

RELATIONSHIP OF DAILY RAINFALL WITH SHORT DURATION RAINFALL

R.N. ADHIKARI¹ AND S.C. GOYAL²

Central Soil & Water Conservation Research and Training Institute,
Research Centre, Bellary-583 104 Karnataka

ABSTRACT

An attempt is made to establish a relationship between 50-year return period of daily rainfall and 50-year return period of various short duration rainfall for lower Godavari basin considering altitude of stations and distance from the sea as additional parameters. The regression equations developed based on 9 self recording rain gauge data and tested on data of 5 independent stations randomly selected in the same region.

INTRODUCTION

For estimation of design flood in small and medium catchments, past record of short duration rainstorm are utilised. The data are very inadequate in length and coverage of thin net work. Therefore, it is necessarily required to involve daily rainfall data, which are easily available in long term basis and also with thick net work, in computing short duration rainfall estimates by employing suitable technology. The work so far done in this field involves a great deal of exercise by the users with formulating designs. Therefore, it was strongly felt to evolve a sound methodology to be used as an easily usable technique.

MATERIAL AND METHODS

To work out short rainfall durations, Rao et al. (1983) used the following quadratic equation :

$$Y = a + bx + cx^2 \quad \dots \quad (1)$$

where Y is the any short duration rainfall and x is the daily rainfall.

In the present study, the hourly rainfall data of 14 SRRG (Self Recording Rain Gauge) stations in the lower Godavari basin (Anon., 1980) were arranged to make series of 3 h, 6 h and 12 h durations rainfall. The stations selected had data recorded

¹Scientist S-2 (Engg.), ²Meteorologist Grade I, India Meteorological Department, Meteorological Office, Lodi Road, New Delhi.

Table 2. 50 years recorded/estimated values for different durations of rainfall

Station	3 h duration			9 h duration			12 h duration		
	Recorded	Estimated	Error (%)	Recorded	Estimated	Error (%)	Recorded	Estimated	Error (%)
Narayanagunj	150	128.3	14	190	166.6	12	218	200	8
Chandrapur	145	132	9	165	180	-9	208	200	4
Seoni	130	125	4	185	153	17	240	200	16.7
Amroati	120	123	-2.4	152	142	6.4	175	169	3.3
Chindwara	125	120	4	170	134	21	215	184	14
				Estimated from RE (5) to (7)					
				Estimated from RE (13) to (15)					
Narayanagunj	129.2	129.2	13.8	170.5	170.5	10	209.4	209.4	4
Chandrapur	126.7	126.7	12.6	158.8	158.8	3.7	188.7	188.7	9.3
Seoni	128.5	128.5	1.15	167.1	167.1	9.7	203.4	203.4	15.0
Amroati	126.4	126.4	-5.4	157.5	157.5	-3.6	186.5	186.5	6.6
Chindwara	127.1	127.1	-1.7	160.77	160.77	5.5	192	192	10.7

limit. The results obtained from the second set of regression equations indicate an improvement over the first set of equations. Thus its application can be recommended in order to make use of huge data on daily rainfall for evaluating short duration rainfall for lower Godavari basin.

REFERENCES

- Anonymous, 1975. Flood Studies Report, National Environment Research Council, U.K. Hydrology studies Vol. I Chapter II.
- Anonymous, 1980. Flood estimation Report for lower Godavari Basin (subzone-3 f) Central Water Commission, New Delhi.
- Gumbel, E.J 1958. Statistics of Extremes. Columbia University Press, New York.
- Rao, D.V.L.N., Goyal, S C. and Kathuria S.N. 1983. Interpolation of short duration rainfall from 24 hr rainfall in lower Godavari Basin. Mousam 34 (3).