

Interactive comment on “Integration between X-Band Radar and Buoy Sea State Monitoring”

by Giovanni Ludeno et al.

Anonymous Referee #1

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Review of "Integration between X-Band Radar and Buoy Sea State Monitoring"

by Ludeno et.al

General Comment:

In the manuscript, the authors reported the wave observation results obtained from X band radar, buoy and a model. The technology has been mature for a long time. Thus, the originality of the presented work is little. In addition, the writing is poor.

Technical comments:

The title indicates integration of wave information from radar and buoy. However, it only contains simple comparison of all the sources obtained.

Another claimed contribution the manuscript is the confirmation of the consistency and repeatability of the two X-band radars employed. This didn't provide any new technical contribution to the readers but confidence of the radar products.

Reply

We carried out the comparison between the two wave radar system and wave buoy at Capo Granitola and Sciacca sites, which are located in the south west part of Sicily . This area of the Mediterranean Sea has a significant biodiversity and is affected by several complex oceanographic processes. Therefore, the information about the sea state parameters as well as surface currents is important: to safeguard the biodiversity; to forecast the coastal erosion; to support decisions for the crisis events related to pollution. Although, the wave radar system and buoy are indeed established methods, we believe that the use of the devices simultaneously can be useful to understand these complex oceanographic processes.

In order to clarify this, the following sentences have been add at the end of the Introduction:

“This area of the Mediterranean Sea has a significant biodiversity and is affected by several complex oceanographic processes. Therefore, the information about the sea state parameters as well as surface currents is important in order to safeguard the biodiversity, to forecast the coastal erosion, to support decisions for the crisis events related to pollution. The novelty of the work lies also in the possibility monitor these complex oceanographic processes simultaneously and to verify their evolution in the space and time on a small scale with various devices.”

On the second page, it is said “it is somewhat surprising that so few experiments are reported in the literature of combined application of two or more systems.” This is not true, there many publications presenting the results of two or more systems.

Reply

To avoid misunderstanding we deleted this sentence.

Are the two calibration scale factors same for the two radar systems?

Reply

In Section 4 (Location and Data) of the submitted manuscript two slightly different wave radar systems are described. In particular, the Cape Granitola system is based on a CONSILIUM X Band radar, while a SPERRY Marine X-Band is installed at the Sciacca site. Consequently, as reported in page 6 line 4 of the submitted manuscript, the calibration scale factor depends on particular wave radar installation.

In order to clarify this, the following sentence has been added in the revised manuscript:

“Hence, the wave spectra retrieved from the wave radar systems installed at Cape Granitola and Sciacca site have been calibrated with two different scale factor.”

How the buoy wave data is linearly transformed should be explained.

Reply

In order to clarify this point, a detailed explanation of the procedure has been added in the Section 5 :

“If H_1, H_2 , are the Wave Heights with a period T_0 , their heights H_1 and H_2 at the depth d_1 and d_2 respectively, are linked by

$$\frac{H_2^2}{H_1^2} = \frac{C_{g2}}{C_{g1}} = \frac{C_2 n_2}{C_1 n_1} \quad (5)$$

Where C_1, C_2 are the wave velocities, given by the dispersion equation (2) reported above C_{g1} and C_{g2} are the group velocities and the parameter n is

$$n = \frac{1}{2} \left(1 + \frac{2k}{\sinh(2kd)} \right) \quad (6)$$

The dispersion equation cannot be solved directly, but well known approximation such as Hunt’s (see for instance USACE Coastal Engineering Manual) are easily available”

The scatter plots of wave heights over time are not meaningful.

Reply

The purpose of the plots of wave heights over time it is to show the dispersion of the wave height data around the trend. We agree with the referee that it is not a correlation. Therefore, in the revised manuscript, we have removed the correlation coefficient values and the term scatter plot has been changed in *“time regression”*.

Editorial comments:

The manuscript is very poor-written. There are too many grammar mistakes and broken sentences. E.g., “begin the wave number” on page 3; “an $U=(U_x, U_y)$ dis” on page 3; “An equalization step is implemented using the spectral Modulation Transfer Function (MTF), is to move from the filtered radar image spectrum ... by minimizing the electromagnetic modulation effect.” On page 4 is broken:

Reply

We re-wrote part of the manuscript and corrected many grammar and style mistakes (in blue) and took into account many of the referee’s suggestion (in green)