GHOST Quality Control Check Definitions

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# Preface

# Definition Syntax

# QUALITY CONTROL CHECK DEFINITIONS

## check key metadata

Check have key metadata (latitude, longitude), i.e. they have a numerical value.

Also check both latitude and longitude are not set both as 0 (must be bug as nothing but ocean there)

## check altitude metadata

Check have valid altitude metadata, i.e. it has a numerical value

## check missing measurement

Check if have missing measurements (i.e NaN)

## check negative measurement

#Check if have negative measurements (i.e < 0), or have network flags stating negative measurements (X6)

## check zero values

Check if have values == 0

## check infinite values

Check if have infinite values (i.e. np.inf).

This happens when values are outside of the range that the float32 data type can handle (-3.4E+38 to +3.4E+38)

## check lod

iterate through measured data, and check if the values are <=/>= the reported/documented limits of detection

the reported limits of detection are either variable in time, or as a fixed value for an entire data range.

additionally network providers often give flags stating if data is <=/>= detection limits

these flags are first used in preference over testing if measurements are above/below static/variable detection limits

variable LODs are then taken preferentially over static LODs where both are available.

if have no valid LODs or flags, no measurements are flagged

## check nighttime

#calculate the solar elevation angle for a latitude/longitude/measurement height at a certain timestamp.

#he solar elevation angle is the angle between the horizon and the centre of the sun's disc.

#the distinction between day and night is partially subjective.

#there are 3 intermediary states between night and day:

#1. astronomical twilight (where solar elevation angle is between -18 deg. and -12 deg.)

#2. nautical twilight (where solar elevation angle is between -12 deg. and -6 deg.)

#3. civil twilight (where solar elevation angle is between -6 deg. and 0 deg.)

#depending on which of these states are classed as day/night

#sunrise is classically defined as when these states end (where solar elevation angle is >= 0)

#sunset is classically defined as when these states start (where solar elevation angle is < 0)

#for atmospheric chemistry, the presence of any light (however weak it may be) will start photochemistry.

#therefore it is defined if the solar elevation angle is <= -18 degrees, then the time is classed as night.

#station altitude + sampling height is added to produce a measurement height

#if no sampling height is available, only station altitude is used.

#if any of latitude/longitude/measurement height is NaN, do not do check

#only do check if measurement resolution is finer than 1 day

#do check for time in centre of measurement window (therefore if 51% of measurement window is night - the window will be classed as night)

## check weekday

module that checks if the time of measurement is a weekday, or weekend.

only do check if measurement resolution is finer <= 2 days

do check for time in centre of measurement window (therefore if 51% of measurement window is weekday - the window will be classed as weekday)