

Validation in Turkey: Vortex MAST & SERIES

In this study, wind measurement series from 14 different sites in Turkey have been analysed. These sites are located in the coloured provinces shown in the following figure:



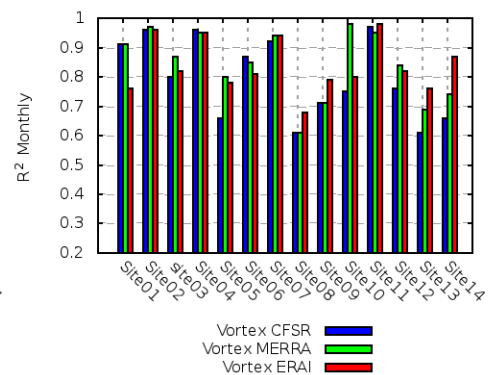
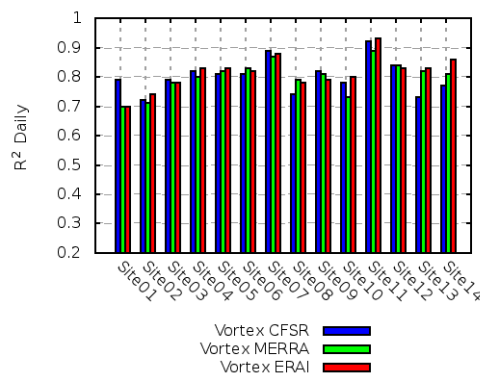
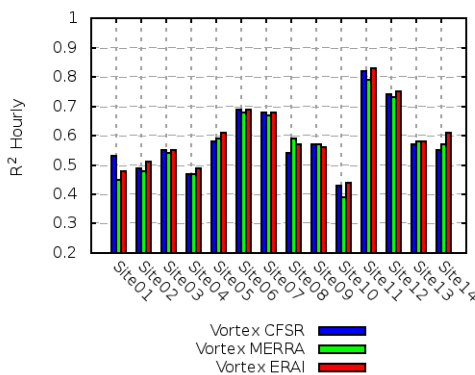
As can be seen in the following table, measurements are available at different heights:

Site	Height (m)	Province
01	60	Mersin
02	70	Karabuk
03	70	Kırklareli
04	60	Tekirdag
05	60	Kırklareli
06	60	Karaman
07	60	Balıkesir

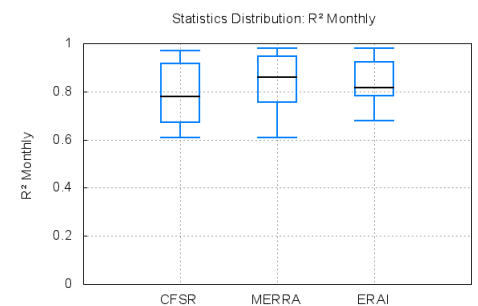
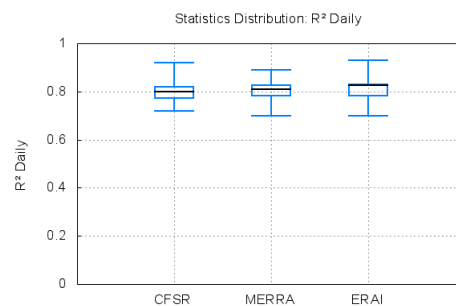
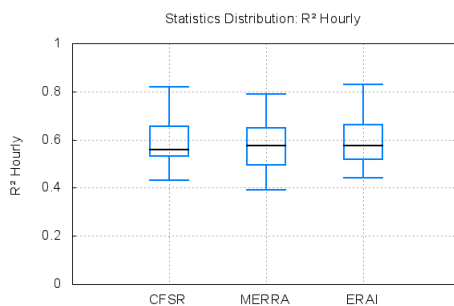
Site	Height (m)	Province
08	70	Çanakkale
09	60	Çanakkale
10	70	Cide
11	60	Manisa
12	80	Mugla
13	60	Çanakkale
14	50	Çanakkale

Three synthetic Vortex time SERIES from three different reanalysis sources (cfsr, merra and era-interim) have been calculated for each site and for the same period as the measurements. Comparison of Vortex time SERIES against measurements is shown in terms of the coefficient of determination R^2 (hourly, daily and monthly) for the mean wind speed:

	Average of correlation coefficients		
	R^2h	R^2d	R^2m
Vortex CFSR	0.59	0.80	0.80
Vortex MERRA	0.58	0.80	0.84
Vortex ERAI	0.60	0.81	0.84



Statistical distribution of these parameters is shown in the following boxplots:



In this study wind measurement series from 17 different sites in Turkey have been analysed. These sites are located as shown in the following figure:



As can be seen in the following table, the observed data is available at different heights:

Site	Height (m)	Province
01	70	Amasya
02	81	Bartın
03	70	Kirklareli
04	60	Tekirdag
05	60	Kirklareli
06	80	Kirklareli

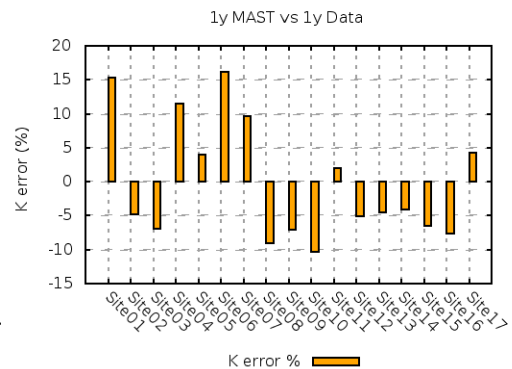
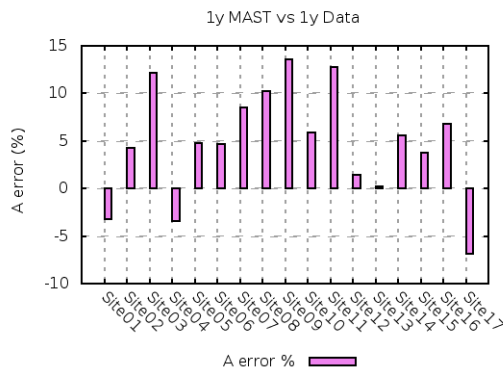
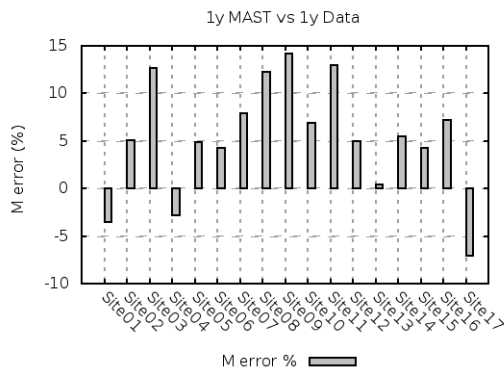
Site	Height (m)	Province
07	80	Izmir
08	70	Çanakkale
09	60	Çanakkale
10	10	Izmir
11	60	Manisa
12	80	Mugla

Site	Height (m)	Province
13	50	Çanakkale
14	60	Çanakkale
15	60	Çanakkale
16	60	Çanakkale
17	70	Çanakkale

The accuracy of Vortex MAST has also been proved by comparing one year period of the measurements against 1 year Vortex MAST.

The following bar plot shows mean wind speed error and Weibull parameters errors in % :

	Average of Weibull parameters errors (absolute value)		
	M error	A error	K error
Vortex MAST	6.88%	6.36%	7.58%



The purpose of this study was both, to compare how different reanalysis sources affect results of time SERIES when comparing them against real measured data in different terrain features sites as well as to compare Weibull parameters obtained from MAST products against wind distribution from real wind data.

Regarding time SERIES from different reanalysis sources, results show that generally Vortex time SERIES calculated with ERA-Interim reanalysis correlate better with measured data. Although CFSR reanalysis performs also quite good in this region.

Vortex MAST seems to be accurate enough in all these sites. It must be taken into account that Vortex MAST calculated for most of the analysed sites overestimate the Weibull parameters.