Rainfall Regime Uncertainty and Extreme values in the Mediterranean Basin

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The Most Expectable Rainfall Regime (*MERR*) in a certain location is composed of many variables referring to the rainfall totals, its temporal distribution, the rainy season length, the distribution of the rain spells and their yields, the distribution of the dry spells and so on. .

The scope of the present research is to quantify the different components of the *MERR*, within the Mediterranean basin, (excluding the North African Coasts) in order to describe and present the rainfall regimes, and analyze their time-series. The rainfall data used for the analyses are daily rainfall totals from 39 stations obtained from the European Climate Assessment & Dataset- ECA&D, for at least 41 years during the period 1947-2003. Once the *MERR* is defined it is possible to evaluate to what extent a season or a period, varies from the *MERR*, and to quantify the extreme values of its various components. This will determine the Rainfall Regime Uncertainty (*RRU*) which enables to compare between years and/or locations.

The following examples from Valencia may reflect to what extent there are uncertainties regarding the various components of the *MERR*. It should be make clear that similar results were obtained also in other stations

For example, the maximum annual rainfall, 888.1 mm (1989/90), is five times higher than the minimum, 179.5 mm (1954/5).

Regarding the temporal rainfall distribution, quantified by the Date of Accumulated Percentage (*DAP*), in 1969, 90% of the annual rainfall was accumulated as early as January 5, 12 days earlier than the date (January 17) when in 1981 only 10% of the annual rainfall was accumulated. This reflects the inconsistency of the temporal distribution within the rainy season.

Rainspells of two days contributes over 26% of the total annual rainfall in Valencia. During the period 1938-2003, 638 rainspells of two days were recorded. In only 4 cases, they yield over 100 mm, 135.0 mm (twice), 169.7 mm and 285.3 mm, while 618 of them yielded less than 50 mm. This can be demonstrated also in an other way: 50% of the total rain accumulated in rainspells of two days, were produced by 87% of the spells, whereas, the remaining 50% by only 13% of the events. For other rainspells' durations, the distributions are even more skewded.

Extreme values are evident also when the distribution of dry spells is analyzed. The

longest dry spell recorded in Valencia during the analysis period, was of 75 days, between 8.12.1994 and 20.2.1995. This duration is 9 to 37.5 times longer than the median dry spell duration in this season, that lasts for only 2-8 days.

Additional examples regarding extreme values across the Mediterranean will be presented and their climatological aspects will be discussed.