EMDR20 All Sky Meteor Radar Data Format

MET Parameter Record

1、Magic number: 0x2050xxxx where “xxxx” is the revision number of the record.
Revision 0x0001: phase differences not stored

Parameter	Description	Data Type	Data Size	Allowable Values
Number of Ranges	The number of ranges included in the analysed data record	Integer	4	0 - ?[2]
Radar frequency	The operating frequency of the radar in Hz during this experiment.	Float	4	0 - ?
Transmit Beam direction	The transmit beam direction used during this experiment.	Integer array	4×2	Azimuth = 0 – 360 Zenith = 0 - 90
Nyquist velocity	The maximum unambiguous radial velocity used in the analysis	Float	4	0 - ? ms^{-1}
GPS locked	Indicates whether GPS was locked through acquisition of data-set	Boolean	4	0,1
Number of Receiving Channels	The number of receiving channels used for data analysis (N)	Integer	4	1 - 16

Receiving Channels	The receiving channels used for data analysis(1 - based).	Integer Array	4×N	1 - ?

Revision 0x0002: phase differences stored

Parameter	Description	Dta Typea	Data Size	Allowable Values
Number of Ranges	The number of ranges included in the analysed data record	Integer	4	0 - ?2
Radar frequency	The operating frequency of the radar in Hz during this experiment.	Float	4	0 - ?
Transmit Beam direction	The transmit beam direction used during this experiment.	Integer array	4×2	Azimuth = 0 – 360 Zenith = 0 - 90
Nyquist velocity	The maximum unambiguous radial velocity used in the analysis	Float	4	0 - ? ms^{-1}
Phase Difference Pairs	The number of pairs (N_p) of phase differences stored to file	Integer	4	0 - ?
GPS locked	Indicates whether GPS was locked through acquisition of data-set	Boolean	4	0,1
Number of Receiving Channels	The number of receiving channels used for data analysis (N)	Integer	4	1 - 16
Receiving Channels	The receiving channels used for data analysis(1 - based).	Integer Array	4×N	1 - ?

Antenna Pairs	The antenna pairs used for phase differences	Integer	$4 \times 2 \times N_p$	0 - ?

[2] A number of ranges equals zero means there were no detected meteor events in this record. In this case, a MET analysed data record will not follow the parameter record.

2、Magic number: 0x2051xxxx where "xxxx" is the revision number of the record.
Revision 0x0001: phase differences not stored

Parameter	Description	Data Type	Data Size	Allowable Values
Event Start Time	The start time of the event from the start of the data acquisition period (as recorded in MET parameter record)	Float	4	0 - ?, s
Range	Range	Float	4	0 - ?, km
Error code	Analysis error code	Integer	4	0 - 2
SNR	Signal to noise ratio of detected event	Float	4	?, dB
Power	Signal power of detected event. Note: Power(dB) = 20log(Power)	Float	4	0 - ?,$(\text{ADC units})^2$
Angle of arrival	The angle of arrival of the detected meteor	Float Array	4×2	Azimuth = 0 – 360, Zenith = 0 – 90, degrees
Decay time	Decay time	Float	4	0 - ? , s

Decay time error	Error in decay time estimate	Float	4	0 - ? , s
Diffusion coefficient	Diffusion coefficient	Float	4	0 - ? , s
Diffusion coefficient error	Error in diffusion coefficient estimate	Float	4	0 - ? , s
Radial velocity	Radial velocity	Float	4	? , ms^{-1}
Radial velocity error	Error in radial velocity estimate	Float	4	? , ms^{-1}

Revision 0x0002: phase differences stored

Parameter	Description	Data Type	Data Size	Allowable Values
Event Start Time	The start time of the event from the start of the data acquisition period	Float	4	0 - ?, s
Range	Range	Float	4	0 - ?, km
Error code	Analysis error code	Integer	4	0 - 2
SNR	Signal to noise ratio of detected event	Float	4	?, dB
Power	Signal power of detected event. Note: Power(dB) = 20log(Power)	Float	4	0 - ?,$(ADC\ units)^2$
Angle of arrival	The angle of arrival of the detected meteor	Float Array	4×2	Azimuth = 0 – 360, Zenith = 0 – 90, degrees

Decay time	Decay time	Float	4	0 - ? , s
Decay time error	Error in decay time estimate	Float	4	0 - ? , s
Diffusion coefficient	Diffusion coefficient	Float	4	0 - ? , s
Diffusion coefficient error	Error in diffusion coefficient estimate	Float	4	0 - ? , s
Radial velocity	Radial velocity	Float	4	? , ms^{-1}
Radial velocity error	Error in radial velocity estimate	Float	4	? , ms^{-1}
Phase Differences	Phase differences for the number of pairs used (N_p), and mean phase difference error	Float Array	$4 \times (N_p+1)$	0 to 360 degrees

Revision 0x0003: meteoroid speeds stored

Parameter	Description	Data Type	Data Size	Allowable Values
Event Start Time	The start time of the event from the start of the data acquisition period	Float	4	0 - ?, s
Range	Range	Float	4	0 - ?, km
Error code	Analysis error code	Integer	4	0 - 2
SNR	Signal to noise ratio of detected event	Float	4	?, dB
Power	Signal power of detected event. Note: Power(dB) = 20log(Power)	Float	4	0 - ?,$(\text{ADC units})^2$

Angle of arrival	The angle of arrival of the detected meteor	Float Array	4×2	Azimuth = 0 – 360, Zenith = 0 – 90, degrees
Decay time	Decay time	Float	4	0 - ? , s
Decay time error	Error in decay time estimate	Float	4	0 - ? , s
Diffusion coefficient	Diffusion coefficient	Float	4	0 - ? , s
Diffusion coefficient error	Error in diffusion coefficient estimate	Float	4	0 - ? , s
Radial velocity	Radial velocity	Float	4	? , ms^{-1}
Radial velocity error	Error in radial velocity estimate	Float	4	? , ms^{-1}
Meteoroid speed	Meteoroid speed	Float	4	0 - ? , ms^{-1}
Meteoroid speed error	Meteoroid speed error	Float	4	0 - ? , ms^{-1}
“Fitted” range estimate	Range estimate obtained by Gaussian fit to echo range profile	Float	4	0 to ? km
“Frequency agility” range estimate	Range estimate obtained using frequency agility	Float	4	0 to ? km

Revision 0x0004: phase differences and meteoroid speeds stored

Parameter	Description	Data Type	Data Size	Allowable Values
Event Start Time	The start time of the event from the start of the data acquisition period	Float	4	0 - ?, s
Range	Range	Float	4	0 - ?, km
Error code	Analysis error code	Integer	4	0 - 2
SNR	Signal to noise ratio of detected event	Float	4	?, dB
Power	Signal power of detected event. Note: Power(dB) = 20log(Power)	Float	4	0 - ?,$(\text{ADC units})^2$
Angle of arrival	The angle of arrival of the detected meteor	Float Array	4×2	Azimuth = 0 – 360, Zenith = 0 – 90, degrees
Decay time	Decay time	Float	4	0 - ? , s
Decay time error	Error in decay time estimate	Float	4	0 - ? , s
Diffusion coefficient	Diffusion coefficient	Float	4	0 - ? , s
Diffusion coefficient error	Error in diffusion coefficient estimate	Float	4	0 - ? , s
Radial velocity	Radial velocity	Float	4	? , ms^{-1}
Radial velocity error	Error in radial velocity estimate	Float	4	? , ms^{-1}
Meteoroid speed	Meteoroid speed	Float	4	0 - ? , ms^{-1}
Meteoroid speed	Meteoroid speed error	Float	4	0 - ? , ms^{-1}

error				
“Fitted” range estimate	Range estimate obtained by Gaussian fit to echo range profile	Float	4	0 to ? km
“Frequency agility” range estimate	Range estimate obtained using frequency agility	Float	4	0 to ? km
Phase Differences	Phase differences for the number of pairs used (N_p), and mean phase difference error	Float Array	$4 \times (N_p+1)$	0 to 360 degrees