Weather

MONSOON SEASON (JUNE—SEPTEMBER 1963)

Introduction—This year's monsoon was characterised by its normal onset, withdrawal and activity. As mentioned in the previous review for the Hot Weather period, the monsoon set in by the normal date over the south Bay of Bengal during the last week of May and over the extreme south Peninsula by 31 May. It advanced into the various parts of the country by about the normal dates and covered the entire country by 17 July. Although the monsoon activity was generally normal throughout the season, there were spells of heavy rains leading to floods in many parts of north India. On the other hand, a spell of drought conditions prevailed in Rajasthan and Gujarat State in July as a result of scanty rainfall. In all, six depressions formed in the Bay of Bengal and moved inland during the season. The tracks of these depressions are shown in Fig. 1. The monsoon began to withdraw from northwest India from 18 September and had actually withdrawn from northwest India, Uttar Pradesh, north Madhya Pradesh and Gujarat State by the end of the month. The total rainfall for the period from 1 June to 30 September 1963 in terms of its departure from normal is shown in Fig. 2. The progress of the monsoon over various sub-divisions of India, month by month, is shown in Fig. 3.

The important features of the weather are given below month by month.

June—In association with an upper air trough in the east central Arabian Sea, the Arabian Sea branch of the monsoon advanced rapidly upto the south Konkan by 5 June. A sea level trough which developed in the east central Arabian Sea off the Konkan coast on 7th and persisted off the Kathiawar-Konkan coast till 12th was responsible for the further extension of the monsoon upto Gujarat State by 12th. Heavy rains fell at a number of places in the west coast and the Ghats and also in Gujarat State during this period. Thereafter, the monsoon became weak along the coast until 18th when a feeble sea level low developed off the Konkan-Kanara coast and persisted along the west coast till the end of the month.

The monsoon was active in the Bay Islands during the first week. Nan Cowrie recorded 26 cm of rain on 1st. Under the influence of a depression which formed over the head Bay of Bengal on 6th and moved northnorth-eastwards into Assam, the monsoon advanced northwards and covered most parts of northeast India by 11th. The monsoon was active over Assam and most parts of north-east India and continued to be so till the end of the third week in association with a feeble sea level low persisting over Gangetic West Bengal and neighbourhood from 15th to 18th. Cherrapunji recorded 59 cm of rain on 20th. According to press reports, the continuous heavy rains in the catchment areas caused the Brahmaputra and other rivers to rise above the danger levels and led to breaches and flooding of many villages, the worst-affected area being Nowgong district. The monsoon activity decreased considerably during the fourth week resulting in a temporary improvement in the flood situation in Assam. But the rainfall again increased over the area towards the end of the month.

A depression forming over north Andaman Sea on 23rd, moved inland near Gopalpur on 26th. Later it weakened and merged into the seasonal trough over west Uttar

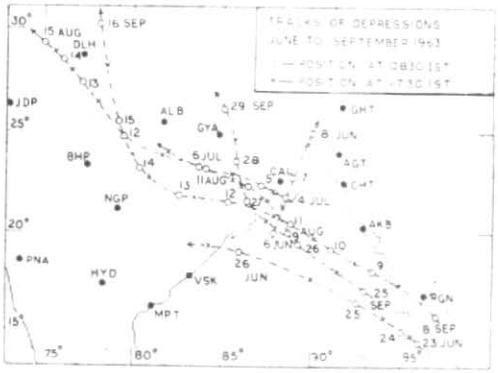

Fig. 1

Pradesh by 30th. Under its influence, the monsoon activity increased considerably in the Bay Islands initially and over the Peninsula and central parts of the country later. The monsoon also advanced into east Rajasthan and west Uttar Pradesh by the end of the month.

A number of troughs in the westerlies moving across the Western Himalayas caused spells of good precipitation there and in the adjoining plains. According to press reports, a number of places in northwest India and Uttar Pradesh experienced severe thunderstorms, the severest being the one that hit Ambala on 6th, with the squall speed of 158 kmph.

July—Under the influence of a trough of low pressure over the northwest Bay of Bengal, a depression formed over the head Bay on the morning of 4th with centre about 150 km southsoutheast of Calcutta. Moving northwestwards, it weakened by 7th into a low pressure area and recurved northwards. It finally moved away eastwards across Assam by 14th. A well-marked low pressure area also formed and persisted over the Gulf of Cambay and adjoining Gujarat State during the period 2nd to 5th. In association with these developments the monsoon was quite active in the Peninsula during the first ten days. Spells of heavy rains also occurred in most of the remaining parts of the country. Dahanu recorded 31 cm of rain on 5th, Mahabaleshwar 37 cm and Bombay 19 cm on 7th, Baroda 14 cm and Jalpaiguri 20 cm on 9th and Cherrapunji 52 cm on 12th. According to press reports, the railway traffic between Bombay and Gujarat was disrupted owing to breaches in the Western Railway track between Sanjan and Umbergaon caused by heavy downpour. Also, twenty people were reported to have been drowned in the flood waters in Surat district and another twenty-five in Gujarat. There were also press reports about the second wave of floods in Assam which began towards the end of the last month.

The monsoon trough shifted northwards during the second week and its axis lay generally close to the foot of the Himalayas till the beginning of the fourth week. Consequently, the monsoon activity was confined to the northern parts of the country, while the activity over the Peninsula remained generally feeble till 25th.

In association with a low pressure area moving westwards from east Uttar Pradesh, very heavy rains also occurred in Uttar Pradesh, Allahabad recording 20 cm of rain on 14th and 23 cm on 15th. With the seasonal low over West Pakistan becoming quite active during the third week and the axis of the monsoon trough lying close to the foot of the Himalayas, a spell of heavy rains occurred in Western Himalayas. A number of rivers in the Punjab (I) were reported to have risen in spate due to the heavy rains. According to press reports, 40 people were feared to have been killed and a few buildings and vehicles swept away by a fierce cloud burst at Pahalgam on the evening of 20th.

Most parts of northeast India continued to get good rainfall. The activity increased during the third week when an upper air trough moved from Uttar Pradesh to Assam. The continuous heavy rain in the area was reported to have caused serious floods in Assam, Sub-Himalayan West Bengal and Bihar Plains.

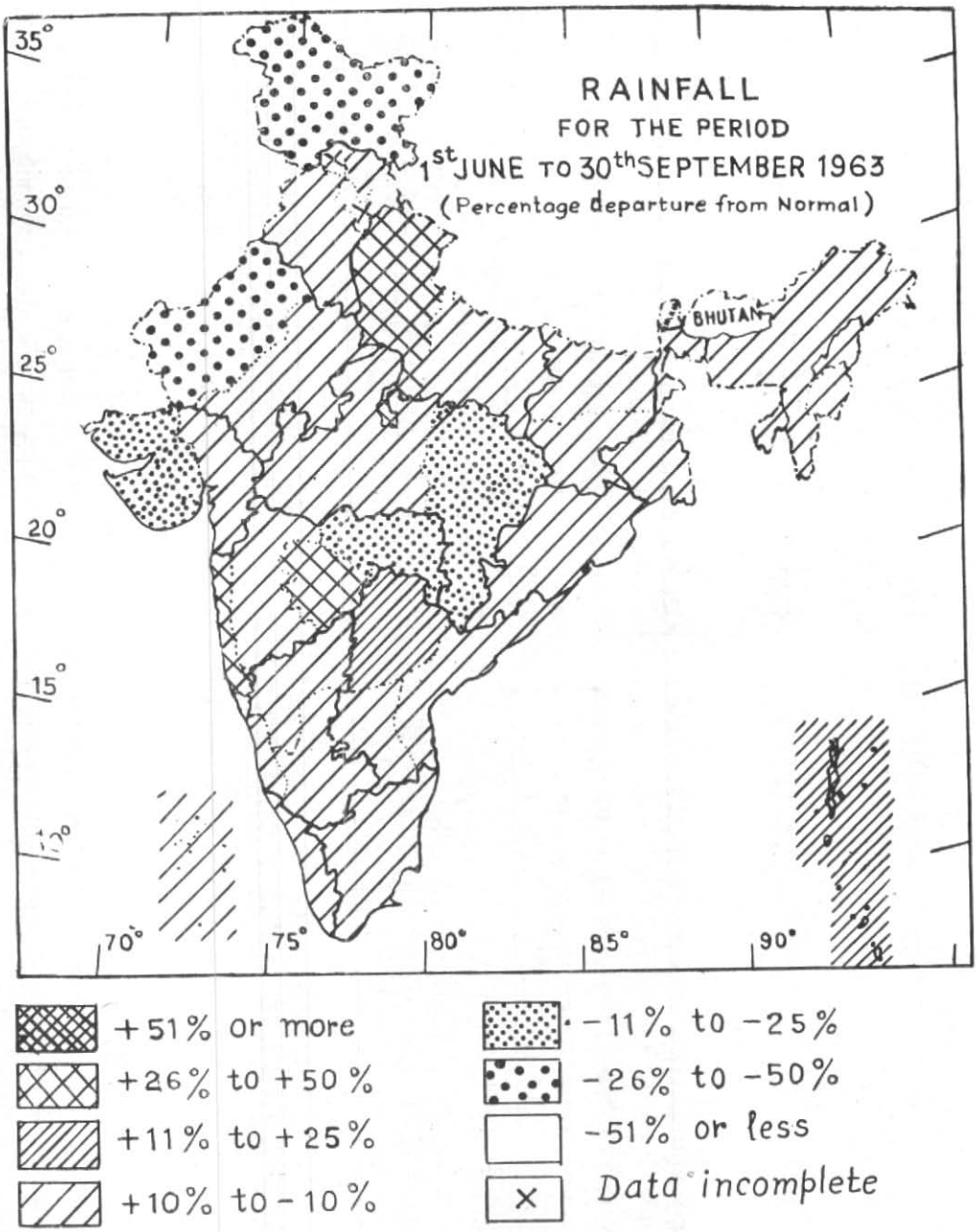
RAINFALL
FOR THE PERIOD
1st JUNE TO 30th SEPTEMBER 1963
(Percentage departure from Normal)
BHUTAN
35°
30°
25°
20°
15°
10°
70°
75°
80°
85°
90°
+51% or more
+26% to +50%
+11% to +25%
+10% to -10%
-11% to -25%
-26% to -50%
-51% or less
Data incomplete

Fig. 2

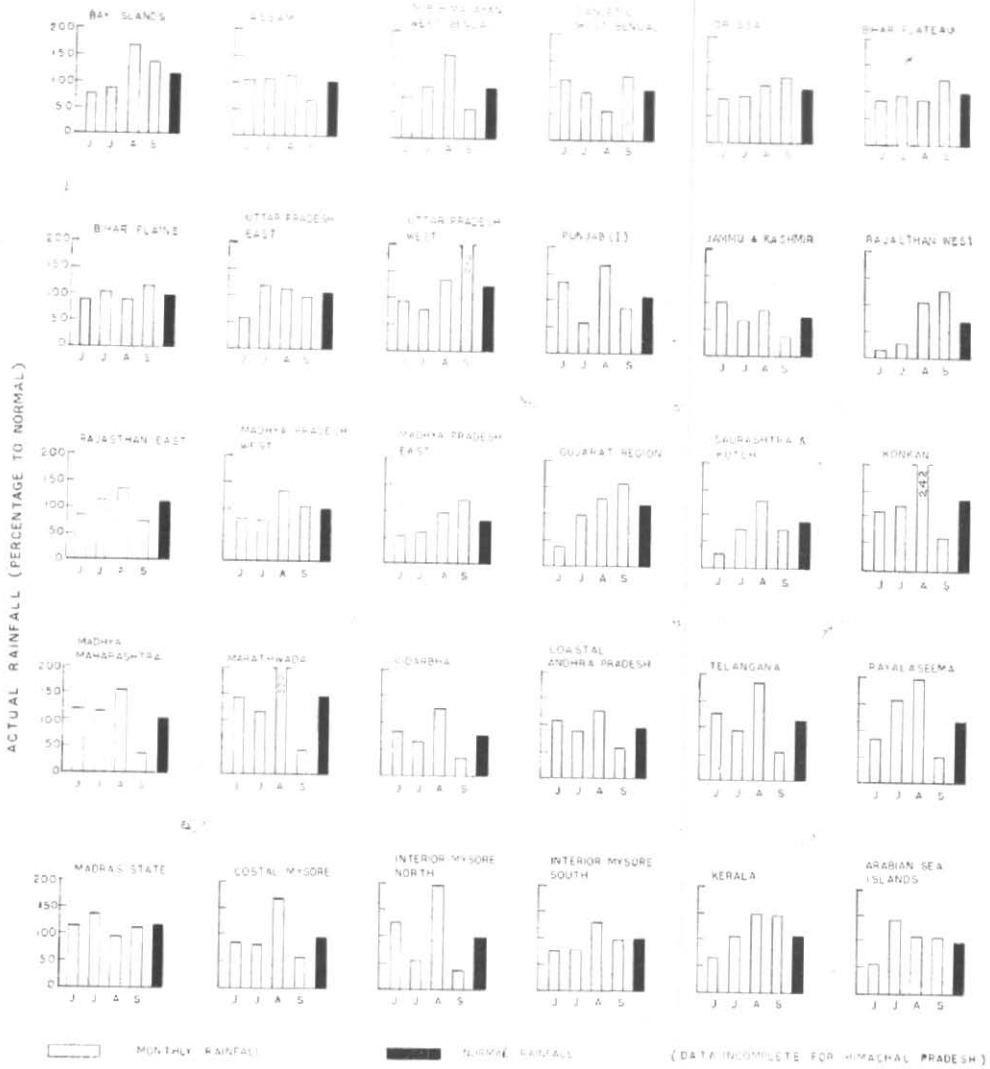

Fig. 3. Progress of the monsoon month by month — 1963

Under the influence of the two low pressure areas moving successively westwards from the Bay of Bengal, the rainfall activity revived over the Peninsula during the last week and the monsoon was also generally active over the country towards the end of the month. According to press reports, many parts of Rajasthan and Gujarat State which had been hit by drought saw the end of the dry spell towards the close of the month. In Assam, West Bengal and Bihar States, the flood situation continued to be serious and even deteriorated in some parts, due to persistent heavy rains.

August—The monsoon activity was sustained over the country in general throughout the month in association with a series of low pressure systems including a depression which moved inland from the head Bay of Bengal. The spells of heavy rains led to floods in many States in north and central India.

A low pressure area which lay over north Madhya Pradesh at the end of last month, weakened and merged with the seasonal low by 3rd. Another low pressure area formed in west central Bay of Bengal off the Circars coast and moving inland became diffused and merged with the seasonal trough by 7th. In association with these systems, heavy rains occurred in most parts of north India. Heavy rains also occurred in the Bay Islands in the beginning of the week, Long Island recording a very heavy fall of 28 cm of rain on 4th. According to press reports, many rivers in Assam, Bihar State, Uttar Pradesh and the Punjab (I) were in spate and the flood waters inundated low lying areas. Half of Nowgong town was submerged by the flood waters of the Keleng river.

A depression formed over the head Bay of Bengal on 9th. Moving northwestwards, it crossed coast near Contai during the night of 9th-10th and finally merged into the seasonal low over the Punjab (I) by 19th. Under its influence, the monsoon continued to be active particularly in Orissa, central parts of the country and in Uttar Pradesh, where considerable damage to standing crops and loss of a few lives were reported to have been caused by the flood waters. Chandbali recorded 27 cm of rain and Cuttack 25 cm on 10th and Champa 26 cm on 11th.

The above depression was followed by three feeble low pressure systems from the Bay of Bengal in regular sequence during the second half of the month. In association with them, the monsoon activity continued unabated over most parts of the country. Spells of heavy rain occurred in the central parts of the country, Uttar Pradesh, Gujarat State and Rajasthan. According to press reports, the heavy rains led to floods in Vidarbha during the third week and in Assam and Sub-Himalayan West Bengal during the last week. A few places in northwest Rajasthan and in Uttar Pradesh were also inundated by the flood waters from rivers towards the end of the month.

September—The monsoon was fairly active in most parts of north India and weak in the Peninsula during the first fortnight. Under the influence of a low pressure wave from the east, a low pressure area developed over Gangetic West Bengal and adjoining Orissa on 4th. Moving westnorthwestwards, it merged into the seasonal low over south Rajasthan by 9th. It caused heavy rains at a number of places in northeast India in the beginning of the month. The belt of heavy monsoon rainfall shifted progressively westwards to Gujarat State and east Rajasthan. In particular, the monsoon was vigorous in Gujarat region from the 7th to 10th. According to press reports, the heavy rains led to serious floods in Gujarat State and Rajasthan causing considerable damage to standing crops and disruption of traffic.

A depression in the Bay of Bengal which moved from the east, intensified into a deep depression on 9th with centre about 80 km eastsoutheast of Sandheads. Moving westnorthwestwards, it crossed coast near Balasore during the night of 11th-12th. It began to change its course on 13th, to northwest and later northnorthwest. It weakened after 15th and became unimportant by 17th

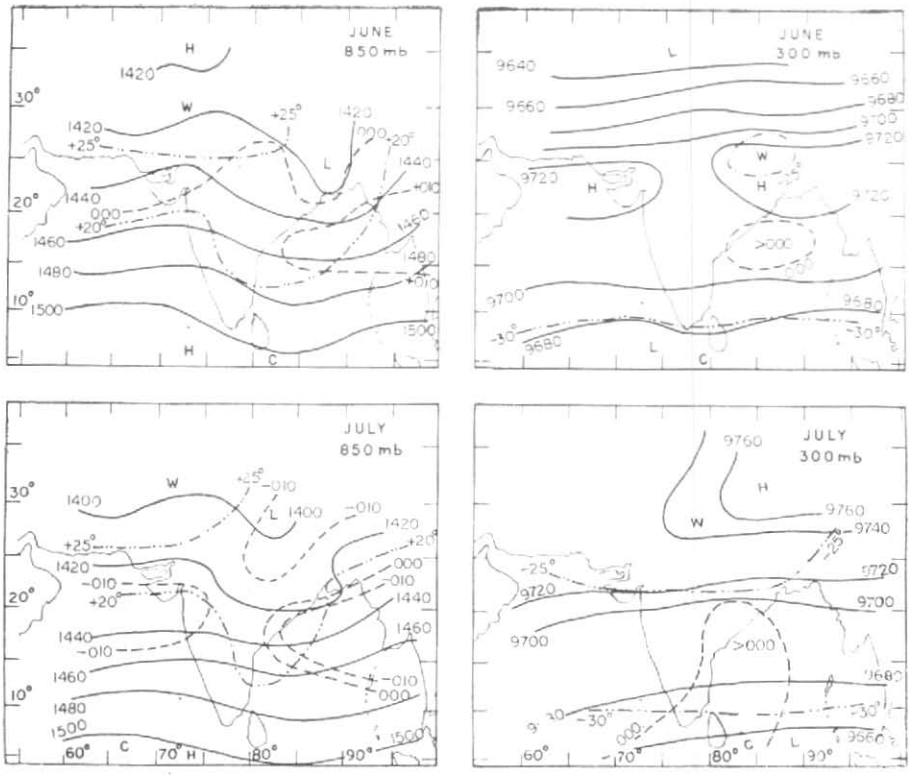

Fig. 4 (a)

Under its influence, the monsoon activity increased over the belt from Gangetic West Bengal and Orissa to the Punjab (I). The heavy rains caused by the deep depression led to flooding in the major rivers of Orissa, Vidarbha, west Uttar Pradesh and the Punjab (I) with consequent damage to public property and loss of life. The floods were all the more serious in the western districts of Uttar Pradesh where 237 people were reported to have lost their lives. More than 50 lakhs of people in nearly 16,000 villages were also affected and over 6 lakhs of houses were damaged or destroyed.

An upper air trough in the westerlies, which appeared over northwest India on 13th, moved away eastwards across Assam by 19th. In association with it, fairly well distributed rainfall with a few heavy falls occurred in northeast India during the third week.

In the wake of the above upper air trough, the monsoon withdrew from Jammu and Kashmir, the Punjab (I) and west Rajasthan on 18th and subsequently from the rest of northwest India, Gujarat State, Uttar Pradesh and north Madhya Pradesh during the course of the third week. The further withdrawal of the monsoon was arrested due to the development and movement of the following deep depression.

This depression moved from the east into the east central Bay of Bengal on 25th and intensified into a deep depression by the

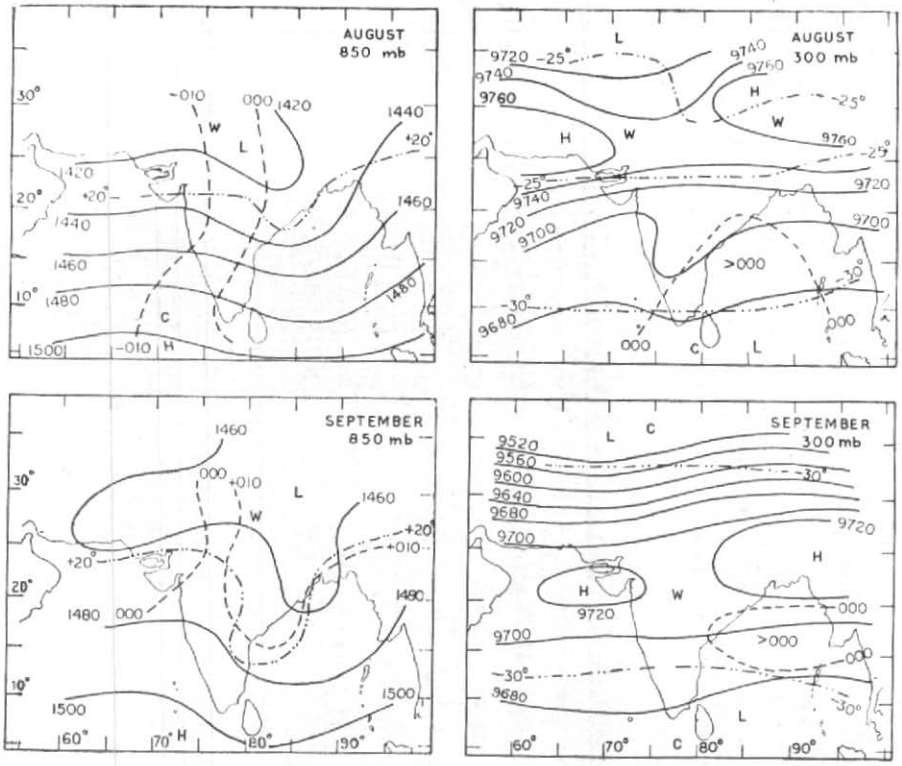

Fig. 4 (b)

next day. Moving northeastwards, it crossed coast just south of Balasore in the early hours of 27th. Thereafter, it moved in a northerly direction, weakened progressively and became unimportant over Bihar Plains by 27th. Under its influence, there was good rainfall activity in the Bay Islands and northeast India with a few heavy falls particularly in Orissa and Bihar. 15 persons were reported to have lost their lives and serious damage was caused to property in Orissa due to the heavy rains.

The monsoon weakened appreciably at the beginning of the month over the Peninsula. However, fairly well distributed rainfall occurred in the Madras State on the first day. The west coast also continued to get fairly widespread light to moderate rain till the middle of the month. A trough of low pressure persisted over the Peninsula from the 18th to 23rd and another feeble one over the east central Arabian Sea off the Konkan-Kanara coast till the end of the month. Under their influence, spells of rain or thundershowers occurred over most parts of the Peninsula during the second half of the month.

Upper air features—The mean monthly constant pressure charts for 850 and 300-mb levels showing the mean contour lines, anomaly lines and isotherms are given in Figs. 4(a) and 4(b). The low level features as seen from the mean charts for 850-mb level and particularly the low values of the contour

anomalies bring out the normal behaviour of the monsoon with larger contour gradient during the mid-monsoon months of July and August. The mean position of the axis of the monsoon trough close to the foot of the Himalayas particularly at the west half in July was probably responsible for the scanty rainfall in Rajasthan and Gujarat State where drought conditions were reported to have prevailed during that month. The mean position of the axis of the monsoon trough, however, shifted southwards and lay even south of the Gangetic plains in August leading to the sustained monsoon activity during the month. The high level features also reveal more or less the normal features of the season. The mean sub-tropical high pressure belt with two cells on either side of Long. 75°E had its axis running roughly along Lat. 24°N in June. It shifted northwards to about Lat. 29°N in July and August and retreated to about Lat. 23°N in September. While the features for July and August were nearly the same, those for June and September showed great similarity, except for the fact that the contour gradient in the north was considerably larger in September than in June, indicating the prevalence of stronger westerlies in the northern parts of the country in September.