



Prediction of wind circulation patterns in the central part of the Pyrenees by means of artificial neuronal network.

Nerea Pérez (1) and Agustín Ezcurra (2)

(1) Facultad de Farmacia, Universidad del País Vasco, Vitoria-Gasteiz, Spain (nerea.perezg@ehu.eus), (2) Facultad de Farmacia, Universidad del País Vasco, Vitoria-Gasteiz, Spain (agustin.ezcurra@ehu.eus)

The Pyrenees is a range of mountains that form a natural border between France and Spain. Several studies have been carried out in the area in order to analyze their winds circulations patterns. Most of these studies were focused on Foehn like phenomena observed in the area and the pollution impact produced by wind transport. In the present work, meteorological information provided by WRF model simulation for the period April-October of 2013 was assessed to define the structure of the winds in the central part of this mountain region and to evaluate the usability of WRF model data to characterize weather condition.

In a first step validation of WRF model data was tested. With this aim tethered balloon measurements were used to compare the actual vertical temperature profiles against WRF model results. Also winds rose observed at 6000 meters by means of one VHF profiler and dipole of pressures between France and Spain were used for validation purpose.

After validation, daily meteorological data produced at 12 UTC by WRF simulation were plotted with the aim to obtain by individual inspection a subjective classification of wind circulation patterns in the area.

In this work, we found the same patterns as those previously found in another experimental study carried out in the same area and three new meteorological situations that had never been defined and observed because of the lack of vertical wind measurements.

Finally, we analyzed the use of that subjective wind patterns as a reference to produce through objective methods the prediction of wind circulation in the area. In this view several methods were applied like automatic cluster classifications, methods based on several "non euclidean distance" and artificial neural networks. The results found allow us to conclude that artificial neural networks are the best technique to diagnose and consequently to predict the wind weather conditions in the central part of the Pyrenees.