Buoy 62094 - 2024 Quality Control Report

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Data Overview

• Station ID: 62094
• Year: 2024
• Total Records: 14,495
• Time Range: 2024-01-01 00:00:00 to 2024-10-30 23:00:00
• Duration: 303 days
• Sensors/Loggers: 4 active
- 12143_CR6: 4,666 records (32.2%)
- 12142_CR6: 4,662 records (32.2%)
- 8704_CR6: 2,584 records (17.8%)
- 347_Wavesense: 2,583 records (17.8%)

Quality Control Results

Record-Level QC Status

- **QC complete:** 12,213 records (84.3%)
- **No QC performed:** 2,282 records (15.7%)

Parameter-Level QC Results

Parameter	Total	Missing	Range Fail	Spike Fail	Flat Line Fail	Passed	Pass Rate
airpressure	14,495	0	0	0	24	14,471	99.8%
airtemp	14,495	0	0	0	721	13,774	95.0%
humidity	14,495	0	0	4	170	14,322	98.8%
windsp	14,495	0	0	1	48	14,446	99.7%
winddir	14,495	0	0	179	12	14,304	98.7%
hm0	14,495	0	0	1	1,584	12,910	89.1%
hmax	14,495	0	0	1,512	593	12,390	85.5%
tp	14,495	0	0	1,538	51	12,906	89.0%
mdir	14,495	0	0	1,224	5	13,266	91.5%
seatemp_aa	14,495	0	2	2	92	14,400	99.3%

Issues Identified

- airpressure: 24 flat line values (5+ consecutive identical)
- airtemp: 721 flat line values (5+ consecutive identical)
- humidity: 4 spike values (>20.0 change)
- humidity: 170 flat line values (5+ consecutive identical)
- windsp: 1 spike values (>18.0 change)
- windsp: 48 flat line values (5+ consecutive identical)
- winddir: 179 spike values (>180.0 change)

- winddir: 12 flat line values (5+ consecutive identical)
- hm0: 1 spike values (>3.5 change)
- hm0: 1584 flat line values (5+ consecutive identical)
- hmax: 1512 spike values (>5.5 change)
- hmax: 593 flat line values (5+ consecutive identical)
- tp: 1538 spike values (>10.0 change)
- tp: 51 flat line values (5+ consecutive identical)
- mdir: 1224 spike values (>180.0 change)
- mdir: 5 flat line values (5+ consecutive identical)
- seatemp_aa: 2 values outside range [4.5-18.5]
- seatemp_aa: 2 spike values (>2.5 change)
- seatemp_aa: 92 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	55.0	18.0	Station-specific
winddir	0.0	360.0	180.0	Default
hm0	0.0	16.0	3.5	Station-specific
hmax	0.0	26.0	5.5	Station-specific
tp	1.0	25.0	10.0	Default
mdir	0.0	360.0	180.0	Default
seatemp_aa	4.5	18.5	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

Critical Issues

- **hmax**: High failure rate - investigate sensor calibration
- **tp**: High failure rate - investigate sensor calibration

Manual QC Actions Needed

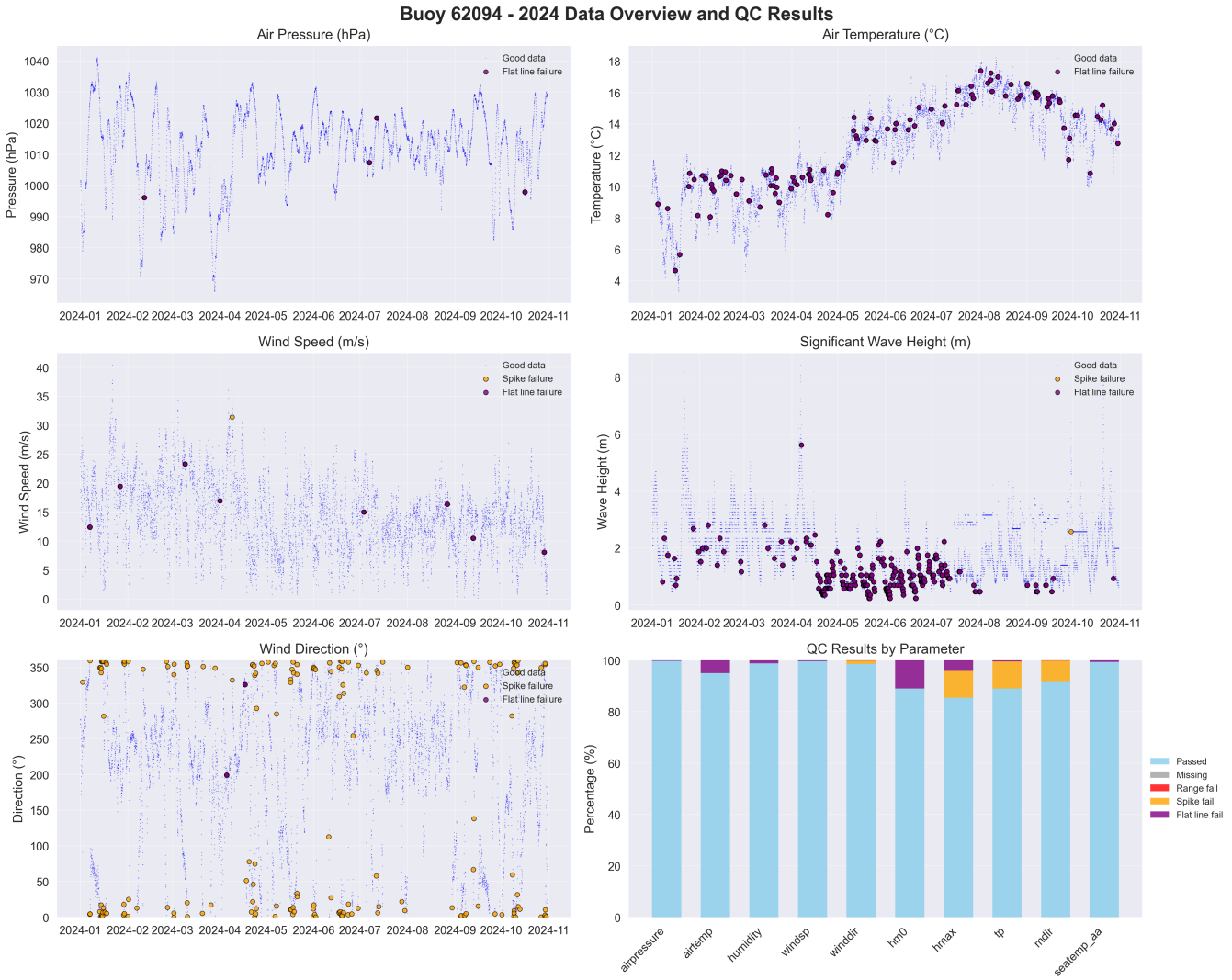
1. **Review flagged extreme values** - validate against weather events
2. **Investigate sensor failures** - replace/repair faulty sensors
3. **Cross-validate between loggers** - compare duplicate measurements
4. **Apply sensor hierarchy** - prioritize Wavesense for hm0, Datawell for hmax

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



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