



Radon tower measurements in a Spanish coastal site for Lagrangian particle dispersion model inter-comparison and performance assessment at the mesoscale

Arturo Vargas (1), Delia Arnold (1,2), Miguel Ángel Hernández-Ceballos (3), José Antonio Adame (4), Don Morton (5), Claudia Grossi (6), Irene Schicker (7), Benito de la Morena (4), Juan Pedro Bolivar (3), and Manuel Gil (4)

(1) Technical University of Catalonia, Institute of Energy Technologies, Barcelona, Spain (arturo.vargas@upc.edu), (2) Central Institute for Meteorology and Geodynamics, Vienna, Austria, (3) Department of Applied Physics, University of Huelva, Huelva, Spain, (4) Atmospheric Sounding Station – El Arenosillo. Atmospheric Research and Instrumentation Branch. National Institute for Aerospace Technology (INTA). Huelva. Spain., (5) Arctic Region Supercomputing Center, University of Alaska, Fairbanks, USA, (6) Catalan Institute of Climate Sciences, Barcelona, Spain, (7) Institute of Meteorology, University of Natural resources and Life Sciences, Vienna, Austria

In the framework of the Spanish research project "Development and validation of advanced atmospheric dispersion models for their application in radiological emergency systems" (ref:CGL2008-00473) /CLI, the "El Arenosillo" tower, belonging to the National Institute for Aerospace Technology (INTA) was equipped with radon monitors and, since 2011, is providing reliable and high quality measurements of Rn-222 air concentrations on an hourly basis at two elevations, namely 10 and 100 m above ground level. This radionuclide data is accompanied by continuous meteorological data including temperature, humidity, pressure and wind speed / direction. The location of the station, at the very edge of the Southern Europe, exposed to continental (rural, industrial and urban), marine and Saharan air masses, together with the Rn-222 and meteorological measurements, make it particularly attractive to study the transport phenomena and the performance of meteorological and transport models at all scales, as well as to carry out studies on the vertical structure of the atmosphere in a coastal site. In this context, two intensive measurement campaigns, including radio soundings, were performed during October 2011 and May 2012, allowing the comparison and a better understanding of the Rn-222 measurements under different meteorological conditions. This work will present a first evaluation of the two campaigns at the INTA station, analyzing the evolution of Rn-222 concentration data and the results of the meteorological numerical modelling of those episodes using the Weather Research and Forecasting (WRF) model with different parameterizations. Finally, the atmospheric dispersion model inter-comparison (HYSPLIT-WRF and FLEXPART-WRF) with Rn-222 as a tracer is performed.