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The influence of Western Disturbances on the weather over northeast India in monsoon months

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(*Received 6 January 1956*)

1. Introduction

It is well-known that the weather over northeast India during the period June to September is determined by the strength of southwest monsoon which is not a steady current but undergoes a series of pulsations mainly under the influence of a series of eastern depressions moving westnorthwestwards across Orissa coast. Apart from these eastern depressions a number of western disturbances are observed to pass eastwards through the northern part of India during the period June to September. Although these western disturbances are in most cases not as active as the western depressions of the winter season, they appear to have some influence on the weather of northeast India during the monsoon season. The object of this note is to discuss, on the basis of the analysis of the meteorological data for the years 1950-54, how and to what extent these western disturbances contribute to influence the weather of northeast India during the monsoon season and how the information about the movement of western disturbances through the extreme north of the country during the monsoon season is useful in daily weather forecasting particularly for the submontane regions of Bihar, West Bengal and Assam.

2. Western disturbances and the onset of monsoon

Fig. 1 shows the normal dates of onset of monsoon in the different parts of the Bay and northeast India and Figs. 2, 3, 4, 5 and 6 show the actual dates of onset in the years 1950, 1951, 1952, 1953 and 1954 respectively. Below the respective onset of monsoon charts are given information in brief about the eastern and western disturbances that affected the areas concerned during the period, middle of May to middle of June, in the respective years.

It will be seen from Figs. 1 to 6 that the advance of monsoon in the different parts of Andaman Sea and Bay of Bengal did not take place at the usual time in each of the years 1950 to 1954. A critical study of the information given below Figs. 2 to 6 with reference to Figs. 1 to 6 will reveal that the eastern depressions help the advance of monsoon while western disturbances have a retarding effect.

In 1950, monsoon set in over south Andaman Sea at the usual time but its advance into east central Bay and northeast Bay was slightly retarded under the conditions mentioned at (a), (b), (c) and (d) below Fig. 2. With decreased activity of western disturbances and formation of an eastern depression on 8 June as mentioned at (e), monsoon current was accelerated.

In 1951, monsoon came rather late in the Andaman Sea under the conditions mentioned under items (a), (b), (c) and (d) below Fig. 3. After the onset had taken place there was no western disturbance and the progress of the monsoon current towards north Bay and northeast India was accelerated due to the eastern depression mentioned at (e).

In 1952, the onset of monsoon in the Andaman Sea and its further progress were rather

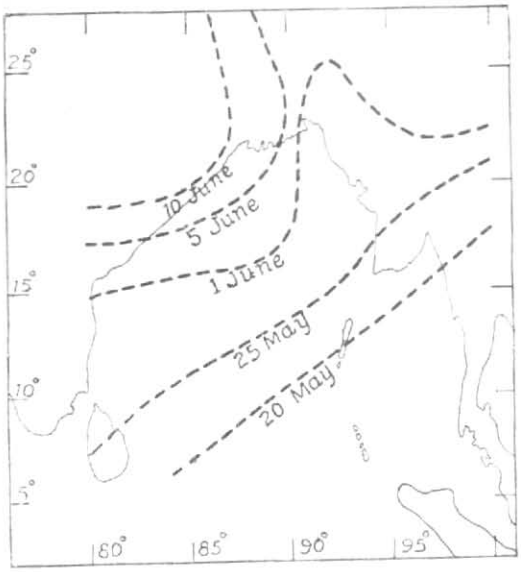

Fig. 1. Normal dates of onset of monsoon

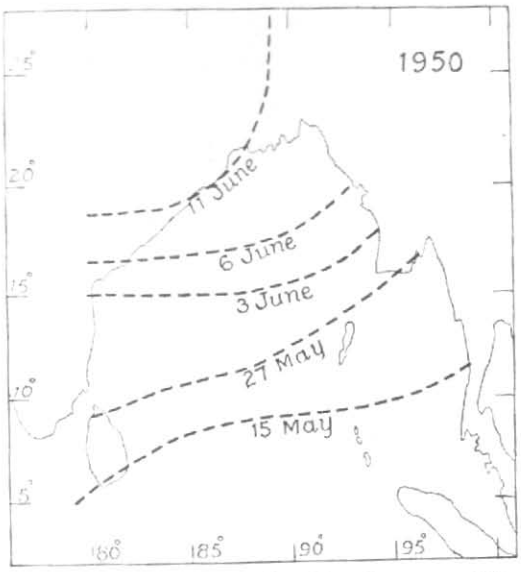

Fig. 2. Gradual advance of southwest monsoon into northeast India (1950)

(a) A western disturbance affected Punjab (I) to Bihar from 18-21 May, (b) An eastern depression moved from north Andaman Sea to west central Bay during 24 to 27 May and thereafter it weakened and became unimportant by 30 May, (c) A western disturbance affected Punjab (I) to Assam during 29 to 31 May, (d) A feeble western disturbance affected south Baluchistan to Punjab hills from 1 to 3 June, (e) An eastern depression moved westnorthwest across Bengal-Orissa coast during 8 to 12 June

late under the increased activity of western disturbances and decreased activity of eastern depressions throughout the period—items (a) to (f) below Fig. 4.

The situation—(a) to (d) below Fig. 5—in 1953 is similar to that in 1950. The progress of the monsoon current in this year was retarded under the increased activities of western disturbances till the 2nd week of June as mentioned at items (a), (b) and (c) when under the influence of an eastern depression it set in over northeast India.

1954 showed more or less a normal behaviour in the advance of the monsoon current in the Bay and northeast India. It will be seen from the items (a) to (d) below Fig. 6 that the activity of neither the western disturbances nor the eastern depressions was pronounced.

3. Influence of western disturbances on the rainfall in the submontane districts of Bihar, West Bengal and Assam

On a day of normal monsoon during June to September an elongated trough extends over the Gangetic plain from northwest India to Orissa and its axis passes from Sriganganagar to Balasore (Fig. 7). With the approach of easterly waves the trough extends out into the Bay before the eastern depressions are formed in the north Bay (Fig. 8). These depressions move westnorthwestwards and cause widespread rain along and near their tracks. When there is no depression, the distribution of rainfall over northeast India and its neighbourhood depends upon the position of the axis of the monsoon trough and the strength of the monsoon current in and round the trough. In the absence of the eastern depressions the axis of the monsoon trough often shifts northwards to the foot of the Himalayas and under such a situation which is called as "break in the monsoon" rainfall in northeast India is generally restricted to the submontane districts of Assam, West Bengal and Bihar and rainfall decreases to the south of these areas. The present analysis reveals that the cases in which western disturbances passed eastwards through the Eastern Himalayas during the monsoon months, though few, are mostly associated with the "break" condition described above. The result of this

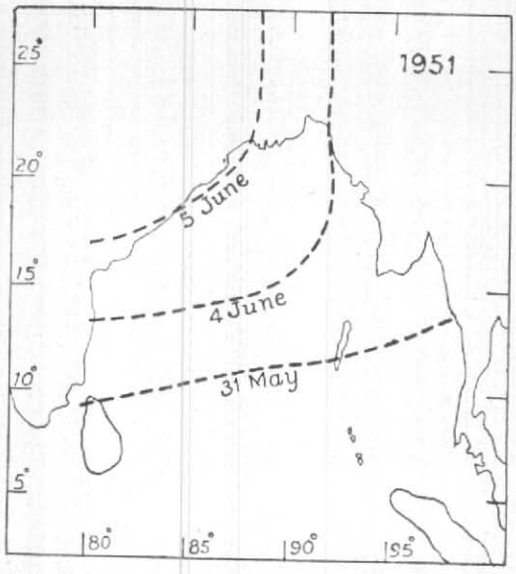

Fig. 3. Gradual advance of southwest monsoon into northeast India (1951)

(a) A feeble western disturbance affected Sind and Rajasthan during 11 to 14 May and a heat wave passed over northeast India during 12 to 20 May, (b) A low lay in east Arabian Sea during 24 to 29 May and then became unimportant, (c) Two western disturbances affected northwest India and Eastern Himalayas during 23 to 29 May, (d) A western disturbance affected south Punjab to west Uttar Pradesh on 31 May, (e) An eastern depression passed westwards across Orissa coast during 3 to 5 June, (f) A depression formed in east Arabian Sea on 11 June, moved away northwestwards and weakened into a trough on 12th

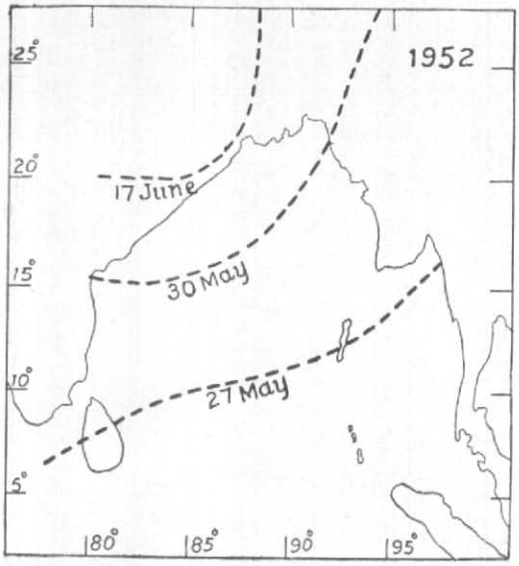

Fig. 4. Gradual advance of southwest monsoon into northeast India (1952)

(a) Three western disturbances affected Punjab to Eastern Himalayas during 14 to 21 May, (b) An eastern depression formed in south Andaman Sea on 15 May and became unimportant on 17 May. Another eastern depression passed northwestwards through southwest Bay and adjoining west central Bay during 21 to 25 May and became unimportant thereafter, (c) A western disturbance affected Western Himalayas on 27 and 28 May, (d) Two western disturbances affected Punjab to eastern Himalayas from 30 May to 3 June, (e) A trough persisted over central Bay from 4 to 11 June, (f) A trough lay over east Arabian Sea from 9 to 17 June

coincidence was responsible for widespread rain with heavy falls at the foot of the Eastern Himalayas. The data given in Tables 1 (pp. 266-271) and 2 (p.272) are relevant in this connection. The data given in Table 2 reveal that the passage of western disturbances across Eastern Himalayas during a particular period is associated with increased rainfall in the submontane districts during that period. From the above observations it may be accepted that besides other factors, the contribution of western disturbances when they pass eastwards through the Eastern Himalayas, to increase the rainfall over the submontane regions of northeast India is significant and often important. It is explained by the fact that the passage of western disturbances accentuates the monsoon trough and drags it towards their tracks near the foot of the Himalayas, strengthening the monsoon current over that region, due to the convergence of Arabian Sea and Bay of Bengal branches of the monsoon.

4. Adverse effect of western disturbances on the development and movement of eastern depressions

It has already been pointed out earlier that during the monsoon season low pressure waves from the east develop into depressions in the north Bay and the westnorthwest passage of these depressions towards the normal position of the monsoon trough helps the progress of monsoon current over the Gangetic plain. But the eastward passage of western disturbances across or near the Eastern Himalayas creates a position which is unfavourable for the easterly waves to develop into depressions in as much as the air

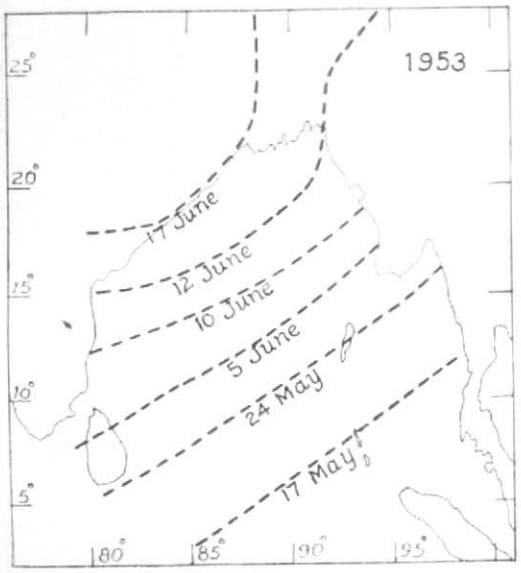

Fig. 5. Gradual advance of southwest monsoon into northeast India (1953)

(a) Three western disturbances affected Punjab to Eastern Himalayas from 14 to 20 May, (b) Three western disturbances affected northern India during 20 to 27 May. A heat wave affected Gangetic West Bengal during this week, (c) Two feeble western disturbances affected Punjab to Gangetic West Bengal during 28 May to 7 June. A heat wave affected northeast India during the week ending 3 June, (d) An eastern depression fromed in west central Bay on 15 June and passed northwestwards across Orissa coast on 17 June

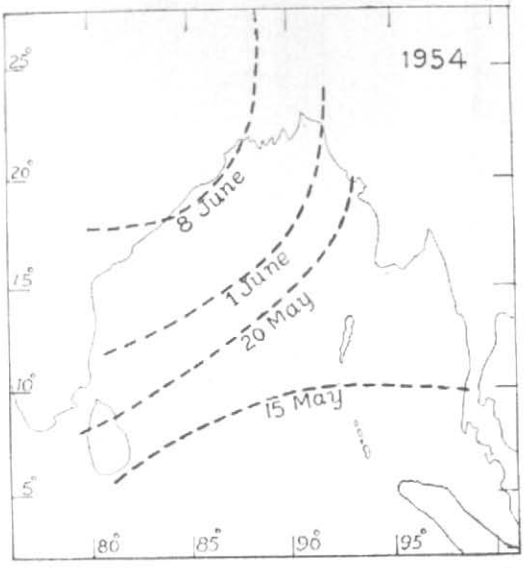

Fig. 6. Gradual advance of southwest monsoon into northeast India (1954)

(a) Two western disturbances affected extreme north of India during 14 to 18 May, (b) A feeble western disturbance affected Punjab and Eastern Himalayas during 20 to 23 May, (c) A low pressure wave from east affected Head Bay during 29 May to 1 June, (d) A depression was formed in east Arabian Sea on 8 June and moved northwestwards and became unimportant by 10 June

mass contrast on account of the flow of northerlies into the Bay which is necessary for the formation of a depression cannot exist with the westerlies induced by the western disturbances. From an examination of the data shown under remarks column of Table 1, it will be seen that inspite of other conditions favourable for the formation of depressions the low pressure areas in the Bay did not actually develop into depressions as long as the western disturbances were present. The intensification of a low into depression took place soon after the western disturbance had moved away *vide* Table 1 (page 266). Another interesting feature which one can observe from the data shown against 24—27 July 1954 (Table 1) is that under the adverse environment created by the western disturbances in higher latitude the depression took an unusual course in July across south Peninsula. It is interesting to observe that although easterly waves moved into the north Bay in the 1st and 2nd weeks of June 1952 and a trough of low pressure extended from northwest Uttar Pradesh to inland Orissa, no depression was formed. Presumably the easterly waves were too feeble to create the necessary contrast in the air mass for the formation of a depression.

An overall study of the number of western disturbances and eastern depressions in monsoon season reveals that the frequency of formation and movement of eastern depressions in the normal path in any particular year increases with the decrease in the frequencies of western disturbances in the year. Table 3 is relevant in this connection.

5. Prediction of heavy rain at the foot of the Eastern Himalayas in the monsoon months

From what has been discussed so far it is fairly clear that the information about the

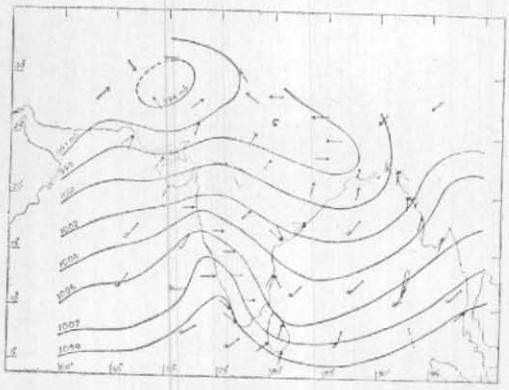

Fig. 7. Normal sea level chart for July

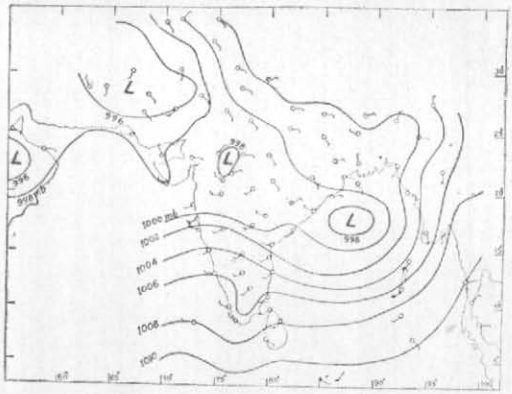

Fig. 8. Sea level chart at 0830 IST on 31 July 1953

TABLE 3

Total No. of days during Jun—Sep on which northeast India and the Bay were affected by disturbances

Year	Western disturbances	Eastern depressions
1950	12	43
1951	15	40
1952	5*	29
1953	20	28
1954	19	28

*This excludes 11 days of western disturbances which had no appreciable effect in northeast India

movement of western disturbances is useful in the prediction of the progress of monsoon in the Bay and northeast India and particularly of occurrence of heavy rain in the submontane districts of Bihar, West Bengal and Assam. When a break in monsoon conditions occurs simultaneously with the movement of a western disturbance, one can expect heavy rain at the foot of the Eastern Himalayas.

While it is not difficult for a forecaster to guess the movement of the axis of the monsoon trough on the basis of the data available from the existing network of observatories in India, one cannot trace the movement of the western disturbances during the monsoon season with confidence on account of paucity of the actual data from the Himalayan region.

It is, therefore, highly desirable that the network of surface, pibal and radiosonde observatories in the Western Himalayas as well as the Eastern Himalayas be improved so that the daily observations from a closer network of observatories from these regions are available for daily weather forecasting.

6. Acknowledgement

The authors are grateful to Shri S. K. Das, Director, Regional Meteorological Centre, Calcutta, for the facilities extended to them in the work.

TABLE 1

Days of western disturbance	Approximate track of the disturbance	Weather caused	Position of axis of trough	Other remarks
		1950		
1—2 Jul	Uttar Pradesh to Sub-Himalayan West Bengal	1st—Widespread rain in north-east India with locally heavy falls in Bihar and Sub-Himalayan West Bengal 2nd—Widespread heavy rain in Sub-Himalayan West Bengal and adjoining Bihar	Close to the foot of the Himalayas	
16—18 Aug	Uttar Pradesh to Assam	17th—Widespread rain in Bihar, Sub-Himalayan West Bengal and Assam, locally heavy in Sub-Himalayan West Bengal and Assam 18th—Widespread and locally heavy rain in Assam	Do.	
20—23 Aug	Do.	21st—Widespread rain in West Bengal and adjoining Bihar 22nd—Widespread rain in north-east India outside Orissa 23rd—Widespread rain in West Bengal and Assam	Do.	Low pressure wave passed away westwards across south Bay and adjoining west central Bay
7—9 Sep	Do.	7th—Local rain in Bihar, Sub-Himalayan West Bengal and Assam 8th—Local rain in north Bihar, Sub-Himalayan West Bengal and Assam, scattered heavy falls in Sub-Himalayan West Bengal 9th—Local rain in north Bihar, Sub-Himalayan West Bengal and Assam	Do.	A low pressure wave passed away westwards through central Bay and adjoining south Bay during 7 to 11 September without any further development. Just after this an easterly wave developed into a depression in the north Bay and further intensified into a storm
24—26 Sep	Nepal Hills to Assam	25th—Local rain with scattered heavy falls in Assam 26th—Local rain in Upper Assam	Do.	An easterly wave passed through central Bay during 24—27 Sep without any further development
		1951		
1—3 Jun	Punjab-Kumaon hills to Uttar Pardesh	Not much rain along the foot of the Himalayas	Do.	A cyclonic circulation over central Bay and adjoining south Bay was prominent on 3 June. It moved northwards but ultimately it became unimportant

TABLE 1 (*contd*)

Days of western disturbance	Approximate track of the disturbance	Weather caused	Position of axis of trough	Other remarks
		1951 (*contd*)		
8–11 Jun	Nepal hills to Assam	9th—Fairly widespread rain with scattered heavy falls in Sub-Himalayan West Bengal and Upper Assam 10th— Do. 11th—Fairly widespread rain in Sub-Himalayan West Bengal and Upper Assam with locally heavy falls in Sub-Himalayan West Bengal 12th—Fairly widespread rain with scattered heavy falls in Sub-Himalayan West Bengal and Upper Assam	Close to the foot of the Himalayas	A cyclonic circulation was noticed in west central Bay on 10th morning but it did not develop further
28–30 Jun	(1) Uttar Pradesh to Assam (2) Uttar Pradesh to Chota Nagpur	29th—Fairly widespread rain over Bihar, Sub-Himalayan West Bengal and Assam with scattered heavy falls over Sub-Himalayan West Bengal and Assam 30th—Widespread rain in north-east India outside south Orissa. Scattered heavy rain in Bihar and Gangetic West Bengal	Uttar Pradesh to Chota Nagpur	
1–3 Jul	Uttar Pradesh to Assam	2nd—Widespread heavy rain in Sub-Himalayan West Bengal and adjoining Assam 3rd—Widespread rain outside Orissa	Close to the foot of the Himalayas	Axis moved southwards on 4 July
10–13 Jul	Do.	11th—Widespread rain in Sub-Himalayan West Bengal and Assam with locally heavy falls in Sub-Himalayan West Bengal 12th—Widespread rain in north-east India. Heavy rain occurred locally in Assam and at a few stations in Bihar and Sub-Himalayan West Bengal 13th—Widespread rain in Bihar, West Bengal and Assam. Locally heavy rain in Assam	Do.	
16–17 Jul	Do.	17th—Fairly widespread rain in north Bihar, Sub-Himalayan West Bengal and Upper Assam with locally heavy falls in Sub-Himalayan West Bengal	Do.	

TABLE 1 (*contd*)

Days of western disturbance	Approximate track of the disturbance	Weather caused	Position of axis of trough	Other remarks
		1951 (*contd*)		
23–26 Aug	Uttar Pradesh to Assam	24th—Widespread rain in Bihar, Sub-Himalayan West Bengal and adjoining Assam with locally heavy falls in Sub-Himalayan West Bengal and adjoining Assam and scattered heavy falls in north Bihar	Close to the foot of the Himalayas	
		25th—Widespread rain in Sub-Himalayan West Bengal and Assam with scattered heavy falls in Assam		
		26th— Do.		
		1952		
1–2 Jun	Punjab–Uttar Pradesh–Orissa	No appreciable rain in northeast India	Northwest Uttar Pradesh to Orissa	
28–29 Jun	Uttar Pradesh to Sub–Himalayan West Bengal	29th—Widespread rain over northeast India outside Orissa with scattered heavy falls in north Bihar and Sub-Himalayan West Bengal	Close to the foot of the Himalayas	
10–13 Jul	Uttar Pradesh to Assam	10th—Widespread rain over north Bihar, Sub-Himalayan West Bengal and Upper Assam with locally heavy falls in Sub-Himalayan West Bengal and Upper Assam	Do.	Low pressure wave moving westwards across south Bay on 10th and became unimportant on 11th
		11th—Main belt extended southwards to Gangetic West Bengal and Eastern Pakistan. Locally heavy falls in Sub-Himalayan West Bengal and adjoining Assam	Do.	
		12th—Widespread rain in Assam, West Bengal and Eastern Pakistan with scattered heavy falls in Sub-Himalayan West Bengal and Assam	Do.	
		13th—Widespread and locally heavy rain in Sub-Himalayan West Bengal and Assam	Do.	
		1953		
1–3 Jun	Northwest Uttar Pradesh–Chota Nagpur–Orissa	2nd—Fairly widespread rain in Assam, East Pakistan and Sub-Himalayan West Bengal	Northwest Uttar Pradesh to Orissa	
		3rd—Fairly widespread rain in south Bengal and scattered rain in Upper Assam and north Bengal	Do.	

TABLE 1 (*contd*)

Days of western disturbance	Approximate track of the disturbance	Weather caused	Position of axis of trough	Other remarks
		1953 (*contd*)		
1–3 Jun (*contd*)	Northwest Uttar Pradesh—Chota Nagpur—Orissa	4th—Widespread rain in Orissa and adjoining West Bengal and local rain in Upper Assam	Northwest Uttar Pradesh to Orissa	
5–6 Jun	Punjab—Sub-Himalayan West Bengal	5th—Local rain in Assam, East Pakistan and Sub-Himalayan West Bengal	Close to the foot of the Himalayas	
		6th—Fairly widespread rain in Assam, Pakistan and Sub-Himalayan West Bengal with locally heavy falls in Assam		
		7th—Widespread and heavy rain over Sub-Himalayan West Bengal		
24–25 Jun	Uttar Pradesh to Assam	25th—Widespread rain in West Bengal and Assam	Do.	
		26th—Widespread rain in north-east India with locally heavy falls in north Bihar, Sub-Himalayan West Bengal and Upper Assam	Do.	
26–27 Jun	Do.	27th—Widespread rain in north-east India outside Chota Nagpur and Orissa with locally heavy falls in north Bihar and Sub-Himalayan West Bengal	Do.	
2–5 Jul	Western Himalayas to West Bengal	No significant rainfall	Do.	The movement o a low over south Bengal was checked till 5th, then the low moved westwards
10–11 Jul	Uttar Pradesh to Assam	11th—Widespread rain with locally heavy falls in Sub-Himalayan West Bengal	Trough close to the foot of the Himalayas	
15–16 Jul	Do.	16th—Widespread rain in north-east India outside Orissa, Chota Nagpur and Gangetic West Bengal with heavy falls in Sub-Himalayan West Bengal and adjoining Assam	Do.	
20–22 Jul	Uttar Pradesh—Sub-Himalayan West Bengal	21st—Widespread rain in north Bihar and Sub-Himalayan West Bengal with scattered heavy falls in north Bihar	Close to the foot of the Himalayas	
		22nd—Widespread rain in West Bengal, Bihar and Chota Nagpur with heavy falls in Sub-Himalayan West Bengal and adjoining Bihar	Do.	

TABLE 1 (*contd*)

Days of western disturbance	Approximate track of the disturbance	Weather caused	Position of axis of trough	Other remarks
		1953 (*contd*)		
23–26 Jul	Uttar Pradesh—Sub-Himalayan West Bengal	25th—Widespread rain in West Bengal 26th—Widespread rain in north-east India 27th—Widespread rain in north-east India with heavy rain in Sub-Himalayan West Bengal	Close to the foot of the Himalayas	Cyclonic circulation in west central Bay was noticed on 23rd. It became unimportant on 25th morning but westerly wave became active and monsoon trough shifted close to foot of eastern end of Himalayas
20–21 Aug	Do.	21st—Widespread rain in north-east India outside Orissa, south Chota Nagpur and adjoining West Bengal. Heavy falls in Sub-Himalayan West Bengal and adjoining Bihar	Do.	
7-8 Sep	West Himalayas to Uttar Pradesh	7th—Widespread and locally heavy rain in Bihar	Do.	
		8th—Widespread rain in north-east India with locally heavy falls in Sub-Himalayan West Bengal	Westerly wave merged with the seasonal trough	
9-12 Sep	West Himalayas to Bihar	9th—Widespread rain in north-east India with scattered heavy falls in Bihar and Sub-Himalayan West Bengal	Do.	
		10th—Fairly widespread and heavy rain in Sub-Himalayan West Bengal and locally heavy falls in north Bihar	Trough close to the foot of the Himalayas	
		11th—Very heavy rain continued in Sub-Himalayan West Bengal	Do.	
		12th— Do.	Do.	
		1954		
14–16 Jun	Uttar Pradesh to Eastern Himalayas	15th—Widespread rain in Sub-Himalayan West Bengal 16th—Widespread rain in Upper Assam	Close to the foot of the Himalayas Do.	
28–29 Jun	Do.	29th—Widespread rain with locally heavy falls in Bihar and Sub-Himalayan West Bengal	Do.	
		30th—Widespread rain with locally heavy falls in Chota Nagpur, West Bengal and Assam	Do.	

TABLE 1 (*contd*)

Days of western disturbance	Approximate track of the disturbance	Weather caused	Position of axis of trough	Other remarks
		1954 (*contd*)		
30 Jun to 2 Jul	Uttar Pradesh to Assam	1st—Jul Fairly widespread rain in north Bihar, Sub-Himalayan West Bengal and Upper Assam with scattered heavy falls in Sub-Himalayan West Bengal	Close to the foot of the Himalayas. Axis shifted southwards to Eastern Pakistan on 2 July	
19–21 Jul	Uttar Pradesh to Eastern Himalayas	19th—Widespread rain with locally heavy falls in Sub-Himalayan West Bengal	Close to the foot of the Himalayas	
		20th— Do.		
		21st— Do.		
24–27 Jul	Do.	24th—Widespread rain with locally heavy falls in Sub-Himalayan West Bengal and Upper Assam to 27th	Do.	Unusual westward movement of a depression near Madras & south Circars coast
19–23 Aug	Kashmir to Eastern Himalayas (Upper Assam)	20th—Widespread rain in north-east India outside Orissa	Do.	
		21st— Do.	Do.	
		22nd—Widespread rain in north-east India outside Orissa with locally heavy falls in Assam and scattered heavy falls in Sub-Himalayan West Bengal and Bihar	Do.	
		23rd—Widespread rain in Assam and West Bengal with scattered heavy falls in Assam	Do.	
23–24 Aug	Uttar Pradesh to Eastern Himalayas	24th—Widespread rain in Assam	Do.	
10–11 Sep	Do.	10th—Widespread rain in Bihar, Sub-Himalayan West Bengal and Assam	Do.	
		11th—Widespread rain in north Bihar, Sub-Himalayan West Bengal and Assam with locally heavy falls in Sub-Himalayan West Bengal	Do.	

TABLE 2

The rainfall (in inches) in the submontane districts of Bihar, Sub-Himalayan West Bengal and Assam on selected dates during which these areas were affected by western disturbances

Year	Date	Bihar		Sub-Himalayan West Bengal		Assam	
		Actual	Departure from normal (%)	Actual	Departure from normal (%)	Actual	Departure from normal (%)
1950	16 Aug	6·2	+345	6·1	+337	..	..
	17 ,,	..	..	12·6	+500	..	..
	8 Sep	..	..	5·5	+162	..	..
	9 ,,	2·5	+355	2·7	+107	..	..
1951	9 Jun	..	..	3·6	+ 44	5·4	+157
	10 ,,	..	..	9·7	+288	5·0	+127
	11 ,,	..	..	7·2	+188	3·6	+ 80
	29 ,,	..	..	4·3	+ 34	9·1	+314
	11 Jul	..	..	9·4	+167	3·4	+ 48
	12 ,,	6·0	+445	6·6	+113	11·6	+404
	13 ,,	..	..	6·3	+110	6·1	+239
	17 ,,	4·5	+309	10·9	+304	..	..
	24 ,,	6·7	+379	7·9	+229	8·6	+617
1952	29 Jun	4·8	+336	6·5	+103	..	..
	10 Jul	..	..	7·1	+ 87	5·0	+100
	11 ,,	..	..	7·3	+109	7·7	+235
1953	6 Jun	..	..	..	..	9·0	+309
	7 ,,	..	..	14·6	+535	..	..
	25 ,,	..	..	4.5	+ 29	5·5	+129
	26 ,,	7·3	+462	9·1	+160	5·4	+135
	27 ,,	9·4	+623	..	..	..	..
	11 Jul	4·8	+336	9·7	+177	..	..
	10 Sep	6·0	+360	8·5	+507	4·7	+194
	11 ,,	..	..	..	..	9·9	+482
	12 ,,	..	..	5·5	+175	10·5	+556
1954	15 Jun	..	..	10·8	+286	..	..
	16 ,,	..	..	4·8	+ 71	8·3	+361
	29 ,,	..	..	14·4	+345	7·2	+227
	30 ,,	..	..	13·1	+297	4·8	+129
	1 Jul	..	..	9·8	+216	..	..
	25 ,,	..	..	15·1	+459	5·1	+183
	26 ,,	5·2	+271	..	..	..	..