

S25 Optimal Meteorological Conditions at Selected NASCAR Facilities

Which month has the highest probability of optimal fan comfort at a particular NASCAR facility?

Definition of Optimal Fan Comfort:

- Apparent Temperature $\geq 65^{\circ}\text{F}$ and $\leq 80^{\circ}\text{F}$

$$AT = T + 0.33 * e - 0.70 * ws - 4.0$$
- Wind Speed < 17 knots
 Based on the Beaufort Wind Scale
- No Measurable Precipitation

Procedure:

- Time frame between 7 AM and Midnight LST
- Use Excel to filter data and determine:
 - The number of hours that meet all optimal conditions
 - The number of total hours during the observation time
 - A percentage of which all optimal conditions are met

AT(F min)	AT (F max)	Wind Max	Precip	HR	Total Obs	Opt Obs		
65	80	16	0.01					
				12	1151	553	Optimum Conditions	
				13	1147	688	Count all hours	11396
				14	1140	697	Count morning	3780
				15	1149	665	Count afternoon	3827
				16	1138	598	Count evening	3789
				17	1135	579		
				18	1145	618	Total Hours	
				19	1133	603	Count all	20493
				20	1139	598	Count morning	6860
				21	1143	630	Count afternoon	6822
				22	1141	684	Count evening	6811
				23	1121	694		
				0	1147	709		
				1	1129	662		
				2	1136	658		
				3	1146	633		
				4	1123	589		
				5	1130	538		
				Total	20493	11396		

Month	All Day	Morning	Afternoon	Evening
January	25.27%	24.92%	31.59%	19.31%
February	25.44%	25.92%	31.51%	18.89%
March	40.54%	41.78%	44.36%	35.48%
April	55.61%	55.10%	56.10%	55.63%
May	51.12%	43.16%	40.10%	70.20%
June	15.73%	9.98%	6.83%	30.47%
July	6.55%	2.98%	2.04%	14.70%
August	4.90%	2.56%	1.49%	10.70%
September	11.96%	10.50%	6.60%	18.83%
October	44.31%	39.45%	40.34%	53.15%
November	49.28%	49.00%	51.23%	47.63%
December	32.97%	31.54%	39.54%	27.83%

Example Analysis:

Daytona International Speedway

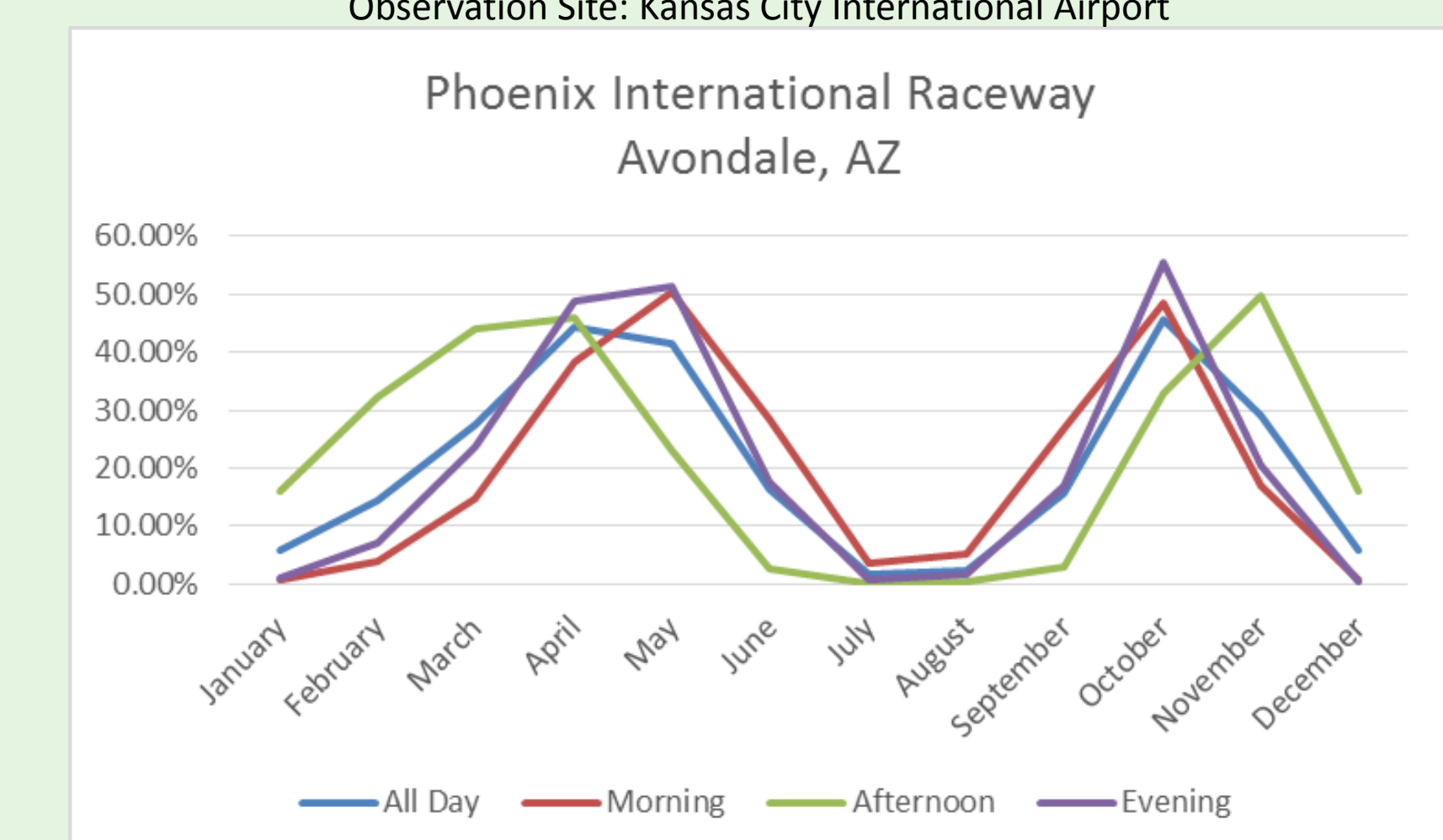
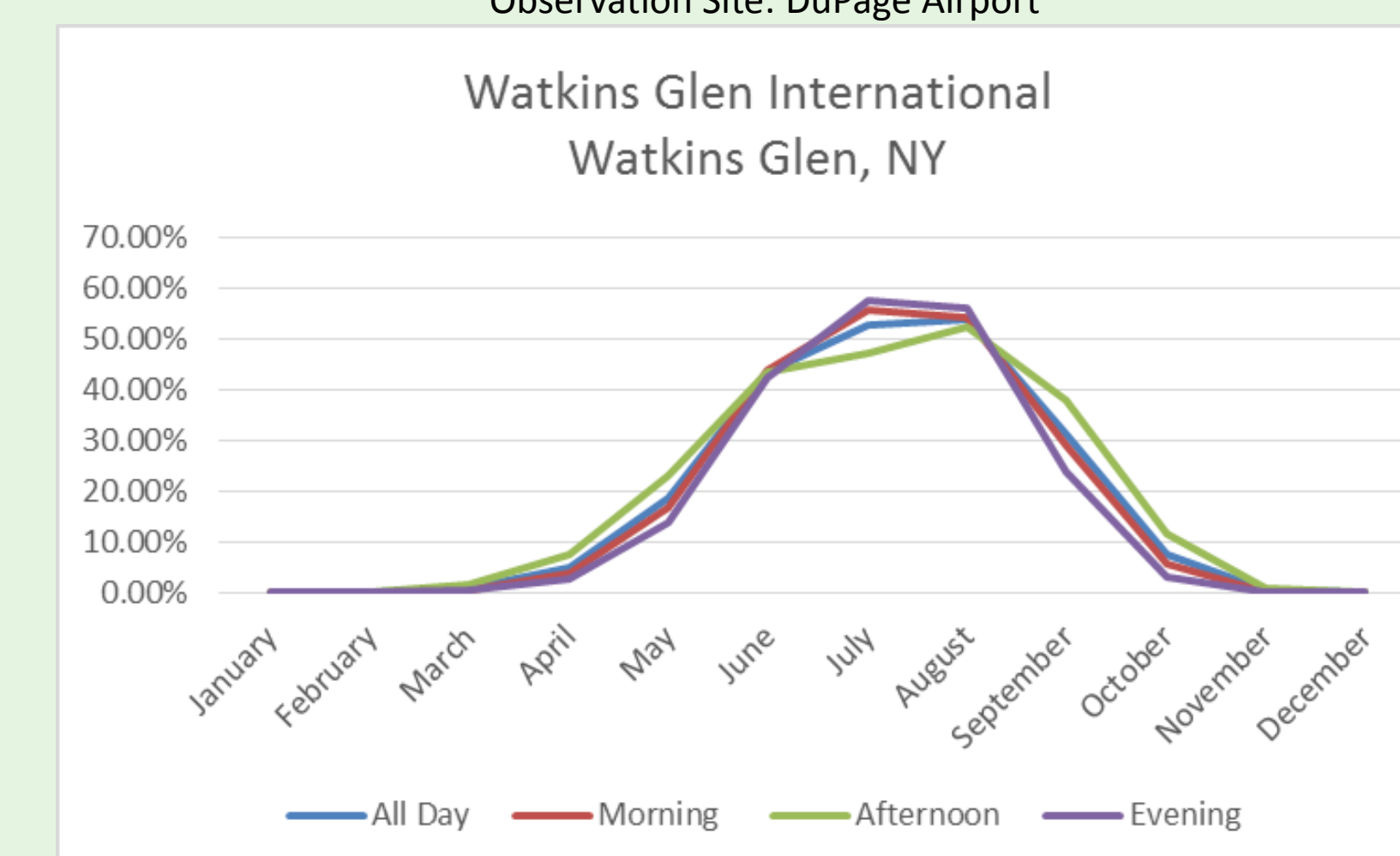
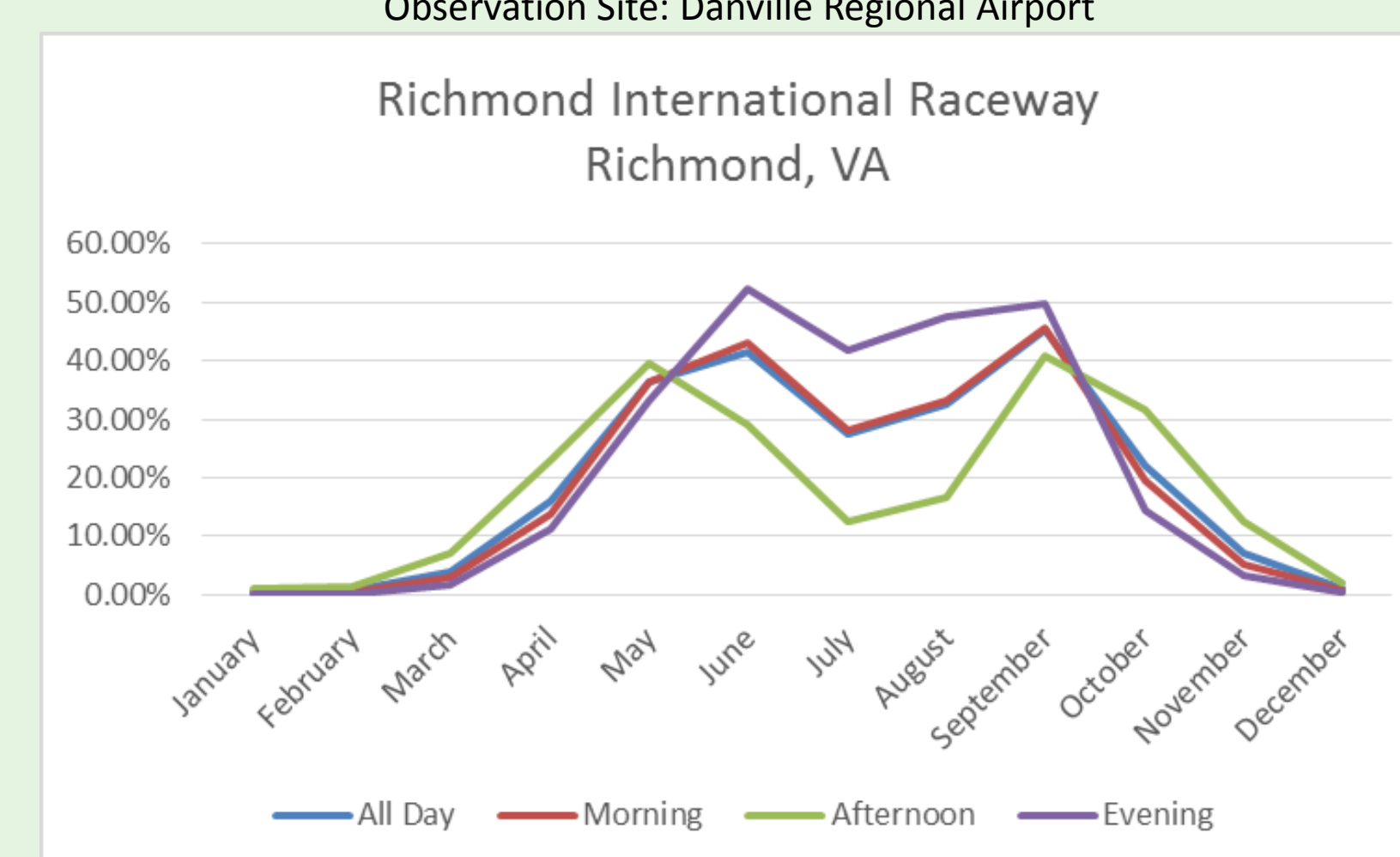
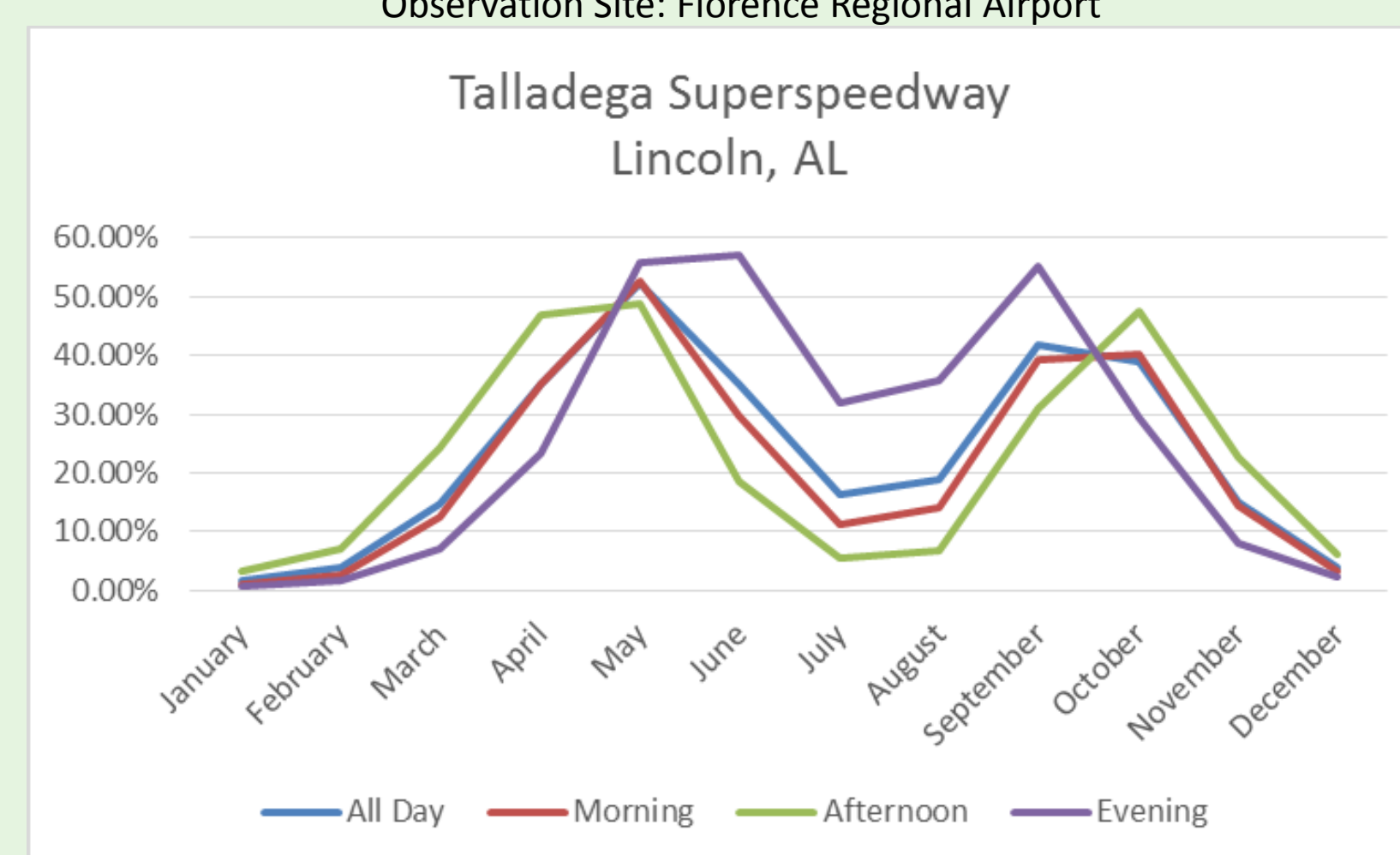
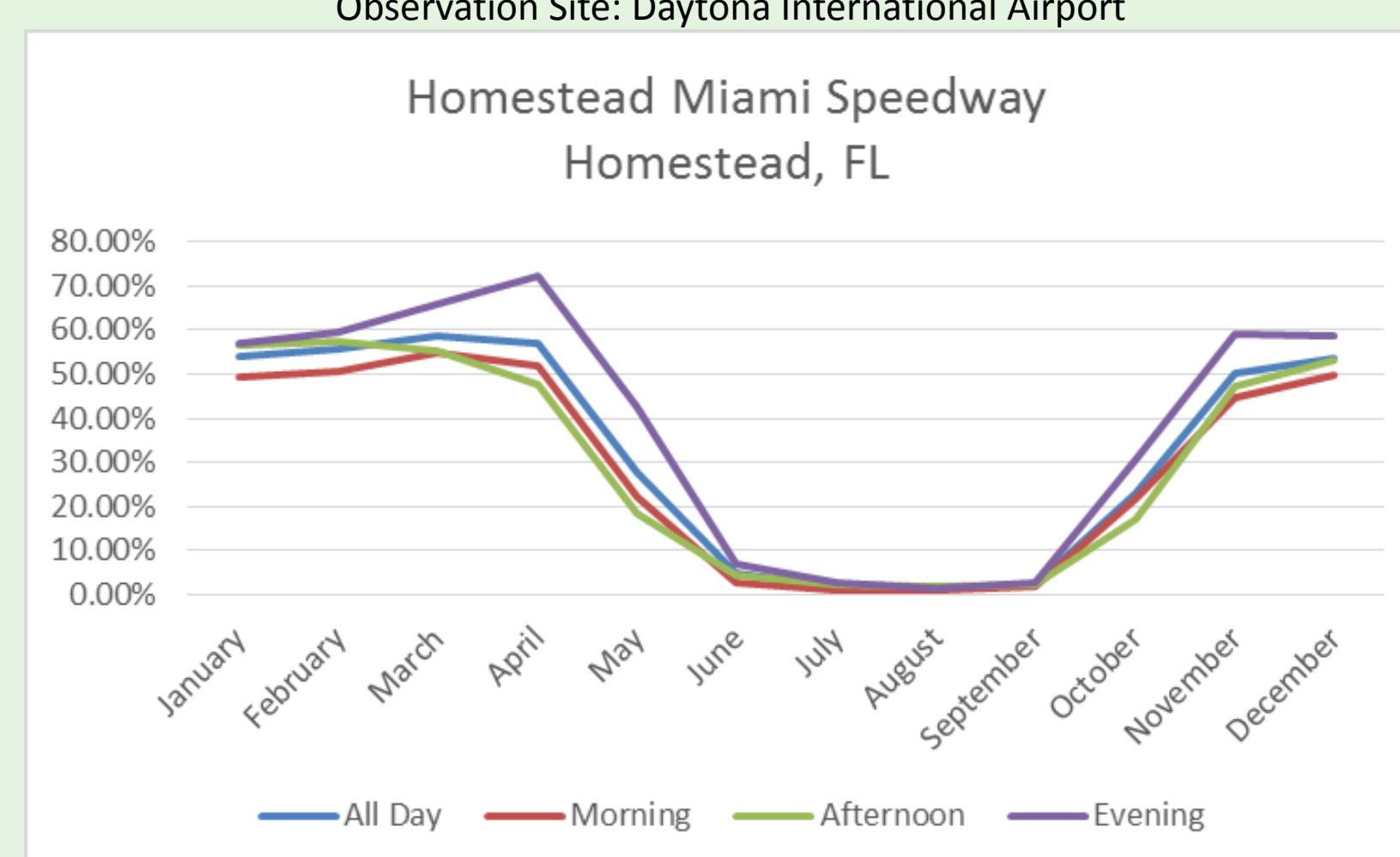
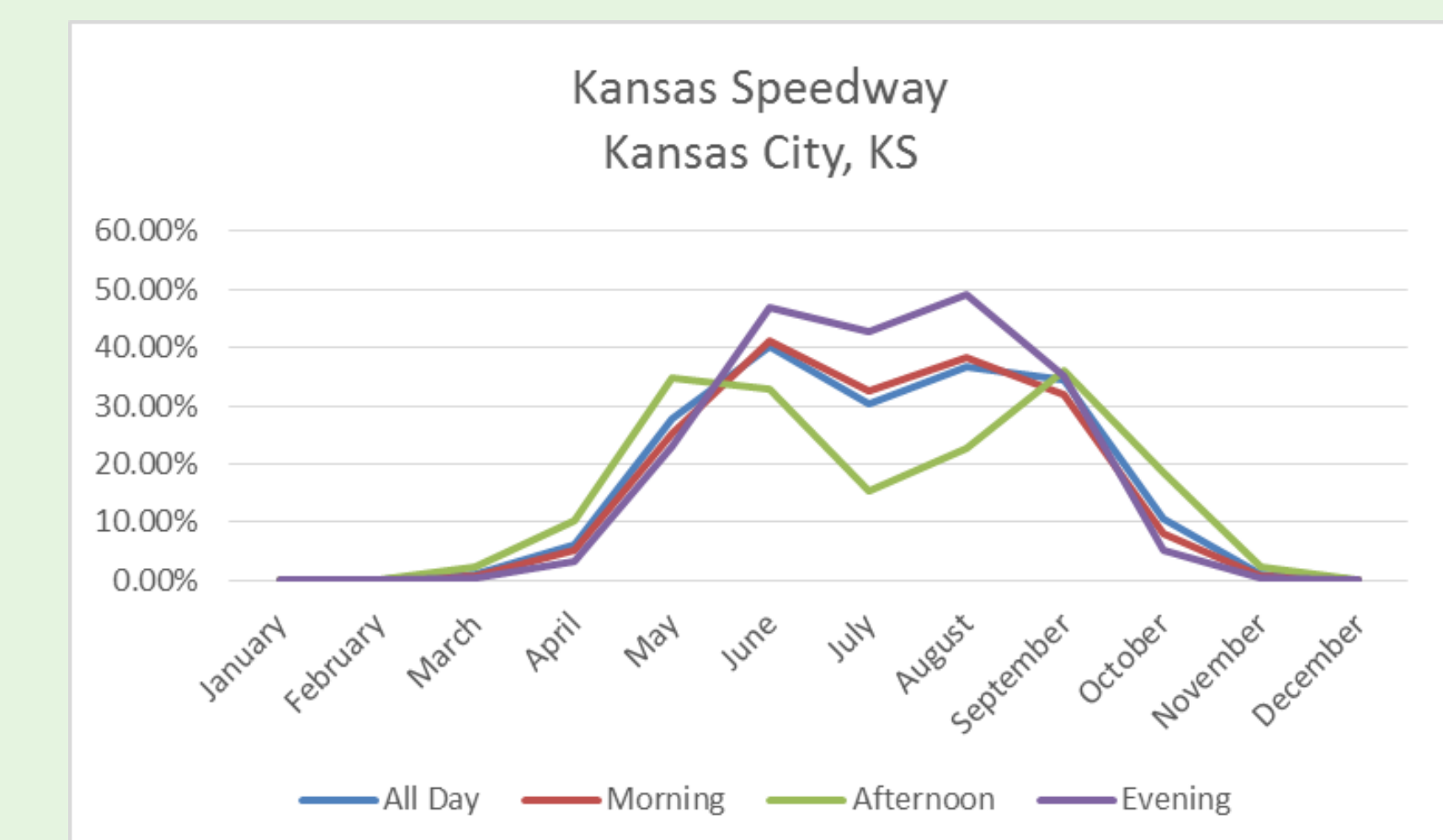
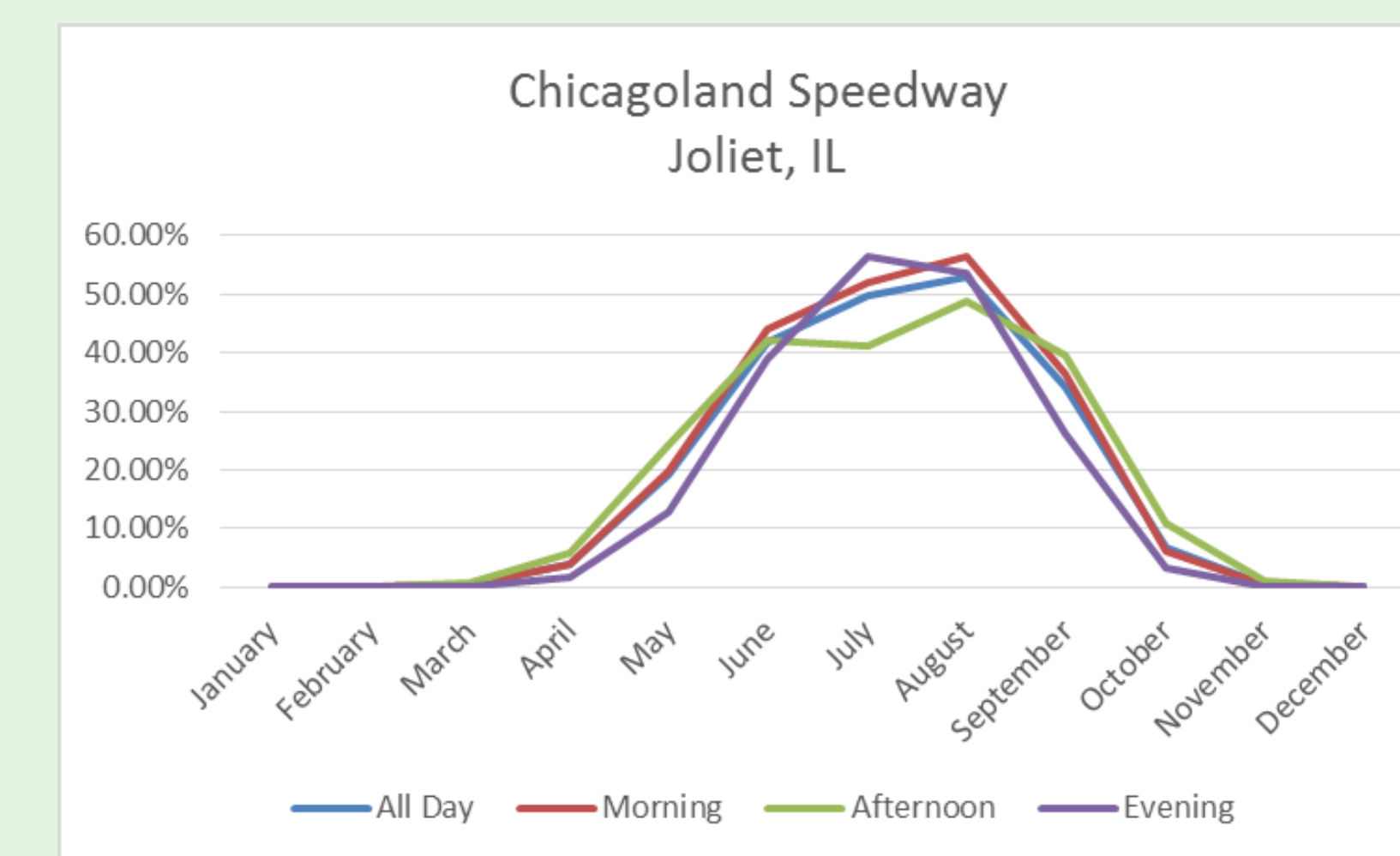
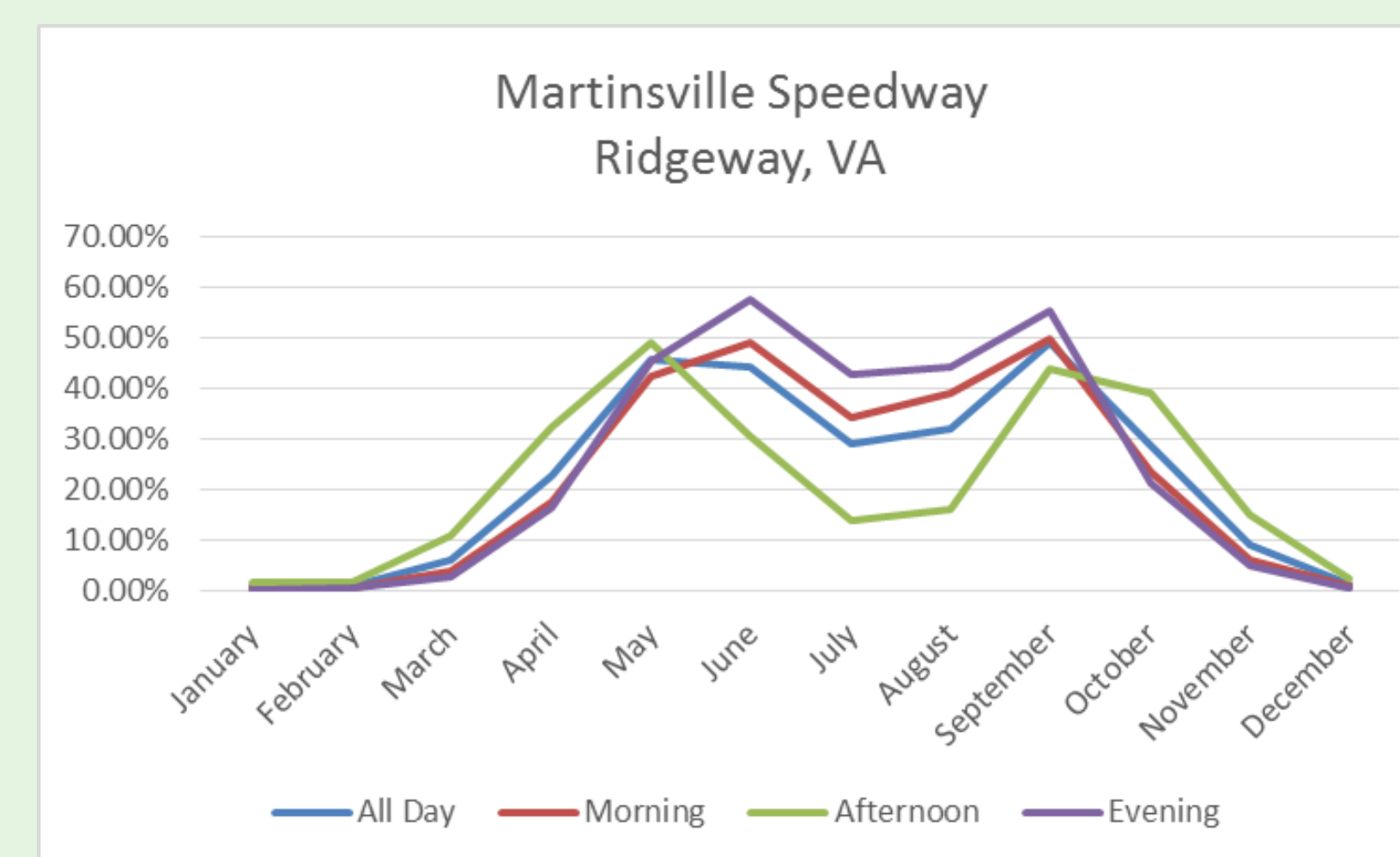
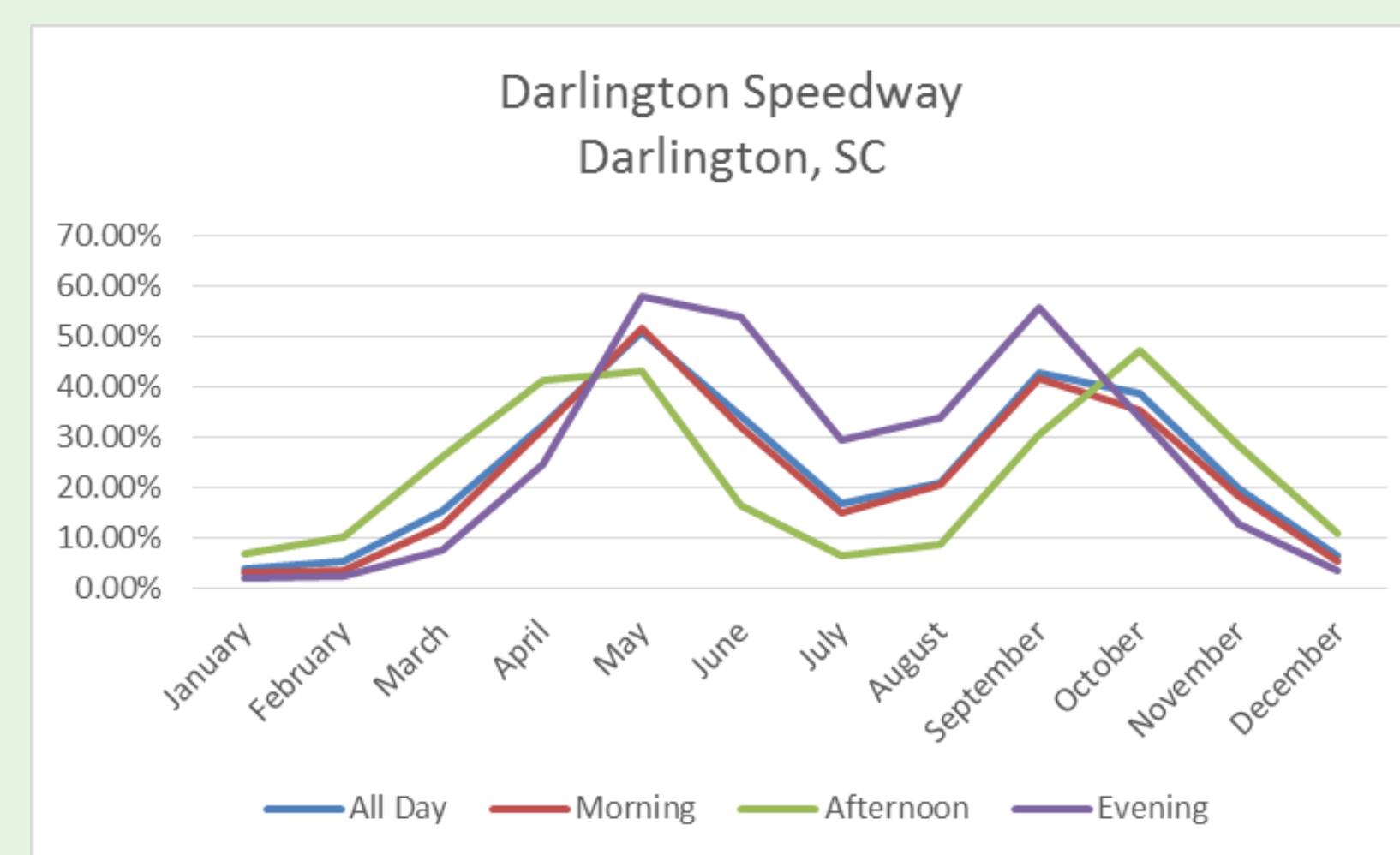
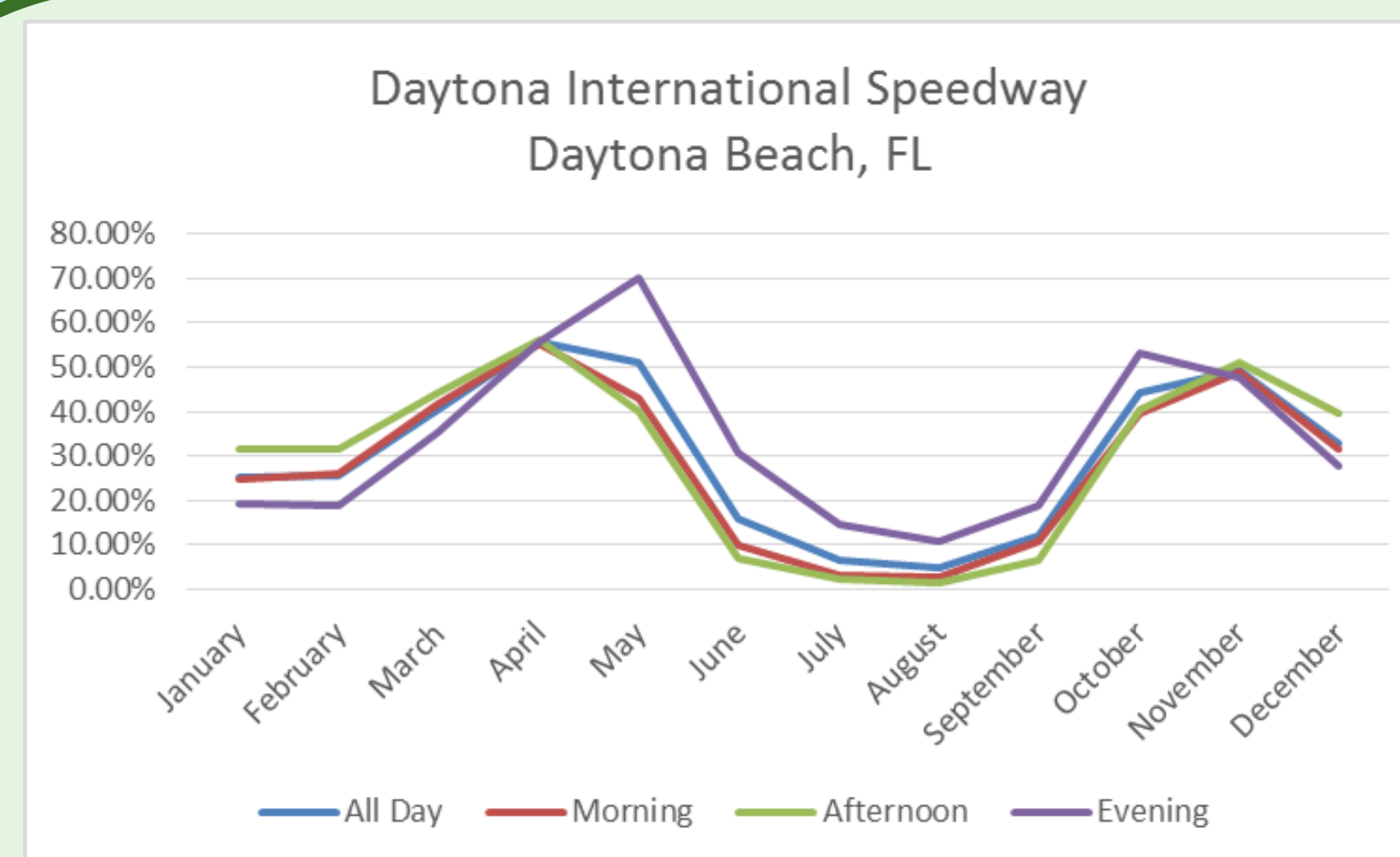
Left: Number of all observations and number of observations that meet all optimal conditions at each hour

Below: Percentage of optimal conditions met for each month



*~38 years of data
(10 stations, ~340,000 observations per station)*

Results



Observation Site: Daytona International Airport | Observation Site: Florence Regional Airport | Observation Site: Danville Regional Airport | Observation Site: DuPage Airport | Observation Site: Kansas City International Airport | Observation Site: Homestead AFB | Observation Site: Birmingham International Airport | Observation Site: Richmond International Airport | Observation Site: Ithaca Tompkins Regional Airport | Observation Site: Phoenix Sky Harbor International Airport