Key: Measurements, Statistics, Calculated values

Filters applied to entire dataset:

CleanDataset.m removes all data<-100 and >=998

ApplyLimits.m applies physical bounds provided. Defaults:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Col. # C | Instrument | Calls to filters | Meaning of Constants | Lower limit | Upper limit |
| 4 | Shortwave Incoming | In “CleanRadiation.m”:  GradientCleaning(200,[4 5 32 33])  Interpolation(4,[4 5 32 33]) | 200 Wm^-2 / hr | 0 | 1500 |
| 5 | Shortwave Outgoing | Filtered above |  | 0 | 1500 |
| 6 | Net Radiation | GradientCleaning(120,[6 34])  Interpolation(5,[6 34]) |  | -200 | 200 |
| 7 | TC Air 01 | In “CleanTypeE.m”: for channel 7 & 8  GradientCleaning(12,Channels)  Interpolation(24,Channels)  In CleanRH:  RHice(RHChannels,TChannels) |  | -80 | 25 |
| 8 | TC Air 02 | Filtered above |  | -80 | 25 |
| 9 | T air 1 HMP 45 | In “CleanCS500” Channels 9 & 10:  GradientCleaning(12,Channels)  Interpolation(24,Channels)  In CleanRH:  RHice(RHChannels,TChannels) |  | -80 | 25 |
| 10 | T air 2 HMP 45 | Filtered above |  | -80 | 25 |
| 11 | RH 1 | In “CleanRH.m”:  GradientCleaning(15,RHChannels) % --- Threshold of 15 %/hr  Interpolation(24,RHChannels) % --- Interpolation on a 24hrs Window |  |  |  |
| 12 | RH 2 | Filtered above |  |  |  |
| 13 | Wind Speed 1 | No filter found |  | 0 | 40 |
| 14 | Wind Speed 2 | No filter found |  | 0 | 40 |
| 15 | Wind Direction 1 | No filter found |  | 0 | 360 |
| 16 | Wind Direction 2 | No filter found |  | 0 | 360 |
| 17 | Pressure | In “CleanAtmPressure.m”:  GradientCleaning(3,Channels) % --- Threshold of 3 mBar/hr  Interpolation(48,Channels) % --- Interpolation on a 48hrs Window  SpectralVarianceFilter(2.5,15,200,Channels) %  Interpolation(48,Channels) % --- Interpolation on a 48hrs Window  GradientCleaning(5,Channels) % --- Threshold of 5 mBar/hr  Interpolation(48,Channels) % --- Interpolation on a 48hrs Window |  | 0 | 1100 |
| 18 | Snow Height 1 | In “CleanSnowHeights.m”:  GradientCleaning(.25,18:19)  SpectralVarianceFilter(2.5,0.05,80,18:19)  Also another complex algorithm with some 40 hr hysteresis? |  | 0 | 10 |
| 19 | Snow Height 2 | Filtered above |  | 0 | 20 |
| 20-29 | 10x Snow thermocouple | N/A | N/A | N/A | N/A |
| 30 | Battery Voltage | No filter found |  |  |  |
| 31 | Shortwave Incoming Max | Filtered in #4? |  |  |  |
| 32 | Shortwave Outgoing Max | Filtered in #4 |  |  |  |
| 33 | Net Radiation Max | Filtered in #5 |  |  |  |
| 34 | TC air 01 Max | Should be filtered as 7 & 8 |  |  |  |
| 35 | TC air 02 Max | Should be filtered as 7 & 8 |  |  |  |
| 36 | TC air 01 Min | Should be filtered as 7 & 8 |  |  |  |
| 37 | TC air 02 Min | Should be filtered as 7 & 8 |  |  |  |
| 38 | Wind Speed 1 Max | No filter found |  |  |  |
| 39 | Wind Speed 2 Max | No filter found |  |  |  |
| 40 | Wind Speed 1 Stdev | No filter found |  |  |  |
| 41 | Wind Speed 2 Stdev | No filter found |  |  |  |
| 42 | Tref |  |  |  |  |
| 43 | U 2m from theory | Calculated in WindProfile.m |  |  |  |
| 44 | U 10m from theory | Calculated in WindProfile.m |  |  |  |
| 45 | Height of profile 1 | Calculated in “WindHeights.m” |  |  |  |
| 46 | Height of profile 2 | Calculated in “WindHeights.m” |  |  |  |
| 47 | Albedo | Calculated in “CleanRadiation.m” |  |  |  |
| 48 | Zenith angle | Calculated in “CleanRadiation.m” |  |  |  |

Description of Repeated Filter Functions:

**GradientCleaning(Threshold,columns)**

Gradient = abs((Record\_i – Record\_i-1) / (time\_i – time\_i-1)) [Units/Hr]

Sets value Record\_i to NaN if Gradient > Threshold

**SpectralVarianceFilter(NDVS,GradThreshold,BoxSize,columns)**

NDVS: Number of standard deviations

GradThreshold: Gradient Threshold

Box size: size of window over which calculation runs?

It seems that this runs filters on chunks of data BoxSize large and checks if values are more than NDVS standard deviations from the mean of the data Box, or if the difference to the mean is more than the GradThreshold

**Interpolation(BoxSize,columns)**

Interpolates missing data:

Only interpolates if gap is <= BoxSize HRS

Interpolates all columns of dataset passed in columns parameter

**RHice(Relative humidity columns, Temperature columns)**

Corrects the relative humidity

**Calibration Files: ##-CalibrationDefault.cal in Ancilliary/##-Name/Defaults/**

**These calibration parameters are applied in the function DataCalibration.m**

|  |  |  |
| --- | --- | --- |
| Column # | Parameter | Offset/Mulitplier |
| 1 | TCAir | Multiplier |
| 2 | CS500 | Multiplier for cs500 temperatures |
| 3 | WindSpeed | Multiplier |
| 4 | SWin | Multiplier |
| 5 | SWref | Multiplier |
| 6 | NetRadPos | If NetRad >0, multiplier |
| 7 | NetRadNeg | If NetRad <0, multiplier |
| 8 | PressureOffset | Offset added to raw pressure |
| 9 | LiCor | Multiplier for Incoming & Refl. SW |

Additonal Calibrations:

Sonic Sensor Temperature Correction: Hcorrected = Hmeasured \* sqrt(1+T/273.15)

% --- T = (TC1+TC2)/2 if both TCs are defined

% --- T = TC1 or TC2 if TC2 or TC1 (resp.) does not exist

% --- if TC1 & TC2 do not exist:

% --- T = (TCS1+TCS2)/2 if TCS1 & TCS2 do exist

% --- T = TCS1 or TCS2 if TCS2 or TCS1 (resp.) does not exist.

% --- No correction is made when no Temps are defined.