



Flagging Realtime Data

Using simple quality control rules

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AIMS: Australia's tropical marine research agency.

Results available on line



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No quality control performed (Flag 1) = good data - probably good data - probably bad data - bad data -



Thursdays Island
(10.58 S , 142.23 E)

[See map](#)

Now [12hrs](#) [7days](#) [more](#)

(12 mins ago) Thu, 23 Aug 2012 11:20 +10:00

pressure : 1012.5 hpa
air temperature : 25.8 °C
humidity : 81.2 %
par : 750.78 $\mu\text{mol s}^{-1} \text{m}^{-2}$
wind direction : ESE
wind speed : 29.23 km/h (15.78 knots)



Raine Island
(11.59 S , 144.03 E)

[See map](#)

Now [12hrs](#) [7days](#) [more](#)

(32 mins ago) Thu, 23 Aug 2012 11:00 +10:00

pressure : 1011.1 hpa
air temperature : 25.8 °C
humidity : 85.6 %
rain : 0.0 mm
wind direction : ESE
wind speed : 21.78 km/h (11.76 knots)



Lizard Island
(14.68 S , 145.45 E)

[See map](#)

Now [12hrs](#) [7days](#) [more](#)

(12 mins ago) Thu, 23 Aug 2012 11:20 +10:00

air temperature : 24.8 °C
humidity : 84.0 %
rain : 0.0 mm
wind direction : SE
wind speed : 29.92 km/h (16.15 knots)

(7 mins ago) Thu, 23 Aug 2012 11:25 +10:00

water temperature at 24.18 °C
0.6m :

Data sourced from IMOS

QA/QC Details for Wind Speed (vector avg 10 min) Thursday Island

Date: 2012-08-22T20:00:00.000+1000

Reading: 6.03

QAQC: Bad

Details

Compare rule: the observation is < than 0.0

ok

Score: 0

Rolling avg rule: the observation is within 3.0 standard deviations (16.859045041324535) of the +/- 15 day rolling average (23.726662030598053)

Difference between this observation and the +/-1296000 second rolling average (23.726662030598053) is too great (greater than 16.859045041324535) which is 3.0 std dev's

Score: 45

Min max rule: the minimum and maximum observations for the last 7200 seconds are >40.0 apart

ok

Score: 0

How it works - The Process



- A series of rules is applied to each data point
- Each rule has a score
- A score is calculated for the data point
 - The total scores of all the failed rules
- The score for the data point is converted to a QAQC result
 - 0 → Good
 - 1 to 49 → Probably Good
 - 50 to 99 → Probably Bad
 - > 100 → Bad

How it works – The Rules



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- Compare to constant
 - the value is $<$ (or $>$) a constant
- Compare to another sensor
 - Difference between this value and the corresponding reading $<$ a constant
- Compare to previous value
 - Difference between this value and the previous value is $<$ a constant
- Compare rolling average
 - Value is within three standard deviations of a rolling average over X seconds
- MinMax Rule (Rolling range)
 - Rolling range is $<$ a constant

Creating Rules



- Usually Rules are created programatically
- Rules can be created or modified using a GUI

Creating Rules - GUI



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Database: PRODUCTION - F2 to edit a field.

Deployments for Channel | Qaqc Rules For Channel | Web Pages for Channel

Clear All Qaqc since: 7/Aug/2012

Cha...	Proj...	Channel Name	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4701	IMO...	Davies Reer Sensor Float 1 water Pressure @5.2m	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
9382	IMO...	Davies Reef Sensor Float 5 Water Pressure @5.8m	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
63	AIM...	Davies Reef Platform Water Temperature @4m duplicate	...	...	...	...	4	1	...	...	...	...	...	...	...	...	...	...
65	AIM...	Davies Reef Platform Water Temperature @4m	...	...	...	...	4	1	...	...	...	...	...	...	...	...	...	...
67	AIM...	Davies Reef Platform Water Temperature @18.5m	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
74	AIM...	Davies Reef Platform Water Temperature @8.5m	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...
270	IMO...	Davies Reef Sensor Float 1 Water Temperature @.6m	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...
271	IMO...	Davies Reef Sensor Float 2 Water Temperature @7m	...	...	...	...	7	1	...	...	...	...	...	...	...	...	...	...
273	IMO...	Davies Reef Sensor Float 2 Water Temperature @.6m	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...

alt-Home alt-Up alt-Up alt-End alt-Insert alt-Delete

Print

Creating Rules - GUI



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QaqcRulesAppDatabase: PRODUCTION - F2 to edit a field.

...	Rule	Comparison Channel Name	Oper...	Th...	F...	C...
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Sensor Float 4 Water Temperature @.6m	>	3	45			277	<input type="checkbox"/>	▲
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Platform Water Temperature @4m	>	34	45			65	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Sensor Float 5 Water Temperature @.6m	>	3	45			281	<input checked="" type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Sensor Float 1 Water Temperature @5.2m	>	3	45			4...	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRollingAverageRule			3	45				<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Platform Water Temperature @18.5m	>	3	45			67	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Sensor Float 1 Water Temperature @.6m	>	3	45			270	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Sensor Float 2 Water Temperature @.6m	>	3	45			273	<input checked="" type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Platform Water Temperature @4m	<	16	45			65	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Platform Water Temperature @4m	<	5	100			65	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.ComparePreviousRule			2	90				<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.MinMaxRule			2	45			...	<input type="checkbox"/>	
65	aims.rtds.data.qaqc.rules.CompareRule	Davies Reef Platform Water Temperature @4m duplicate	>	3	45			63	<input type="checkbox"/>	▼

alt-Home alt-Up alt-Up alt-End alt-Insert alt-Delete

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Air Temperature Rules



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- Compare: >35 Score: 45
- Compare: <12 Score: 45
- Compare: <5 Score: 100
- Difference to Previous: >2.5 Score: 90
- Rolling Average: 15 Days Score: 45
- Rolling Range: >20 over 12 hours Score: 45

Water Temperature Rules



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- Compare: >34 Score: 45
- Compare: <16 Score: 45
- Compare: <5 Score: 100
- Difference to Previous: >2 Score: 90
- Rolling Average: 15 Days Score: 45
- Rolling Range: >4 over 12 hours Score: 45
- Difference near sensors >3 Score: 45

Air Pressure Rules



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- Compare: <940 Score: 45
- Difference to Previous: >2 Score: 90
- Rolling Average: 15 Days Score: 45
- Rolling Range: >30 over 12 hours Score: 45

Wind Speed Rules (km/h)



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- Compare: >70 Score: 45
- Compare: <0 Score: 100
- Difference to Previous: >15 Score: 90
- Rolling Average: 15 Days Score: 45
- Rolling Range: >40 over 2 hours Score: 45

About



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- The quality control system is part of our “Real Time Data System”
- Tightly coupled with our database
- In production since 2009
- Originally developed for weather station data
- Also used for SOOP (Underway) data
- Limited collection of rules in use
 - Need to develop rules for other parameter types
 - Particularly for the National Reference Stations

Links



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- Weather Stations
 - <http://data.aims.gov.au/aimsrtds>
- Metadata system
 - <http://data.aims.gov.au/metadataviewer/faces/search.xhtml>