Polly Config

The filename of polly config should be names as {polly version}_config.json. And it should be noted that the {polly version} is the lower case. Any wrong spelling can not be recognized correctly.

Descriptions

I will summarize all the configurations in the table below. But you should keep in mind there could be different settings for different polly, so you should create a new configuration file according to your demands.

keyword	Description	Example
flagCorrectFalseMShots	whether to correct the invalid shots stored in the netcdf files. (I don't know the reason yet, but it does exist in pollyxt_tropos for a period of time)	true
flagFilterFalseMShots	whether to filter out the profiles with invalid shots. (Since I don't know whether it's trustable for these profiles, I will leave this keyword for future development.)	false
flagDTCor	whether to implement deadtime correction	true
flagWVCalibration	whether to implement water vapor calibration	true
MWRFolder	The folder of prw results from MWR. (This is only for LACROS)	"C:\Users\zhenping\Desktop\Picasso\test\read_IWV_from_MWR"
dataFileFormat	regular expression to extract the data and time info from polly data file. (This is based on the syntax of matlab **regexp**)	"(?\d{4})*(?|d{2})*(?\d{2})|w*(?\d{2})*(?|d{2})*(?\d{2})\w*.nc"
gdas1Site	gdas1 site for the current campaign. (You can find the info in gdas1-site-list.txt)	"warsaw"
max_height_bin	the number of bins you want to extract for each profile. (Normally, the high altitude bins only contain noise. If you load too much bins, you will slow down the whole processing process)	2500
first_range_gate_indx	the first bin for each channel. (It's highly suggested to tune this parameter to compensate the lag among different channels)	[261, 261, 261, 261, 261, 261, 261, 261, 262, 262, 262, 262]
first_range_gate_height	The height for the first range bin. [m]. You need to take great care for this parameter, since it will create large bias for extinction coefficient with Raman method. Look for advice from hardware scientist if you are not certain about this	78.75 m **->(The unit is only for demonstration, don't set it in the conf files)**
dtCorMode	deadtime correction mode. (1: use the parameters saved in the netcdf files; 2: nonparalyzable correction with user define deadtime; 3: paralyzable correction with user defined parameters; 4: no deadtime correction)	1
dt	parameters for deadtime correction. If "dtCorMode" is set to be '2', only the deadtime for each channel need to be set here with unit of ns. If "dtCorMode" is set to be '3', the correction parameters need to be set accordingly. You can take pollyxt_tropos_config.json as an example	[[0.0, 0.972992, 0.00353332, -7.90981e-006, 1.06451e-007, 1.42895e 009], [0, 1.0117, -0.0014, 0.0002, -0.0000, 0.0000], [0, 0.9674, 0.0023 0.0000, 0.0000, 0.0000], [0, 0.9929, 0.0000, 0.0001, -0.0000, 0.0000], 0.9843, 0.0022, 0.0001, -0.0000, 0.0000], [0, 0.9391, 0.0063, -0.0001 0.0000, -0.0000], [0, 1.0035, 0.0003, 0.0001, -0.0000, 0.0000], [0, 1.00(0, 0, 0, 0], [0, 1.0000, 0.0029, 0.0000, 0.0000, 0.0000], [0, 1.0000, 0.00: 0.0000, 0.0000, 0.0000], [0, 1.0000, 0.0028, 0.0000, 0.0000, 0.0000], [1.0000, 0.0025, 0.0000, 0.0000, 0.0000], [0, 1, 0, 0, 0, 0]]

keyword	Description	Example
bgCorRangeIndx	the bottom and top index of signal to calculate the background	[10, 240]
mask_SNRmin	the SNR threshold to mask noisy bins	[1.6, 1, 1, 1, 1.5, 1, 1, 1.5, 1, 1, 1, 1, 1]
init_depAng	the initial angle of the polariser withou depo calibration [degree]	0
maskDepCalAng	the mask for postive and negative calibration angle. 'none' means invalid profiles with different depol_cal_angle	["none", "none", "p", "p", "p", "p", "p", "p", "p", "p", "none", "none", "n", "n", "n", "n", "n", "n", "n", "n"]
depol_cal_minbin_{wavelength}	the minimum bin used for depolarization calibration	40
depol_cal_maxbin_{wavelength}	the maximum bin used for depolarization calibration	300
depol_cal_SNRmin_{wavelength}	Threshold for the minimum SNR used in depol-calibration. There are four signal profiles used in the calibration, total channel at ±45° and cross channel at ±45°. Therefore, an array of four element need to be configured. Namely, [total+45°, total−45°, cross+45°, cross−45°]	
[1, 1, 1, 1]		
depol_cal_sigMax_{wavelength}	The maximum signal strength could be used for depol-calibration to prevent signal pileup effects	[1500, 1500, 1500, 1500] (photon count)
rel_std_dplus_{wavelength}	Threshold for maximum relative uncertainty of signal ratio at +45° depol-calibration. If relative uncertainty exceed this value, it states there could be clouds or too weak signal for this calibration period.	0.2
rel_std_dminus_{wavelength}	Threshold for maximum relative uncertainty of signal ratio at −45° depol-calibration.	0.2
depol_cal_segmentLen_{wavelength}	The small region for evaluating the uncertainty of depol calibration	40
depol_cal_smoothWin_{wavelength}	The smoothing window for depol-calibration	8
isFR	flag of far-range channel	[1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0]
isNR	flag of near-range channel	[0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 0]
is532nm	flag of 532nm channel	[0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0]
is355nm	flag of 355nm channel	[1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0]
is1064nm	flag of 1064nm channel	[0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0]
isTot	flag of total channel	[1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 1, 0, 0]
isCross	flag of cross polarized channel	[0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0]
is387nm	flag of 387nm channel	[0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0]
is407nm	flag of 407nm channel	[0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0]
is607nm	flag of 607nm channel	[0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0]
channelTag	label of each channel	["FR-total-355 nm", "FR-cross-355 nm", "FR-387 nm", "FR-407 nm", "FR-total-532 nm", "FR-cross-532 nm", "FR-607 nm", "FR-total-1064 nm", "NR-total-532 nm", "NR-607 nm", "NR-total-355 nm", "NR-387 nm", "unknown"]

keyword	Description	Example
minPC_fog	The minimum photon count for non-fog profile. The detected photon count between 40th and 120th bin (above the first bin) for each 30s profile will be accumulated for the fog profile screening.	60
TR	Transmission ratio for different channel.	[0.898, 1086, 1, 1, 1.45, 778.8, 1, 1, 1, 1, 1, 1]
overlapCalMode	1:estimate the overlap function based on the near-range signal. 2: calculate the overlap function with Raman method (U. Wandinger, et al, Applied Optics, 2002)	1
overlapCorMode	1:overlap correction with using the default overlap function. 2: overlap correction with using the calculated overlap function	1
overlapSmoothBins	vertical window (bins) for smoothing the noisy overlap function	8
maxSigSlope4FilterCloud	The slope threshold for cloud screening. The screening is based on the slope of the Range Corrected Signal(photon count * m^2). In theory, this should be done with the attenuated backscatter. Since the lidar constant is unknown and cloud-screen is highly important for retrieving aerosol profiles, this is the only applicable way to my knowledge. Attention should be paid for the threshold setting, because it's dependent on the the order of ND filter. But it's not very sensitive because cloud scattering signal is much more stronger than that from aerosols. You can keep this value if there is no dramatic changes of ND filter(more than 1)	3e6
maxSigSlope4FilterCloud_NR	The slope threshold for cloud screening with using NR signal	0.5e6
saturate_thresh	the threshold for signal saturation	100 [MHz]
heightFullOverlap	height for the base of full overlap	[500, 500, 500, 500, 500, 500, 500, 500, 150, 150, 150, 150, 150]
minSNR_4_sigNorm	The minimum SNR requirement for the signal used for signal normalization both for near- and far- range signal.	[10]
intNProfiles	Accumulated profiles for retrieving.	120
minIntNProfiles	minimum integral profiles for aerosol retrieving	90
meteorDataSource	the data source for meteorological data. If the current data does not exist. It will turn to standard atmosphere model.	"gdas1"
radiosondeSitenum	The site number for the nearest radiosonde launching site. (You can search the number in radiosonde-station-list.txt)	14430
IWV_instrument	the data source of IWV. ('mwr' or 'aeronet')	"AERONET"
maxIWVTLag	The minumum lag required for water vapor calibration between IWV data and lidar water vapor measurement.	0.1666 (day)
minDecomLogDist{wavelength}		0.2
maxDecomHeight{wavelength}		8000

keyword	Description	Example
maxDecomThickness{wavelength}		700
decomSmoothWin{wavelength}	The smoothing window for molecular corrected signal used in Douglas-Peucker decomposition algorithm.	20
minRefThickness{wavelength}	The minimum thickness for the reference height. There is thickness test in the RayleighFit function which will ensure the minimum thickness of the reference height	500 [m]
minRefDeltaExt{wavelength}	The maximum slope difference between measured signal and molecule signal. This threshold is used in RayleighFit slope test which will examine whether $slope_{molecular signal}\in[slope_{measured signal} - k\sigma_{slope_{measured signal}}, slope_{measured signal} + k\sigma_{slope_{measured signal}}]$	2
minRefSNR{wavelength}	The minimum SNR for the accumulated signal at the tested reference height.	5
LR{wavelength}	Default lidar ratio for Klett retrieving method	50 Sr
refBeta{wavelength}	Reference value for Klett and Raman method	2e-8
smoothWin_klett_{wavelength}	smoothing window for klett method	21
maxIterConstrainFernald	The maximum iterations for searching the best Lidar Ratio with Constrained-AOD fernald method	20 Sr
minLRConstrainFernald	The minimum lidar ratio used for Constrained-AOD fernald method	1 Sr
maxLRConstrainFernald	The maximum lidar ratio used for Constrained-AOD fernald method	150 Sr
minDeltaAOD	The minimum AOD deviation that is required for Constrained-AOD fernald method	0.01
minRamanRefSNR387	The minimum SNR for the signal at the reference height. If SNR at the reference height is smaller than this value, raman method will not implemented.	40
minRamanRefSNR607	The minimum SNR for the signal at the reference height. If SNR at the reference height is smaller than this value, raman method will not implemented.	20
angstrexp	Default angstroem exponent for Raman method	0.9
smoothWin_raman_{wavelength}	smoothing window for raman method	61
LCMeanWindow	The window for calculating the Lidar Constant	50
LCMeanMinIndx	The minimum bin used for lidar constant calculation	70
LCMeanMaxIndx	The maximum bin used for lidar constant calculation	1000
LCCalibrationStatus	The tag for lidar calibration status, which will displayed in the output figures	["none", "Klett", "Raman", "Defaults"

keyword	Description	Example
quasi_smooth_h	temporal smoothing window for quasi retrieving method. For consistency, this parameter should be set for each channel	[1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
quasi_smooth_t	spatial smoothing window for quasi retrieving method. For consistency, this parameter should be set for each channel	[1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
hWVCaliBase	The minimum height used for calculating the IWV from lidar measurement.	120
minHWVCaliTop	The minimum top height required for calculating the IWV from lidar measurement.	2000
clear_thres_par_beta_1064	The threshold for discriminating clear atmosphere based on particle backscatter at 1064nm	1e-8 m^{-1}
turbid_thres_par_beta_1064	The threshold for discriminating turbid atmosphere based on particle backscatter at 1064nm	2e-7 m^{-1}
turbid_thres_par_beta_532	The threshold for discriminating turbid atmosphere based on particle backscatter at 532nm	2e-7 m^{-1}
droplet_thres_par_depol	The threshold for discriminating cloud droplets based on particle depolarization ratio at 532nm	0.05
spheroid_thres_par_depol	The threshold for discriminating spheriod paricles based on particle depolarization ratio at 532nm	0.07
unspheroid_thres_par_depol	The threshold for discriminating unspheriod paricles based on particle depolarization ratio at 532nm	0.2
ice_thres_par_depol	The threshold for discriminating ice crystals based on particle depolarization ratio at 532nm	0.35
ice_thres_vol_depol	The threshold for discriminating ice crystals based on volume depolarization ratio at 532nm	0.3
large_thres_ang	The threshold for discriminating large particles based on angstroem exponent	0.75
small_thres_ang	The threshold for discriminating small particles based on angstroem exponent	0.5
cloud_thres_par_beta_1064	The threshold for discriminating cloud layers based on quasi particle backscatter at 1064nm	2e-5 m^{-1}
min_atten_par_beta_1064	The minimum attenuation factor could be expected at the first 250m penatration depth	10
search_cloud_above	The parameter is used in cloud top detection. The cloud top will be searched between the first bin with quasi particle backscatter at 1064nm larger than cloud_thres_par_beta_1064 and +search_height_above	300 m

keyword	Description	Example
search_cloud_below	The parameter is used in cloud base detection. The cloud base will be searched between the first bin with quasi particle backscatter at 1064nm larger than cloud_thres_par_beta_1064 and -search_height_below	100 m
overlap{wavelength}Color	the color settings for the line of overlap	[0, 255, 64]
xLim_Profi_Bsc	x-range of the profile of aerosol backscatter	[-0.1, 10] Mm^{-1}sr^{-1}
xLim_Profi_NR_Bsc	x-range of the profile of aerosol backscatter retrieved with near-range signal	[-0.1, 10] Mm^{-1}sr^{-1}
xLim_Profi_Ext	x-range of the profile of aerosol extinction coefficient	[-1, 300] Mm^{-1}
xLim_Profi_NR_Ext	x-range of the profile of aerosol extinction coefficient retrieved with near-range signal	[-1, 300] Mm^{-1}
xLim_Profi_WV_RH	x-range (**z-range**) of the profile (**time-height plot**) of water vapor mixing ratio	[0, 10] g*kg^{-1}
xLim_Profi_RCS	x-range of the profile of range corrected signal	[0.3, 10] (*1e6 a.u.)
xLim_Profi_LR	x-range of the profile of lidar ratio	[0, 120] sr
yLim_LC_{wavelength}	y-range of the profile of lidar constant at certain wavelength	[0, 1e14]
yLim_LC_ratio_{wavelength1}_{wavelength2}	y-range of the scatter plot of the lidar constant ratio at two given wavelength	[0, 1]
yLim_WVConst	y-range of the profile of water vapor calibration constant	[0, 20]
yLim_FR_RCS	y-range of the profile of range corrected signal (**time-height plot of signal saturation bits**) from far-range channels	[0, 20000] m
yLim_NR_RCS	y-range of the profile of range corrected signal (**time-height plot of signal saturation bits**) from near-range channels	[0, 3000] m
yLim_att_beta	y-range of the time-height plot of attenuated backscatter	[0, 15000] Mm^{-1}sr^{-1}
yLim_Quasi_Params	y-range of aerosol optical products retrieved by quasi-retrieving method	[0, 12000] m
yLim_WV_RH	y-range of the profile of water vapor mixing ratio (relative humidity)	[0, 7000] m
yLim_Profi_Ext	y-range of the profile of extinction coefficient	[0, 5000] m
yLim_Profi_LR	y-range of the profile of lidar ratio	[0, 5000] m
yLim_Profi_DR	y-range of the profile of volume/particle depolarization ratio	[0, 20000] m
yLim_Profi_Bsc	y-range of the profile of aerosol backscatter	[0, 20000] m
yLim_Profi_WV_RH	y-range of the profile of water vapor mixing ratio (relative humidity)	[0, 7000] m
yLim_depolConst_{wavelength}	y-range of the profile of depolarization calibration constant at certain wavelength	[0, 0.2]
zLim_att_beta_{wavelength}	z-range of the time-height plot of attenuated backscatter	[0, 15] Mm^{-1}sr^{-1}

keyword	Description	Example
zLim_quasi_beta_{wavelength}	z-range of the time-height plot of quasi aerosol backscatter coefficient	[0, 8] Mm^{-1}sr^{-1}
zLim_quasi_Par_DR_532	z-range of the time-height plot of quasi particle depolarization ratio	[0, 0.4]
zLim_FR_RCS_{wavelength}	z-range of the time-height plot of range corrected signal from far-range channels	[1e-2, 30] (1e6 a.u.)
zLim_NR_RCS_{wavelength}	z-range of the time-height plot of range corrected signal from near-range channels	[1e-2, 5] (1e6 a.u.)
calibrationDB	database for saving calibration results	"polly_calibration.db"
logbookFile	path to the logbook file. Only the logfile generated by the pollylog program was accepted.	"C:\Users\StarWalker\Documents\Data\PollyXT\pollyxt_lacros\logbook.cs
radiosondeFolder	directory of the radiosonde file. The radiosonde file should be in standardized format, which has been defined in '../doc/meteorological_file_settings.pptx'	"/home/picasso/data/radiosonde"
imgFormat	image format	'png'
prodSaveList	control the output of nc files	["overlap", "aerProfFR", "aerProfNR", "aerProfOC", "aerAttBetaFR", "aerAttBetaOC", "WVMR_RH", "volDepol", "quasiV1", "quasiV2", "TC", "TCV2"]