

APPLYING A "QUALITY FACTOR" TO SODAR DATA

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Executive Summary

Not all sodar data is created equal. Each sodar wind measurement from the Triton (and most other commercial sodar systems) is averaged from multiple shots of each of the three sound beams. Strength of the return signal and other factors can be aggregated to provide a quality factor for each wind measurement. Second Wind has developed an easy-to-interpret quality factor that is implemented in its Triton sonic wind profiler.

Q: What is Quality Factor?

A: Quality Factor ("Q") is...

the grade that Triton assigns to every wind speed measurement, from 0 to 100%. A Q of 90% is an "A," 80% is a "B," and so on.

Q: Why do I need "Q"?

A: Q is needed...

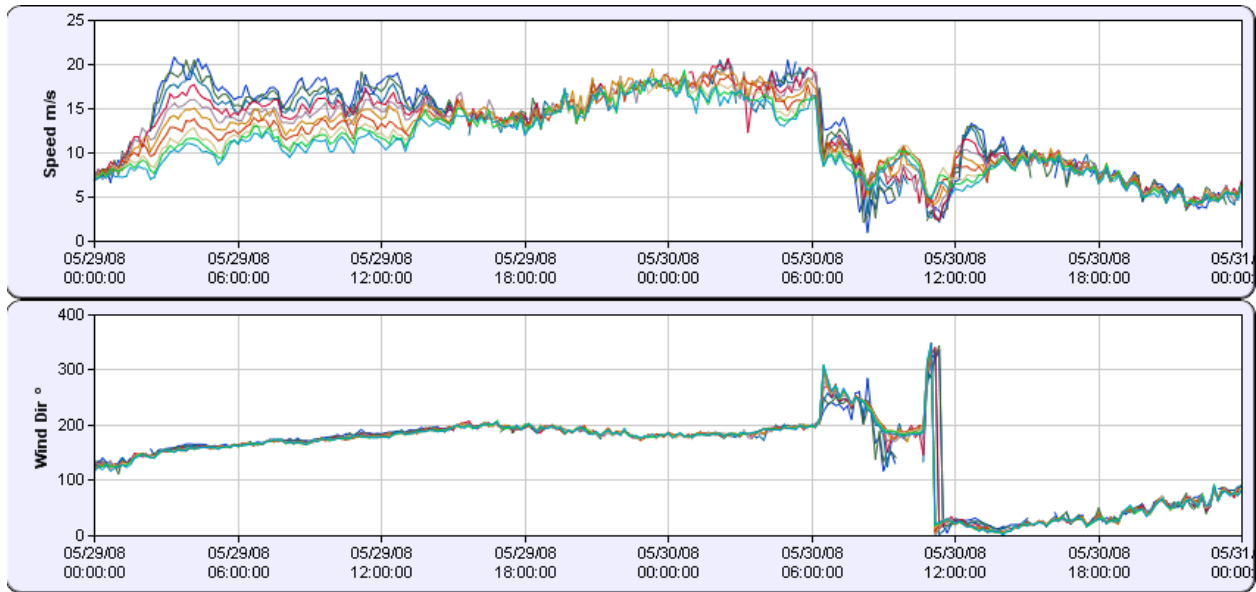
because sonic wind profiling works most, but not all of the time. Triton *always* generates ten-minute data from 30 to 200 meters. Q is part of our system to preserve all this data while automatically tagging it for reliability. Consider it a major first step in data Quality Assurance.

Triton sends SkyServe ten-minute data summaries including Q:

Latest Ten-Minute Data

Height (m)	Wind Speed (horiz) (m/s)	Wind Direction (°)	Wind Speed (vert) (m/s)	Quality (%)	Confidence (%)			SNR (dB)			Signal (dBr)			Number of Shots			Valid Spectra			Suppressed Echoes		
					A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
200	2.1	358.9	-0.1	94	74	71	77	8.6	8.1	9.5	14	14.3	14.5	86	86	85	78	84	77	0	0	0
180	1.8	336.8	-0.1	96	86	85	83	9.8	10.3	10.5	14.2	14.6	14.8	86	86	85	83	81	77	0	0	0
160	1.3	334.6	-0.1	97	95	87	91	11.9	11.2	12.5	15.7	15.7	15.7	86	86	85	85	81	84	0	0	0
140	1.4	318.3	-0.1	99	99	94	97	14.3	13.9	15.1	14.8	15.1	15.4	86	86	85	86	85	84	0	0	0
120	1	322.6	-0.1	100	98	98	99	16.6	16.8	17	15.2	15.5	15.7	86	86	85	86	85	85	0	0	0
100	1.5	324.3	0	100	100	99	99	18.8	19	18.4	16	16.3	16.4	86	86	85	86	86	85	0	0	0
80	1.4	319.2	0	100	100	100	100	19.8	19.7	20.1	16.5	16.9	17	86	86	85	86	86	85	0	0	0
60	1.6	307.9	0.1	100	100	100	100	19.8	19.8	19.8	16.9	17.2	17.4	86	86	85	86	86	85	7	8	4
50	1.3	304.5	0.1	97	100	88	96	19.1	11.7	14.1	17.2	17.5	17.7	86	86	85	86	83	85	7	7	6
40	0.9	293.1	0.1	99	95	100	97	15.4	18.2	15.2	17.7	17.9	18.1	86	86	85	85	86	84	3	3	6

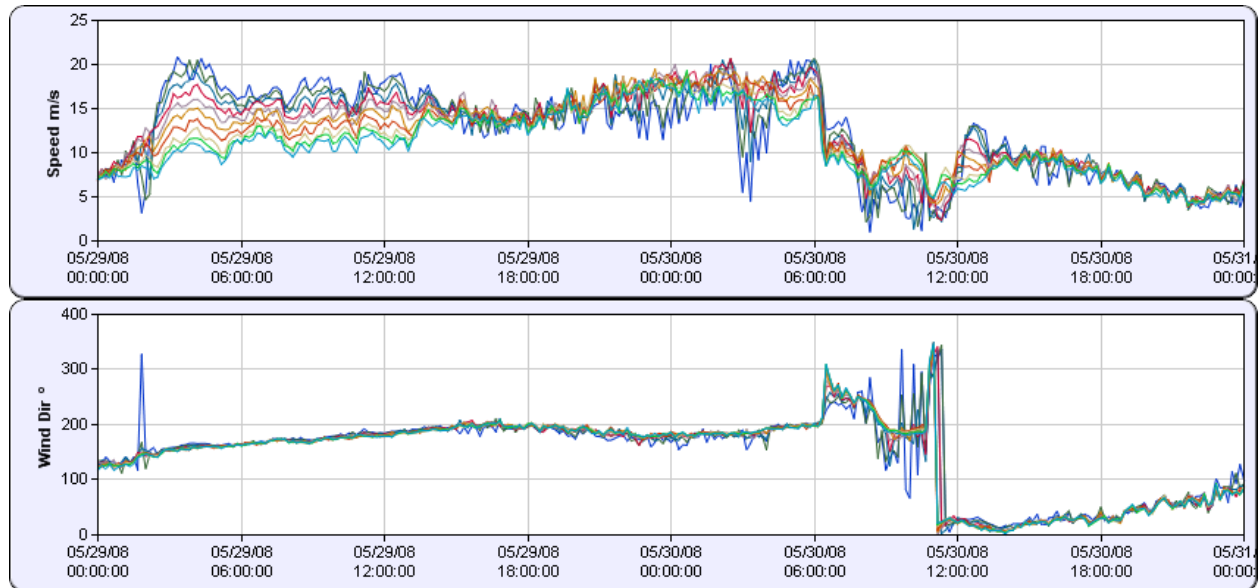
SkyServe lets customers filter their data using a chosen value of Q to display this:



and this:

Q > 80%			
Height	Wind Speed	Wind Direction	Avg. Wind Speed
200m	NA	NA	NA
180m	NA	NA	NA
160m	NA	NA	NA
140m	NA	NA	NA
120m	NA	NA	NA
100m	15.8 m/s	111°[E]	12.2m/s
80m	13.3 m/s	104°[E]	11.8m/s
60m	10.9 m/s	100°[E]	11.4m/s
50m	9.6 m/s	100°[E]	11.1m/s
40m	8 m/s	96°[E]	10.8m/s

instead of this:



and this:

Q > 0%			
Height	Wind Speed	Wind Direction	Avg. Wind Speed
200m	13.1 m/s	119°[ESE]	12.3m/s
180m	12.3 m/s	131°[ESE]	12.5m/s
160m	12.3 m/s	128°[ESE]	12.6m/s
140m	17.7 m/s	130°[ESE]	12.6m/s
120m	13 m/s	130°[ESE]	12.4m/s
100m	15.8 m/s	111°[E]	12.2m/s
80m	13.3 m/s	104°[E]	11.8m/s
60m	10.9 m/s	100°[E]	11.4m/s
50m	9.6 m/s	100°[E]	11.1m/s
40m	8 m/s	96°[E]	10.8m/s

Filtering by Q also works with SkyServe's export facility, so you get this:

	A	Y	Z	AA	AB	AC	AD	AE	AF
1	Triton Wind Speed Data								
2	Logger Serial Number: 111								
3	Date and Time	100m Q	120m Dir	120m Vh	120m Vz	120m Q	140m Dir	140m Vh	140m Vz
4	units	%	°	m/s	m/s	%	°	m/s	m/s
620	5/28/2008 6:30	99	143.5	3.1	-0.17	99	126.6	2.53	-0.02
621	5/28/2008 6:40	99	133.4	2.02	-0.02	95	130.1	2.36	0.05
622	5/28/2008 6:50	99	150.9	2.35	-0.09	91	122.4	1.75	0.06
623	5/28/2008 7:00	100	132.6	1.45	-0.07	95	109.3	1.97	-0.1
624	5/28/2008 7:10	100	155.9	1.5	-0.07	95	121.4	1.66	0.07
625	5/28/2008 7:20	100	179.1	0.97	-0.03	99	131.1	0.95	0.01
626	5/28/2008 7:30	100	222.3	1.19	-0.04	98	188.1	0.66	0.07
627	5/28/2008 7:40	100	233.3	1.44	-0.1	93			
628	5/28/2008 7:50	98	168.3	1.33	-0.06	86			
629	5/28/2008 8:00	97							
630	5/28/2008 8:10	100							
631	5/28/2008 8:20	100	203.6	1.19	-0.07	98			
632	5/28/2008 8:30	100	243.6	1.59	-0.15	100	221.1	1.07	-0.15
633	5/28/2008 8:40	100	252.9	2.25	-0.15	100	246.9	2.03	-0.11
634	5/28/2008 8:50	100	260.5	1.84	0.01	100	269.2	1.22	0.04

instead of this:

	A	Y	Z	AA	AB	AC	AD	AE	AF
1	Triton Wind Speed Data								
2	Logger Serial Number: 111								
3	Date and Time	100m Q	120m Dir	120m Vh	120m Vz	120m Q	140m Dir	140m Vh	140m Vz
4	Units	%	°	m/s	m/s	%	°	m/s	m/s
620	5/28/2008 6:30	99	143.5	3.1	-0.17	99	126.6	2.53	-0.02
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623	5/28/2008 7:00	100	132.6	1.45	-0.07	95	109.3	1.97	-0.1
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627	5/28/2008 7:40	100	233.3	1.44	-0.1	93	234.2	1.17	-0.06
628	5/28/2008 7:50	98	168.3	1.33	-0.06	86	198.5	0.9	0
629	5/28/2008 8:00	97	191.5	0.89	-0.14	50	306.5	1.15	-0.22
630	5/28/2008 8:10	100	212.7	1.2	-0.05	78	135.1	1.42	0.15
631	5/28/2008 8:20	100	203.6	1.19	-0.07	98	167.1	0.71	-0.09
632	5/28/2008 8:30	100	243.6	1.59	-0.15	100	221.1	1.07	-0.15
633	5/28/2008 8:40	100	252.9	2.25	-0.15	100	246.9	2.03	-0.11
634	5/28/2008 8:50	100	260.5	1.84	0.01	100	269.2	1.22	0.04

Q: So Second Wind has it all figured out?

A: Not quite...

SkyServe makes a decision on the fly to determine the quality factor for each reading. If the data gets markedly better or worse over time, different quality factors might be applied to the same quality data. It's like assigning test grades on a curve as each student completes the test and hands it in. The most accurate grades will be awarded once all the tests are graded and the performance of the whole class is known. Also, our understanding of the information underlying the quality factor, and the performance of Triton, continues to evolve. It's important to remember that all the data is there – SkyServe provides quality factor as a tool to filter the data.