# ICON Data Product 1.1,1.2: MIGHTI Calibrated LOS Winds and Temperature Array

This document describes the data product for ICON MIGHTI-B Level 1.1, 1.2 Calibrated Science Image File, which is in NetCDF4 format.

This file contains MIGHTI phase deltas and IR brightnesses for temperature retrieval

NetCDF files contain **variables** and the **dimensions** over which those variables are defined. First, the dimensions are defined, then all variables in the file are described.

#### **Dimensions**

The dimensions used by the variables in this file are given below, along with nominal sizes. Note that the size may vary from file to file. For example, the "Epoch" dimension, which describes the number of time samples contained in this file, will likely have a varying size.

| Dimension Name                         | Nominal Size |
|--|--------------|
| ICON_L1_MIGHTI-B_Vector_Roll           | 3            |
| ICON_L1_MIGHTI-B_IR_Array_Altitudes    | 20           |
| ICON_L1_MIGHTI-B_Green_Array_OPD       | 361          |
| ICON_L1_MIGHTI-B_Red_Array_Altitudes   | 60           |
| ICON_LO_MIGHTI_B_Image_ROI_Rows        | 929          |
| ICON_L1_MIGHTI-B_Vector_XYZ            | 3            |
| ICON_LO_MIGHTI_B_Image_ROI_Columns     | 92           |
| ICON_L1_MIGHTI-B_Green_Array_Altitudes | 82           |
| Epoch                                  | 1            |
| ICON_L1_MIGHTI-B_Vector_LLA            | 3            |
| ICON_L1_MIGHTI-B_IR_Array_Pixel_Index  | 413          |
| ICON_L1_MIGHTI-B_Time_Channel          | 3            |
| ICON_L1_MIGHTI-B_Red_Array_OPD         | 323          |

## **Variables**

Variables in this file are listed below. First, "data" variables are described, followed by the "support\_data" variables, and finally the "metadata" variables. The variables classified as "ignore\_data" are not shown.

#### data

| Variable Name   | Description   | Units                           | Dimensions  |
|---|---|---------------------------------|---|
| ICON_L1_MIGHTI_B_IR_A rray                            | Brightnesses corresponding to the five IR filters Brightnesses corresponding to the five IR filters   | Rel. R                          | Epoch, ICON_L1_ MIGHTI-B_IR_Arr ay_Altitudes, I CON_L1_MIGHTI-B _IR_Array_Pixel _Index                          |
| ICON_L1_MIGHTI_B_Gree n_Phase                         | Phase difference between the green atmospheric line and the associtaed calibration line minus the corresponding Zero Wind delta - by pixel and altitude Phase difference between the green atmospheric line and the associtaed calibration line minus the corresponding Zero Wind delta - by pixel and altitude | rad                             | Epoch, ICON_L1_ MIGHTI-B_Green_ Array_Altitudes , ICON_L1_MIGHT I-B_Green_Array _OPD                            |
| ICON_L1_MIGHTI_B_Gree n_Envelope                      | Envelopes of the green atmospheric fringes by pixel and altitude  Envelopes of the green atmospheric fringes by pixel and altitude  | Counts                          | Epoch, ICON_L1_ MIGHTI-B_Green_ Array_Altitudes , ICON_L1_MIGHT I-B_Green_Array _OPD                            |
| ICON_L1_MIGHTI_B_Gree n_Phase_Uncertainties           | Uncertainties of the phases of the green atmospheric line by pixel and altitude  Uncertainties of the phase deltas of the green atmospheric line by pixel and altitude  | rad                             | Epoch, ICON_L1_<br>MIGHTI-B_Green_<br>Array_Altitudes   |
| ICON_L1_MIGHTI_B_Gree<br>n_Envelope_Uncertaint<br>ies | Uncertainties of the envelopes of the green atmospheric fringes by pixel and altitude  Uncertainties of the envelopes of the green atmospheric fringes by pixel and altitude  | Counts                          | Epoch, ICON_L1_<br>MIGHTI-B_Green_<br>Array_Altitudes   |
| ICON_L1_MIGHTI_B_Gree n_Tangent_LatLonAlt             | Tangent point longitudes, latitudes, and altitudes for green side - middle of FoV, all altitudes  Tangent point longitudes, latitudes, and altitudes for green side - middle of FoV, all altitudes  | Degree<br>s, Degr<br>ees,<br>km | Epoch, ICON_L1_ MIGHTI-B_Time_C hannel, ICON_L1 _MIGHTI-B_Vecto r_LLA, ICON_L1_ MIGHTI-B_Green_ Array_Altitudes |
| ICON_L1_MIGHTI_B_Red_<br>Phase                        | Phase difference between the red atmospheric line and the associtaed calibration line minus the corresponding Zero Wind delta - by pixel and altitude Phase difference between the red atmospheric line and the associtaed calibration line minus the corresponding Zero Wind delta - by pixel and altitude     | rad                             | Epoch, ICON_L1_ MIGHTI-B_Red_Ar ray_Altitudes, ICON_L1_MIGHTI- B_Red_Array_OPD                                  |

| Variable Name                                       | Description  | Units                           | Dimensions   |
|---|--|---------------------------------|--|
| ICON_L1_MIGHTI_B_Red_<br>Envelope                   | Envelopes of the red atmospheric fringes by pixel and altitude  Envelopes of the red atmospheric fringes by pixel and altitude   | Counts                          | Epoch, ICON_L1_<br>MIGHTI-B_Red_Ar<br>ray_Altitudes,<br>ICON_L1_MIGHTI-<br>B_Red_Array_OPD                         |
| ICON_L1_MIGHTI_B_Red_<br>Phase_Uncertainties        | Uncertainties of the phase deltas of the red atmospheric line by pixel and altitude  Uncertainties of the phase deltas of the red atmospheric line by pixel and altitude                       | rad                             | Epoch, ICON_L1_<br>MIGHTI-B_Red_Ar<br>ray_Altitudes  |
| ICON_L1_MIGHTI_B_Red_<br>Envelope_Uncertaintie<br>s | Uncertainties of the envelopes of the red atmospheric fringes by pixel and altitude  Uncertainties of the envelopes of the red atmospheric fringes by pixel and altitude                       | Counts                          | Epoch, ICON_L1_<br>MIGHTI-B_Red_Ar<br>ray_Altitudes  |
| ICON_L1_MIGHTI_B_Red_<br>Tangent_LatLonAlt          | Tangent point longitudes, latitudes, and altitudes for red side - middle of FoV, all altitudes  Tangent point longitudes, latitudes, and altitudes for red side - middle of FoV, all altitudes | Degree<br>s, Degr<br>ees,<br>km | Epoch, ICON_L1_ MIGHTI-B_Time_C hannel, ICON_L1 _MIGHTI-B_Vecto r_LLA, ICON_L1_ MIGHTI-B_Red_Ar ray_Altitudes      |
| ICON_L1_MIGHTI_B_Gree<br>n_ECEF_Unit_Vectors        | ECEF Unit Vectors per pixel representing the green lines of sight  ECEF Unit Vectors per pixel representing the green lines of sight   |                                 | Epoch, ICON_L1_ MIGHTI-B_Vector _XYZ, ICON_L1_M IGHTI-B_Green_A rray_Altitudes, ICON_L1_MIGHTI- B_Green_Array_O PD |
| ICON_L1_MIGHTI_B_Red_<br>ECEF_Unit_Vectors          | ECEF Unit Vectors per pixel representing the red lines of sight  ECEF Unit Vectors per pixel representing the red lines of sight   |                                 | Epoch, ICON_L1_ MIGHTI-B_Vector _XYZ, ICON_L1_M IGHTI-B_Red_Arr ay_Altitudes, I CON_L1_MIGHTI-B _Red_Array_OPD     |

## Support\_Data

| Variable Name              | Description   | Units            | Dimensions |
|----------------------------|---|------------------|------------|
| ICON_L0_MIGHTI_B_Time _UTC | ISO 9601 formatted UTC timestamp (at middle of image integration).  |                  | Epoch      |
|                            | ISO 9601 formatted UTC timestamp (at middle of image integration).  |                  |            |
|                            | Derived from original GPS values reported from spacecraft (Time_GPS_Seconds and Time_GPS_Subseconds).   |                  |            |
|                            | Time calculation is offset by 615ms (flush time) for the first image in the series and for all other images are adjusted by subtracting (integration time + 308 milliseconds) from the reported GPS time then adding the difference between the readout FRT and the header FRT. |                  |            |
|                            | Time may be delayed by up to 10 ms due to FSW polling delay.  |                  |            |
|                            | Maximum time is ~2150 UTC and minimum time is ~1970 UTC.  |                  |            |
|                            | All character arrays are NULL terminated (size includes NULL).  |                  |            |
| ICON_LO_MIGHTI_B_Time _GPS | Milliseconds since 1980-01-06 00:00:00 TAI (coincident with UTC) at middle of image integration.  | millisec<br>onds | Epoch      |
|                            | Milliseconds since 1980-01-06 00:00:00 TAI (coincident with UTC) at middle of image integration.  |                  |            |
|                            | Derived from original GPS values reported from spacecraft (Time_GPS_Seconds and Time_GPS_Subseconds).   |                  |            |
|                            | Time calculation is offset by 615ms (flush time) for the first image in the series and for all other images are adjusted by subtracting (integration time + 308 milliseconds) from the reported GPS time then adding the difference between the readout FRT and the header FRT. |                  |            |
|                            | Time may be delayed by up to 10 ms due to FSW polling delay.  |                  |            |
|                            | Maximum time is ~2150 UTC and minimum time is ~1970 UTC.  |                  |            |

| Variable Name                      | Description   | Units            | Dimensions |
|------------------------------------|---|------------------|------------|
| ICON_LO_MIGHTI_B_Time _UTC_Start   | Milliseconds since 1970-01-01 00:00:00 UTC at start of image integration.   | millisec<br>onds | Epoch      |
|                                    | Milliseconds since 1970-01-01 00:00:00 UTC at start of image integration.   |                  |            |
|                                    | Derived from original GPS values reported from spacecraft (Time_GPS_Seconds and Time_GPS_Subseconds).   |                  |            |
|                                    | Time calculation is offset by 615ms (flush time) for the first image in the series and for all other images are adjusted by subtracting (integration time + 308 milliseconds) from the reported GPS time then adding the difference between the readout FRT and the header FRT.         |                  |            |
|                                    | Time may be delayed by up to 10 ms due to FSW polling delay.  |                  |            |
|                                    | Maximum time is ~2150 UTC and minimum time is ~1970 UTC.  |                  |            |
| ICON_LO_MIGHTI_B_Time _UTC_Stop    | Milliseconds since 1970-01-01 00:00:00 UTC at end of image integration.   | millisec<br>onds | Epoch      |
|                                    | Milliseconds since 1970-01-01 00:00:00 UTC at end of image integration.   |                  |            |
|                                    | Derived from original GPS values reported from spacecraft (Time_GPS_Seconds and Time_GPS_Subseconds).   |                  |            |
|                                    | Time calculation is offset by 615ms (flush time) for the first image in the series and for all other images are adjusted by subtracting (integration time + 308 milliseconds) from the reported GPS time then adding the difference between the readout FRT and the header FRT.         |                  |            |
|                                    | Time may be delayed by up to 10 ms due to FSW polling delay.  |                  |            |
|                                    | Maximum time is ~2150 UTC and minimum time is ~1970 UTC.  |                  |            |
| ICON_LO_MIGHTI_B_Time _GPS_Seconds | GPS seconds count when FSW received image packet header.  | Second<br>s      | Epoch      |
|                                    | GPS seconds count when FSW received image packet header.  |                  |            |
|                                    | The FSW received the header of the first image in a series 615ms after start of image processing. Following headers are adjusted by subtracting (integration time + 308 milliseconds) from the reported GPS time then adding the difference between the readout FRT and the header FRT. |                  |            |
|                                    | Time may be delayed by up to 10 ms due to FSW polling delay.  |                  |            |

| Variable Name  | Description  | Units                  | Dimensions |
|--|--|------------------------|------------|
| ICON_LO_MIGHTI_B_Time _GPS_Subseconds                    | FSW 20MHz clock (50 nanosecond) offset from GPS seconds.  FSW 20MHz clock (50 nanosecond) offset from GPS seconds.   | 50 Nan<br>osecon<br>ds | Epoch      |
|  | The FSW received the header of the first image in a series 615ms after start of image processing. Following headers are adjusted by subtracting (integration time + 308 milliseconds) from the reported GPS time then adding the difference between the readout FRT and the header FRT.  |                        |            |
|  | The offset may be more than 1 second but never 2 or more seconds.  |                        |            |
|  | Time may be delayed by up to 10 ms due to FSW polling delay.   |                        |            |
| ICON_LO_MIGHTI_B_Time _Integration                       | Time to integrate MIGHTI-B region of interest (ROI) image.   | millisec<br>onds       | Epoch      |
| ICON_LO_MIGHTI_B_Time _Header_Free_Running_              | Free running timer reading for MIGHTI image header.  | millisec<br>onds       | Epoch      |
| Timer  | The FRTs are millisecond free running timers used to calculate the time offset for this image's integration from the observatory GPS time tag. This is only used when it is not the first image in the integration sequence. When the prior image FRT is not known a timing error is generated as a calculation cannot be performed. The base GPS time is used as the start time.  |                        |            |
| ICON_LO_MIGHTI_B_Time _Readout_Free_Running _Timer       | Free running timer reading for MIGHTI image data readout start.  The FRTs are millisecond free running timers used to calculate the time offset for this image's integration from the observatory GPS time tag. This is only used when it is not the first image in the integration sequence. When the prior image FRT is not known a timing error is generated as a calculation cannot be performed. The base GPS time is used as the start time. | millisec<br>onds       | Epoch      |
| ICON_LO_MIGHTI_B_Time _Prior_Readout_Free_R unning_Timer | Free running timer reading for MIGHTI prior image data readout start.  | millisec<br>onds       | Epoch      |
|  | The FRTs are millisecond free running timers used to calculate the time offset for this image's integration from the observatory GPS time tag. This is only used when it is not the first image in the integration sequence. When the prior image FRT is not known a timing error is generated as a calculation cannot be performed. The base GPS time is used as the start time.  |                        |            |

| Variable Name   | Description   | Units | Dimensions |
|---|---|-------|------------|
| ICON_LO_MIGHTI_B_Time<br>_Prior_Known                       | Flag indicating prior image's free running timer known.   | Flag  | Epoch      |
|   | The FRTs are millisecond free running timers used to calculate the time offset for this image's integration from the observatory GPS time tag. This is only used when it is not the first image in the integration sequence. When the prior image FRT is not known a timing error is generated as a calculation cannot be performed. The base GPS time is used as the start time. |       |            |
| <pre>ICON_L0_MIGHTI_B_MT_D evice_ID</pre>                   | MIGHTI camera instrument ID (0=MIGHTI-A, 1=MIGHT-B).  | Flag  |            |
| ICON_LO_MIGHTI_B_MT_D evice_Current_Sense                   | MIGHTI camera current (power) monitor count.  | Count | Epoch      |
| <pre>ICON_L0_MIGHTI_B_Cali bration_Lamp_1</pre>             | MIGHTI camera calibration lamp 1 setting (0=OFF, 1=ON).   | Flag  | Epoch      |
| ICON_L0_MIGHTI_B_Cali<br>bration_Lamp_2                     | MIGHTI camera calibration lamp 2 setting (0=OFF, 1=ON).   | Flag  | Epoch      |
| ICON_L0_MIGHTI_B_Cali bration_Lamp_Current                  | MIGHTI camera calibration lamp combined current monitor sense count.  | Count | Epoch      |
| ICON_LO_MIGHTI_B_Cali<br>bration_Lamp_Temperat<br>ure       | MIGHTI camera calibration lamp combined temperature monitor sense count.  | Count | Epoch      |
| ICON_LO_MIGHTI_B_Inte<br>rferometer_1_Temperat<br>ure_Sense | MIGHTI interferometer 1 fine temperature sense count.   | Count | Epoch      |
| ICON_LO_MIGHTI_B_Inte<br>rferometer_2_Temperat<br>ure_Sense | MIGHTI interferometer 2 fine temperature sense count.   | Count | Epoch      |
| ICON_LO_MIGHTI_B_Opti<br>cs_Bench_Temperature_<br>Forward   | MIGHTI optics bench forward temperature sense count.  | Count | Epoch      |
| ICON_LO_MIGHTI_B_Opti<br>cs_Bench_Temperature_<br>Rear      | MIGHTI optics bench rear temperature sense count.   | Count | Epoch      |
| ICON_LO_MIGHTI_B_Opti cs_Temperature_Aft                    | MIGHTI optics aft temperature sense count.  | Count | Epoch      |
| ICON_LO_MIGHTI_B_TEC_<br>Current_Input_Count                | MIGHTI thermo-electric cooler combined (TEC-A + TEC-B) input current count.   | Count | Epoch      |
| ICON_LO_MIGHTI_B_TEC_ Temperature_Cold_Coun t               | MIGHTI thermo-electric cooler cold-side temperature sense count.  | Count | Epoch      |
| <pre>ICON_L0_MIGHTI_B_TEC_ Temperature_Hot_Count</pre>      | MIGHTI thermo-electric cooler hot-side temperature sense count.   | Count | Epoch      |

| Variable Name                        | Description  | Units | Dimensions |
|--------------------------------------|--|-------|------------|
| ICON_LO_MIGHTI_B_MTA_                | MIGHTI-A camera aperture 1 position sense flag.  | Flag  | Epoch      |
| Aperturel_Position                   | 0=OPEN, 1=CLOSED, 2=15% OPEN, 3=UNKNOWN  |       |            |
| ICON_LO_MIGHTI_B_MTA_                | MIGHTI-A camera aperture 2 position sense flag.  | Flag  | Epoch      |
| Aperture2_Position                   | 0=OPEN, 1=CLOSED, 2=15% OPEN, 3=UNKNOWN  |       |            |
| ICON_LO_MIGHTI_B_MTA_<br>Aperture1   | MIGHTI-A camera aperture 1 switch setting (0=OPEN, 1=CLOSED).  | Flag  | Epoch      |
| ICON_LO_MIGHTI_B_MTA_<br>Aperture2   | MIGHTI-A camera aperture 2 switch setting (0=OPEN, 1=CLOSED).  | Flag  | Epoch      |
| ICON_LO_MIGHTI_B_MTB_                | MIGHTI-B camera aperture 1 position sense flag.  | Flag  | Epoch      |
| Aperture1_Position                   | 0=OPEN, 1=CLOSED, 2=15% OPEN, 3=UNKNOWN  |       |            |
| ICON_LO_MIGHTI_B_MTB_                | MIGHTI-B camera aperture 2 position sense flag.  | Flag  | Epoch      |
| Aperture2_Position                   | 0=OPEN, 1=CLOSED, 2=15% OPEN, 3=UNKNOWN  |       |            |
| ICON_LO_MIGHTI_B_MTB_<br>Aperture1   | MIGHTI-B camera aperture 1 switch setting (0=OPEN, 1=CLOSED).  | Flag  | Epoch      |
| ICON_LO_MIGHTI_B_MTB_<br>Aperture2   | MIGHTI-B camera aperture 2 switch setting (0=OPEN, 1=CLOSED).  | Flag  | Epoch      |
| ICON_LO_MIGHTI_B_Erro                | Error count during compression (per packet).   | Count | Epoch      |
| r_Compression                        | Error count during compression (per packet).   |       |            |
|                                      | Should be zero (for no error) but if it is a non-zero number then the number indicates the number of packets that contained an overflow in the delta bit field during compression.                           |       |            |
| ICON_LO_MIGHTI_B_Erro<br>r_Time      | Error finding prior image readout FRT (0=GOOD, 1=ERROR).   | Flag  | Epoch      |
|                                      | Error finding prior image readout FRT (0=GOOD, 1=ERROR).   |       |            |
|                                      | The prior image read out FRT was missing so proper time offset couldn't be calculated correctly. The time will indicate later then the actual time. This only occurs when not the first image of the series. |       |            |
| ICON_LO_MIGHTI_B_CCD_<br>CS_Register | CCD CS register value from image header at end of integration.   | Flag  | Epoch      |
|                                      | CCD CS register value from image header at end of integration.   |       |            |
|                                      | See ICN-ICD-002 (MIGHTI) for more details on this parameter.   |       |            |

| Variable Name  | Description   | Units | Dimensions |
|--|---|-------|------------|
| ICON_LO_MIGHTI_B_Hori<br>zontal_Charge_Transfe<br>r_Efficiency_Count | Horizontal charge transfer efficiency register count indicating the horizontal overscan pixel configuration per MIGHTI ICD.       | Count | Epoch      |
|  | Horizontal charge transfer efficiency register count indicating the horizontal overscan pixel configuration per MIGHTI ICD.       |       |            |
|  | See ICN-ICD-002 (MIGHTI) for more details on this parameter.  |       |            |
| ICON_LO_MIGHTI_B_Imag<br>e_BIN_Parameters                            | MIGHTI binning parameters (BINCOUNTS).  MIGHTI binning parameters (BINCOUNTS).  See ICN-ICD-002 (MIGHTI) for more details on this | Flag  | Epoch      |
| ICON_LO_MIGHTI_B_Imag<br>e_First                                     | parameter.  First image in MIGHTI integration sequence (0=NOT FIRST, 1=FIRST).  | Flag  | Epoch      |
| ICON_LO_MIGHTI_B_Imag<br>e_ROI_Column_Count                          | MIGHTI region of interest (ROI) pixel column count.   | Count | Epoch      |
| ICON_LO_MIGHTI_B_Imag<br>e_ROI_Column_Start                          | MIGHTI region of interest (ROI) pixel starting column.  | Count | Epoch      |
| ICON_LO_MIGHTI_B_Imag<br>e_ROI_Row_Count                             | MIGHTI region of interest (ROI) pixel row count.  | Count | Epoch      |
| ICON_LO_MIGHTI_B_Imag<br>e_ROI_Row_Start                             | MIGHTI region of interest (ROI) pixel starting row.   | Count | Epoch      |

## support\_data

| Variable Name                           | Description   | Units | Dimensions  |
|---|---|-------|---|
| Epoch                                   | Milliseconds since 1970-01-01 00:00:00 UTC at middle of image integration   | ms    | Epoch   |
|   | Milliseconds since 1970-01-01 00:00:00 UTC at middle of image integration   |       |   |
| ICON_L1_MIGHTI_B_IR_A rray_Pixel_Index  | Pixel indicies corresponding to the five IR filters  Pixel indicies corresponding to the five IR filters  |       | Epoch, ICON_L1_<br>MIGHTI-B_IR_Arr<br>ay_Pixel_Index  |
| ICON_L1_MIGHTI_B_IR_A<br>rray_Altitudes | Altitudes corresponding to the five IR filters  Altitudes corresponding to the five IR filters  | km    | Epoch, ICON_L1_<br>MIGHTI-B_IR_Arr<br>ay_Altitudes    |
| ICON_L1_MIGHTI_B_Gree n_Quality_Factor  | Data quality Factor by altitude for 557nm  Data quality Factor by altitude for 557nm. 0 is untrusted data. 0.5 is usable with care. 1.0 is good data. |       | Epoch, ICON_L1_<br>MIGHTI-B_Green_<br>Array_Altitudes |
| ICON_L1_MIGHTI_B_Gree<br>n_Array_OPD    | Optical path differences corresponding to the green fringes  Optical path differences corresponding to the green fringes                              | cm    | Epoch, ICON_L1_<br>MIGHTI-B_Green_<br>Array_OPD       |

| Variable Name   | Description  | Units | Dimensions  |
|---|--|-------|---|
| ICON_L1_MIGHTI_B_Gree<br>n_Array_Altitudes                | Altitudes corresponding to the green fringes - middle of integration, middle of FoV  Altitudes corresponding to the green fringes - middle of integration, middle of FoV       | km    | Epoch, ICON_L1_<br>MIGHTI-B_Green_<br>Array_Altitudes                             |
| ICON_L1_MIGHTI_B_Red_<br>Quality_Factor                   | Data quality Factor by altitude for 630nm  Data quality Factor by altitude for 630nm. 0 is untrusted data. 0.5 is usable with care. 1.0 is good data.                          |       | Epoch, ICON_L1_<br>MIGHTI-B_Red_Ar<br>ray_Altitudes                               |
| ICON_L1_MIGHTI_B_Red_<br>Array_OPD                        | Optical path differences corresponding to the red fringes Optical path differences corresponding to the red fringes  | cm    | Epoch, ICON_L1_<br>MIGHTI-B_Red_Ar<br>ray_OPD                                     |
| ICON_L1_MIGHTI_B_Red_<br>Array_Altitudes                  | Altitudes corresponding to the red fringes Altitudes corresponding to the red fringes  | km    | Epoch, ICON_L1_<br>MIGHTI-B_Red_Ar<br>ray_Altitudes                               |
| ICON_L1_MIGHTI_B_SC_P<br>osition_ECEF                     | Spacecraft Position Vector in ECEF Spacecraft Position Vector in ECEF  | km    | Epoch, ICON_L1_<br>MIGHTI-B_Time_C<br>hannel, ICON_L1<br>_MIGHTI-B_Vecto<br>r_XYZ |
| ICON_L1_MIGHTI_B_SC_V elocity_ECEF                        | ECEF Vector for spacecraft velocity  ECEF Vector for spacecraft velocity   | m/s   | Epoch, ICON_L1_ MIGHTI-B_Time_C hannel, ICON_L1 _MIGHTI-B_Vecto r_XYZ             |
| ICON_L1_MIGHTI_B_Imag<br>e_Times                          | Epochs corresponding to the Start, Middle, and Stop of the integration  Epochs corresponding to the Start, Middle, and Stop of the integration                                 | ms    | Epoch, ICON_L1_<br>MIGHTI-B_Time_C<br>hannel                                      |
| ICON_L1_MIGHTI_B_Roll<br>_Angles                          | Roll angles of the field of view  Roll angles of the field of view   | deg   | Epoch, ICON_L1_<br>MIGHTI-B_Vector<br>_Roll                                       |
| ICON_L1_MIGHTI_B_Qual ity_Flag_Near_Termina tor           | Quality Flag indicating that terminator is within field of view  Quality Flag indicating that terminator is within field of view   |       | Epoch   |
| ICON_L1_MIGHTI_B_Qual<br>ity_Flag_Low_Signal_T<br>o_Noise | Quality Flag indicating low signal to noise  Quality Flag indicating low signal to noise   |       | Epoch   |
| ICON_L1_MIGHTI_B_Qual<br>ity_Flag_SAA                     | Quality Flag indicating that the spacecraft is within the South Atlantic Anomoly  Quality Flag indicating that the spacecraft is within the South Atlantic Anomoly             |       | Epoch   |
| ICON_L1_MIGHTI_B_Qual ity_Flag_Bad_Calibrat ion           | Quality Flag indicating an inappropriate calibration file has been used or was missing  Quality Flag indicating an inappropriate calibration file has been used or was missing |       | Epoch   |

| Variable Name                | Description                          | Units | Dimensions |
|------------------------------|--------------------------------------|-------|------------|
| ICON_L1_MIGHTI_B_SC_A        | Spacecraft Attitude Control Register |       | Epoch      |
| ttitude_Control_Regis<br>ter | Spacecraft Attitude Control Register |       |            |
|                              | Bit 0: LVLH NORMAL                   |       |            |
|                              | Bit 1: LVLH Reverse Mode             |       |            |
|                              | Bit 2: Earth Limb Pointing           |       |            |
|                              | Bit 3: Inertial Pointing             |       |            |
|                              | Bit 4: Stellar Pointing              |       |            |
|                              | Bit 5: Attitude Slew                 |       |            |
|                              | Bit 6: Conjugate Maneuver            |       |            |
|                              | Bit 7: Nadir Calibration             |       |            |
|                              | Bit 8: Lunar Calibration             |       |            |
|                              | Bit 9: Stellar Calibration           |       |            |

#### Data

| Variable Name                      | Description  | Units | Dimensions   |
|------------------------------------|--|-------|--|
| ICON_LO_MIGHTI_B_Imag e_ROI_Pixels | MIGHTI region of interest pixel values layed out [ROWS]x[COLUMNS]. | Count | Epoch, ICON_L0_ MIGHTI_B_Image_ ROI_Rows, ICON_ L0_MIGHTI_B_Ima ge_ROI_Columns |

### metadata

| Variable Name                  | Description  | Units | Dimensions                        |
|--------------------------------|--|-------|-----------------------------------|
| ICON_L1_MIGHTI_B_Vect or_LLA   | Vector labels corresponding to the tangent lat, lon, and alt   |       | ICON_L1_MIGHTI-<br>B_Vector_LLA   |
|                                | Vector labels corresponding to the tangent lat, lon, and alt   |       |                                   |
| ICON_L1_MIGHTI_B_Vect or_XYZ   | Vector labels corresponding to the ECEF lines of sight   |       | ICON_L1_MIGHTI-<br>B_Vector_XYZ   |
|                                | Vector labels corresponding to the ECEF lines of sight   |       |                                   |
| ICON_L1_MIGHTI_B_Vect or_Roll  | Vector labels corresponding to the field of view roll angles  Vector labels corresponding to the field of view roll angles |       | ICON_L1_MIGHTI-<br>B_Vector_Roll  |
| ICON_L1_MIGHTI_B_Time _Channel | Vector labels corresponding to the time channels  Vector labels corresponding to the time channels                         |       | ICON_L1_MIGHTI-<br>B_Time_Channel |

Software version: ICON SDC > MIGHTI L1 Processor v1.0.0