Level 3 Product Specifications in the New Aura Guidelines

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Agenda

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  - Swath Data Structure
  - Grid Data Structure
  - Zonal Means Data Structure
  - Metadata File
- Tools and Components
- Current Status
- Useful Websites

Background

- Guidelines are voluntary
- Affect data layout and naming conventions
- Design goals
  - Commonality where possible
  - Diversity where necessary
- Level 2 Products were set up and implemented first
  - HDF-EOS5 and Swath Data Type
  - Metadata File
- Level 3 design built on same principles
  - HDF-EOS5
  - Added Grid and Zonal Average Data Types

Example: Level 3 Data Format

- MLS Level 3 Daily Products:
  - Using HDF-EOS5 Swath and Grid formats
    - MLS Swaths comply with the Aura Guidelines, v1.7
  - 13 daily maps and their metadata files for the following species: ClO, CO, GPH, H2O, HCl, HCN, HNO3, N2O, O3, OH, RHI, IWC, and Temperature
- MLS Level 3 Monthly Products:
  - Using HDF-EOS5 Swath, Grid and/or Zonal Means formats
  - 'Standard' and 'Diagnostic' data files for each day of the processed month in Zonal Means format
  - Two monthly data files named 'Standard' and 'Diagnostic' in Zonal Means format
  - Two monthly data files named 'Standard' and 'Diagnostic' in Grid and Swath formats

Level 3 Grid Data Structure

File Level Attributes:

OrbitNumber – 16 (for daily) or 2 (for monthly) orbit numbers
OrbitPeriod – 16 (for daily) or 2 (for monthly) orbit periods
InstrumentName – 'MLS Aura'
ProcessLevel – 'L3-Daily' or 'L3-Monthly'
GranuleMonth – '3'
GranuleDay – '11'
GranuleYear – '2005'
TAI93At0zOfGranule – '3.846e+08'
PGEVersion – 'v2-0'
StartUTC -- '2005-070T00:00:00.00000Z'
EndUTC -- '2005-070T23:59:99.99999Z'
Period --'Daily' or 'Monthly'

Grid Level Attributes:
Projection – 'Simple Cylindrical'
GridOrigin – 'Center'
GridSpacing – '(4,2)'
GridSpacingUnit – 'Degree'
GridSpan – '(0,360,-82,+82)'
GridSpanUnit – 'Degree'

Level 3 Grid Data Structure (Cont.)

Grid Name 1: *Species names (cont.)*

Dimensions:

XDim – Which is Longitude
YDim – Which is Latitude
nLevels -- Number of Pressure levels

Data Fields:

Value
Precision
Latitude
Longitude
Pressure
Time

Data Field Attributes:

MissingValue
Title
Units
UniqueFieldDefinition

Grid Name2: *Species names*

Additional grids may occur in a file

Level 3 Zonal Means Data Structure

File Level Attributes:

OrbitNumber – 16 (for daily) or 2 (for monthly) orbit numbers
OrbitPeriod – 16 (for daily) or 2 (for monthly) orbit periods
InstrumentName – 'MLS Aura'
ProcessLevel – 'L3-Daily' or 'L3-Monthly'
GranuleMonth – '3'
GranuleDay – '11'
GranuleYear – '2005'
TAI93At0zOfGranule – '3.846e+08'
PGEVersion – 'v2-0'
StartUTC -- '2005-070T00:00:00.00000Z'
EndUTC -- '2005-070T23:59:99.99999Z'
Period --'Daily' or 'Monthly'

Zonal Name 1: *Species names*

Zonal Level Attributes:
Pressure – Pressure values
VerticalCoordinate – 'Pressure'
ZonalSpacing – '2'
ZonalSpacingUnit – 'Degree'

Dimensions:
nLatitude – Number of Latitudes
nLevels -- Number of Pressure levels

Level 3 Zonal Means Data Structure (Cont.)

Zonal Name 1: *Species names (cont.)*

Data Fields:
- Value
- Precision
- Latitude
- Pressure
- Time

Data Field Attributes:
- MissingValue
- Title
- Units
- UniqueFieldDefinition

Zonal Name2: *Species names*

Additional zonals may occur in a file

Level 3 Metadata

- MLS Level 3 Metadata file will be created for each data file.
- MLS Level 3 Metadata file contains the following information:
  - Local Granule ID
  - Production Date and Time
  - Local Version ID
  - PGE Version
  - Reprocessing Planned
  - Input Granule
  - Short Name
  - Beginning and Ending Date and Time
  - Group of Measured Parameter contains QA Flags and Statistic
  - Group of Orbit Calculated Spatial Domain contains Start and Stop Orbit Numbers, Equator Crossing Date, Time and Longitude
  - Group of Horizontal and Vertical Spatial Domain

Tools and Components

- MLS Level 3 currently built with the following:
  - Toolkit version 5.2.14
  - HDF5 library version 1.6.5
  - HDF-EOS5 library version 5.1.10
- MLS Level 3:
  - Fortran 95
  - Lahey compiler v6.10e
  - Linux with Red Hat Enterprise v 3.4.4-2
- IDL
  - MLS uses version 6.2
  - Version 6.1 or later required to read Aura Guidelines-compliant data
  - A Level 2 reader available now; a Level 3 reader is promised

Current Status

- MLS Level 1 and Level 2 products continue to be produced, and archived, having become available to users since February 2005.
- MLS Level 3 is currently under development; its release is planned for August 2006.
- The latest version 2.5 of HDF-EOS Aura Guidelines including the MLS Level 3 Standard will be drafted September 2006.

Useful Websites

- Microwave Limb Sounder home page
  - http://mls.jpl.nasa.gov/
- EOS-Aura Guidelines

  http://www.eos.ucar.edu/hirdls/

  RevHDFEOS_Aura_File_Format_Guidelines.doc