ICON Data Product 0P: IVM Ancillary Products

ERROR: Missing variables attribute Epoch : Var_Type
ERROR: Missing variables attribute ICON_L2_IVM_A_ALTITUDE : Var_Type
ERROR: Missing variables attribute ICON_L2_IVM_A_FRAC_DENS_H : Var_Type
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ERROR: Missing variables attribute ICON_L2_IVM_A_SUN_STATUS : Var_Type
ERROR: Missing variables attribute ICON_L2_IVM_A_SPACE_ENVIRONMENT_REGION_STATUS : Var_Type
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ERROR: Missing variables attribute ICON_L2_IVM_A_ION_DENS : CatDesc
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ERROR: Missing variables attribute ICON_L2_IVM_A_TIME_UTC_END : CatDesc

This document describes the data product for Ancillary Products for IVM Data Processing, which is in NetCDF4 format.

MISSING Text_Supplement

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
Epoch	75632

Variables

Variables in this file are listed below. First, the most important variables (the "data" variables) are described, followed by the "support_data" variables, and finally the "metadata" variables. The variables classified as "ignore_data" are not shown.

Support_Data

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_TIME_UTC	ISO 9601 formatted UTC timestamp (at middle of reading). ISO 9601 formatted UTC timestamp (at middle of reading).Time is generated from the time-code at byte 1015 of the IVM packet minus the time sync at byte 1019 of the IVM packet. This is the GPS time at the start of the integration period. The integration period is assumed to be 4 seconds so the center time is 2 seconds after that. The formula is (time-code * 1000ms) + 2000ms - (16 * time sync / 1000) in GPS milliseconds then converted to UTC time. See the UTD 206-024 Rev A document.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.		Epoch
ICON_L2_IVM_A_TIME_UTC_START	Milliseconds since 1970-01-01 00:00:00 UTC at start of reading. Milliseconds since 1970-01-01 00:00:00 UTC at start of reading.Time is generated from the time-code at byte 1015 of the IVM packet minus the time sync at byte 1019 of the IVM packet. This is the GPS time at the start of the integration period. The integration period is assumed to be 4 seconds so the center time is 2 seconds after that. The formula is (time-code * 1000ms) + 2000ms - (16 * time sync / 1000) in GPS milliseconds then converted to UTC time. See the UTD 206-024 Rev A document.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.	milliseconds	Epoch

MISSING Var_Type

Variable Name	Description	Units	Dimensions
Epoch	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_ALTITUDE	WGS84 Altitude of s/c position (geodetic) Geodetic Altitude of Spacecraft using WGS84	km	Epoch
ICON_L2_IVM_A_FRAC_DENS_H	MISSING CatDesc MISSING Var_Notes		Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_FRAC_DENS_O	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_LATITUDE	WGS84 Latitude of s/c position (geodetic) Geodetic Latitude of Spacecraft using WGS84	degrees North	Epoch
ICON_L2_IVM_A_LST	Local Solar Time	hour	Epoch
ICON_L2_IVM_A_SC_MLT	Magnetic Local Time at S/C	hours	Epoch
ICON_L2_IVM_A_LONGITUDE	WGS84 Longitude of s/c position (geodetic) Geodetic Longitude of Spacecraft using WGS84	degrees East	Epoch
ICON_L2_IVM_A_ION_DENS	MISSING CatDesc MISSING Var_Notes	N/cc	Epoch
ICON_L2_IVM_A_ION_TEMP	MISSING CatDesc MISSING Var_Notes	K	Epoch
ICON_L2_IVM_A_IV_FA	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_IV_MER	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_IV_X	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_IV_Y	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_IV_Z	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_IV_ZON	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_RAW_IV_X	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_RAW_IV_Y	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_RAW_IV_Z	MISSING CatDesc MISSING Var_Notes	m/s	Epoch
ICON_L2_IVM_A_UNIT_MER_X	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_UNIT_MER_Y	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_UNIT_MER_Z	MISSING CatDesc MISSING Var_Notes		Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_AP_POT	MISSING CatDesc MISSING Var_Notes	V	Epoch
ICON_L2_IVM_A_MTB_STATUS	MTB Firing Status If the MTB are active during any part of the measurement, it is recorded as active for whole measurement. Decoded from s/c housekeeping file: /disks/icondata/Temporary/ICON.SDC.Pipeline.IVM.Ancillary.2018-03-12T192534.13E89CDF-ABDE-41D7-A962-42EFFB73FD1F/Input/ICON_L0_Spacecraft_Housekeeping-MTB_2017-05-29_v01r000.CSVIf the MTB are active during any part of the measurement, it is recorded as active for whole measurement. Decoded from s/c housekeeping file: If the MTB are active during any part of the measurement, it is recorded as active for whole measurement. Decoded from s/c housekeeping file: If the MTB are active during any part of the measurement, it is recorded as active for whole measurement. Decoded from s/c housekeeping file:		Epoch
ICON_L2_IVM_A_SLEW_STATUS	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_SUN_STATUS	s/c Sun/Shadow Status Code Data is from predictive ephemeris. 0=Sun, 1=Earth Shadow		Epoch
ICON_L2_IVM_A_SPACE_ENVIRONMENT_REGION_STATUS	Slew or off-point Status Code Standarized for several missions, so not all codes are relevant. Binary Coded Integer (16 bits). LVLH Normal Mode: 1, LVLH Reverse Mode: 2, Earth Limb Pointing: 4, Inertial Pointing: 8, Stellar Pointing: 16, Attitude Slew: 32, Conjugate Maneuver: 64, Nadir Calibration: 128, Lunar Calibration: 256, Stellar Calibration: 512		Epoch
ICON_L2_IVM_A_ORBIT_NUMBER	Orbit Number Integer Orbit Number		Epoch
ICON_L2_IVM_A_MAGNETIC_LATITUDE	Magnetic Latitude of s/c position Quasi-dipole magnetic latitude for S/C position	degrees North from Magnetic Equator	Epoch
ICON_L2_IVM_A_MAGNETIC_LONGITUDE	Magnetic Longitude of s/c position Quasi-dipole magnetic longitude for S/C position	degrees East	Epoch
ICON_L2_IVM_A_DM_FLAG	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_RPA_FLAG	MISSING CatDesc MISSING Var_Notes		Epoch
ICON_L2_IVM_A_TIME_UTC_END	MISSING CatDesc MISSING Var_Notes		Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_APEX_HEIGHT	Modified APEX Height Modified APEX height for S/C position	km	Epoch
ICON_L2_IVM_A_A_STATUS	IVM-A Status Standarized for several missions, so not all codes are relevant. Binary Coded Integer (16 bits), Earth Day View: 1, Earth Night View: 2, Calibration Target View: 4, Off-target View: 8, Sun Proximity View: 16, Moon Proximity View: 32, North Magnetic Footpoint View: 64, South Magnetic Footpoint View: 128, Science Data Collection View: 256, Calibration Data Collection View: 512, Spare: 1024 – 32768		Epoch
ICON_L2_IVM_A_B_STATUS	IVM-B Status Standarized for several missions, so not all codes are relevant. Binary Coded Integer (16 bits), Earth Day View: 1, Earth Night View: 2, Calibration Target View: 4, Off-target View: 8, Sun Proximity View: 16, Moon Proximity View: 32, North Magnetic Footpoint View: 64, South Magnetic Footpoint View: 128, Science Data Collection View: 256, Calibration Data Collection View: 512, Spare: 1024 – 32768		Epoch
ICON_L2_IVM_A_A_ACTIVITY	IVM-A ACTIVITY Standarized for several missions, so not all codes are relevant. Binary Coded Integer (16 bits). Earth Day Activity: 1, Earth Night Activity: 2, Calibration Target Activity: 4, Off-target Activity: 8, Sun Proximity Activity:16, Moon Proximity Activity: 32, North Magnetic Footpoint Activity: 64, South Magnetic Footpoint Activity: 128, Science Data Collection Activity: 256, Calibration Data Collection Activity: 512, Spare: 1024 – 32768		Epoch
ICON_L2_IVM_A_B_ACTIVITY	IVM-A ACTIVITY Standarized for several missions, so not all codes are relevant. Binary Coded Integer (16 bits). Earth Day Activity: 1, Earth Night Activity: 2, Calibration Target Activity: 4, Off-target Activity: 8, Sun Proximity Activity:16, Moon Proximity Activity: 32, North Magnetic Footpoint Activity: 64, South Magnetic Footpoint Activity: 128, Science Data Collection Activity: 256, Calibration Data Collection Activity: 512, Spare: 1024 – 32768		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_ALT	Altitude of North Footpoint of Geomagnetic line at 150 km from IGRF Altitude location of the magnetic footpoint in Northern Hemisphere at 150 km. These data were interpolated using tricubic algorithm from IGRF and ephemeris data then linearly interploted to IVM times. These values should all be 150 km	km	Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_NORTH_FOOTPOINT_FA_ECEF_X	ECEF X-Conponent of field aligned drift at Northern Footpoint At the northern footpoint this is the x-conponent of the unit vector for field aligned ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_FA_ECEF_Y	ECEF Y-Conponent of field aligned drift at Northern Footpoint At the northern footpoint this is the y-conponent of the unit vector for field aligned ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_FA_ECEF_Z	ECEF Z-Conponent of field aligned drift at Northern Footpoint At the northern footpoint this is the z-conponent of the unit vector for field aligned ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_LAT	Latitude of North Footpoint of Geomagnetic line at 150 km from IGRF Latitude location of the magnetic footpoint in Northern Hemisphere at 150 km. These data were interpolated using tricubic algorithm from IGRF and ephemeris data then linearly interploted to IVM times.	degrees	Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_LON	Longitude of North Footpoint of Geomagnetic line at 150 km from IGRF Longitude location of the magnetic footpoint in Northern Hemisphere at 150 km. These data were interpolated using tricubic algorithm from IGRF and ephemeris data then linearly interploted to IVM times.	degrees	Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_MER_DRIFT	Translating scalars meridional ion drifts at northern footpoint Scalars for translating meridional ion drifts (zonal E fields) measured at the S/C down to the northern footpoint.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_QD_LAT	Quesi dipole latitude of northern footpoint Calculated value of quesi dipole latitude of northern footpoint from IGRF	degrees	Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_QD_LON	Quesi dipole longitude of northern footpoint Calculated value of quesi dipole longitude of northern footpoint from IGRF	degrees	Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_MER_ECEF_X	ECEF X-Conponent of meridional drift at Northern Footpoint At the northern footpoint this is the x-conponent of the unit vector for meridional ion drifts expressed in the ECEF frame.		Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_NORTH_FOOTPOINT_MER_ECEF_Y	ECEF Y-Conponent of meridional drift at Northern Footpoint At the northern footpoint this is the y-conponent of the unit vector for meridional ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_MER_ECEF_Z	ECEF Z-Conponent of meridional drift at Northern Footpoint At the northern footpoint this is the z-conponent of the unit vector for meridional ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_ZON_DRIFT	Translating scalars zonal ion drifts at northern footpoint Scalars for translating zonal ion drifts (meridional E fields) measured at the S/C down to the northern footpoint.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_ZON_ECEF_X	ECEF X-Conponent of Zonal drift at Northern Footpoint At the northern footpoint this is the x-conponent of the unit vector for zonal ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_ZON_ECEF_Y	ECEF Y-Conponent of Zonal drift at Northern Footpoint At the northern footpoint this is the y-conponent of the unit vector for zonal ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_NORTH_FOOTPOINT_ZON_ECEF_Z	ECEF Z-Conponent of Zonal drift at Northern Footpoint At the northern footpoint this is the z-conponent of the unit vector for zonal ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_ALT	Altitude of South Footpoint of Geomagnetic line at 150 km from IGRF Altitude location of the magnetic footpoint in Northern Hemisphere at 150 km. These data were interpolated using tricubic algorithm from IGRF and ephemeris data then linearly interploted to IVM times. These values should all be 150 km	km	Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_FA_ECEF_X	ECEF X-Conponent of field aligned drift at Southern Footpoint At the Southern footpoint this is the y-conponent of the unit vector for field aligned ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_FA_ECEF_Y	ECEF Y-Conponent of field aligned drift at Southern Footpoint At the Southern footpoint this is the y-conponent of the unit vector for field aligned ion drifts expressed in the ECEF frame.		Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_SOUTH_FOOTPOINT_FA_ECEF_Z	ECEF Z-Conponent of field aligned drift at Southern Footpoint At the Southern footpoint this is the z-conponent of the unit vector for field aligned ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_LAT	Latitude of South Footpoint of Geomagnetic line at 150 km from IGRF Latitude location of the magnetic footpoint in Southern Hemisphere at 150 km. These data were interpolated using tricubic algorithm from IGRF and ephemeris data then linearly interploted to IVM times.	degrees	Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_LON	Longitude of South Footpoint of Geomagnetic line at 150 km from IGRF Longitude location of the magnetic footpoint in Southern Hemisphere at 150 km. These data were interpolated using tricubic algorithm from IGRF and ephemeris data then linearly interploted to IVM times.	degrees	Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_MER_DRIFT	Translating Scalars for meridional Ion Drifts at southern footpoint Scalars for translating meridional ion drifts (zonal E fields) measured at the S/C down to the southern footpoint.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_QD_LAT	Quesi dipole latitude of southern footpoint Calculated value of quesi dipole latitude of southern footpoint from IGRF	degrees	Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_QD_LON	Quesi dipole longitude of southern footpoint Calculated value of quesi dipole longitude of southern footpoint from IGRF	degrees	Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_MER_ECEF_X	ECEF X-Conponent of meridional drift at Southern Footpoint At the Southern footpoint this is the y-conponent of the unit vector for meridional ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_MER_ECEF_Y	ECEF Y-Conponent of meridional drift at Southern Footpoint At the Southern footpoint this is the y-conponent of the unit vector for meridional ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_MER_ECEF_Z	ECEF Z-Conponent of meridional drift at Southern Footpoint At the Southern footpoint this is the z-conponent of the unit vector for meridional ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_ZON_DRIFT	Translating Scalars for zonal ion drifts at southern footpoint Scalars for translating zonal ion drifts (meridional E fields) measured at the S/C down to the southern footpoint.		Epoch

Variable Name	Description	Units	Dimensions
ICON_L2_IVM_A_SOUTH_FOOTPOINT_ZON_ECEF_X	ECEF X-Conponent of Zonal drift at Southern Footpoint At the Southern footpoint this is the y-conponent of the unit vector for zonal ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_ZON_ECEF_Y	ECEF Y-Conponent of Zonal drift at Southern Footpoint At the Southern footpoint this is the y-conponent of the unit vector for zonal ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SOUTH_FOOTPOINT_ZON_ECEF_Z	ECEF Z-Conponent of Zonal drift at Southern Footpoint At the Southern footpoint this is the z-conponent of the unit vector for zonal ion drifts expressed in the ECEF frame.		Epoch
ICON_L2_IVM_A_SC_B_X	X Component of the Magnetic Field	nT	Epoch
ICON_L2_IVM_A_SC_B_Y	Y Component of the Magnetic Field	nT	Epoch
ICON_L2_IVM_A_SC_B_Z	Z Component of the Magnetic Field	nT	Epoch
ICON_L2_IVM_A_EQU_MER_DRIFT	Translating Scalars for meridional Ion Drifts at equatorial footpoint Scalars for translating meridional ion drifts (zonal E fields) measured at the S/C down to the magnetic equator.		Epoch
ICON_L2_IVM_A_EQU_ZON_DRIFT	Translating Scalars for zonal ion drifts at equatorial footpoint Scalars for translating zonal ion drifts (meridional E fields) measured at the S/C down to the magnetic equator.		Epoch

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