "N2ONormChiSq" {
- DATASET "N2OPrecision" {
- DATASET "N2OQuality" {
- DATASET "NO2" {
- DATASET "NO2NormChiSq" {
- DATASET "NO2Precision" {
- DATASET "NO2Quality" {
- DATASET "O3" {
- DATASET "O3NormChiSq" {
- DATASET "O3Precision" {
- DATASET "O3Quality" {

L2 data fields -4 of 4

- DATASET "Temperature" {
- DATASET "TemperatureNormChiSq" {
- DATASET "TemperaturePrecision" {
- DATASET "TemperatureQuality" {
- DATASET "Altitude" {
- DATASET "Latitude" {
- DATASET "LocalSolarTime" {
- DATASET "Longitude" {
- DATASET "OrbitAscendingFlag" {
- DATASET "Pressure" {
- DATASET "ProfileID" {
- DATASET "ScanAzimuthAtNominalAltitude" {
- DATASET "ScanElevationAtNominalAltitude" {
- DATASET "ScanUpFlag" {
- DATASET "ScienceScanMode" {
- DATASET "SecondsInDay" {
- DATASET "SolarZenithAngle" {
- DATASET "SpacecraftAltitude" {
- DATASET "SpacecraftLatitude" {
- DATASET "SpacecraftLongitude" {
- DATASET "TangentHeightAtNominalAltitude" {
- DATASET "Time" {
- DATASET "ViewDirectionAtNominalAltitude" {