

## **Surface based ducts and evaporation ducts combined effects on marine radars coverage prediction.**

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Within the Marine Boundary Layer (MBL), the vertical refractivity profile is rarely standard. At radiofrequencies (RF), the evaporation duct strongly modifies the low altitude radar coverage diagrams. Moreover, the presence of occasional surface based or elevated ducts can also impact the detection of rather low altitude targets. The occurrence of such trapping layers depends on the region of interest and increases near the land-sea interface, i.e. in coastal areas.

In littoral regions, experimental measurements show that the duct heights may significantly vary along the radar lines of sight (Hurtaud et al., Review REE, Feb. 2008). Thus, the use of meteorological mesoscale models, such as AROME developed by Meteo-France, appears nowadays as a very promising way to determine the complete refractivity mapping. The blending of AROME vertical profiles with surface layer ones, computed by “bulk” models, provides the necessary vertical resolution (Claverie et al., IEEE AP-S Symposium, Chicago, July 2012) for radar performances assessment.

Our blending technique has been improved and the resulting refractivity profiles sometimes lead to a very complex radar coverage diagram due to interaction between evaporation duct effects and surface based duct effects, especially when the targets are near the standard radioelectrical horizon.

Our presentation will be illustrated with some case studies based upon real radar measurements performed in the Mediterranean Sea and also with propagation data concerning the Wallops Islands region. A particular emphasis will be put on the horizontal variability of the propagation medium. Our simulations will be undertaken thanks to the latest version of the PREDEM software. The new functionalities of PREDEM will be also described.