Buoy 62093 - 2023 Quality Control Report

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Data Overview

• Station ID: 62093
• Year: 2023
• Total Records: 17,351
• Time Range: 2023-01-01 00:00:00 to 2023-12-30 23:00:00
• Duration: 363 days
• Sensors/Loggers: 4 active
- 427_Wavesense: 5,607 records (32.3%)
- 12147_CR6: 5,527 records (31.9%)
- 12144_CR6: 3,109 records (17.9%)
- 189_Wavesense: 3,108 records (17.9%)

Quality Control Results

Record-Level QC Status

- **QC complete:** 16,842 records (97.1%)
- **No QC performed:** 509 records (2.9%)

Parameter-Level QC Results

Parameter	Total	Missing	Range Fail	Spike Fail	Flat Line Fail	Passed	Pass Rate
airpressure	17,351	0	0	0	6	11,556	66.6%
airtemp	17,351	0	0	0	606	11,160	64.3%
humidity	17,351	0	0	13	135	11,456	66.0%
windsp	17,351	0	0	5	24	11,537	66.5%
winddir	17,351	0	0	195	14	11,417	65.8%
hm0	17,351	0	0	0	242	12,126	69.9%
hmax	17,351	0	0	7	7	8,010	46.2%
tp	17,351	0	0	21	60	17,270	99.5%
mdir	17,351	0	0	539	0	11,155	64.3%
seatemp_aa	17,351	0	0	0	211	11,421	65.8%

Issues Identified

- airpressure: 6 flat line values (5+ consecutive identical)
- airtemp: 606 flat line values (5+ consecutive identical)
- humidity: 13 spike values (>20.0 change)
- humidity: 135 flat line values (5+ consecutive identical)
- windsp: 5 spike values (>15.0 change)
- windsp: 24 flat line values (5+ consecutive identical)
- winddir: 195 spike values (>180.0 change)

- winddir: 14 flat line values (5+ consecutive identical)
- hm0: 242 flat line values (5+ consecutive identical)
- hmax: 7 spike values (>5.0 change)
- hmax: 7 flat line values (5+ consecutive identical)
- tp: 21 spike values (>10.0 change)
- tp: 60 flat line values (5+ consecutive identical)
- mdir: 539 spike values (>180.0 change)
- seatemp_aa: 211 flat line values (5+ consecutive identical)

QC Limits Applied

Station-specific QC limits used for this analysis:

Parameter	Min Value	Max Value	Spike Threshold	Notes
airpressure	950.0	1050.0	10.0	Default
airtemp	-20.0	40.0	5.0	Default
humidity	0.0	100.0	20.0	Default
windsp	0.0	50.0	15.0	Default
winddir	0.0	360.0	180.0	Default
hm0	0.0	15.0	3.5	Station-specific
hmax	0.0	25.0	5.0	Station-specific
tp	1.0	25.0	10.0	Default
mdir	0.0	360.0	180.0	Default
seatemp_aa	5.0	19.0	2.5	Station-specific

Data Visualization

QC Failure Color Coding

The visualization uses different colors to distinguish QC failure types:
- **Blue dots**: Good data (passed all QC tests)
- **Red dots**: Range failures (values outside physical limits)
- **Orange dots**: Spike failures (unrealistic sudden changes)
- **Purple dots**: Flat line failures (sensor stuck/malfunctioning)
The bottom-right panel shows a stacked bar chart with the percentage breakdown of each QC result type per parameter.

Recommendations
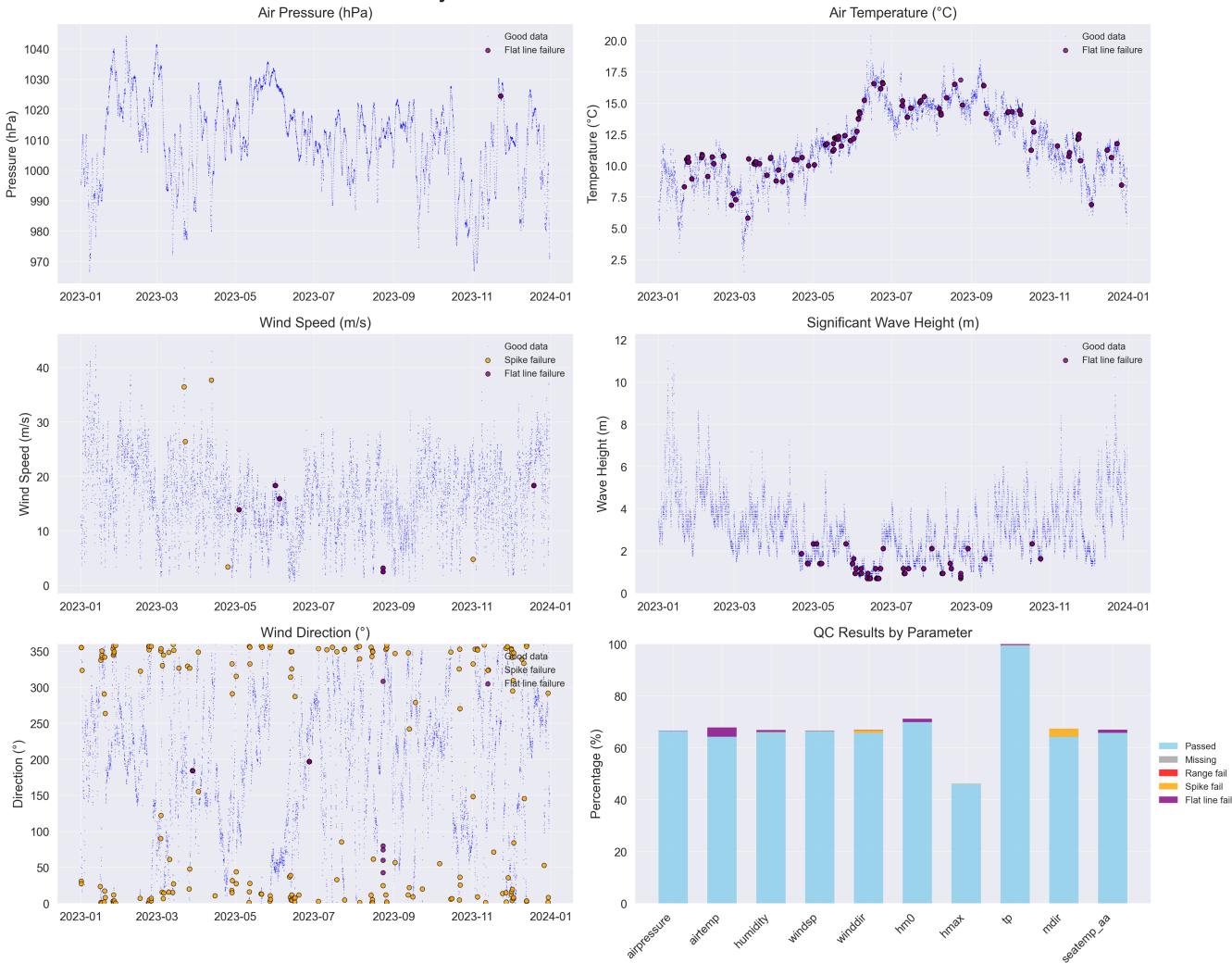
Manual QC Actions Needed

1. **Review flagged extreme values** - validate against weather events
2. **Investigate sensor failures** - replace/repair faulty sensors
3. **Cross-validate between loggers** - compare duplicate measurements
4. **Apply sensor hierarchy** - prioritize Wavesense for hm0, Datawell for hmax
5. **Transfer to production** - move QC'd data to irish_buoys_fugro table

Next Steps

1. Execute parameter-level QC SQL commands from readme.md
2. Perform individual value corrections for flagged data
3. Complete record-level QC marking
4. Transfer approved data to production table

Data Visualization

Buoy 62093 - 2023 Data Overview and QC Results

QC Failure Color Coding

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