

Below are the attributes inside of each
'traceraq-GSFCCeilometer_LaPorte_yyyymmdd_RA.nc.nc' file in the directory.

PI_CONTACT_INFO: John T. Sullivan, email: john.t.sullivan@nasa.gov

PLATFORM: LaPorte, Texas, USA - NASA GSFC

LOCATION: Lat, Lon, elevation(m) = 29.67, -95.06, 10

INSTRUMENT_INFO: Lufft CHM15k Nimbus Ceilometer

PROJECT_INFO: <https://www-air.larc.nasa.gov/missions/tracer-aq/>

STIPULATIONS_ON_USE: Use of these data should be done in consultation with the PI

Global Attributes:

title = 'CHM15k Nimbus'
source = 'CHM200123'
device_name = 'CHM200123'
serlom = 'TUB200024'
day = 9
month = 8
year = 2021
location = 'TROPOZ'
institution = 'GSFC/Sullivan'
wmo_id = 0
wigos_id = ''
netcdf_mode = 2
software_version = '18.10.1 2.13 1.070 0'
comment = ''
overlap_file = 'TUB200024 (2020-11-23 14:27:31)'

Dimensions:

time = 1839 (UNLIMITED)
range = 1024
range_hr = 32
layer = 3

Variables:

time

Size: 1839x1

Dimensions: time

Datatype: double

Attributes:

units = 'seconds since 1904-01-01 00:00:00.000 00:00'

long_name = 'time UTC'

axis = 'T'

range

Size: 1024x1

Dimensions: range

Datatype: single

Attributes:

units = 'm'

long_name = 'distance from lidar'

axis = 'Z'

range_hr

Size: 32x1

Dimensions: range_hr

Datatype: single

Attributes:

units = 'm'

long_name = 'high resolution distance from lidar'

layer

Size: 3x1

Dimensions: layer

Datatype: int32

Attributes:

long_name = 'layer index'

latitude

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'degrees_north'

long_name = 'latitude of site'

longitude

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'degrees_east'

long_name = 'longitude of site'

azimuth

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'degree'

long_name = 'laser direction of site'

zenith

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'degree'

long_name = 'laser direction of site'

altitude

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'm'

long_name = 'altitude of ceilometer
above mean sea level'

wavelength

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'nm'

long_name = 'laser wavelength'

average_time

Size: 1839x1

Dimensions: time

Datatype: int32

Attributes:

units = 'ms'

long_name = 'average time per record'

range_gate

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'm'

long_name = 'length of range gate, binwidth'

range_gate_hr

Size: 1x1

Dimensions:

Datatype: single

Attributes:

units = 'm'

long_name = 'length of range gate with high resolution, binwidth'

life_time

Size: 1839x1

Dimensions: time

Datatype: int32

Attributes:

```
        units    = 'h'
        long_name = 'laser life time'
error_ext
    Size:    1839x1
    Dimensions: time
    Datatype: int32
    Attributes:
        long_name = '32 bit service code'
state_laser
    Size:    1839x1
    Dimensions: time
    Datatype: int8
    Attributes:
        units    = 'percent'
        long_name = 'laser quality index'
state_detector
    Size:    1839x1
    Dimensions: time
    Datatype: int8
    Attributes:
        units    = 'percent'
        long_name = 'quality of detector signal'
state_optics
    Size:    1839x1
    Dimensions: time
    Datatype: int8
    Attributes:
        units    = 'percent'
        long_name = 'transmission of optics'
temp_int
    Size:    1839x1
    Dimensions: time
    Datatype: int16
    Attributes:
        units    = 'K'
        long_name = 'internal temperature'
        scale_factor = 0.1
temp_ext
    Size:    1839x1
    Dimensions: time
    Datatype: int16
    Attributes:
        units    = 'K'
        long_name = 'external temperature'
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        scale_factor = 0.1
temp_det
    Size: 1839x1
    Dimensions: time
    Datatype: int16
    Attributes:
        units = 'K'
        long_name = 'detector temperature'
        scale_factor = 0.1
temp_lom
    Size: 1839x1
    Dimensions: time
    Datatype: int16
    Attributes:
        units = 'K'
        long_name = 'laser optic module temperature'
        scale_factor = 0.1
laser_pulses
    Size: 1839x1
    Dimensions: time
    Datatype: int32
    Attributes:
        long_name = 'number of laser pulses per record (lp)'
p_calc
    Size: 1839x1
    Dimensions: time
    Datatype: int16
    Attributes:
        units = 'counts'
        long_name = 'calibration pulse in photons per shot'
        scale_factor = 1e-05
scaling
    Size: 1x1
    Dimensions:
    Datatype: single
    Attributes:
        long_name = 'scaling factor (cs)'
base
    Size: 1839x1
    Dimensions: time
    Datatype: single
    Attributes:
        units = 'counts'
        long_name = 'baseline raw signal in photons per shot (b)'

```

stddev

Size: 1839x1

Dimensions: time

Datatype: single

Attributes:

units = 'counts'

long_name = 'standard deviation raw signal in photons per shot'

beta_raw

Size: 1024x1839

Dimensions: range,time

Datatype: single

Attributes:

units = ''

long_name = 'normalized range corrected signal

$((P_{\text{raw}} / lp) - b) / (cs * o(r) * p_{\text{calc}}) * r * r$

with $P_{\text{raw}} = \text{sum}(P_{\text{raw_hr}} * \text{range_gate_hr} / \text{range_gate})$

beta_raw_hr

Size: 32x1839

Dimensions: range_hr,time

Datatype: single

Attributes:

units = ''

long_name = 'normalized range corrected signal (high resolution)

$((P_{\text{raw_hr}} / lp) - b) / (cs * o(r) * p_{\text{calc}}) * r * r$

pbl

Size: 3x1839

Dimensions: layer,time

Datatype: int16

Attributes:

units = 'm'

long_name = 'aerosol layer in PBL'

pbs

Size: 3x1839

Dimensions: layer,time

Datatype: int8

Attributes:

long_name = 'quality score for aerosol layer in PBL'

tcc

Size: 1839x1

Dimensions: time

Datatype: int8

Attributes:

long_name = 'total cloud cover'

bcc

Size: 1839x1
Dimensions: time
Datatype: int8
Attributes:
 long_name = 'base cloud cover'

sci

Size: 1839x1
Dimensions: time
Datatype: int8
Attributes:
 long_name = 'sky condition index
 (0: nothing, 1: rain, 2: fog, 3: snow,
 4: precipitation or particles on window)'

vor

Size: 1839x1
Dimensions: time
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'vertical optical range'

voe

Size: 1839x1
Dimensions: time
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'vertical optical range error'

mxh

Size: 1839x1
Dimensions: time
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'maximum detection height'

cbh

Size: 3x1839
Dimensions: layer,time
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'cloud base height'

cbe

Size: 3x1839
Dimensions: layer,time

Datatype: int16
Attributes:
 units = 'm'
 long_name = 'cloud base height variation'

cdp

Size: 3x1839
Dimensions: layer,time
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'cloud depth'

cde

Size: 3x1839
Dimensions: layer,time
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'cloud depth variation'

cho

Size: 1x1
Dimensions:
Datatype: int16
Attributes:
 units = 'm'
 long_name = 'cloud height offset'

nn1

Size: 1839x1
Dimensions: time
Datatype: int16
Attributes:
 long_name = 'nn1'

nn2

Size: 1839x1
Dimensions: time
Datatype: int16
Attributes:
 long_name = 'nn2'

nn3

Size: 1839x1
Dimensions: time
Datatype: int16
Attributes:
 long_name = 'nn3'