



Remote sensing of the sea by X-band, dual-polarized, coherent weather radar

Philippe Forget (1), Marc Saillard (1), Jacques Testud (2), and Erwan Le Bouar (2)

(1) LSEET - CNRS, La Garde, France (philippe.forget@lseet.univ-tln.fr), (2) NOVIMET, 10-12 Avenue de l'Europe, 78140 Vélizy, France

Remote sensing of the sea surface over large areas with high resolution (<1km) and at high time rate (<1h) is still a challenge that space-borne radiometers and radars can only satisfy. This presentation is an investigation of the use for this purpose of a ground-based, rotating, coherent X-band, dual-polarized (HH-VV) weather radar.

We studied the data acquired by such a meteorological device, dedicated to precipitation measurements and operated in South of France at the top of a mountain near the Ligurian Sea. One month of data was considered. We observed that the sea signal often dominated the atmospheric signal despite the only slight inclination from horizontal of the radar beam direction. The radar signals being calibrated for weather application, both atmosphere and ocean radar equations were used to extract the normalized radar cross section (NRCS) of the sea. Other useful experimental parameters provided by the radar were the mean Doppler velocity and, to mask the undesirable rain signals, the polarization ratio.

In situ measurements on wind and wave conditions were recorded by an off-shore meteorological buoy. Furthermore, the surface wind field as computed by the meteorological model MM5 over the Ligurian Sea was available at high time and space resolution during the experimental period

The main results concern the variation of NRCS and Doppler velocity with wind and wave conditions. In particular, for moderate to strong winds, we generally found a very good correlation between the Doppler velocity field and the wind velocity component along the radar azimuths.

The preliminary results obtained in this experiment suggest that operational weather radars can be valuable means to monitor useful wind information over large sea surfaces.