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| **SOFIELevel 2 netCDF file Description** |
| SOFIE\_Level\_2\_netcdf\_file\_description\_v1.01 | Date: August 07, 2008 |
| SOFIE\_Level\_2\_netcdf\_file\_description\_v1.022 | Date: February 17, 2008 |

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| **Revisions** |
| Rev | Description of Change | By | Approved | Date |
| 1.01 | Initial Release | E. Thompson | L. Gordley | 2/19/2008 |
| 1.022 | Release 2 and V1.022 | E. Thompson |   | 2/17/2009 |

This is a description of the data contained in the SOFIE Level 2 netCDF files released in V1.022 (release 2), the second public release.
The listing of the data that the user can obtain by doing a "ncdump" on the netCDF file is described.

**A few important notes regarding some data not included in V1.022**

The sensitivities for each retrieval point are the absolute value of d(Mixing ratio)/d(Signal) for mixing ratio retrievals, d(Temperature)/d(Signal) for temperature retrievals, and d(Extinction)/d(Signal) for extinction retrievals. This is the Jacobian diagonal value in units of change in retrieved parameter per change in a signal amount equal to the measurement noise. At PMC altitudes this is approximately (underestimated by up to 50%) the retrieved parameter random noise. Future releases will report better estimates of the random noise. A value of 1.0e24 signifies that there was essentially no sensitivity for that particular retrieval point, and the retrieval algorithm moved on to the next layer.

The temperature retrieval uses the signals from band 13, the H2O retrieval uses band 6, the O3 retrieval uses Band 1 and CH4 uses the signals from band 11.

CO2 and CO2 precision estimates: CO2 retrievals will be started after a thorough evaluation of the temperature results using the 2.7 micron and the 4.3 micron channels. The CO2 retrieval requires a very precise inter calibration of those two channels.

NO and NO precision: The NO channel has unexpected detector characteristics, namely an unexpected level of temperature sensitivity. This requires some special corrections in the level 1 processing that wasn't planned. Those corrections are under development.

13 and 8 arcmin lockdown data: This data requires advanced pointing analysis and signal drift corrections with accompanying validation, which were not ready in time for this release. This data is taken approximately once a week for calibration purposes.

**Gray** shading signifies that the data has not been released, and all values in the netCDF file are assigned the missing value of -1.e24.

**SOFIE Level 2 netCDF file description for V1.022**

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| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Long name/Description** | **Valid min** | **Valid max** | **Missing value** | **Fill value** | **Units** |
| Int event(event) | Event\_number | 1 | 1000000 | -1 |   |   |
| Int Orbit(event) | Orbit\_number | 1 | 50000 | -1 | -1 |   |
| Int Date(event) | Date of occultation event |   |   |   |   | YYYYDDD |
| Int Mode (event) | Spacecraft occultation mode, Rise(0) or Set(1) | 0 | 1 |   |   |   |
| Double Latitude\_83km(event) | Geodetic latitude of 83km tangent point measurement | -90 | 90 | -1.e24 | -1.e24 | deg |
| Double Longitude\_83km(event) | Longitude of 83km tangent point measurement. | 0 | 360 | -1.e24 | -1.e24 | deg E |
| Double Time\_83km(event) | Time of 83 km measurement, Seconds since Unix Epoch+MicroTime (milliseconds) | 0 | None | -1.e24 | -1.e24 | seconds |
| Double Altitude(altitude) | Geodetic altitude grid |   |   |   |   | km |
| Double Pressure(event,altitude) | Atmospheric pressure at tangent point | 0 | 2000 | -1.e24 | -1.e24 | mbar |
| Double Temperature(event,altitude) | Atmospheric temperature at tangent point | 0 | 1000 | -1.e24 | -1.e24 | K |
| Double Temperature\_Precision(event,altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | K |
| Double H2O\_vmr(event,altitude) | Water vapor volume mixing ratio at tangent point | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double H2O\_vmr\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double CH4\_vmr(event,altitude) | Methane volume mixing ratio at tangent point | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double CH4\_vmr\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double O3\_vmr(event, altitude) | Ozone volume mixing ratio at tangent point | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double O3\_vmr\_precision(event,altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double CO2\_vmr(event, altitude) | Data not currently available. Data will be available in future releases. | 0 | 1 | -1.e24 | -1.e24 | vmr |
| Double NO\_vmr(event, altitude) | Data not currently available. Data will be available in future releases. |   |   |   |   |   |
| Double Extinction\_0330(event, altitude) | Data not currently available. Data will be available in future releases. | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_0330\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) |   |   | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_0867(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_0867\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_1037(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_1037\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_1037dv(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_1037dv\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_2462(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_2462\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_2939(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_2939\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3064(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3064\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3064dv(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3064dv\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3186(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3186\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3384(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3384\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3479(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_3479\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes). | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_4646(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_4646\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) | 0 | 1000 | -1.e24 | -1.e24 | 1/km |
| Double Extinction\_5006(event, altitude) | Extinction coefficient of tangent ray at the wavelength of this band |   |   |   |   |   |
| Double Extinction\_5006\_precision(event, altitude) | Jacobian diagonal (see comments in global attributes) |   |   |   |   | arcmin |
| Double FOV\_Lock(event) | Field of view lockdown angle relative to the top edge |   |   |   |   |   |
| Double LOS\_Bearing(event) | Line of Sight Bearing |   |   |   |   | deg E |

Where the dimensions are:

* event = UNLIMITED ; // (30 currently)
* altitude = 736
* name\_size = 300

and the global attributes are:

* Title = "SOFIE Level2"
* DP\_Type = "Level2"
* Source = "SOFIE DPC"
* Mission = "AIM"
* DP\_Version = "01.022"
* PF\_Version = "01.022"
* SW\_Version = "01.022"
* SW\_Name = "Sofie Level2"
* Calib\_Version = "01.022"
* Description = "Sofie Level2 Data Product"
* History = ""
* Gen\_Date = "2008-12-12"

Comments = "This is the Jacobian diagonal value in units of change in retrieved parameter per change in a signal amount equal to the measurement noise. At PMC altitudes this is approximately (underestimated by up to 50%) the retrieved parameter random noise. Future releases will report better estimates of the random noise."