

Contents of Image Electron Spectrometer (IES) Data Product File

Description of the BD-IES Instrument:

BD-IES is an advanced particle detector for the analysis of energetic electron distributions in the energy range of 50–600 keV. The use of innovative multiple detectors, in combination with three pinhole acceptance, allows for polar angle measurements of the angular distributions of electrons over a range of 180°. Electrons are identified by their well-known energy range relationships, and the energy channels of the IES instrument are listed in the following table. The IES analyzes energy signals using 11 bit analog digital converters (ADCs), and via a mapping process 2048 channels are reduced to just eight electron sensor energy channels. The IES system is arranged in three heads, each covering 60° in a polar direction, subdivided into 20° ‘pixels’. Thus, there are nine micro-strip solid-state detectors for the IES measurement system overall, one for each polar segment.

Structure of the data product file:

Line	Type	Description
1	string	name of the data file
2	string	label of the energy channels (8 channels in total)
3	float	widths of energy channel in units of keV
4	float	centroids of energy channel in units of keV
5	string	units for electron flux data
6	-	intentionally blank
7-8	string	label of each column of the data blocks
9 to EOF	-	data records at given time tags Column 1: Time (UTC) in formats of yyyy-mm-dd hh:mm:ss.xxx Column 2-4: X,Y,Z in GEO coordinates Column 5: L value Column 6: Magnetic latitude in radian Column 7: Magnetic local time in hours Column 8-79: electron different flux in the n-th (n=1,2,...,8) energy channel of the m-th (m=1,2,...,9) detector presented in the (m-1)*8+n+1 column. Invalid data are filled by -999. The units of the electron flux data is specified in Line 5. The detailed format is shown as follows: Column 8: D1 direction E1 energy channel (50~68keV) electron flux; Column 9: D1 direction E2 energy channel (68~93keV) electron flux; Column 10: D1 direction E3 energy channel (93~130keV) electron flux; Column 11: D1 direction E4 energy channel (130~170keV) electron flux; Column 12: D1 direction E5 energy channel (170~240keV) electron flux; Column 13: D1 direction E6 energy channel (240~320keV) electron flux; Column 14: D1 direction E7 energy channel (320~440keV) electron flux; Column 15: D1 direction E8 energy channel (440~600keV) electron flux; Column 16: D2 direction E1 energy channel (50~68keV) electron flux; Column 17: D2 direction E2 energy channel (68~93keV) electron flux; ... Column 78: D9 direction E7 energy channel (320~440keV) electron flux; Column 79: D9 direction E8 energy channel (440~600keV) electron flux;