1) The use of CCMP data is very doubtful since the time series before 2009 date of the injection of QUIKSCAT data (1999-2009) in the variational analysis underestimates the intensity of the winds and overestimates the wind after 1999. In this context, and to be able to conclude on the trend, the authors have to use other data sources, especially ASCAT, although the series is short, but it allows to validate or correct the data series.

Thanks for the remark. We performed a correlation study between the CCMP V1.1 (PODAAC) database we used in our analysis and the new CCMP V2.0 database (released by REMSS in 2017). This reprocessing is an update of CCMP. It uses the most current and complete RSS cross-calibrated wind datasets, including ASCAT, and uses the ECMWF Interim reanalysis as a consistent and higher resolution background. In addition, in CCMP V2.0 QuikSCAT wind data are improved when compared to the CCMP V1.1 winds.

In any case, the main caution using the CCMP database is when studying high wind regions (wind speeds >25 m/s). As presented in the manuscript, in our region Trade Winds dominate and, therefore, wind intensity is usually moderate (around 5 m/s). In addition, problems with CCMP may arise in heavy rain scenarios; however, in our region these events are infrequent.

The correlation between the CCMP V1.1 database and the new CCMP V2.0 database in our region for the wind intensity is 0.967 (Figure 1) and for the wind direction is 0.978 (Figure 1). Results demonstrate that both datasets are highly correlated in direction and intensity.

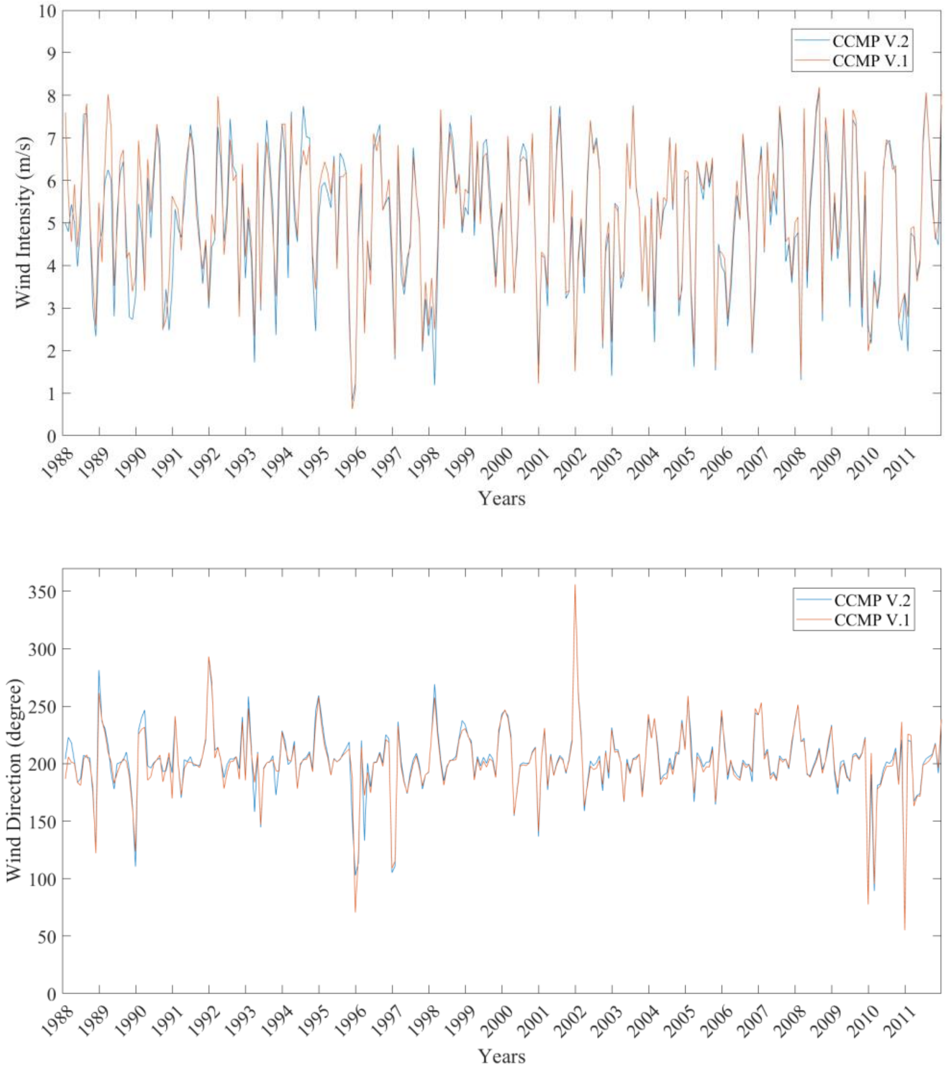

Figure 1. Correlation between CCMP V1 and V2 databases: Top: Wind direction (degrees). Bottom: Wind intensity (m/s).

To clarify the work scope, our study was performed only using the NCEP data due to the long period of time covered. We just used the PODAAC database to validate the reliability of the NCEP reanalysis. In this context, now we performed, as well, the correlation study between the new CCMP V2 database and the NCEP database. The correlation value for the wind intensity is 0.964 (Figure 2) and for the wind direction is 0.972 (Figure 2). The study covered the 24 years period (from 1988 to 2011), as in our manuscript.

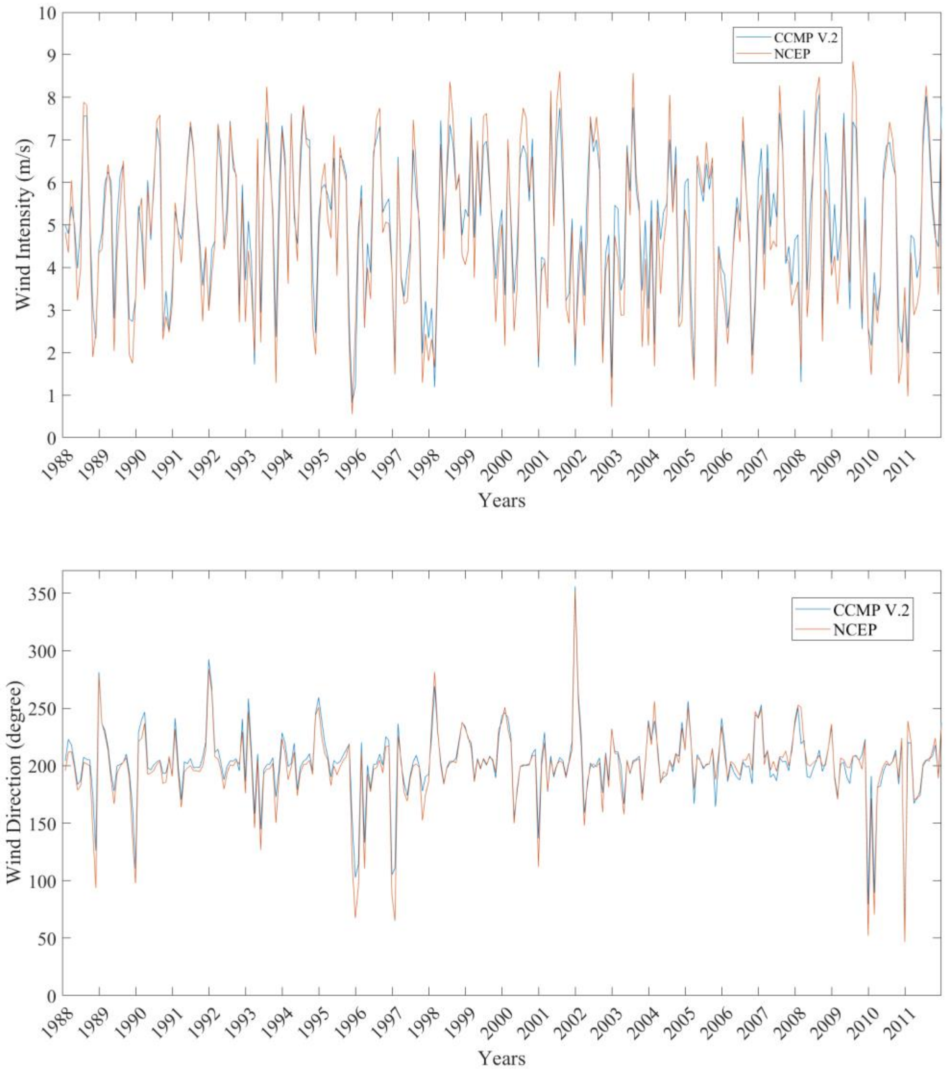

Figure 2. Correlation between CCMP V2 and NCEP databases: Top: Wind direction (degrees). Bottom: Wind intensity (m/s).

In summary, as shown in Figures 1 and 2, the correlation between PODAAC and the improved version is very high and correlations with NCEP are very similar. Therefore, the CCMP V1 in our region provides accurate wind estimates.

The web links to the PODAAC and REMSS databases are: https://podaac.jpl.nasa.gov/dataset/CCMP_MEASURES_ATLAS_L4_OW_L3_5A_MONTHLY_WIND_VECTORS_FLK and http://www.remss.com/measurements/ccmp/.

Action:

Even though PODAAC and CCMP V.2 have high correlation, to clarify this issue and to include the most updated wind data, we replaced the PODAAC database by CCMP V.2 data in the manuscript. We also extended the temporal coverage (1988-2017). Specifically, we included additional text in section “2.2. Data” (line 70), and we added the corresponding references in the References section (lines 216, 220 and 274). In addition, we changed the old Figure 2 to new Figure 2 with CCMP V2 data (line 390).

2) The use of such a long time series would undoubtedly reveal a periodicity in the variability of the wind, could you calculate or estimate the duration of the periods of high intensities and those of low intensities.

Thanks for the comment.

With respect to the periodicity of the wind, we performed a Fourier and a Wavelet analysis to examine the wind intensity periodicity. As expected, the results of the Fourier analysis (Figure 3) show that there is a predominant annual periodic pattern; however, but with much lower magnitude six-monthly and four-month patterns appear as well.

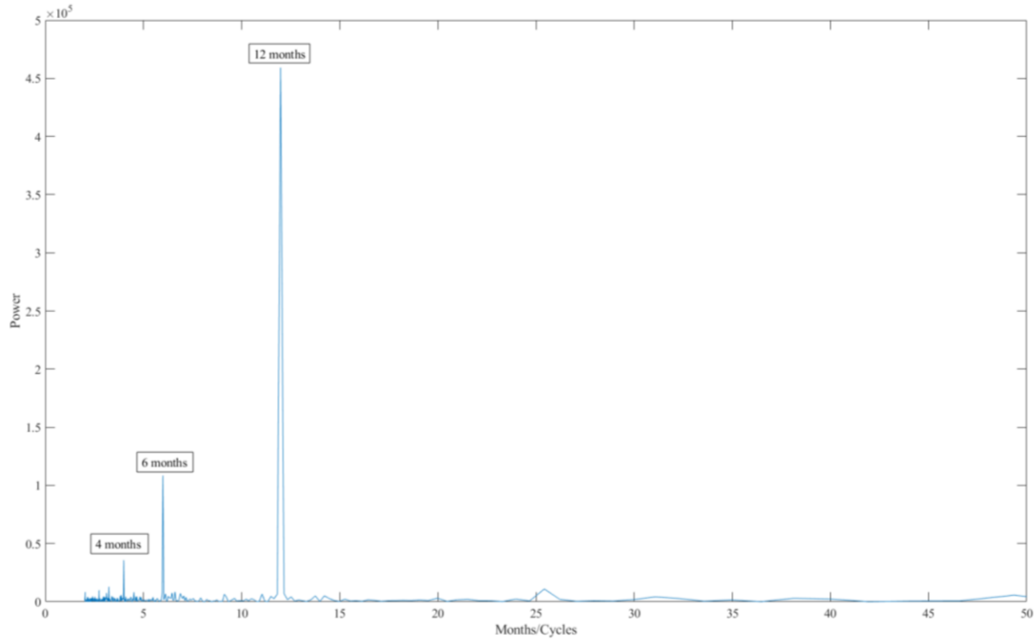

Figure 3. Fourier analysis for wind intensity.

These results are also confirmed by the continuous Wavelets analysis (Figure 4), where the annual pattern is clearly present (x-axis value for the horizontal yellow line) in the wind intensity. In addition, this pattern seems to be discontinuous through the entire time series as it reveals the change in magnitude observed in Figure 4, where the annual periodicity moves its colour from orange/yellow to green/blue during some periods.

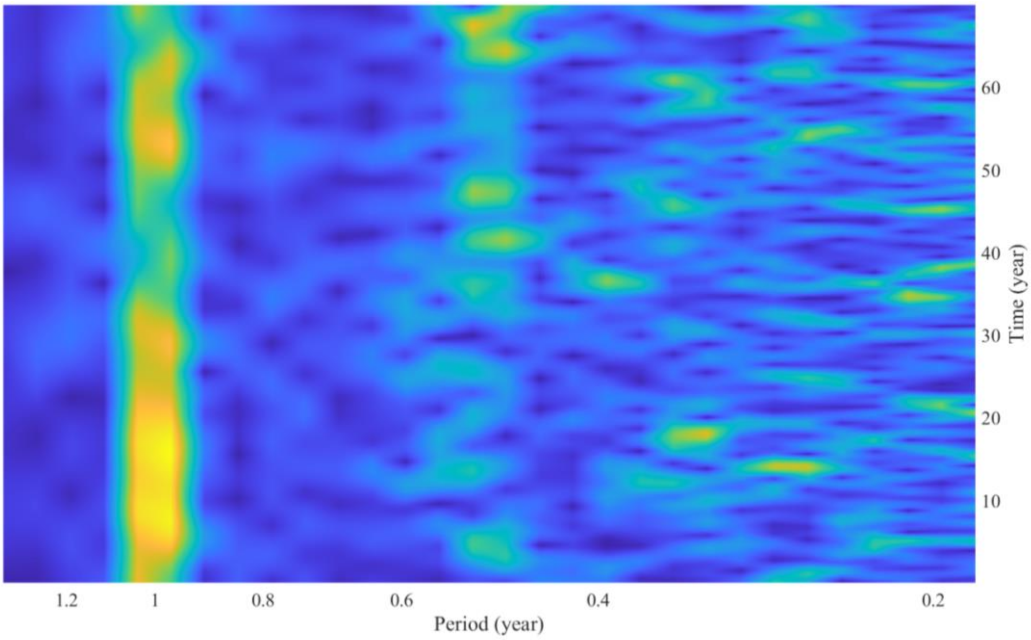

Figure 4. Wavelets analysis of the wind intensity (m/s).

Regarding the periods of high and low intensities, firstly, we would like to indicate that the average wind intensity value for the 70 years' period is 5.1 m/s ± 2 m/s SD. Table 3 (of the manuscript) shows the mean, maximum and minimum values of the wind intensity for each decade. Figure 5 shows the behaviour of wind intensity over the 7 decades analysed representing the decadal mean of the intensity (black line) and the average value of wind intensity for the complete period (red line). Specifically, the highest values of the wind intensity were observed during the 50s and mainly during the 60s (10.4 m/s during July 1961 and 9.91 m/s in August 1962). During the 70's the wind intensity remained stable. Then, in the following decades (80s, 90s and 2000s) the wind intensity was lower than in previous decades. Finally, in recent years, the intensity of the wind is increasing again.

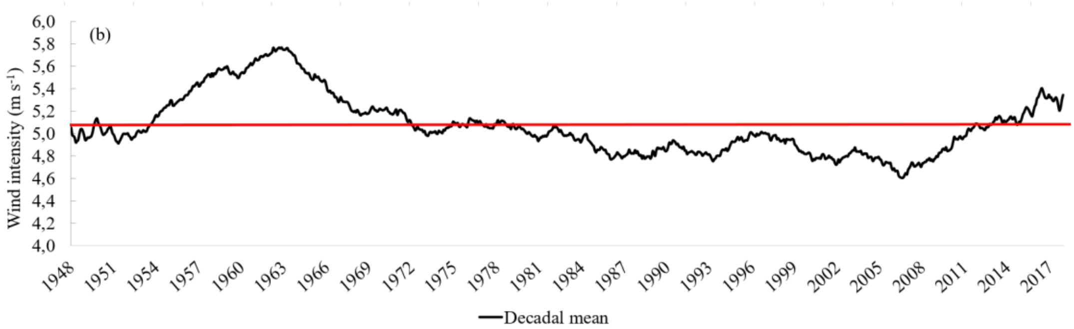

Figure 5. Time series of the 10-years moving average of the wind intensity.

Action:

To clarify this issue, we included additional text in section “3. Results” (lines 107 and 127), and we improved Figure 4 (line 410), and Figure 8 (line 458), adding the wavelet analysis to show the periodicities along the years.