

SEVERE AND CATASTROPHIC FLOODS IN THE TAPI AND THE NARMADA

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ABSTRACT

14 cases of Severe and Catastrophic floods in the Tapi and the Narmada have been studied in great detail with far greater emphasis on the synoptic aspects than on other aspects. The conclusion is drawn that study of the synoptic aspects in depth would lead to more timely warnings against heavy rainfall which leads to these floods.

INTRODUCTION

THE Tapi and the Narmada are two of the longest rivers in India which flow from east to west. These two rivers are highly liable to floods during the southwest monsoon period.

Floods are caused by many factors but one of the most important among them is heavy rainfall. A very good paper on the hydrometeorological aspects of the floods in the Tapi and the Narmada has been published by Pant, Abbi and Gupta¹. They had however dealt with the meteorological aspects, only in a general way. Dhar *et al.*² and Abbi *et al.*^{3,4} have also studied the hydrometeorological aspects with brief references to the synoptic situations. A perusal of the available published literature thus gives the impression that no study in depth has so far been made on the meteorological (synoptic) aspects of the floods in these two rivers.

The present authors have attempted to fill in this lacuna in our knowledge. Their objective has been not only to probe into the *basic meteorological mechanism* of these floods but also to provide forecasters with additional tools, if possible, for the issue of more timely warnings against heavy rainfall which leads to these floods. The present article is a very brief summary of the authors' detailed study of these aspects.

CASES SELECTED FOR STUDY

Tables I and II show the cases during the period 1923-74 selected for study. The classification of the floods in the tables as severe or catastrophic is based on the damage caused by them as reported in the press or by scientific workers. The data contained in the tables are based on the figures given by UNESCO⁵ or by other scientific workers⁶⁻⁸.

Figure 1 shows the track of the cyclonic storm/depression which caused severe floods in the Upper Narmada in September 1926. It will be seen that the storm moved from North Orissa through East Madhya Pradesh by the 18th and reached the neighbourhood of Sutna in Madhya Pradesh where it

TABLE I

Severe and Catastrophic floods in the Tapi (1923-1974)

River discharge measurements made at Kathore which is about 25 km upstream of city of Surat

Sl. No.	Maximum discharge Q_{max} . M ³ /sec (cumecs)	Date	Total duration of the floods (hours)
1.	13600	14-7-1941	288
2.	21500	6-8-1942	216
3.	25500	24-8-1944	360
4.	37300 (at Ukai)*	17-9-1959	120
5.	42500 (at Ukai)*	6-8-1968	120

* Ukai is 109 km upstream of Surat.

TABLE II

Severe and catastrophic floods in the Narmada (1923-1974)

River discharge measurements made at Garudeshwar which is 105 km upstream of Broach.

Sl. No.	Maximum discharge Q_{max} . M ³ /sec (cumecs)	Date	Total duration of the floods (hours)
1.	..	Sept. 1926	..
2.	..	July 1937	..
3.	30000	24-9-1954	336
4.	43200	15-9-1959	696
5.	47700	17-9-1961	576
6.	22900	13-8-1964	696
7.	58000	6-8-1968	312
8.	59000	6-9-1970	144
9.	..	August 1973	..

N.B.—The dates in thick print in Tables I and II refer to catastrophic floods. All other floods have been classified as severe.