SCE Weather Forecast Model Performance Summary

2023

Introduction

SCE evaluates weather model forecast accuracy in summary reports to help inform continuous improvement efforts around increasing situational awareness.

In 2023 SCE decided to provide a summary of forecast accuracy to the public for key fire weather variables at the start of the year covering the previous year.

The following slides report circuit-level weather forecast accuracy for sustained wind speed, wind gust speed, and fire potential index (FPI).

Verification Methodology

Mean absolute error (MAE) is a common metric used throughout meteorology to assess forecast accuracy.

SCE calculates MAE by comparing circuit-level forecasts to available observations from SCE and public weather station networks installed nearby a circuit.

The average absolute difference between forecast-observation pairs provides the MAE value.

For sustained wind speed, wind gust speed, and FPI, the observations providing the maximum value on a circuit for a given time period are used for comparison to the circuit-maximum forecasts.

Verification Methodology

SCE runs weather model systems comprising 18 individual forecast models distilled into ensemble sub-systems.

These systems are detailed below and verification statistics are provided on the following slides for each model source.

Model Name	Forecast Horizon	Purpose	Initial and Lateral Boundary condition Source
Control Model (2km Deterministic)	7 Days	Provide 7-day forecast	0.25-degree GFS
2x2km NAM Ensemble	3.5 Days	Provide high resolution Ensemble forecast	12-km NAM (7 members) + Control Model
1x1km GFS Ensemble	4.5 Days	Provide high resolution Ensemble forecast	0.25-degree GFS
1x1km ECMWF Ensemble	4.5 Days	Provide high resolution Ensemble forecast	ECMWF
1x1km GFS+ECMWF Ensemble	4.5 Days	Provide high resolution Ensemble forecast	GFS and ECMWF
Machine Learning	7 Days	Bias correct control model forecast.	Control Model

Sustained Wind Speed

Forecast Day	2-km Deterministic	2-km Ensemble	1-km GFS+EC Ensemble	1-km GFS Ensemble	1-km EC Ensemble	Machine Learning
1	2.83	2.82	2.67	2.74	2.74	2.06
2	2.91	2.87	2.73	2.80	2.80	2.13
3	2.96	2.90	2.76	2.86	2.84	2.21
4	3.06		2.75	2.90	2.84	2.31
5	3.19					2.42
6	3.21					2.50
7	3.34					2.66

Table: Sustained wind speed forecast mean absolute error (MPH) by forecast horizon; comprised of 01/01/2023-12/31/2023 data.

Wind Gust Speed

Forecast Day	2-km Deterministic	2-km Ensemble	1-km GFS+EC Ensemble	1-km GFS Ensemble	1-km EC Ensemble	Machine Learning
1	4.07	4.03	3.54	3.82	3.57	2.93
2	4.28	4.14	3.65	3.93	3.68	3.06
3	4.43	4.25	3.72	4.06	3.78	3.22
4	4.66		3.78	4.15	3.88	3.41
5	4.92					3.62
6	5.03					3.77
7	5.33					4.08

Table: Wind gust speed forecast mean absolute error (MPH) by forecast horizon; comprised of 01/01/2023-12/31/2023 data.

Fire Potential Index

Forecast Day	2-km Deterministic	2-km Ensemble	1-km GFS+EC Ensemble	1-km GFS Ensemble	1-km EC Ensemble	Machine Learning
1	0.32	0.39	0.32	0.33	0.34	0.32
2	0.35	0.38	0.34	0.35	0.36	0.34
3	0.38	0.39	0.36	0.37	0.39	0.37
4	0.40		0.36	0.38	0.39	0.40
5	0.43					0.43
6	0.48					0.48
7	0.52					0.52

Table: Fire potential index forecast mean absolute error (unitless) by forecast horizon; comprised of 01/01/2023-12/31/2023 data.