Folder	Output	Function Name	Input	Description	Last Updated
Convert	yNew, altNew	crop_altitude	y, alt, minAlt, maxAlt	Crop Matrix Y with N time values and M altitude values to M* altitude values	9/21/2016
Convert	yNew,timeNew	crop_time	y,time,timeMin, timeMax	Crop a 2D matrix NxM, with time dimension M to a new time dimension M*<M	
Convert	dataNew, lat, lon, az_new, el_new, sensorloc, time	DASC_aer_to_geodetic	fileNameStr, az, el, imageSize, minElevation, projectionAltitude	Converts input Digital All Sky Camera image with az, el coordinates to lat, lon projected at the given projection altitude.	2/7/2017
Convert	cumuEnergyFlux	diff_to_cumu_flux	energyFlux, energyBin	Converts differential energy flux into cumulative energy flux	9/26/2016
Convert	numberFlux	energy_to_num	energyFlux, time, energyBin	Converting differential energy flux to differential number flux	9/21/2016
Convert	pfisrGD, magcoords, atTime, atAltitude	geodata_magnetic_field_interpolation	pfisrGD, minTimeStr, maxTimeStr, thisAltitude, magBeamNo	Interpolate geodata beam coordinates along magnetic field direction	1/24/2017
Convert	B	interp_nans	A	Removes nan by interpolating along altitude	9/25/2016
Convert	lat,lon,altitude	magcoords_ned2geodetic	magcoords	Convert magnetic field aligned ned coordinates to geodetic at PFISR	1/24/2017
Convert	newMatrix	modify_matrix_size	matrix, newRowSize, newColSize	Changes the size of the matrix by interpolating within	1/24/2017
	energyFlux	energy_to_num	numberFlux, time, energyBin	Converting differential number flux to differential energy flux	9/21/2016
Convert	Ne	q_to_Ne	q, alt, time, alpha	Estimates electron density from given production rates using static recombination coefficients	9/22/2016
Convert	rotatedArray	rotate_array	array, alpha	Rotate the array clockwise w.r.t data (and counter-clockwise w.r.t to previous configuration)	1/24/2017
Convert	mTime	unix_to_matlab_time	uTime	Converts unix time to matlab time	9/21/2016
Find	altitudeNo	find_altitude	altitudeGrid, thisAltitude	Find the index of a 1-D altitude array, given a particualr altitude value	9/21/2016
Find	medianIndex	find_median_energy	array, dim	Calculates the energy bin that cuts the cumulative energy flux distribuiton into half	12/21/2016

Find	timeNo	find_time	time, thisTime	Find the index of a 1-D time array, given a particular time value (in string format)	9/21/2016
Get	data	get_all_time_series_data		Provides a structure Data, that contains all the data files that can be later be used for plotting.	1/25/2017
Get	B_abs, B_r, B_theta, B_eq, L, magneticLatitude, invariantLatitude	get_dipole_mag_field	radiusInEarthRadii, polarAngle	Dipole magnetic field parameters given input radius and polar angle	1/25/2017
Get	alpha	get_eff_recomb_rate	altitudeGrid	Calculates the effective recombination coefficient	9/21/2016
Get	A	get_energy_dep_matrix	alt,energyBin,latitude,longitude,time	Calculates the energy deposition matrix : altitude profiles of production rate per incident monoenergteic electron beams	9/25/2016
Get	dE	get_error_in_energyFlux	dq, A, energyBin, energyFlux, time, Gamma	Calculates the covariance matrix of energy flux estimates	9/22/2016
Get	error_in_q, q, qTime	get_error_in_q	Ne, dNe, alt, time, mode, alpha	Calculates the error in production rate q, from dNe.	1/24/2017
Get	data -> flux -> energy flux, -> chi2, ->qInverted, ->maxIter, -> energyBin, -> time, -> alt, ->A, ->qInput	get_inverted_flux	q, time, alt, energyBin, A, guessFlux, DateNumBeg, DateNumEnd	Estimate energy spectra by inverting q(z)	9/25/2016
Get	noParticles	get_kappa_E	energyBin, meanEnergy, T, kappa	Normalized Energy distribution function (noParticles) for particles with mean energy E0,T, and kappa value kappa.	9/25/2016

Get	numberFlux	get_kappa_j	x, energyBin	Normalized flux (j(energyBin)) for particles with bulk energy (/velocity) meanEnergy,T,plasmaDensity, and kappa value k.	9/25/2016
Get	dataMSP ->intensity5577, ->intensity4278, ->intensity4861, ->intensity6300, ->el, ->time,->lambda	get_msp_data	fileNameStr, timeMinStr, timeMaxStr	Extract Meridional Scanning Photometer Data given Josh's msp_vvel.mat file	2/7/2017
Get	nBeams	get_nbeams	pfisrGD, coordinateNo	Calculate the number of beams in PFISR experiment using the range, or slant_height coordinate - which is same for all beams	1/24/2017
Get	beamNo, latitude, longitude, altitudeGrid	get_pfisr_beam_coordinates	fileNameStr, msrParameter, altitudeGrid	Calculates the coordinates of measurement parameters varying with altitude along different beams of PFISR (Poker Flat Incoherent Radar) system.	10/14/2016
Get	msrParValue, xEastAlongGrid,	get_pfisr_beam_data	pfisrGD, msrParameter, beamNo, nBeams,	Calculates the value of the parmater specified in 'msrParameter' along altitude from	9/21/2016
Get	msrParValue, altitudeGrid, time	get_pfisr_variable	fileNameStr, msrParameter, mode, altitudeGrid	Calculates the value of the parmater specified in 'msrParameter' along altitude from measurements along the different beams of PFISR (Poker Flat Incoherent Radar) system.	9/21/2016
Get	differentialDirectionalN umFlux_latitude, pitchAngleAtLatitude, invariantLatitude	get_pitch_angle_distribution	differentialDirectionalNumFlu x_equator, pitchAngle, L, latitude	Calculates the pitch angle distribution from input equatorial pitch angle distribution at any latitude on a particular field line	2/8/2017
Get	q, qTime, alpha	get_production_rate	Ne, alt, time, mode, alpha	Estimates the production rate from measured electron density, assuming Vickery et al. model of ion chemistry	9/21/2016
Get	timeAvgData	get_time_avg_time_series_data	data, time, timeMin, timeMax	Calculates time average flux given the time limits	9/26/2016

Misc	isThereNAN, totalNAN	check_nan	thisArray	Check if there is any nan values in the given array	9/22/2016
Misc		include_new_colormaps	filePath	The function initializes a few colormaps, given the path of the color maps	
Misc		initialize_geodata	filePath		
Misc	rootPathStr	initialize_root_path		Generates the root git-hub path based on the computer	2/10/2017
Misc		resize_figure	figureHandle, vert, horz	Resizes figure into a standard paper size	
Plot		add_horizontal_axes	TTick, TTickLim, newAxisTime, newAxisValue, newAxisLabel, axisNo	Add additional XTickLabels below the existing time axis	1/24/2017
Plot	local, thdEflux, thdeBin, pfisrEflux, pfisreBin	find_peaks	thisTimeStr, thd_time, thd_eflux, thd_eBin, pfisr_time, pfisr_eflux, pfisr_eBin	Identify peaks in the energy spectra of THEMIS and PFISR	1/24/2017
Plot	TTick, DateNumBeg, DateNumEnd	get_axes_time_tick_values	time, timeTick, timeMinStr, timeMaxStr	Calculates the time tick values in matlab units	1/24/2017
Plot		label_time_axis	time, setLabel, timeTick, timeMinStr, timeMaxStr	Sets the time axis (x-axis) time-tick locations and labels	9/29/2016
Plot	p	plot_1D_time_slice	time, yAxis, zValue, thisTime, mode	Plots the 1-D energy flux using an input data structure	9/26/2016
Plot	h2	plot_2D_energy_slice_aer	data, aercoords, energyBin, nBeams, timeNo, altitude, energy, setMapOn	Plot 2D energy flux in aer coordinates at a particular time, energy and projected at an altitude	1/24/2017
Plot	h2	plot_2D_energy_slice_geodetic	data, magcoords, energyBin, nBeams, timeNo, altitude, energy, setMapOn	Plot 2D differential energy flux slices on lat,lon map from 4-D PFISR data sets	1/24/2017
Plot	h	plot_2D_time_series	time, yAxis, zValue, timeTick, mode, timeMinStr, timeMaxStr	Plots 2D time series data	10/15/2016
Plot		plot_DASC_aer	dataNew, az, el, imageSize	Plots the All Sky Image in az, el, range coordinates	1/24/2017

Plot	ax1,h	plot_DASC_geodetic	dataNew, time, lat, lon, imageSize, latLim, lonLim	Plot DASC optical image in geodetic coordinates on a map	1/24/2017
Plot	h	plot_energyflux_keogram	data, aercoords, energyBin, nBeams, timeMinStr, timeMaxStr, altitude, energy	Plot 2-D keogram of enegry flux at particular energy	1/24/2017
Plot		plot_grid_aer	az, el, colorStr	Plots grid lines in polar plot at specified azimuth and elevation	1/24/2017
Plot		plot_preset_data_panels	dataChoice	Plots data from the choices in panel form	1/24/2017