Buoy 62091 - 2023 Quality Control Report

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Data Overview

• Station ID: 62091
• Year: 2023
• Total Records: 17,364
• Time Range: 2023-01-01 00:00:00 to 2023-12-30 23:00:00
• Duration: 363 days
• Sensors/Loggers: 2 active
- 347_Wavesense: 8,731 records (50.3%)
- 8704_CR6: 8,633 records (49.7%)

Quality Control Results

Record-Level QC Status

- **QC complete:** 16,368 records (94.3%)
- **No QC performed:** 996 records (5.7%)

Parameter-Level QC Results

Parameter	Total	Missing	Range Fail	Spike Fail	Flat Line Fail	Passed	Pass Rate
airpressure	17,364	0	0	0	26	12,282	70.7%
airtemp	17,364	0	0	0	481	11,228	64.7%
humidity	17,364	0	0	4	33	11,536	66.4%
windsp	17,364	0	0	0	48	11,529	66.4%
winddir	17,364	0	0	203	18	12,150	70.0%
hm0	17,364	0	0	0	1,082	10,812	62.3%
hmax	17,364	10	0	0	235	7,946	45.8%
tp	17,364	0	0	117	116	17,132	98.7%
mdir	17,364	0	0	238	0	11,385	65.6%
seatemp_aa	17,364	0	0	2	94	10,746	61.9%

Issues Identified

- airpressure: 26 flat line values (5+ consecutive identical)
- airtemp: 481 flat line values (5+ consecutive identical)
- humidity: 4 spike values (>20.0 change)
- humidity: 33 flat line values (5+ consecutive identical)
- windsp: 48 flat line values (5+ consecutive identical)
- winddir: 203 spike values (>180.0 change)
- winddir: 18 flat line values (5+ consecutive identical)
- hm0: 1082 flat line values (5+ consecutive identical)
- hmax: 235 flat line values (5+ consecutive identical)

- tp: 117 spike values (>10.0 change)
- tp: 116 flat line values (5+ consecutive identical)
- mdir: 238 spike values (>180.0 change)
- seatemp_aa: 2 spike values (>2.0 change)
- seatemp_aa: 94 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	60.0	20.0	Station-specific
winddir	0.0	360.0	180.0	Default
hm0	0.0	18.0	4.0	Station-specific
hmax	0.0	30.0	6.0	Station-specific
tp	1.0	25.0	10.0	Default
mdir	0.0	360.0	180.0	Default
seatemp_aa	4.0	18.0	2.0	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 62091 - 2023 Data Overview and QC Results

QC Failure Color Coding

• Blue dots: Good data (passed all QC tests)
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• Purple dots: Flat line failures (sensor stuck/malfunctioning)
The bottom-right panel shows a stacked bar chart with percentage breakdown of each QC result type per parameter.