

# THE RELATION BETWEEN INTENSIVE DAILY AND ANNUAL PRECIPITATION QUANTITIES AT THE GORSKI KOTAR AREA (CROATIA)

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**Abstract:** Paper analyzes relation between appearance frequency of intensive daily precipitations and annual precipitation quantities in the mountain area of Gorski kotar and its coastal region in Croatia. Recorded daily precipitations at different levels were analyzed and it was determined that there exists strong correlation between annual precipitation quantities and daily precipitations within the range reaching maximum of 100 mm. More intensive precipitations (>100 mm) didn't express stronger correlation with annual precipitation quantities.

**Keywords** – *daily precipitation, annual precipitation, mountain area, Gorski kotar*

## 1. INTRODUCTION

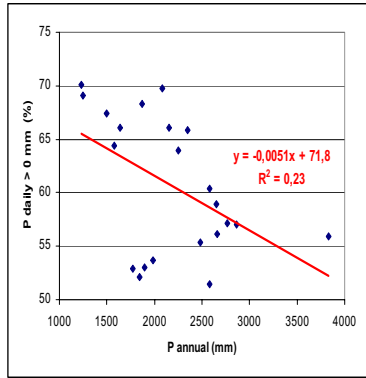
Paper analyzes the character of particular precipitation regime of Gorski kotar mountain area in Croatia. This is relatively small area (about 1000 km<sup>2</sup>) located at the border between coastal and continental area characterized by extensive annual precipitation quantities (between 2000 and 4000 mm) and very intensive short termed precipitations with documented daily intensities reaching between 200 and 300 mm. Such characteristics are mostly the consequence of the altitude position of mountains of Gorski kotar and their spreading in relation to general ways of humid air masses movements (Bonacci, 1994).

Paper analyzes relation between intensive precipitations and annual precipitation quantity at this area. The performed analysis was conducted by one of the authors (Rubinić, 1987), and the results, unpublished so far, were judged that in the absence of similar analyses could be useful contribution to understanding the character of intensive precipitation appearances in mountain areas. Because of different periods of work of certain precipitation (meteorological) stations and their availability, an analyzed period was not identical but mostly comprises about 30 years within the 1950.–1983. The purpose of this research was to evaluate relation between annual precipitation quantities and the presence of days with precipitations higher than certain limits at such mountain area.

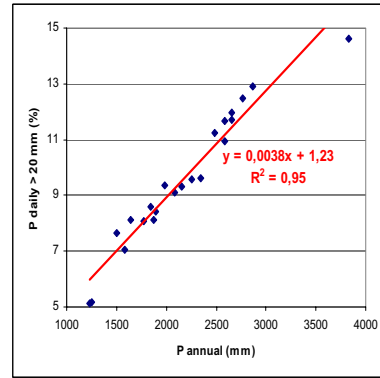
## 2. RESULTS

The analysis was performed in a manner that daily precipitations were categorized according to different levels of their recorded values that were used for definition of a number of days (in %) for each station greater then such defined level. According to these data and data regarding characteristic of annual precipitation quantities, regression relations between a number of day greater then chosen levels and annual precipitation quantities were defined. Paper analyzed limits of 0 mm of daily precipitations (e.g. all rainy days), as well as limits of 50, 100, 140, and 200 mm (fig. 1-3). Dependent on chosen level different strength of connections between the appearances of intensive daily precipitations and annual precipitation quantities were obtained.

The results of performed analyses indicated that there exists correlation between annual precipitation quantities and the frequency of the appearance of days with significant precipitation quantities.

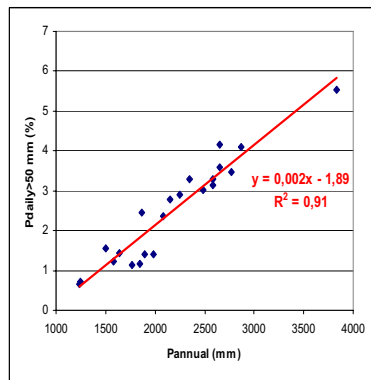


a)

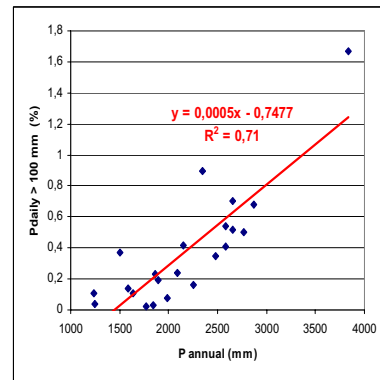


b)

**Figure 1:** Correlation between annual precipitation quantities and the frequency of days with quantities a) > 0 mm and b) > 20 mm

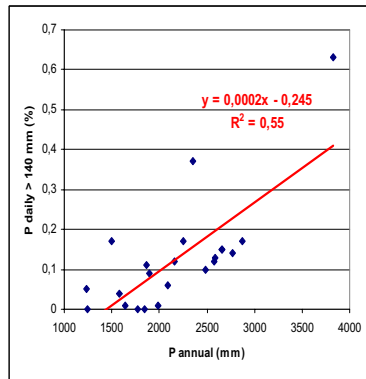


a)

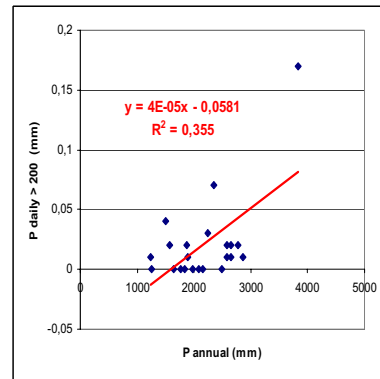


b)

**Figure 2:** Correlation between annual precipitation quantities and the frequency of days with quantities a) > 50 mm and b) > 100 mm



a)



b)

**Figure 3:** Correlation between annual precipitation quantities and the frequency of days with quantities a) > 140 mm and b) > 200 mm

The mentioned correlation is especially strong for daily precipitations between 20 and 100 mm. The strength of connection was diminishing from the starting extremely strong levels for chosen level of 20 mm with the increase of the level of intensive precipitation values.

It was determined that with most intensive recorded daily precipitations (greater than the analyzed level of 200 mm) there is no stronger connection between annual precipitation quantity and the frequency and also the probability of the appearance of such intensive precipitations. On the other hand, it was determined that on analyzed area exists no stronger connection between the number of days and annual precipitation quantities, on the contrary, there are some indications for lower frequency of days with precipitations on (recorded on) stations with higher-annual precipitations quantities.

This is no unexpected finding but authors think that determined regularities from analyzed area of Gorski kotar and coastal area could be used for the analysis of regional engineer's evaluations of the precipitation regime on other mountain areas. Performed analyzes, reduced on the same period of duration and supplemented with analyzes of total precipitation quantities above certain analyzed limits could provide additional contribution to analyzes and typology of appearances of intensive precipitations in mountain areas (Llasat & Barrantes, 1997.).

### **3. CONCLUSIONS**

We determined that there exists strong correlation between annual precipitation quantities and daily precipitations within the range reaching maximum of 100 mm. More intensive precipitations (>100 mm) didn't express stronger correlation with annual precipitation quantities.

### **REFERENCES**

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