



## High Resolution Dynamics Limb Sounder (HIRDLS)

### A short guide to the use and interpretation of V2.00 Level 2 data.

#### Introduction

This document is a brief guide for those wishing to use Level 2 data (geophysical products along the measurement track) produced by the version 2.00 (and later 2.xx) data processing algorithms for the High Resolution Dynamics Limb Sounder (HIRDLS) on the Aura spacecraft. At this time these data are not validated. In addition, they are evolving rapidly as algorithms are improved and extended. Those wishing to use data must contact one of the HIRDLS PI's concerning their intended use. Feedback to the HIRDLS team on features found in the data is strongly encouraged.

A preliminary data description and Quality Document for Data Version 2.00 will be released shortly. This short guide, as well as the Data Description and Quality Document, will be updated as additional products are released.

A full data quality document will be distributed when the data are released to the wider scientific community. This interim document is aimed at those obtaining data directly from the HIRDLS team or from the Aura Validation Data Center (AVDC).

#### Reading HIRDLS Level 2 Data

HIRDLS Level 2 data is stored in the HDF-EOS5 format in the HDF-EOS Aura File Format Guidelines document <sup>1</sup>. These data files can be read via C/C++ or Fortran using either the HDF-EOS5 or HDF5 library. A HIRDLS developed IDL routine "get\_aura" is also available upon request for those users which wish to use IDL to access the HIRDLS data.

Users should obtain the pre-compiled HDF5 library for their operating system, if possible. Otherwise, source code is also available (see <http://hdf.ncsa.uiuc.edu>). These are prerequisite in order to compile the HDF-EOS5 library (see <http://www.hdfeos.org/>). Both libraries are needed to fully access the Aura HIRDLS data files. For additional help contact the GES DISC at [help-disc@listserv.gsfc.nasa.gov](mailto:help-disc@listserv.gsfc.nasa.gov) or telephone 301-614-5224.

Each HIRDLS Level 2 file contains one day's worth of data and contains all species that HIRDLS measures. In the V2.00 series, a number of the fields will be filled completely with missing values until correction algorithms are refined for these species. For users who require only a subset of the HIRDLS species, the Goddard DAAC has the ability to subset data before distributing it to users. Contact the DAAC directly for more information on this service.

<sup>1</sup>[http://www.eos.ucar.edu/hirdls/HDFEOS\\_Aura\\_File\\_Format\\_Guidelines.pdf](http://www.eos.ucar.edu/hirdls/HDFEOS_Aura_File_Format_Guidelines.pdf)

Individual HIRDLS data values for a product are stored in fields labeled with the species name (see Table 1 for exact names). The estimated precision of each data point is a corresponding field named *SpeciesPrecision* (for instance, *Temperature* and *TemperaturePrecision*). Two additional fields for each species, *SpeciesNormChiSq* and *SpeciesQuality*, are both filled with missing for V2. *CloudTopPressure* does not have *Precision*, *NormChiSq* or *Quality* fields.

There are two time fields in the HIRDLS data file, *Time* and *SecondsInDay*. *Time* is stored in TAI time (seconds since the epoch of UTC 12 AM 1-1-1993). This time includes leap seconds and can cause problems with simplistic conversions. For this reason, HIRDLS is also storing *SecondsInDay* which is seconds since midnight of the data day. Leap seconds do not pose a problem when using this field. Note that the first data point may be negative which indicates a time stamp before midnight. This is the case for scans which span a day boundary.

### **Data Points to Avoid**

Data points for which more than half of the information comes from the a priori have the precision field set negative and preferably should not be used. Bearing this in mind, any use should be with great caution.

### **Known Problems**

Some cloud tops are not detected, resulting in retrievals at low altitudes of cloud-contaminated radiances. This can result in temperatures too warm, and positive or negative spikes in species retrievals. There may be some residual differences between up and down scans. Features, especially those with short vertical scales, should be checked to ensure they appear in scans in both directions.

These and other problems are discussed in more detail in the Data Description and Quality Document (SC-HIR-1511).

Remember that these data are currently *not validated*. In particular, no formal statement of the accuracy of the products has yet been made.

Table 1 overleaf details the useful vertical range and the HIRDLS team contact(s) for each product.

### **How do I Interpret the Data?**

The HIRDLS data give a set of values of temperature or mixing ratios on a set of pressure levels. This is described in more detail in the V2.00 data quality document.

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**HIRDLS PI Contact Information:**

**John Gille**  
[gille@ucar.edu](mailto:gille@ucar.edu)

**John Barnett**  
[j.barnett@physics.ox.ac.uk](mailto:j.barnett@physics.ox.ac.uk)

**Table 1: Information concerning HIRDLS standard products.**

| <b>Product</b>        | <b>Field Name</b>           | <b>Useful Range</b> | <b>Contact Name</b> | <b>Contact Email</b>   |
|-----------------------|-----------------------------|---------------------|---------------------|--|
| Temperature           | Temperature                 | 316 - 0.1 hPa       | Hyunah Lee          | <a href="mailto:halee@ucar.edu">halee@ucar.edu</a>                                     |
| O <sub>3</sub>        | O3                          | 100 - 1.0 hPa       | Bruno Nardi         | <a href="mailto:nardi@ucar.edu">nardi@ucar.edu</a>                                     |
| HNO <sub>3</sub>      | HNO3                        | 147 - 2.15 hPa      | Douglas Kinnison    | <a href="mailto:dkin@ucar.edu">dkin@ucar.edu</a>                                       |
| Cloud top pressure    | CloudTopPressure            | 422 - 10 hPa        | Steven Massie       | <a href="mailto:massie@ucar.edu">massie@ucar.edu</a>                                   |
| <i>HDF5, HDF-EOS5</i> | <i>Library installation</i> |                     | GSFC DAAC           | <a href="mailto:Help-disc@listserv.gsfc.nasa.gov">Help-disc@listserv.gsfc.nasa.gov</a> |
| <i>HDF-EOS5</i>       | <i>Reading HIRDLS data</i>  |                     | Cheryl Craig        | <a href="mailto:cacraig@ucar.edu">cacraig@ucar.edu</a>                                 |