

Mount Hope Bay Wind

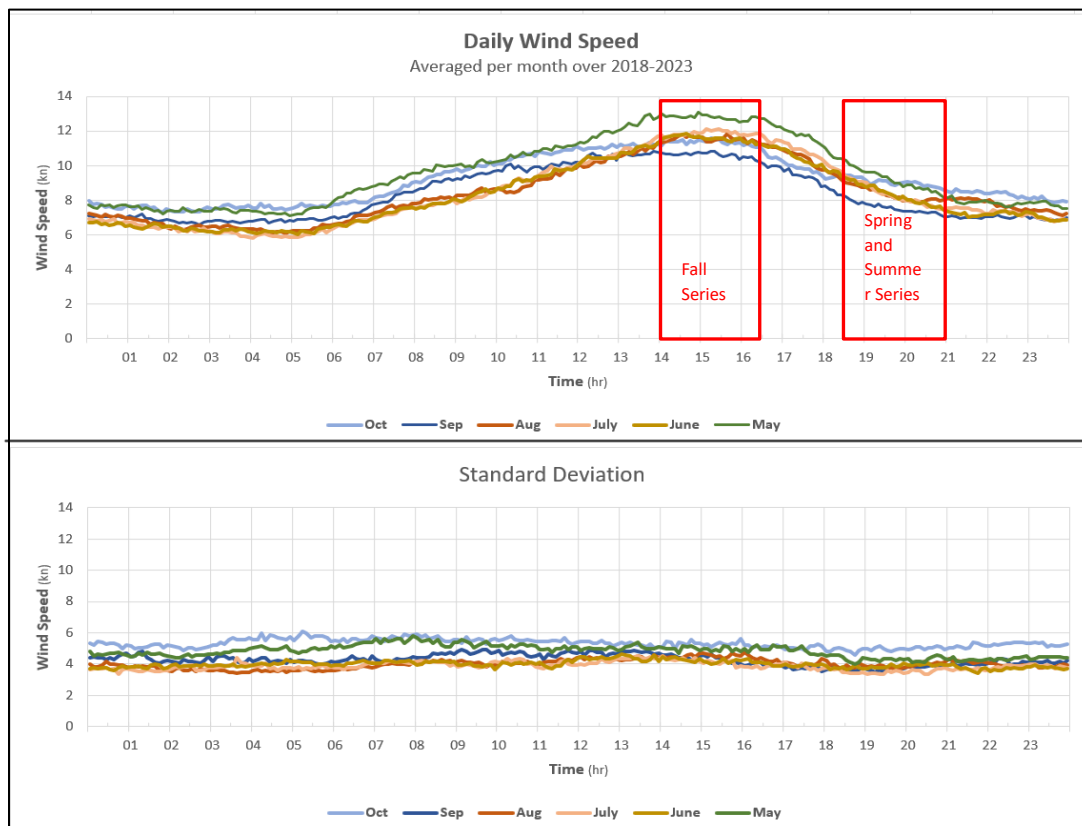
Steve Adkins

Sail boat racing is totally dependent on the Wind (other things come into play also, but if there is no wind...). Wind is created and influenced by the sun creating temperature and pressure differences and the earth's rotation moving those differences about. The purpose of this document is **not to explain** those effects. It is purely observational. It is meant as a review of the Wind in this area over the past several years during the sailing season. The sail boat racing season in Mount Hope Bay Starts mid-May and ends mid-October.

Wind data was downloaded from the [NOAA PORTs](#) Web site: Wind Speed, Wind Direction, and Wind Gust from May thru Oct for the years 2018 thru 2023 at 6-minute intervals as measured at the Borden Flats Light.

Wind Speed

The below plot is the daily wind speeds profile average over a month. The spring series is the Green line, the months associated with Summer 1&2 series are the Orangish lines, and months associated with the Fall series are the Blueish lines. The red boxes show the 2 time periods we race.



This general profile is well recognized with the wind building during the day, peaking in the midafternoon, and falling late in the day. The one thing that surprised me was that I thought that the wind held longer, dropping closer to dusk. This shows that the wind speed actually starts dropping earlier than that. Also, on average the strongest winds are from ~1:30PM to ~4:30PM.

The Next table is a count of the occurrences based on Wind Speed and Time. It basically shows the same thing as the first plot, but is also gives a “feeling” as to the spread of the data. Also note, no big outliers or holes. As an example of how to read it, for the 5 years 2018-2023 from May to Aug, between 6:30PM and 7:30PM there were 1576 times when the wind was 7-9 kn. (The Darker the highlight, the higher the count.)

May-Aug		Time(EST)																							
		0-:30	1-:30	2-:30	3-:30	4-:30	5-:30	6-:30	7-:30	8-:30	9-:30	10-:30	11-:30	12-:30	13-:30	14-:30	15-:30	16-:30	17-:30	18-:30	19-:30	20-:30	21-:30	22-:30	23-:30
WS	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	0	2	0	0
	33	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	1	0	0	1	0	1	0	0	0
	31	0	0	0	0	0	0	0	1	8	3	6	3	2	4	4	4	5	5	1	2	0	1	0	0
	29	0	0	1	0	0	0	0	4	7	12	14	7	7	13	8	13	8	11	5	5	7	2	1	1
	27	1	2	1	1	0	0	2	6	7	16	14	16	23	24	26	15	33	16	8	7	7	6	3	2
	25	6	3	3	3	1	4	2	12	20	20	24	27	30	29	45	44	40	34	16	15	11	14	9	9
	23	9	15	10	12	10	13	27	40	42	28	42	44	58	72	82	102	78	53	39	20	11	7	9	15
	21	13	34	21	30	39	36	66	81	91	69	89	106	153	208	300	292	231	191	105	55	59	39	32	49
	19	36	63	74	76	122	105	93	115	136	160	160	219	302	367	460	515	457	374	239	131	102	115	100	94
	17	85	155	137	131	141	145	156	208	263	309	323	365	489	606	733	753	798	646	432	290	189	212	219	206
	15	194	388	336	312	263	287	350	447	521	574	627	806	926	1096	1239	1265	1216	1009	879	606	527	457	464	458
	13	285	563	514	526	465	444	538	576	667	776	914	1094	1145	1266	1307	1287	1280	1281	1034	906	773	738	619	541
	11	380	791	778	733	737	723	738	928	980	1071	1205	1224	1251	1211	1189	1198	1296	1442	1409	1257	1078	958	888	837
	9	555	1020	1052	1103	1046	954	1086	1212	1307	1240	1251	1248	1169	1031	861	907	934	1128	1525	1576	1377	1198	1293	###
	7	848	1553	1537	1392	1365	1426	1542	1445	1442	1461	1409	1258	1029	748	590	541	570	722	1057	1560	1731	1724	1645	###
	5	749	1694	1585	1606	1530	1572	1503	1158	964	1025	867	663	542	431	320	248	251	291	416	670	1092	1257	1408	###
	3	430	863	992	1120	1262	1278	970	836	719	473	351	235	183	195	156	124	122	124	144	265	368	564	619	674
	1	68	158	230	227	288	281	192	201	135	84	45	35	28	44	30	37	30	24	32	22	62	92	86	119
Sept-Oct		Time(EST)																							
		0-:30	1-:30	2-:30	3-:30	4-:30	5-:30	6-:30	7-:30	8-:30	9-:30	10-:30	11-:30	12-:30	13-:30	14-:30	15-:30	16-:30	17-:30	18-:30	19-:30	20-:30	21-:30	22-:30	23-:30
WS	35	1	0	0	2	4	6	3	3	3	1	1	3	2	3	2	1	2	0	1	0	0	0	0	1
	33	0	3	1	5	5	6	10	4	8	1	0	6	2	1	3	2	2	1	0	0	0	0	0	2
	31	2	2	2	5	3	7	7	8	7	8	7	3	7	3	2	4	5	3	1	0	0	0	1	2
	29	3	4	2	3	6	2	2	7	2	11	4	6	9	10	5	3	2	4	4	0	0	0	1	3
	27	10	12	4	5	6	5	3	3	3	18	17	11	12	8	11	13	10	11	8	0	0	5	5	8
	25	11	7	12	14	9	8	11	13	25	22	31	13	27	22	34	38	35	18	8	12	5	9	19	16
	23	16	18	18	21	24	21	13	25	30	31	46	55	48	58	67	57	60	44	22	26	42	26	32	33
	21	20	55	39	26	36	31	30	43	66	69	87	102	121	130	120	118	88	77	74	65	55	51	57	56
	19	21	67	73	68	64	70	71	85	98	103	125	152	196	182	170	211	162	123	109	70	66	62	56	45
	17	25	98	106	96	108	131	117	116	191	224	241	251	269	241	284	298	264	182	178	124	130	129	95	74
	15	104	185	167	199	188	182	218	223	274	353	427	431	456	501	493	435	392	322	285	236	233	219	231	188
	13	166	271	237	216	228	230	246	284	393	452	488	510	459	559	517	486	550	474	326	353	303	326	287	308
	11	165	310	361	322	372	298	326	423	528	540	524	522	517	559	561	620	670	678	537	501	465	398	437	415
	9	253	576	467	566	470	477	558	600	583	611	492	512	530	462	548	572	655	725	767	705	607	569	490	526
	7	378	699	777	679	691	783	763	750	601	503	535	556	559	503	512	501	470	614	727	753	745	685	704	695
	5	330	703	718	751	746	737	630	531	407	341	359	332	294	269	217	201	194	261	464	513	608	669	651	676
	3	267	540	535	558	532	513	480	406	299	277	207	162	120	114	84	71	66	103	127	220	284	362	427	432
	1	45	81	97	89	125	110	115	79	90	61	39	24	17	18	17	16	21	14	16	29	33	61	85	92

During the Summer 1&2 series the Average Wind Speed is ~8-9kn with a 4-5kn standard deviation. And, we can expect a drop in wind speed over the course of the race (on average ~2-3kn).

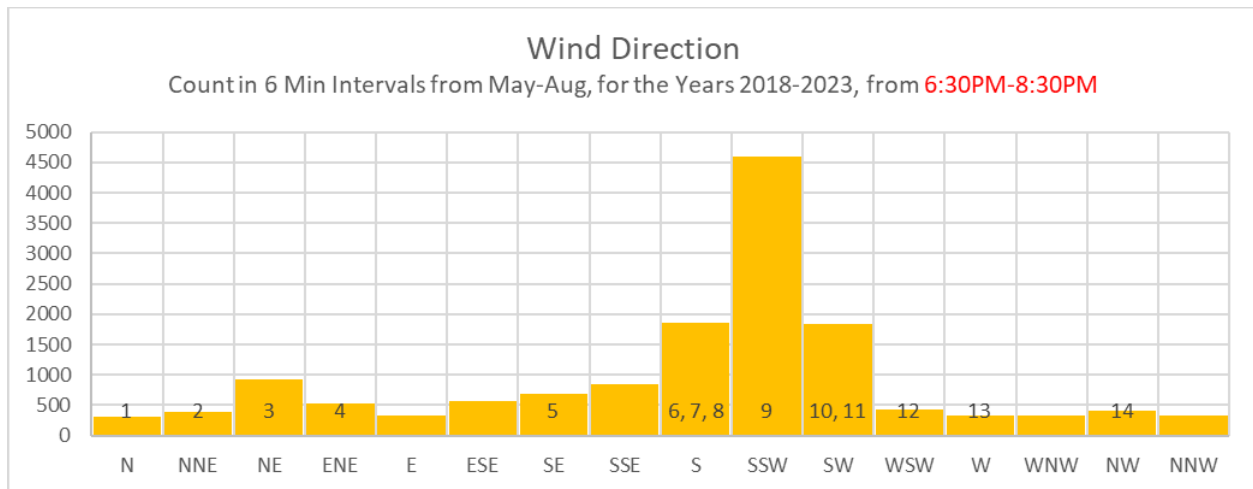
During the Fall series the Average Wind Speed is ~10-11kn again with 4-5kn standard deviation. And, the average wind speed is relatively constant over course of the race.

Wind Direction

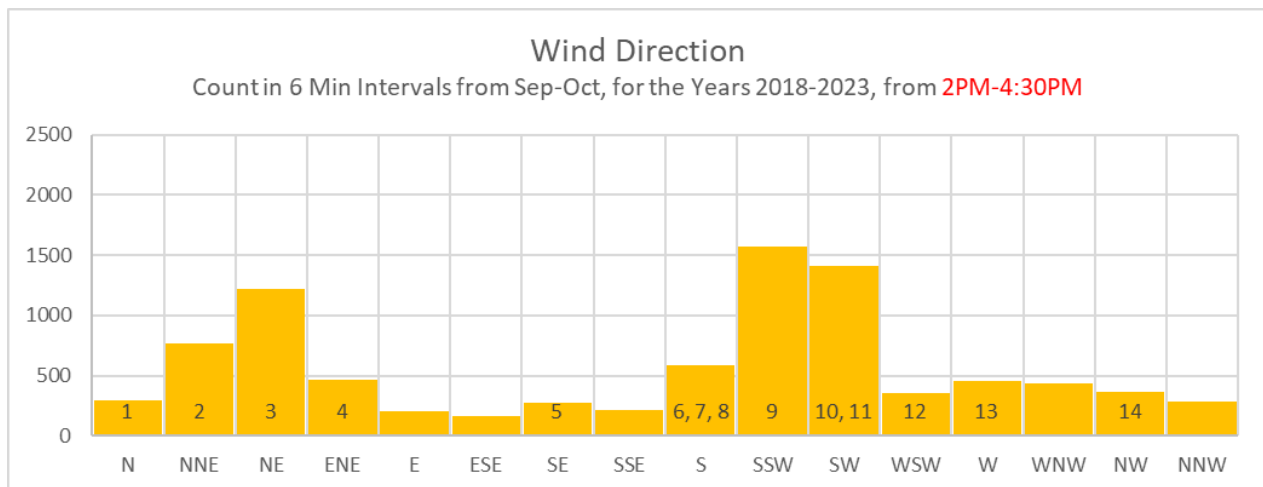
The below plots summarizes the wind direction to the 16 pt compass rose.

It is a count of the number of occurrences in 6 min intervals from **6:30PM to 8:30PM for May to Aug** over the years 2018 to 2023. The number within the box represents the Sira/TYC Course associated with that secondary intercardinal direction.

For example, for SSW there were ~4500 occurrences of that wind direction and 9 is the Sira/TYC course associated with SSW. SSW occurred ~30% of the time and **S/SSW/SW occurred ~60%** of the time. Of special note the plot appears to be bimodal with **NNE/N/ENE occurred ~12%** of the time.



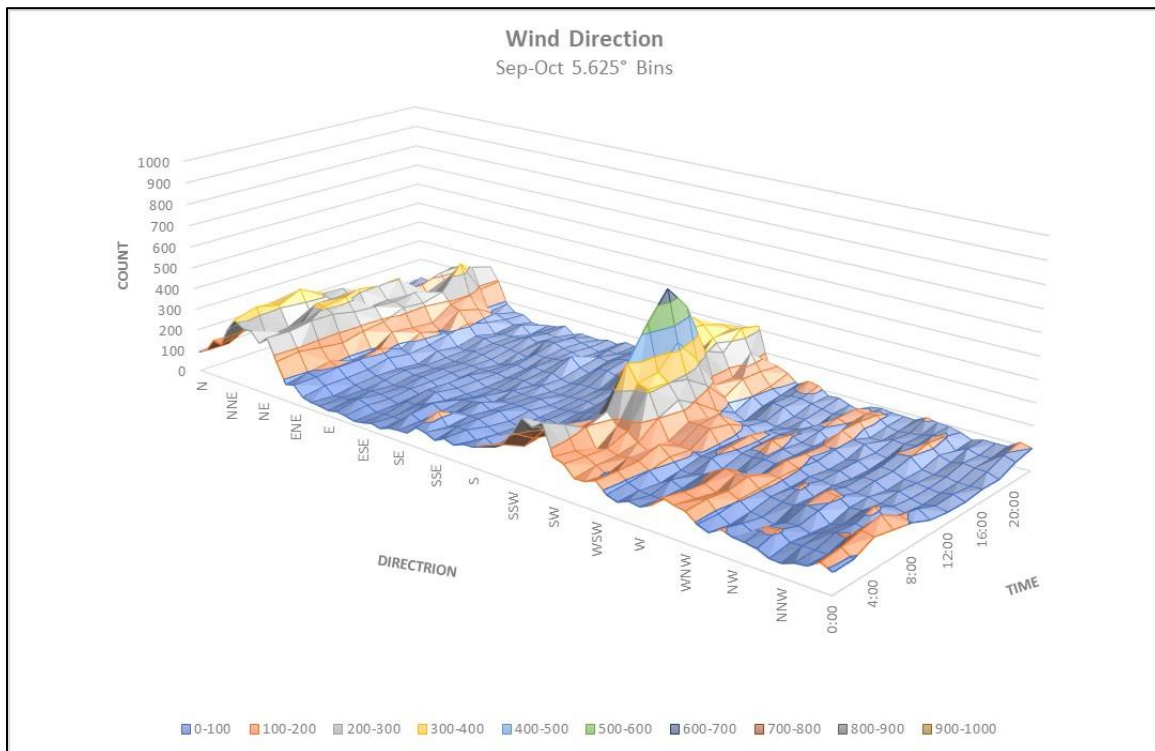
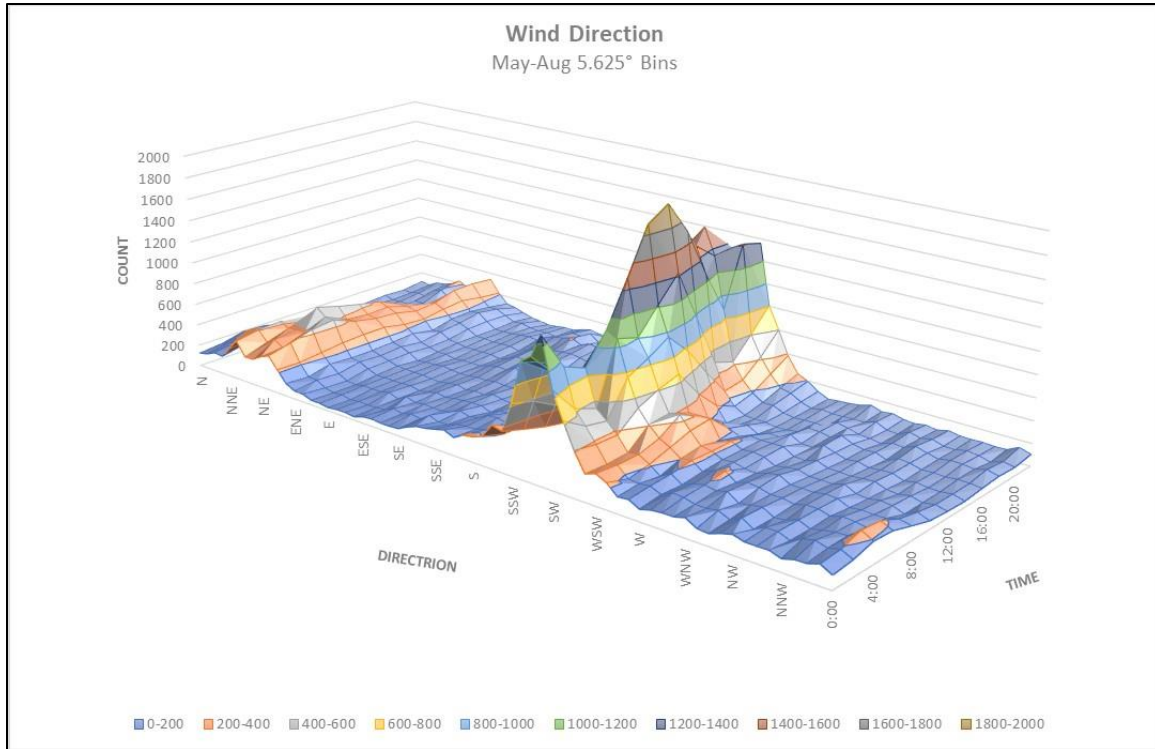
The next plot is for **Sept and Aug and 2PM-4:30PM**. In this case the bimodal feature really comes out with **S/SSW/SW occurred ~40% of the time**, and **NNE/N/ENE occurred ~30% of the time**. This is probably because the SSW breeze has not fully developed yet and the wind is still shifting around.



So far in 2024 the S/SSW/SW courses have been used 11 times. Here is a breakdown of the course usage so far in 2024. Spring/Summer 1&2 (1-1, 3-1, **6-1, 8-2, 9-4, 10-3, 12-1**); Fall (3-2, 7-1)

Below are 3D plots of the Wind Direction. The Vertical Axis is the Count, The Front axis is the Direction (all 360° In 5.625° bins), And the Depth is the Time (24 hr period in 2 hr Time Slots).

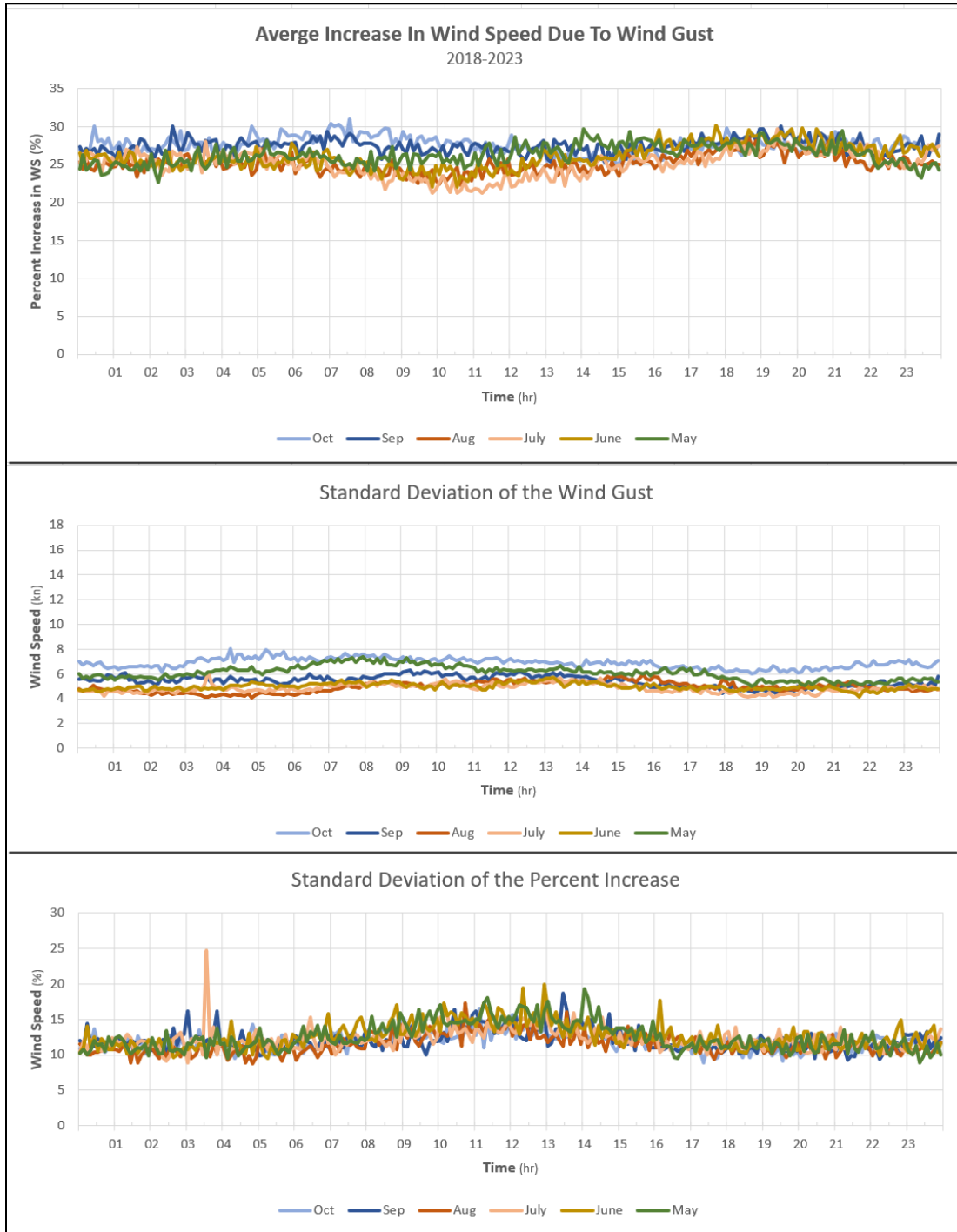
The top plot is May-Aug, the Bottom Plot is Sept-Oct.



The Winds are a little more chaotic in the Fall.

Wind Gust

The next plots are the percent increase in wind speed due to Wind gust. One other limitation was placed on data used in this section in that wind speed less than 5kn were removed. The average increase in Wind Speed due to gust was ~25-30% with a standard deviation of 10%. Of note the largest wind gust during this period was 63kn on Oct 29, 2021.



Appendix

The average Wind Speed per week. Note it is strongest in May and Oct.

