

VNMPF-LIS: The Multiplatform Precipitation Feature (MPF) Database from the Global Precipitation Measurement (GPM) mission Validation Network (VN) with International Space Station Lighting Imaging Sensor (ISS LIS) data

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The variables included in the VNMPF-LIS dataset are listed with their descriptions in Tables 1-4. Tables 1 and 2 describe the ground-radar based statistical geographic, reflectivity, and vertical velocity variables. Table 3 describes the variables for which there are vertical profiles in the dataset. Table 4 describes the ISS LIS lightning observation variables that are identified within the MPF boundary.

Table S1. VN-MPF Variables

Variable Name	Description
CENTERLON	feature center longitude
CENTERLAT	feature center latitude
GEOCOEFFS	feature coefficients corresponding to geographic coordinates (x=lon, y=lat)
FEATURELON	feature perimeter longitude coordinates
FEATURELAT	feature perimeter latitude coordinates
MAJOR_DIMENSION	feature major dimension
ASPECT_RATIO	aspect ratio of feature minor dimension to feature major dimension
AREA	feature area
QC_CLIPPED	boolean whether cell identified by feature was clipped at edge of radar domain such that feature may capture partial cell
DECIMAL_HOUR	time of match, GPM overpass, in fractional hours since 00 UTC on date
YEAR	UTC year of date of match, GPM overpass
MONTH	UTC month of date of match, GPM overpass
DAY	UTC day of date of match, GPM overpass
GRADAR_LON	longitude of ground radar
GRADAR_LAT	latitude of ground radar
MINREF	minimum reflectivity
AVGHT_MINREF	avg height of minimum reflectivity
MAXREF	maximum reflectivity
AVGHT_MAXREF	avg height of maximum reflectivity
MEANREF_M10	mean reflectivity at -10 C
MINREF_M10	minimum reflectivity at -10 C
MAXREF_M10	maximum reflectivity at -10 C
MEANREF_M20	mean reflectivity at -20 C

Table S2. VN-MPF Variables, continued

Variable Name	Description
MINREF_M20	minimum reflectivity at -20 C
MAXREF_M20	maximum reflectivity at -20 C
MAXHT20	maximum height of 20 dBZ
MAXHT30	maximum height of 30 dBZ
MAXHT40	maximum height of 40 dBZ
MAXHT50	maximum height of 50 dBZ
MIN_MEANW	minimum value of mean W
AVGHT_MIN_MEANW	avg height of minimum value of mean W
MAX_MEANW	maximum value of mean W
AVGHT_MAX_MEANW	avg height of maximum value of mean W
MIN_MINW	minimum value of minimum W
AVGHT_MIN_MINW	avg height of minimum value of minimum W
MAX_MINW	maximum value of minimum W
AVGHT_MAX_MINW	avg height of maximum value of minimum W
MIN_MAXW	minimum value of maximum W
AVGHT_MIN_MAXW	avg height of minimum value of maximum W
MAX_MAXW	maximum value of maximum W
AVGHT_MAX_MAXW	avg height of maximum value of maximum W
MEANW_5MSVOL	5 m/s updraft volume based on mean W
MINW_5MSVOL	5 m/s updraft volume based on minimum W
MAXW_5MSVOL	5 m/s updraft volume based on maximum W
MEANW_10MSVOL	10 m/s updraft volume based on mean W
MINW_10MSVOL	10 m/s updraft volume based on minimum W
MAXW_10MSVOL	10 m/s updraft volume based on maximum W

Table S3. VN-MPF Profile Variables

Profile Variable	Description
ISOTHERM_TEMP	RAP isotherm temperatures
ISOTHERM_HT	RAP isotherm heights
REF_PROFILE_HT	geomatch height array corresponding to reflectivity data
MEANREF_PROFILE	mean reflectivity profile
MEANREF_PROFILE_HT	height of mean reflectivity profile
HID_NGATES_PROFILE	total number radar gates found in feature for HID field
FRACTION_PRECIPICE_PROFILE	fraction of HID gates corresponding to precip. ice
FRACTION_NONPRECIPICE_PROFILE	fraction of HID gates corresponding to non-precip. Ice
W_PROFILE_HT	geomatch height array corresponding to wind data
MEANMEANW_PROFILE	mean profile of mean W
MEANMEANW_PROFILE_HT	height of mean profile of mean W
MEANMINW_PROFILE	mean profile of minimum W
MEANMINW_PROFILE_HT	height of mean profile of minimum W
MEANMAXW_PROFILE	mean profile of maximum W
MEANMAXW_PROFILE_HT	height of mean profile of minimum W
MEANW_5MSAREA_PROFILE	profile of area of mean vertical motion greater than 5 m/s
MINW_5MSAREA_PROFILE	profile of area of minimum vertical motion greater than 5 m/s
MAXW_5MSAREA_PROFILE	profile of area of maximum vertical motion greater than 5 m/s
MEANW_10MSAREA_PROFILE	profile of area of mean vertical motion greater than 10 m/s
MINW_10MSAREA_PROFILE	profile of area of minimum vertical motion greater than 10 m/s
MAXW_10MSAREA_PROFILE	profile of area of maximum vertical motion greater than 10 m/s

Table S4. VN-MPF ISS-LIS Variables. Each of the variables listed here is saved for all four clustering levels: Events, Groups, Flashes, and Areas. Variables that are not statistical values (mean, min, max) will have the dimensions of however many clusters there are at each level. The “index” is a Boolean variable with the same dimensions as the ISS-LIS file in its native format, and the 1 values correspond to the clusters that lie within the MPF.

ISS-LIS Variable	Description
COUNT	number of LIS lightning events in feature
RATE	LIS lightning event rate
DENSITY	LIS lightning event density
MIN_RADIANCE	minimum event radiance
MEAN_RADIANCE	mean event radiance
MAX_RADIANCE	maximum event radiance
MIN_FOOTPRINT	minimum event footprint
MEAN_FOOTPRINT	mean event footprint
MAX_FOOTPRINT	maximum event footprint
MIN_X_PIXEL	minimum x pixel location of events
MEAN_X_PIXEL	mean x pixel location of events
MAX_X_PIXEL	max x pixel location of events
TAI93_TIME	event time in seconds since 1993-01-01 00:00:00.000
OBSERVE_TIME	event duration of observation
LAT	event latitude
LON	event longitude
RADIANCE	event calibrated radiance
FOOTPRINT	event footprint size
ADDRESS	event record number
PARENT_ADDRESS	event parent record number
X_PIXEL	event CCD pixel column
Y_PIXEL	event CCD pixel row
DENSITY_INDEX	event lightning activity
INDEX	index mask (0=no, 1=yes) for event occurrences in feature