

Teresa Burlingame  
May 6, 2025



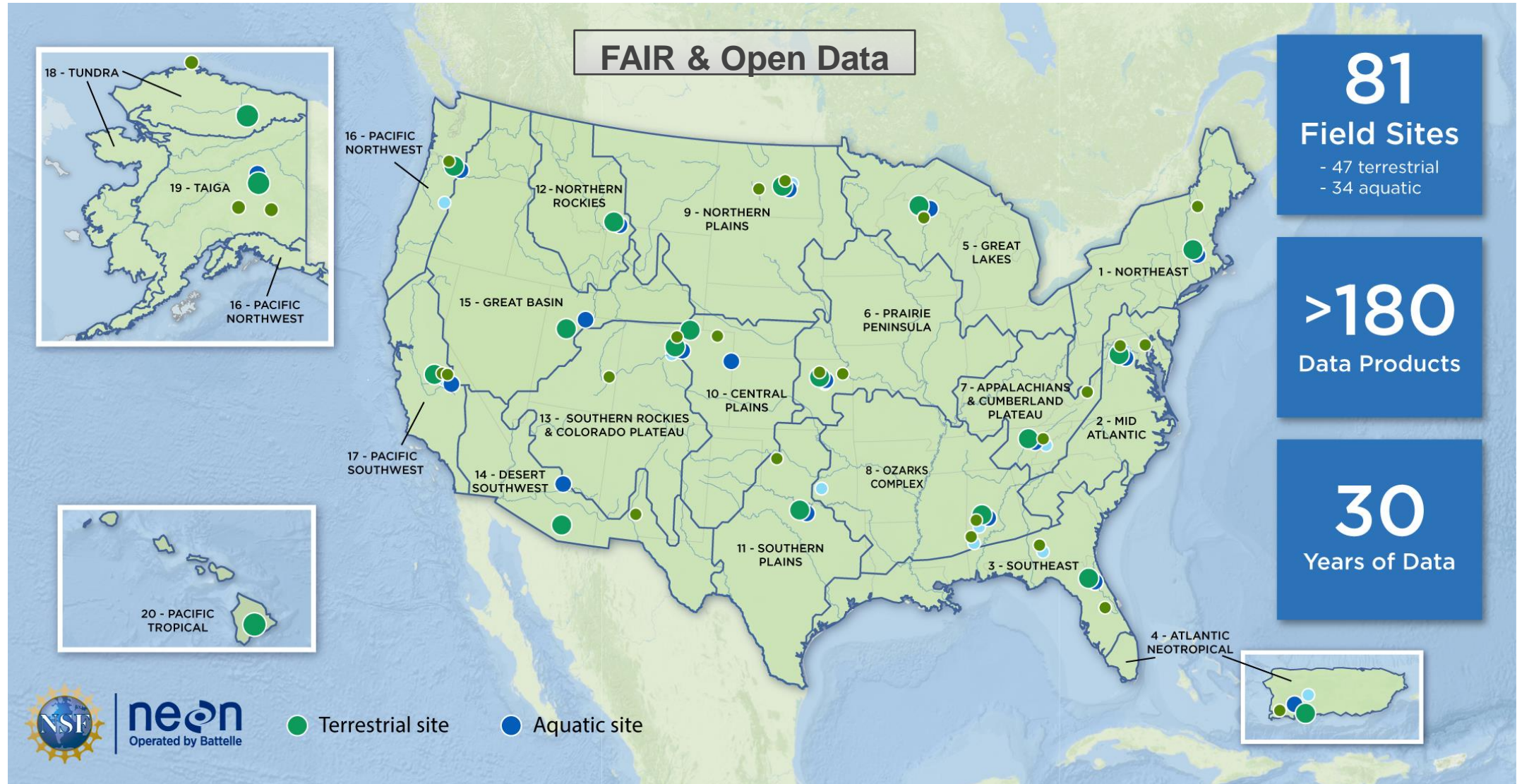
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# NEON's QAQC Tools for Instrumentation Data

OOIFB/DSC Meeting

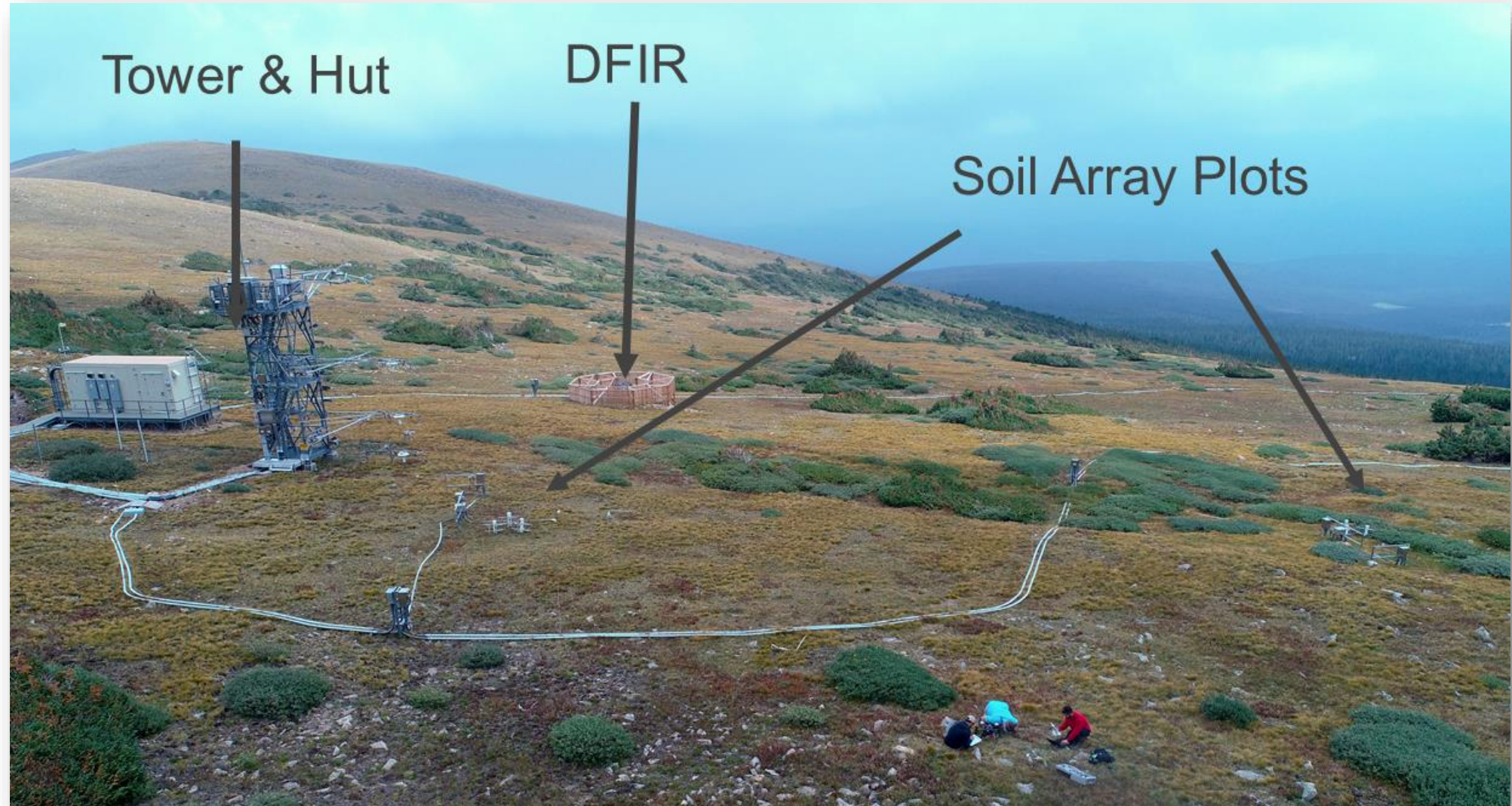


# NEON is a distributed Observatory across the U.S.





# Terrestrial Instrumentation Infrastructure



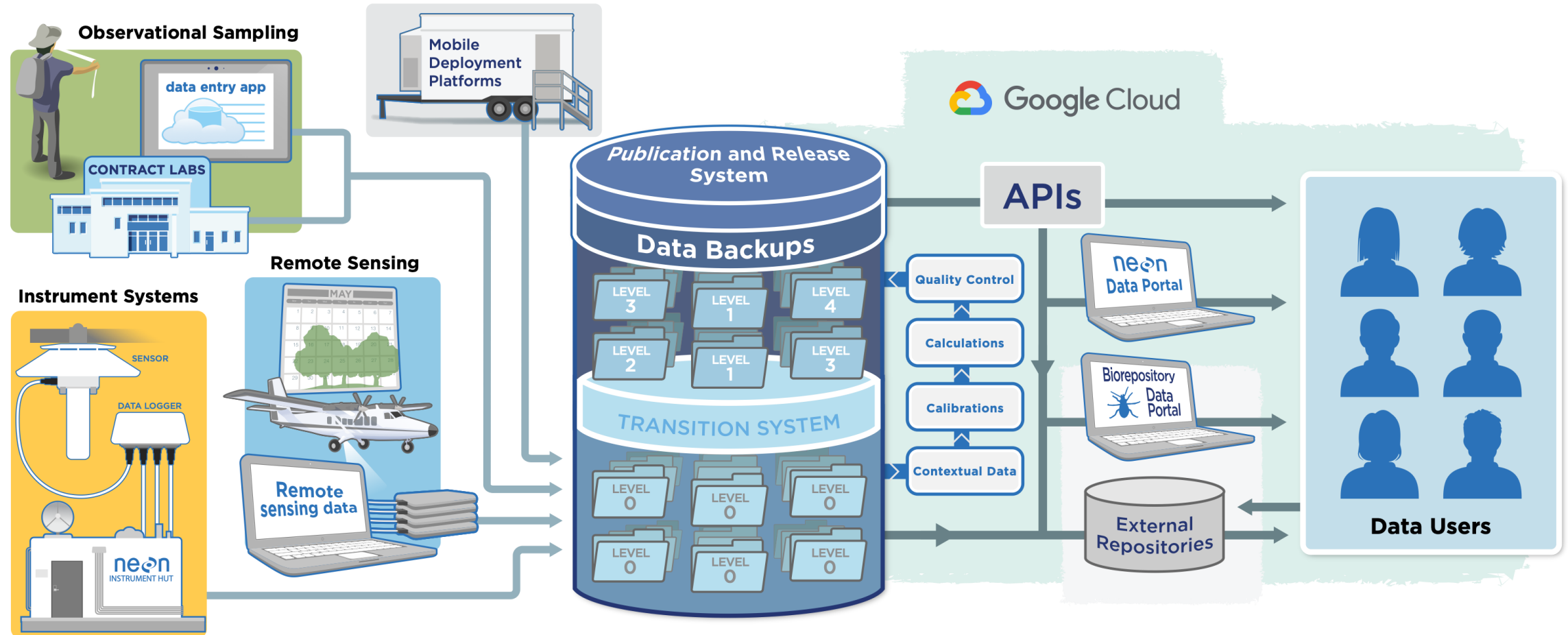


# Aquatic Sensor Infrastructure



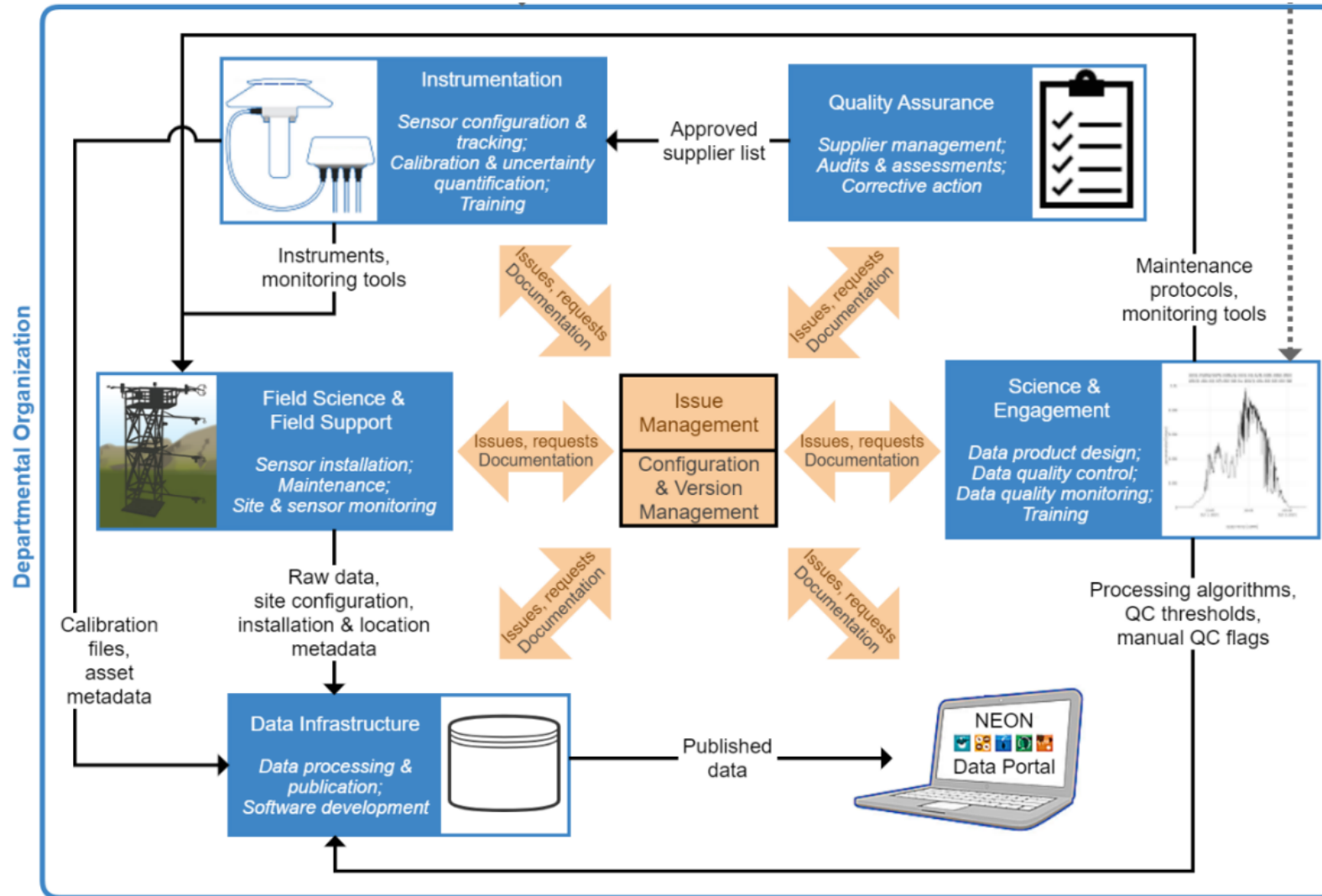
# Data lifecycle

Instrumented data produces ~5.6 billion points per day (65k/second)



>16,000 sensors!

# Instrumentation Data Quality Framework





# Staff Monitoring Tools

Observatory Health

Sensor Health

Stream Info

Help

Sign up for Alerts

Select Date Range

2021-09-01 to 2021-09-08

Select Domain

All

82 % Data Completeness

97 % Sensors in Range (Available streams)

82 % Sensors in Range (Absolute)

Enable colorblind mode

Site	Domain	Type	Uptime (%)	Range (%) [Available Sensors]	Range (%) [Absolute]
DEJU	D19	TER	96	97	93
DELA	D08	TER	77	97	75
DSNY	D03	TER	99	99	98
FLNT	D03	AQU	46	99	46
GRSM	D07	TER	92	99	91

Drill down and sort sensors

Data Product

Stream Name

Location

DSNY

GUAN

HARV

Precipitation	TFFPrecipBucketTips	Soil Plot 1	100	100	100
Precipitation	TFFPrecipBucketTips	Soil Plot 2	100	100	100
Precipitation	TFFPrecipBucketTips	Soil Plot 4	20	100	100
Precipitation	TFFPrecipBucketTips	Soil Plot 5	20	100	100

Full detail and guidance in automated email report

DSNY Precipitation

[Link this event to a ServiceNow ticket](#)

- Throughfall collector likely clogged at soil plot 4
- Throughfall collector likely clogged at soil plot 5
- Guidance:** Please investigate and submit a DQTT

45-Day Precipitation Summary at DSNY

Soil Plot 1 Throughfall

Soil Plot 2 Throughfall

Soil Plot 4 Throughfall

Soil Plot 5 Throughfall

Tower Top Tipping Bucket

Daily Precipitation Totals (mm)

Aug 01

Aug 15

Sep 01

Legend

Clog

No clog

Completeness X Validity (% of expected records present & passing all quality checks)


Legend: AQU, MET, SAE, All-IS, AQU target, MET target, SAE target, All-IS target

mi2 Wind Rose at cibj, mi3 Wind Rose at cibj, mi4 Wind Rose at cibj

Wind Observer II - Wind Speed m/s - All

Location	mi1	mi2	mi3	mi4
Min	0 m/s	0 m/s	0 m/s	0.380 m/s
Max	2.07 m/s	1.60 m/s	8.84 m/s	9.95 m/s
Mean	0.304 m/s	0.529 m/s	2.55 m/s	3.68 m/s
Last	0.413 m/s	0.328 m/s	1.95 m/s	4.55 m/s

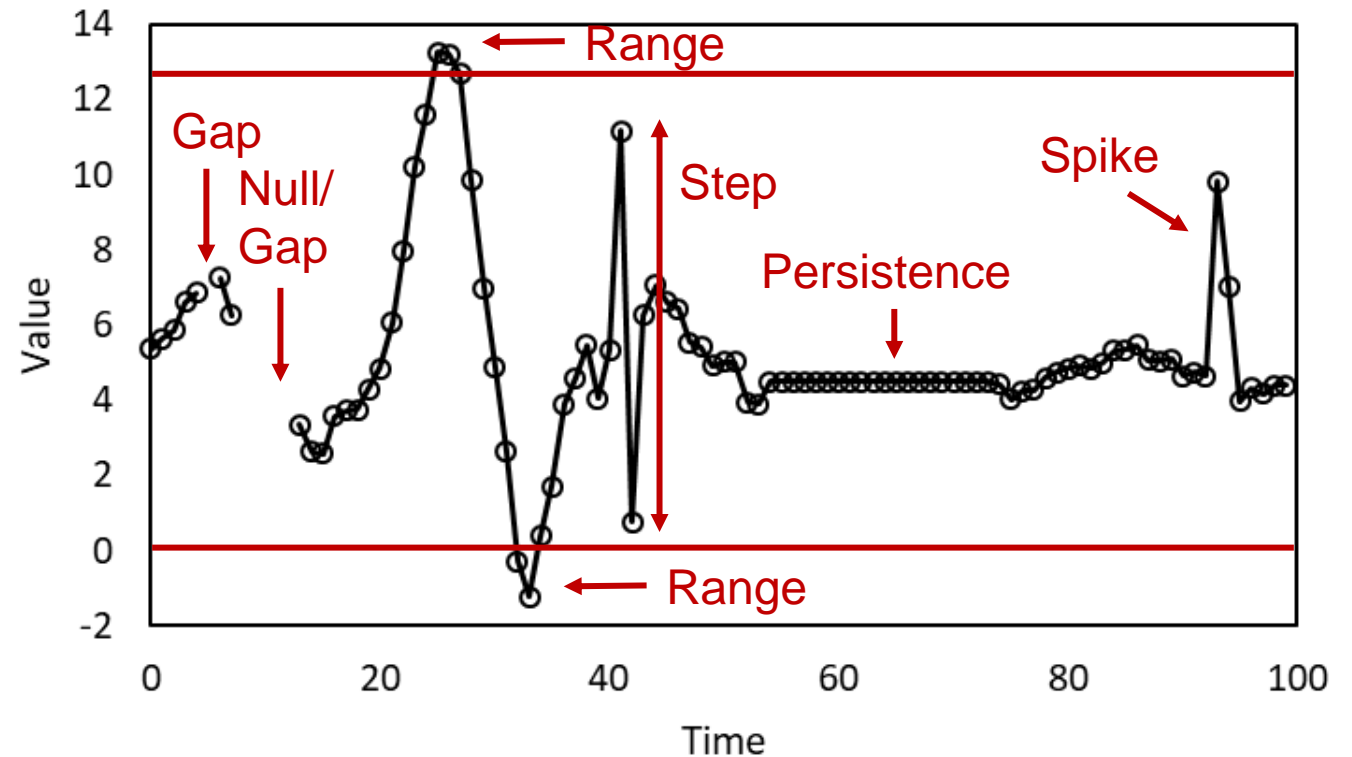
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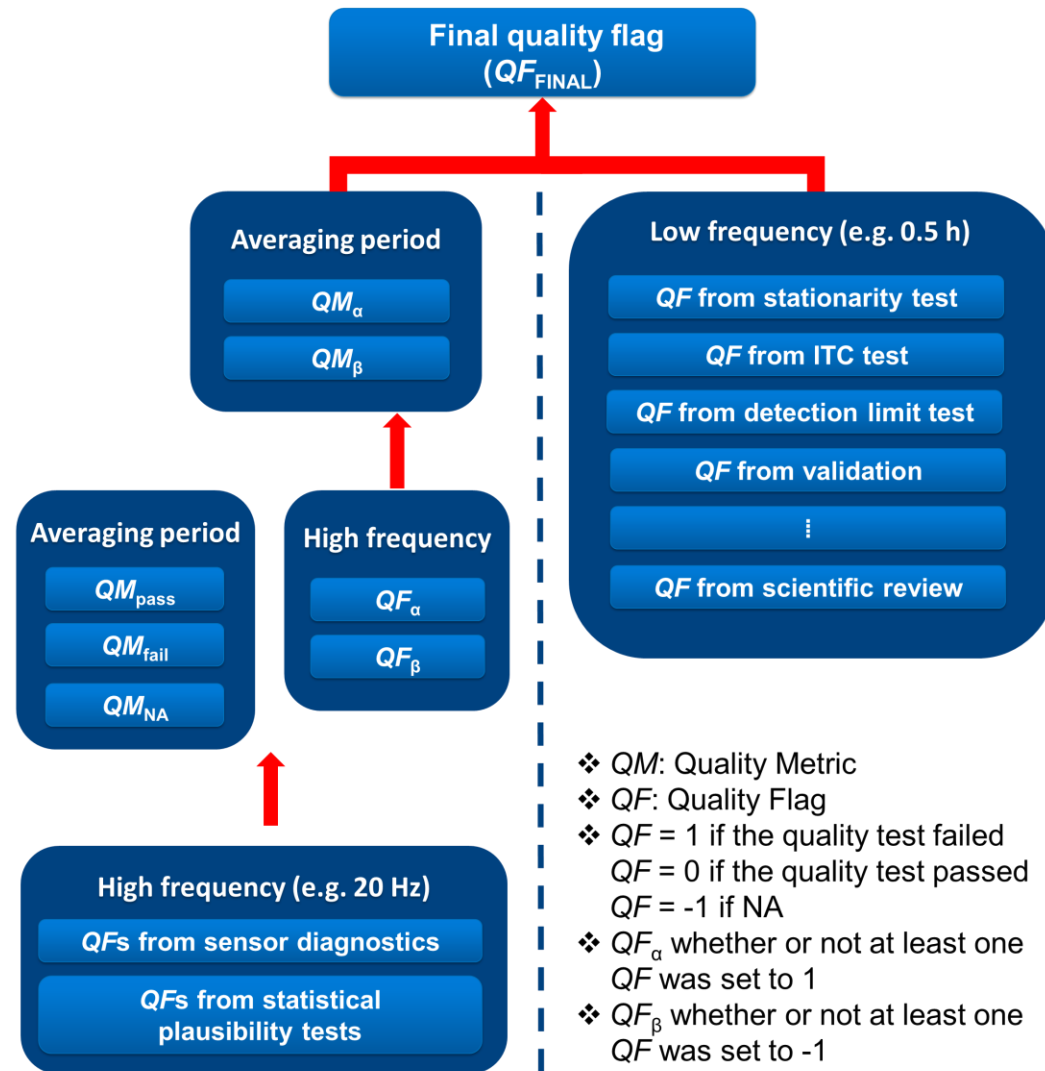
# Automated flagging

- Applied on each calibrated data value (native frequency)
- Basic tests: Null, Gap, Range, Step, Spike, Persistence
- Sensor-specific tests: e.g. sensor diagnostic, flow rate
- If chosen, can remove any data point that fails a test

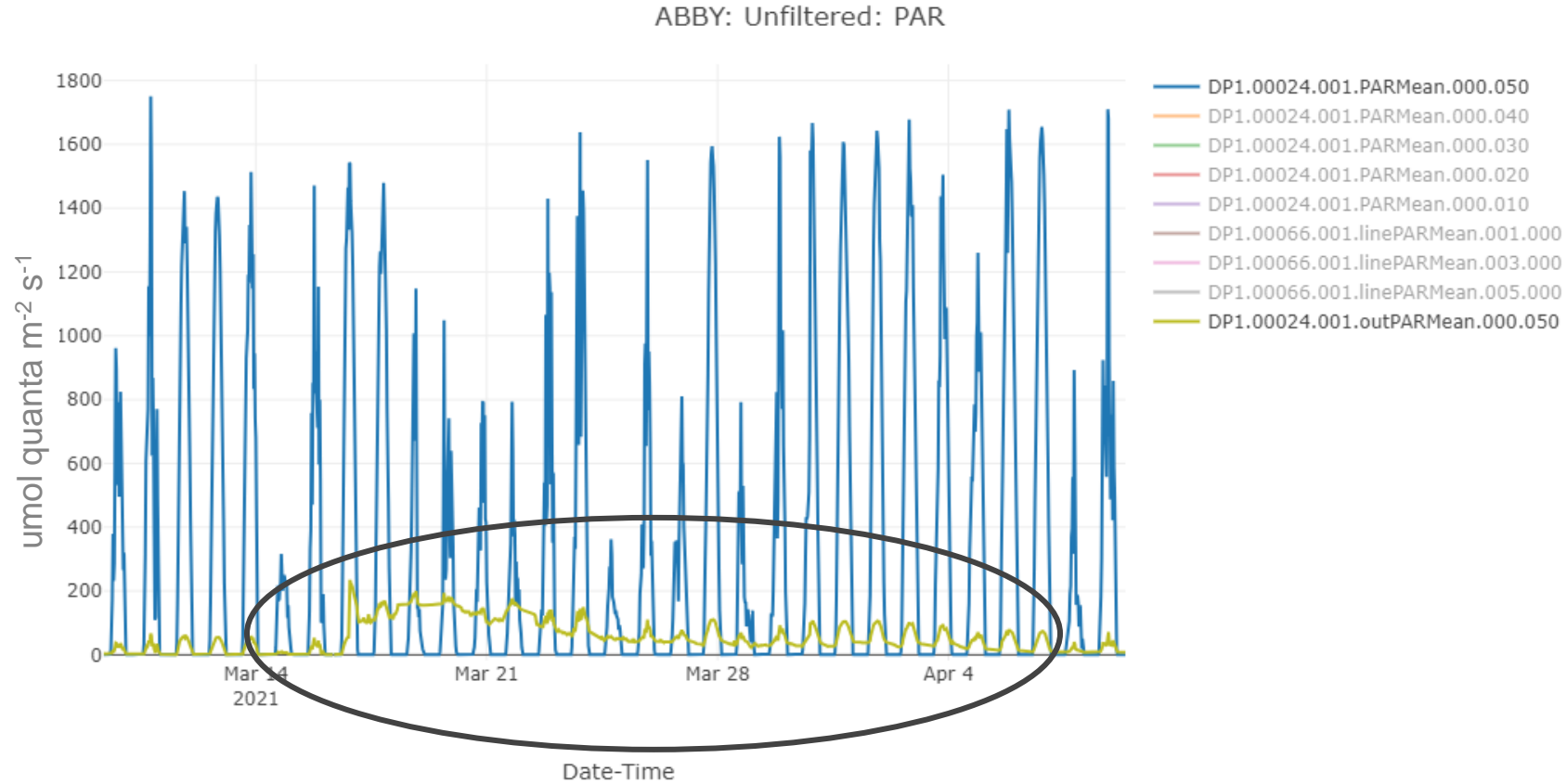




# Quality Flag Quality Metric (QFQM) framework

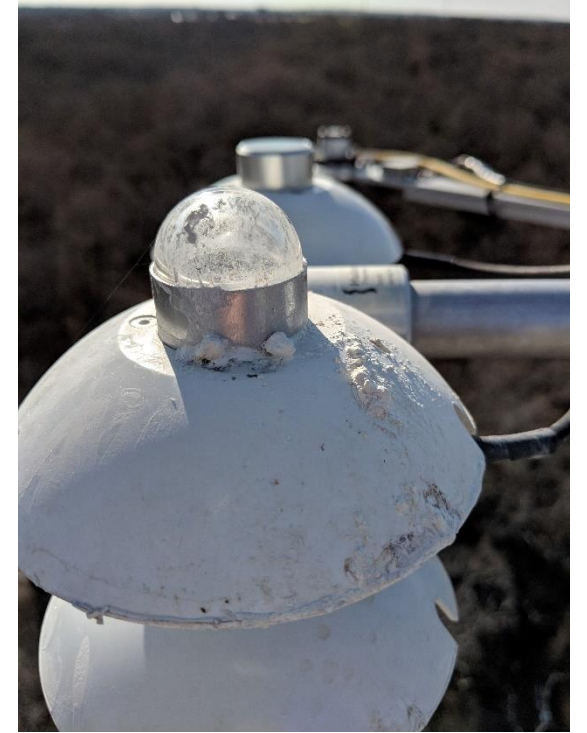


# Manual Flagging





# Data Quality Trouble Tickets



# Data Portal – data and metadata @ data.neonscience.org

Filter

RESET ALL FILTERS

Search

Utah, "snow depth", 2022, etc...

Use several terms to match products having any term (term OR term). Quote terms to match phrases (e.g. "wind speed"). [Browse keywords](#) for ideas.

Release ⓘ

Latest and Provisional

Data in the latest release in addition to provisional data (not yet in any release)

182 data products

RELEASE DETAILS ⓘ

Available Dates

Show products that have any data available between two dates.

FILTER ON AVAILABLE DATES...

Data Status

Available

163

Coming Soon

19

Home / [Data & Samples](#) / [Data Portal](#) / Explore Data Products

Explore Data Products

All Products

182 products from 81 sites

Data available Jan 2012 – Apr 2023

Download Full Catalog: [CSV](#) | [JSON](#) | [PDF](#)

Filtered Products

no filters currently applied

Sort

"Available" data products will always show above "Coming Soon" data products, except when sorting by search relevance.

by Product Name

↓

↑

Showing first 10 of 182 total products

[2D wind speed and direction](#)

DPI.00001.001

DOWNLOAD DATA

PRODUCT DETAILS ⓘ

Two-dimensional wind speed and direction, available as two- and thirty-minute aggregations of 1 Hz observations. Observations are made by 2-D sonic anemometer sensors located at multiple heights on the tower infrastructure and by 2-D sonic anemometer sensors located on the aquatic meteorological station.

Available Dates

2013-12 through 2023-03

Data Themes

Visualize Data

TIME SERIES VIEWER

Key: Available No data

View By: SUMMARY SITE STATE DOMAIN

ALL

2018

2019

2020

2021

2022

2023

2024

2D wind speed and direction

DPI.00001.001

Release ⓘ

Latest and Provisional

Data in the latest release in addition to provisional data (not yet in any release)

RELEASE DETAILS ⓘ

About

[Documentation](#)

[Issue Log](#)

[Availability and Download](#)

[Visualizations](#)

2D wind speed and direction

DPI.00001.001

About

Two-dimensional wind speed and direction, available as two- and thirty-minute aggregations of 1 Hz observations. Observations are made by 2-D sonic anemometer sensors located at multiple heights on the tower infrastructure and by 2-D sonic anemometer sensors located on the aquatic meteorological station.

Abstract

Wind plays an important role in atmospheric and environmental sciences. A function of differential heating of Earth's surface and subsequent pressure gradients, horizontal and vertical winds are responsible for advection of atmospheric pollutants, moisture, heat and momentum (Stull 1988). As such, horizontal and vertical winds will be measured throughout the Observatory.

Latency: Data collected in any given month are published during the second full week of the following month.

Additional Information

Note that the final quality flag for wind direction (windDirFinalQF) in the basic download package includes a test for calm winds, under which the computed wind direction is unreliable (due to light wind speed) though the data quality may still be adequate for scientific purposes. To distinguish between data flagged for calm winds and other quality tests, please download the expanded package.

Citation

Please use the appropriate citation(s) from below in your publications. If using both provisional and release data please include both citations. See [Data Policies & Citation Guidelines](#) for more info.

Product ID ⓘ

DPI.00001.001

Data Themes

Responsible Science Team

Terrestrial Instrument System (TIS)

Date Range ⓘ

December 2013 - ongoing

Scientific Keywords

met station

sonic anemometer

meteorological station



horizontal wind

tower

wind speed

wind direction

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# Data Portal – exploratory tools

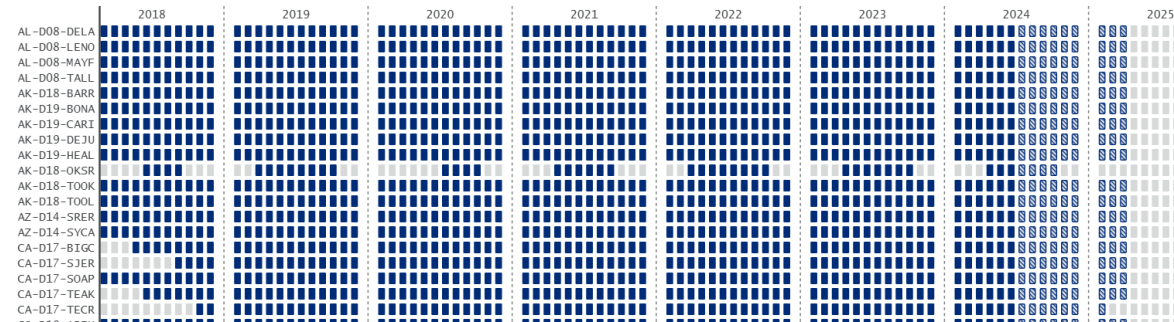
## Availability and Download

December 2013 – March 2025  
79 total sites

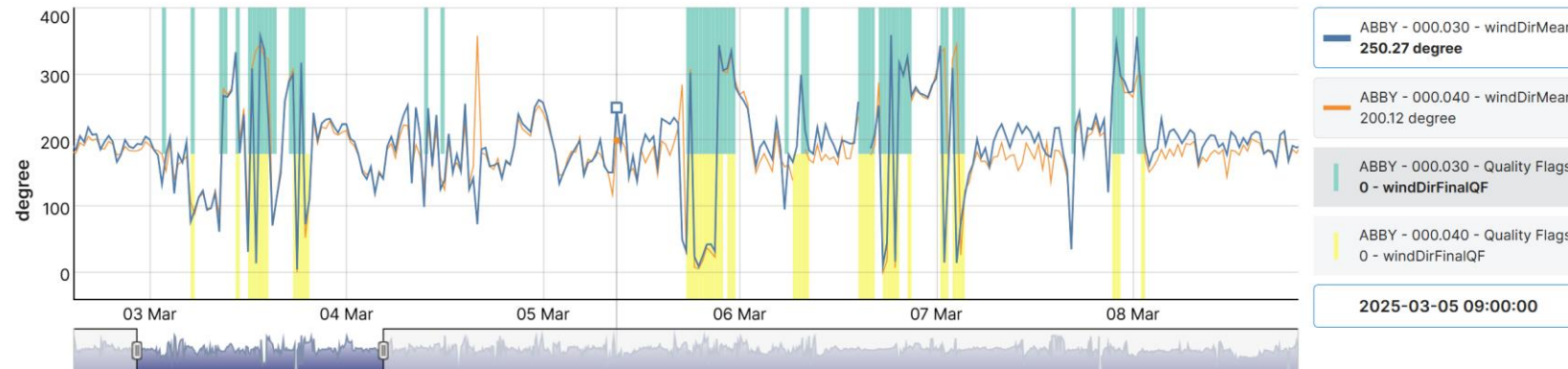
DOWNLOAD DATA 

Key:   Release Available  Not Available  
 Provisional  Mixed

Sort By: by State   



2D wind speed and direction (DP1.00001.001)



NEON (National Ecological Observatory Network). 2D wind speed and direction (DP1.00001.001), provisional data. Dataset accessed from <https://data.neonscience.org/data-products/DP1.00001.001> on April 28, 2025. Data archived at [your DOI].



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720.746.4844 | [neonscience@battelleecology.org](mailto:neonscience@battelleecology.org) | [neonscience.org](http://neonscience.org)