

## **Statistical Characterization of the Atmospheric Refractivity from Weather Radar Data**

Rubén Nocelo López

Signal Theory and Communications Department, University of Vigo, Spain

Santalla del Rio, Verónica (Signal Theory and Communications Department, University of Vigo, Spain)

*E-mail: rubennocelo@uvigo.es*

Knowledge of temporal and spatial variations of the refractivity in the lowest part of the atmosphere is of importance in numerous fields, such as meteorology and electromagnetic wave propagation coverage prediction. Nevertheless, the most commonly used techniques such as radiosonde launches, radio occultation techniques using a GPS signal or the use of signals of opportunity (Broadcast signals) are not able to provide sufficient spatial or temporal resolution and they are not suitable for measuring near surface refractivity. Recently, it has been shown that refractivity can also be obtained from radar response to stationary ground targets [F. Fabry, "Meteorological Value of Ground Target Measurements by Radar", Journal of Atmospheric and Oceanic Technology, vol. 21, 2004]. This method to retrieve the refractivity is based on phase measurements, in particular, on measurements of phase variation between responses from different stationary targets at different instants of time and has the advantage of being able to achieve high spatial and temporal resolution over flat terrain.

The aim of this work is to estimate the atmospheric refractivity and to characterize statistically its temporal and spatial variations over mountainous terrain from the in-phase and quadrature phase components of the received radar signal taking into account the height variation between the selected targets whose paths might be misaligned and the vertical variation of the atmospheric refractivity. The polarimetric weather radar data provided by the C-Band radar (Vaisala WRM200) of Meteogalicia located in Monte Xesteiras over mountainous terrain (Galician Region, Spain) will be used with the proposed algorithm to estimate refractivity and to analyze its statistical properties.