README Documentation of Maps of GNSS-RO Planetary Boundary Layer Heights (PBLH) Over the Northeast Pacific ('pblh_gps_2006-2019_2x2_season_all.nc)

Input File Name: pblh_gps_2006-2019_2x2_season_all.nc

General Description:

These are the seasonal PBLH data used in the manuscript entitled, "Spatiotemporal Variability Relationships of Shallow Cloud Height and Planetary Boundary Layer Height Over the Northeast Pacific Using Satellite Observations and Reanalysis." These are the global seasonal parameters of PBLH, for which we examine maps of the Northeast Pacific in conjunction with MISR cloud top height (CTH) and ERA5 sea surface to 700 hPa lapse rates (Figure 1), the difference between seasonal PBLH and CTH, including relationships of PBLH versus CTH including with and without filtering of free troposphere temperatures at 700 hPa (T_{700}) in Figure 2.

As described in the study, the primary domain for the analysis is 150°W-115°W and 15°N-40°N; since the data are gridded into 2° longitude x 2° latitude boxes, we use all the data between 209°-246° longitude and 15°N-41°N latitude. The surface type flag below is used to constrain the analysis to ocean-grids only (surface_type = 0).

As noted, the method of deriving PBLH was used in Ao et al. JGR, 2012, doi:10.1029/2012JD017598; the full reference is provided in the manuscript.

Dimensions:

lat = 90 ;

lon = 180 ;

season = 4 ;

Variables:

float **lat**(lat) ;

lat:units = "degrees_north" ;

lat:long_name = "latitude" ;

float **lon**(lon) ;

lon:units = "degrees_east" ;

lon:long_name = "longitude" ;

int **season**(season) ;

season:long_name = "seasons (0=DJF, 1=MAM, 2=JJA, 3=SON)" ; (DJF = December-January-February; MAM = March-April-May; JJA = June-July-August; SON = September-October-November)

float **atmosphere_boundary_layer_thickness**(season, lat, lon) ; **(= PBLH in the study)**

atmosphere_boundary_layer_thickness:_FillValue = -999.f ;

atmosphere_boundary_layer_thickness:units = "meters" ;

atmosphere_boundary_layer_thickness:long_name = "atmosphere boundary layer thickness mean value" ;

float **atmosphere_boundary_layer_thickness_sd**(season, lat, lon) ;

atmosphere_boundary_layer_thickness_sd:_FillValue = -999.f ;

atmosphere_boundary_layer_thickness_sd:units = "meters" ;

atmosphere_boundary_layer_thickness_sd:long_name = "atmosphere boundary layer thickness standard deviation" ;

int number_of_soundings(season, lat, lon) ;

number_of_soundings:units = "count" ;

int surface_type(lat, lon) ;

surface_type:long_name = "0 (ocean); 1 (land); 2 (coast/missing); 3 (not classified)" ;

float pbl_sharpness_parameter(season, lat, lon) ;

pbl_sharpness_parameter:_FillValue = -999.f ;

pbl_sharpness_parameter:units = "none" ;

pbl_sharpness_parameter:long_name = "PBL sharpness parameter mean value" ;

float pbl_sharpness_parameter_sd(season, lat, lon) ;

pbl_sharpness_parameter_sd:_FillValue = -999.f ;

pbl_sharpness_parameter_sd:units = "none" ;

pbl_sharpness_parameter_sd:long_name = "PBL sharpness parameter standard deviation" ;

// global attributes:

:Conventions = "CF-1.7" ;

:Format = "NetCDF-4" ;

:RangeBeginningDate = "2006-06-01" ;

:RangeEndingDate = "2019-12-31" ;

:RangeBeginningTime = "00:00:00.000000" ;

:RangeEndingTime = "23:59:59.999999" ;

:ContactPersonalName = "Chi O. Ao" ;

:ContactPersonalEmail = "chi.o.ao@jpl.nasa.gov" ;

:RelatedURL = "http://genesis.jpl.nasa.gov" ;

:ObservationArea = "Global" ;

:SatelliteList = "COSMIC 1-6, TerraSAR-X" ;

:Source = "COSMIC 1-6, TerraSAR-X" ;

:ProcessingDate = "Sun Aug 1 18:30:40 2021" ;

:ProductionDateTime = "2021-08-02T01:30:40.772417Z" ;

:ProcessingCenter = "JPL" ;

:ProductGenerationAlgorithm = "Refractivity gradient method. See Ao et al. JGR, 2012, doi:10.1029/2012JD017598, for description" ;

:ProductGenerationAlgorithmVersion = "V01.00" ;

:SharpnessThreshold = 0. ;

:SouthBoundingCoordinate = -90. ;

:NorthBoundingCoordinate = 90. ;

:LatitudeResolution = 2. ;

:WestBoundingCoordinate = 0. ;

:EastBoundingCoordinate = 360. ;

:NorthernmostLatitude = 90. ;

:SouthernmostLatitude = -90. ;

:WesternmostLongitude = 0. ;

:EasternmostLongitude = 360. ;

:LongitudeResolution = 2. ;

:ShortName = "GPSROZPBLS" ;

:LongName = "GPS Radio Occultation Boundary Layer Depth Seasonal L3 V2" ;

:ProcessingLevel = "Level 3" ;

:VersionID = 1LL ;

:GranuleID = "pblh_gps_2006-2019_2x2_season_all" ;

:IdentifierProductDOIAuthority = "http://dx.doi.org/" ;

:IdentifierProductDOI = "10.5067/XGL1QBKFBI5B" ;

:History = "Initial file creation: Sun Aug 1 18:30:40 2021" ;

data:

lat = -89, -87, -85, -83, -81, -79, -77, -75, -73, -71, -69, -67, -65, -63,
-61, -59, -57, -55, -53, -51, -49, -47, -45, -43, -41, -39, -37, -35,
-33, -31, -29, -27, -25, -23, -21, -19, -17, -15, -13, -11, -9, -7, -5,
-3, -1, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33,
35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69,
71, 73, 75, 77, 79, 81, 83, 85, 87, 89 ;

lon = 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37,
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