



Meteorological zones delimitation in Andorra through glacial orography

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The Principality of Andorra (468 km²), in the Pyrenees chain, has an orographic complex terrain with the lowest point at 843 m and the highest point at 2.943 m. In a straight line, there is a distance of 17,5 Km between these two points. Hydrologically, the country of the Pyrenees has the headwater of 5 rivers basins (*Arieja*, *Valira d'Orient*, *la Llosa*, *Valira del Nord* and *Riu d'Os*). Glacial modelling produced by the last ice age (20.000 years ago) determine the atmospheric communication between different headwaters and valleys. The influence of glacial modelling in atmospheric communication is also present between the headwaters valleys that are in the French or Spanish borders.

The meddling of the Arieja and Soulcem valleys in southern points than the average line of mountain chain border between Mediterranean and Atlantic, gives some Atlantic climate characteristics in the north zone of the country in terms of precipitation. The most frequents patterns that cause the most important differences on weather type and precipitation accumulation are these that have Atlantic or northern latitude origins. But we also have other patterns with typical weather types or precipitation accumulation in other river basins when the atmospheric instability comes from others orientations (west, south-west, south, south-east or east). The north-east atmospheric flux is the only one which causes dry effects in Andorra due to the continental configuration.

The form and the orientation of the glacial valleys determines the meteorological phenomena extension. Therefore, we can define 3 meteorological zones according to the total precipitation accumulation, the valleys orientations and the altitude. These zones are: north, centre and south. The amount of precipitations and altitudinal temperature variations determines the limit of these zones, always in the borders of secondary river basins.

Forecasting weather conditions in a small country is an amazing job that demands a great knowledge of the geography and the finest atmospheric models. Vertical profiles and water saturation column become essential tools.