

Advances and results in the estimation of the sea state parameters from X-band radar images (GI Division Outstanding ECS Award Lecture).

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X-band marine radar is a useful system for the sea state monitoring for both off-shore and coastal areas. For nearly three decades, the wave radar system has been successfully employed to retrieve the sea surface information such as wave parameters, current velocity and for investigating sea floor bathymetry. As well know, starting from the raw radar images collected by the X-band radar, it is possible to reconstruct the sea surface and to estimate the sea state parameters through an inversion procedure [1].

Within this framework, two main classes of reconstruction approaches can be used to retrieve sea wave parameters starting from a sequence of radar images.

The first class is defined as the “Global Method” and relies on the assumption that sea-state parameters are homogenous within the area investigated by the radar [1]. The second class of approaches is based on the “Local Method” to be applied to radar data collected in nearshore areas [2].

This work aims at presenting the recent results and advances obtained from the processing of the data acquired from a wave radar system installed both in off-shore and coastal areas. Concerning off-shore area, I will present the results obtained from the processing of data collected by the wave radar onboard of ship during the navigation [1]. Instead, regarding the coastal area, I will present an advance in the strategy for the estimation of the bathymetry that take into account the spatial inhomogeneity of the wave motion [2]. In addition, a special regard to the study of coastal phenomena at a small scale such as the increase of the sea level, the shift of the sediment on the bottom with a continuous change of the coastline, upwelling, macro vortex, rip currents, wave’s refraction and wave diffraction.

Further, at the conference time, as a new activity in radar imaging, I will present the imaging capabilities offered from an ultralight radar embarked on a commercial hexacopter [3].

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References

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