

PROJECT: EXPORTS

INSTRUMENTS: CALIOP, MODIS, NCEP REANALYSIS

DATE: January 2008 – May 2017

TEMPORAL AVERAGING: Monthly

SPATIAL AVERAGING: 5° latitude by 5° longitude

LOCATION: Ocean Station Papa, 50° N latitude, 145° W longitude

WEBSITES: [eosweb.larc.nasa.gov/project/calipso](http://eosweb.larc.nasa.gov/project/calipso)

[oceancolor.gsfc.nasa.gov](http://oceancolor.gsfc.nasa.gov)

[esrl.noaa.gov/psd/data/reanalysis](http://esrl.noaa.gov/psd/data/reanalysis)

DATA SET INCLUDES:

- Profiles and associated standard deviations for 8 range bins of total attenuated backscatter,  $\beta_{total}$  and perpendicular attenuated backscatter,  $\beta_{perp}$ .
- Hemispheric backscattering coefficient,  $b_{bp}$ , as calculated using the CALIOP attenuated backscatter signals and MODIS (Aqua and Terra) diffuse attenuation coefficient
- MODIS  $b_{bp}$  (GOIP estimated)
- Diffuse attenuation coefficient
- NCEP Reanalysis wind speed

FILE DESCRIPTION:

Missing Data Value: NaN

Delimiter: comma

40 columns, 112 rows (first two rows are labels)

First row: Profile range bins in km (8 estimates and 8 uncertainties each for  $\beta_{total}$  (*total* and *stdev*) and  $\beta_{perp}$  (*perp* and *stdev*) 32 columns

*range (km)*: 0.05276, 0.02282, -0.00534, -0.2779, -0.05024, -0.0727, -0.09515, -0.11761

Column 1 = Date in mm/dd/yyyy, string (*date*)

Column 2 = Number of shots in 5°x5° average, integer (*num*)

Column 3 – Column 35 = attenuated backscatter (532 nm) data and uncertainties, exponential (*total* (8 columns), *std* (8 columns), *perp* (8 columns), *std* (8 columns))

Column 36 = CALIOP determined  $b_{bp}$  at 440 nm using  $K_d$  at 490 nm from MODIS Aqua scaled to 532 nm (*cabbp*)

Column 37 = CALIOP determined  $b_{bp}$  at 440 using  $K_d$  MODIS Terra scaled to 532 nm, exponential (*ctbbp*)

Column 38 =  $b_{bp}$  at 443 nm as estimated from MODIS Terra, exponential (*tbbp*)

Column 39 =  $b_{bp}$  at 443 as estimated from MODIS Aqua, exponential (*abbp*).

Column 40 =  $K_d$  at 490 from MODIS Aqua, exponential (*kd*)

Column 41 = wind speed from NCEP reanalysis, float (*v*)

Only night time half orbit CALIOP total and perpendicular attenuated backscatter profiles are included in the  $5^\circ \times 5^\circ$  spatially averaged dataset. Additionally, profiles must meet two surface conditions.  $\beta_{\text{total}}$  in the surface bin must meet  $\beta_{\text{surf}} > 0.1$ , this ensures sufficient signal, free from atmospheric aerosol and cloud.  $\delta_{\text{surf}}$  must also be sufficiently small,  $\delta_{\text{surf}} < 0.01$ , this constrains the surface state to eliminate strong wave action and foam. Finally, the transient response of the CALIOP detectors was removed using a deconvolution technique and a correction profile.

The original spatial resolution of all MODIS data presented here is 4 km. All MODIS data was spatially averaged to match the CALIOP  $5^\circ \times 5^\circ$  grid. Wind speed data was given at  $2.5^\circ \times 2.5^\circ$  and also averaged to the CALIOP  $5^\circ \times 5^\circ$  grid.