APPENDIX C

SAMPLE SATELLITE PHOTOGRAPHS ILLUSTRATING CONDITIONS IN THE BAY OF BENGAL

The satellite photographs contained in this section have not been chosen to show "normal" conditions. Rather, they are presented to illustrate some of the phenomena discussed in the body of the text and references to these photographs have been made in the appropriate places. This appendix contains a brief description of the salient points brought out by each photograph and cross-references to the main text are provided.

It should be noted that the date given is the "satellite date." The actual date in the area of the Bay of Bengal is one day later; e.g., the satellite photograph dated Feb. 2, 1970 (Figure C-1) corresponds to Feb. 3, 1970 over the bay.

Figure C-1 (opposite)
Digitized ESSA-9 satellite photograph dated February 2, 1970

Features

This is a typical winter picture with no dangerous meteorological features in the Bay of Bengal. The cloud mass near 35N 65E is a western disturbance of the "amorphous cloud area" (see paragraph 4.7). The Southern Hemisphere Convergence Zone is well-developed, lying between 5S and 10S; note the latitudinal extent of the intense convective activity and see paragraph 4.2.4. Also note the convective activity between 5N and 10N from 75E to 90E; this is the Northern Hemisphere Convergence Zone. In practice this cloud mass should be kept under observation in order to detect any northerly movement (paragraph 6.2.1). Over the bay, conditions are generally clear, with cloud amounts increasing to the south (paragraph 6.2.1). Note the convective activity over the Eastern Ghats and also the southern hemisphere tropical storm (around 18S, 78E).

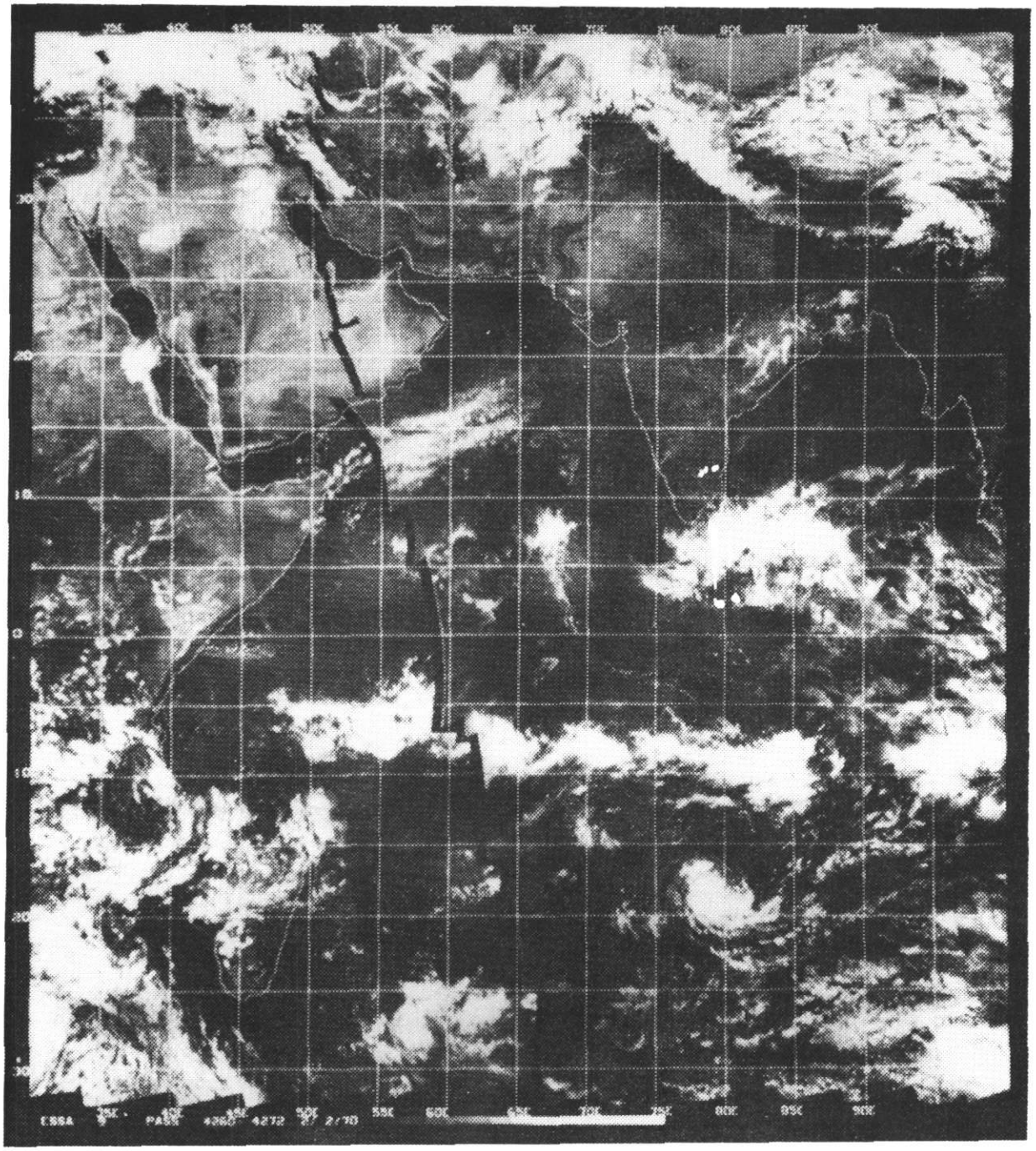

Figure C-1

Figure C-2 (opposite)
Digitized ESSA-9 satellite photograph dated May 23, 1970

Features

This was taken during the spring transition season. (See paragraph 6.2.2). Note the increase in convective activity over India compared with Figure C-1. Later in the day, these cells may move out over the water to cause "Nor'westers" (paragraphs 4.6 and 6.2.2).

Squalls and showers already affect the northeastern part of the Bay of Bengal. The cloud mass near 12N, 87E should be kept under observation for possible development. This is a typical picture for spring.

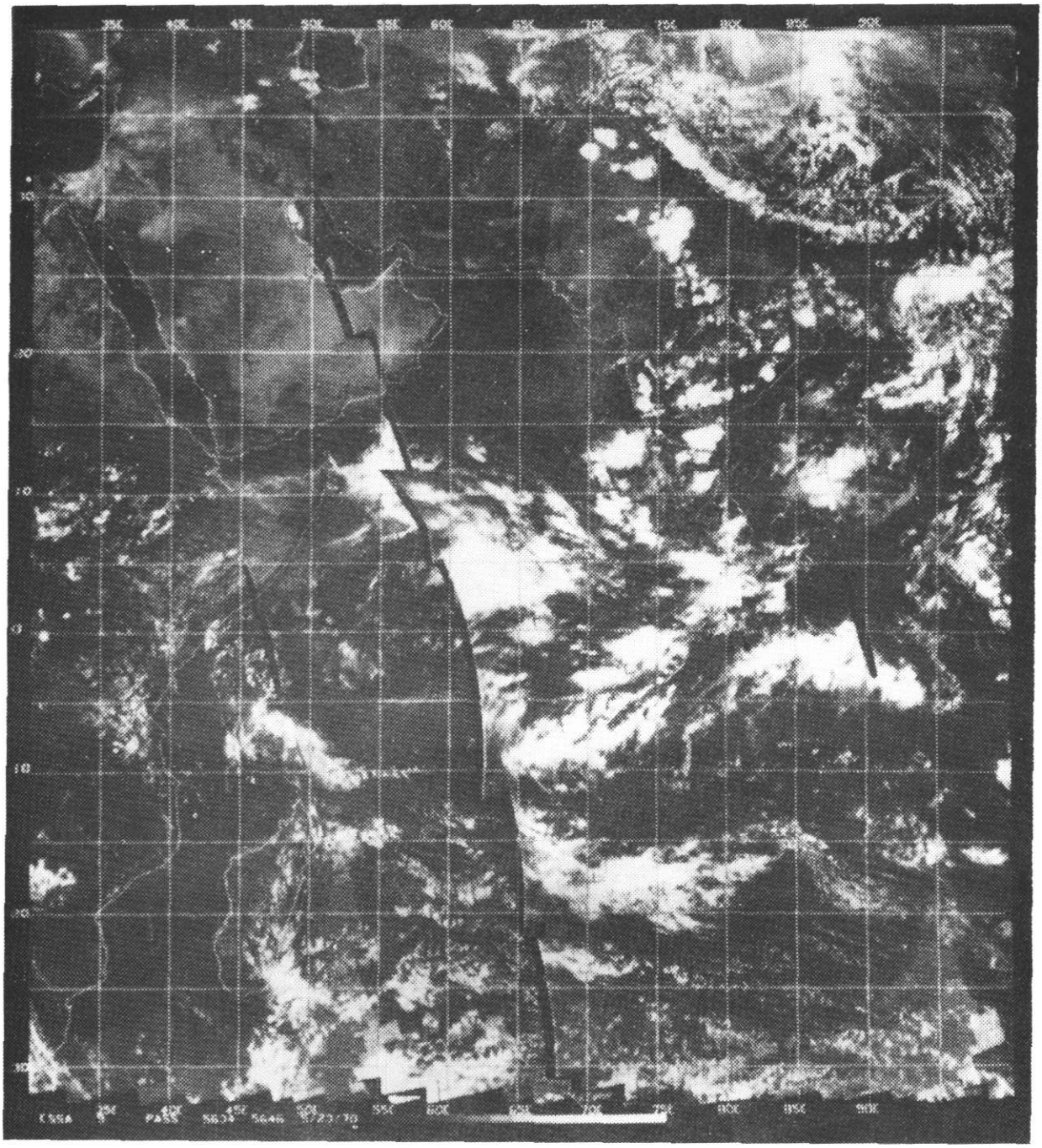

Figure C-2

Figure C-3 (opposite)
Digitized ITOS-1 satellite photograph dated May 2, 1970

Features

This was taken 3 weeks before Figure C-2 with which it should be compared. The Southern Hemisphere Convergence Zone is better defined but the main feature is, of course, the well-developed cyclonic storm over the Bay of Bengal. Subsidence around the storm is clearly shown by the lack of clouds. Apart from the intense convective activity near the center and in the main feeder band extending southwest to the south of India, note the intense showers/squalls in the eastern part of the bay.

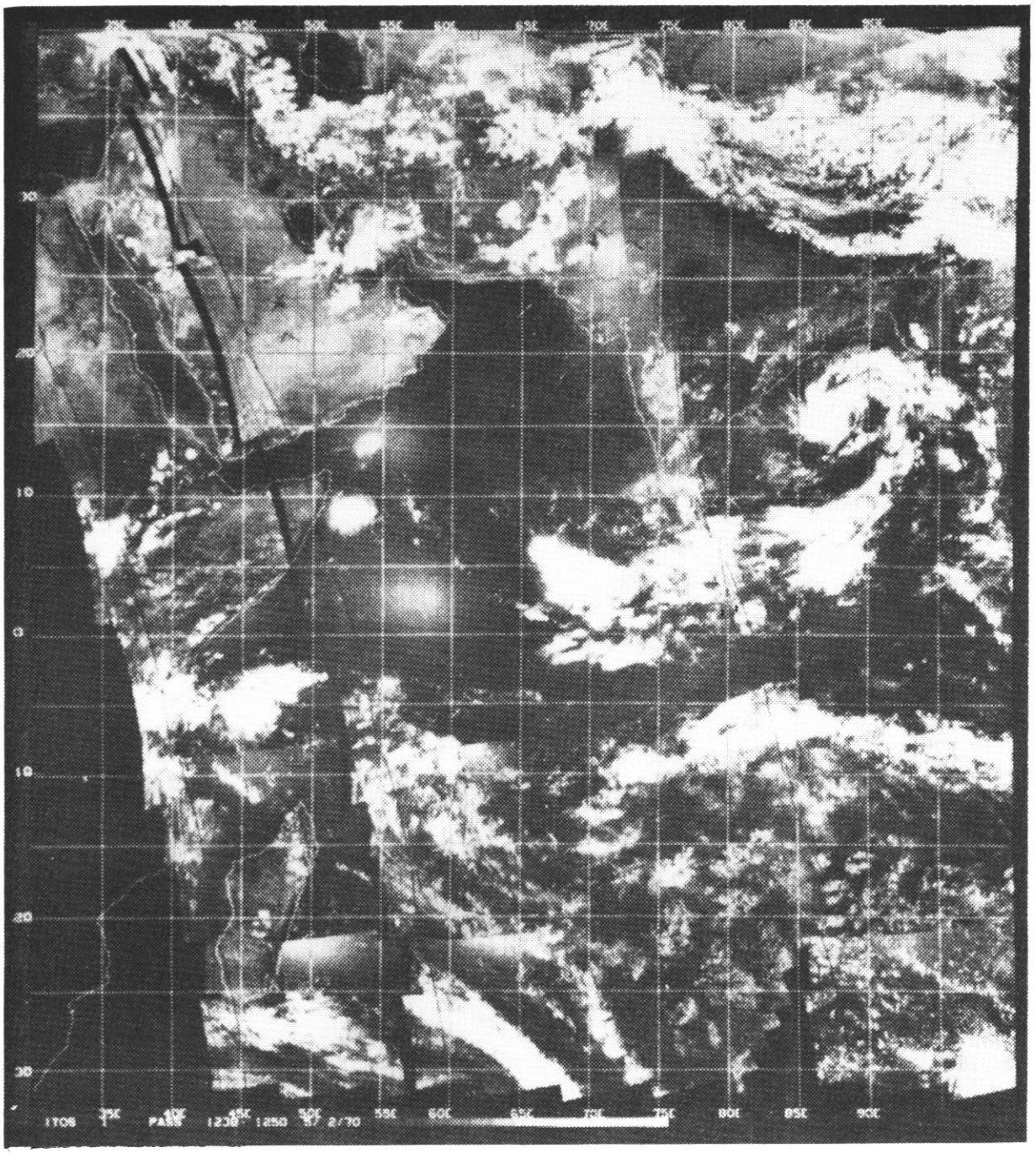

Figure C-3

Figure C-4 (opposite)
Digitized ESSA-9 satellite photograph dated July 29, 1969

Features

This was taken during the southwest monsoon season. Prior to the time of the photograph, a monsoon depression formed over the Bay of Bengal and moved into northeast India. In the photograph, the center is located near the coast at about 21N 87E. Note how difficult it is to locate the center. The major precipitation region is to the southwest of the center (see paragraph 4.3.2). Also note the hard echoes to the north (paragraph 4.3.2). An intense monsoon depression is shown in Figure C-5.

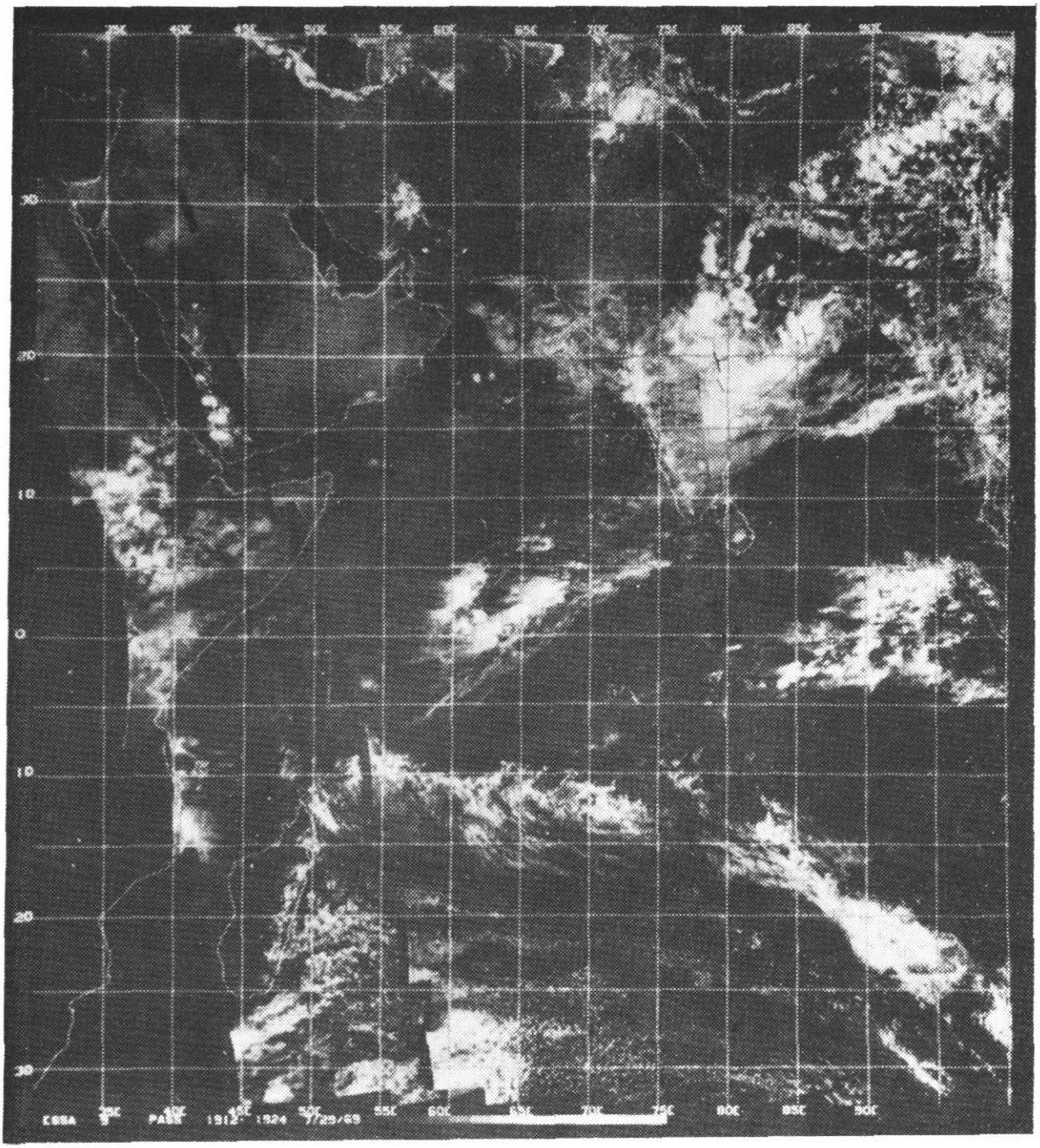

Figure C-4

Figure C-5 (opposite)
Digitized ESSA-9 satellite photograph dated August 12, 1969

Features

This photograph shows a very intense monsoon depression located at the head of the Bay of Bengal. This figure should be compared with Figure C-4. The circulation associated with the depression is easier to make out but is still not obvious to the inexperienced eye. Again note that the main precipitation area is to the southwest (or south) of the system (paragraph 4.3.2). Note also the clearing over the southern part of the bay. An easily detected feature is the cumulus activity to the north of the center. This is noticeably more intense than that seen in Figure C-4 and is a good indicator of the existence of an intense monsoon depression (Srinivason et al, 1971). The cloudiness over the Arabian Sea is associated with a mid-tropospheric cyclone.

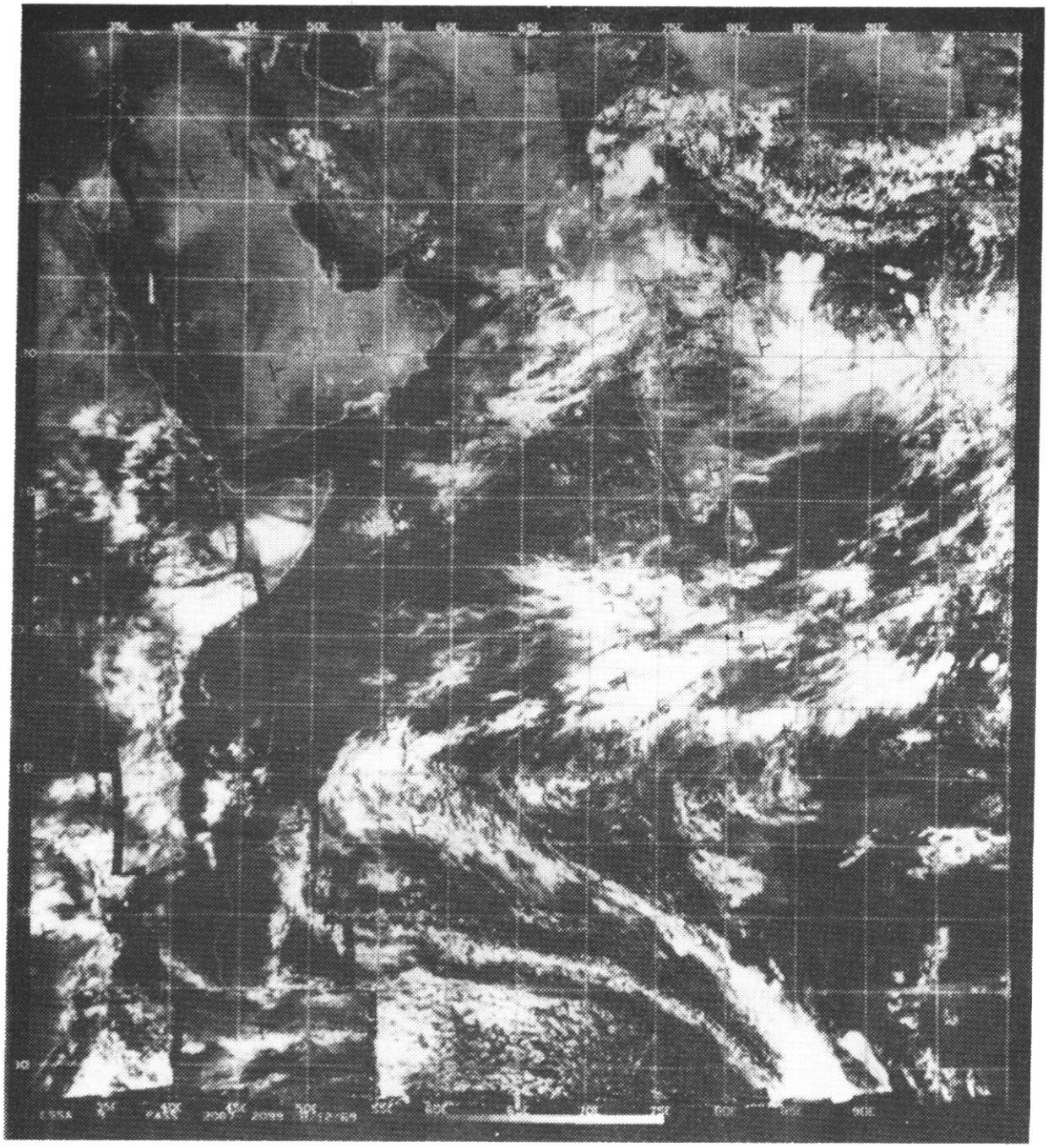

Figure C-5

Figure C-6 (opposite)
Digitized ESSA-9 satellite photograph dated July 19, 1969

Features

This photograph has been selected to show a typical intense southwest monsoon flow. There is no monsoon depression present but, comparing this figure with Figure C-4 and C-5, it will be appreciated how difficult it is to detect such a feature solely from a satellite photograph; see paragraph 4.3.3. Of particular note is the clearing along the foothills of the Himalayas associated with the monsoon heat trough (paragraph 4.2); this can also be seen in Figures C-4 and C-5.

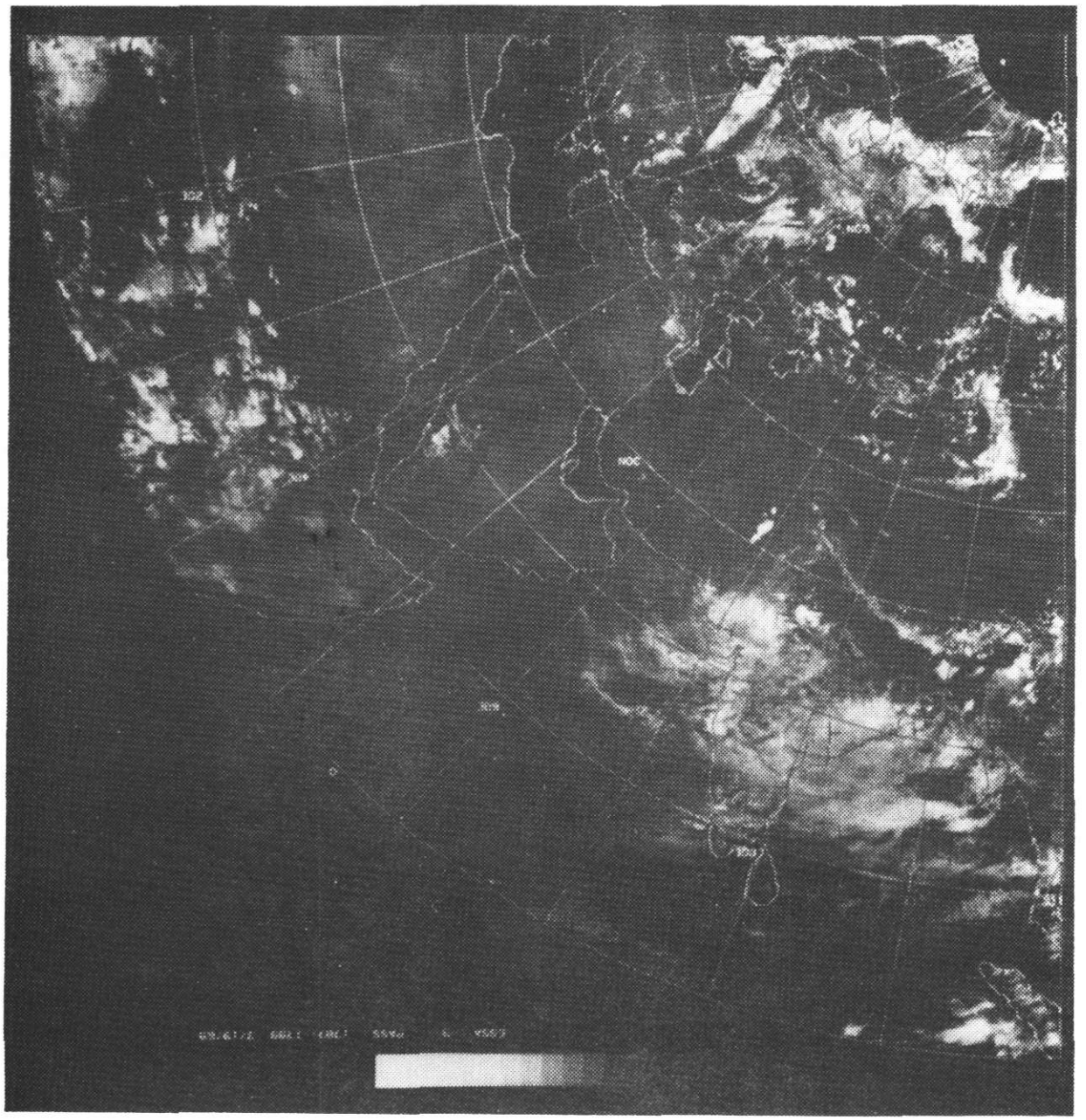

Figure C-6

Figure C-7 (opposite)
Digitized ITOS-1 satellite photograph dated October 14, 1970

Features

This picture was taken during the fall transition season and an active convergence zone is evident over the southern part of the Bay of Bengal. Recall that the lines of cloud do not necessarily correspond to the pressure trough (paragraph 4.2.3). Major cloud masses should be closely monitored for development of circulation. It is at this time of the year that heavy rainfall occurs over southern India and Ceylon, while cloudiness decreases in the northern part of the bay (paragraph 6.2.4). However, scattered but locally intense convective activity can be seen over the central bay.

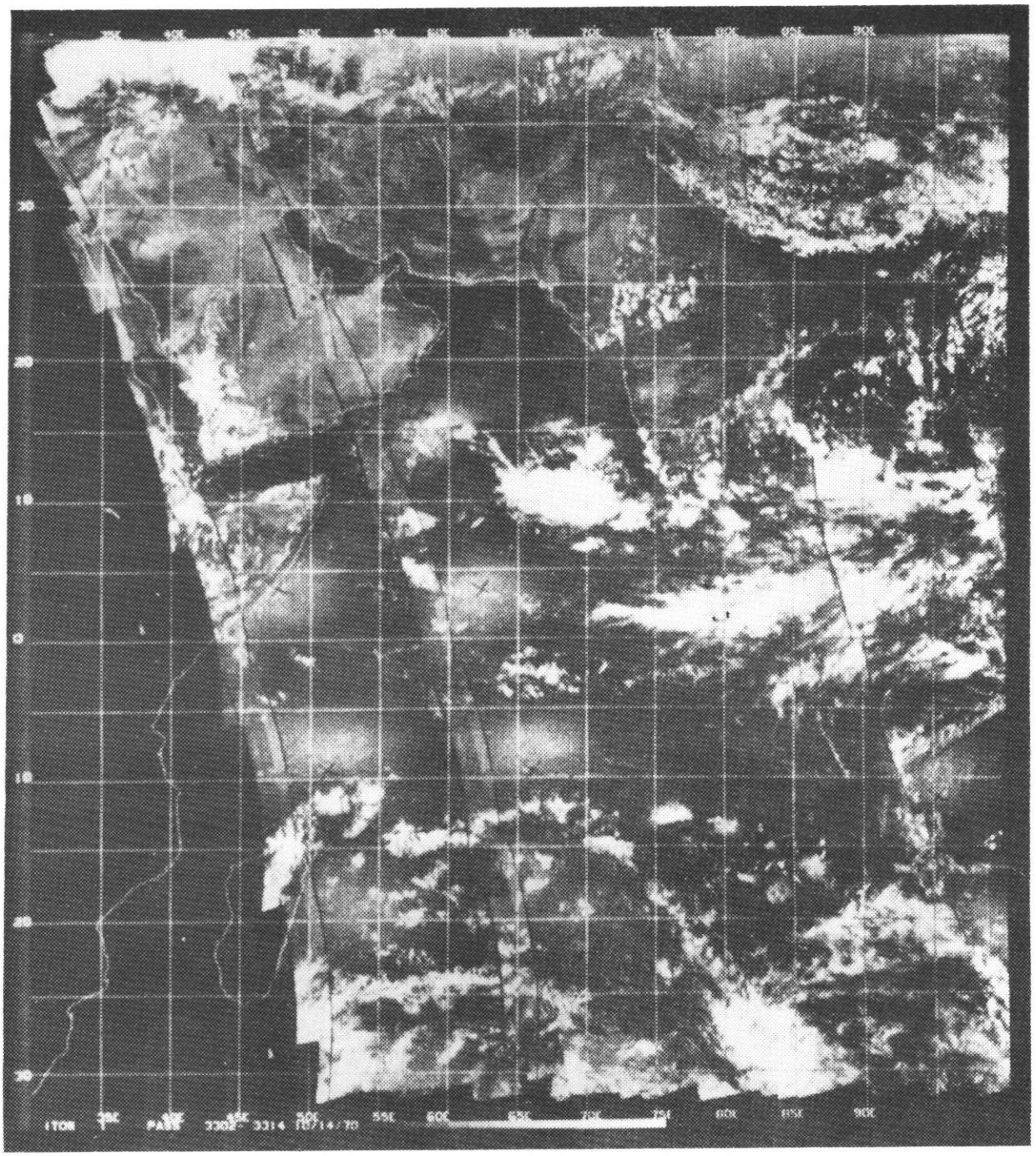

Figure C-7

Figure C-8 (opposite)
Digitized ITOS-1 satellite photograph dated November 6, 1970

Features

This shows an intense circulation developing over the Bay of Bengal. Figure C-9 shows the same circulation 3 days later.

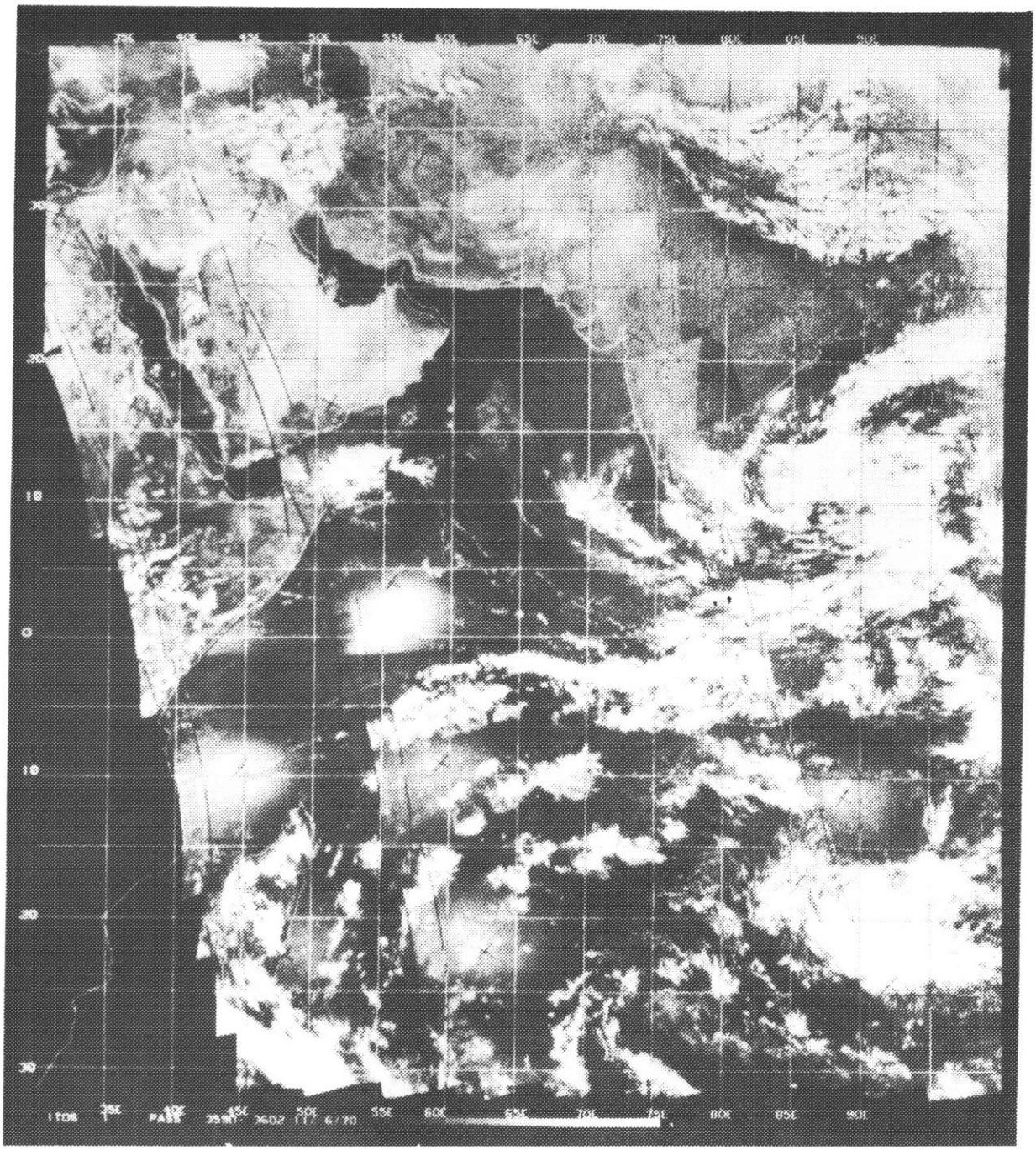

Figure C-8

Figure C-9 (opposite)
Digitized ITOS-1 satellite photograph dated November 9, 1970

Features

This shows the same storm as that in Figure C-8 but 3 days later. Intense outflow is evident toward the north-east. From these two photographs it can be seen that a ship initially located at the head of the Bay of Bengal would have been presented with an interesting problem in evasion. This storm developed hurricane force winds and caused unprecedented loss of life in the low-lying land at the head of the bay.

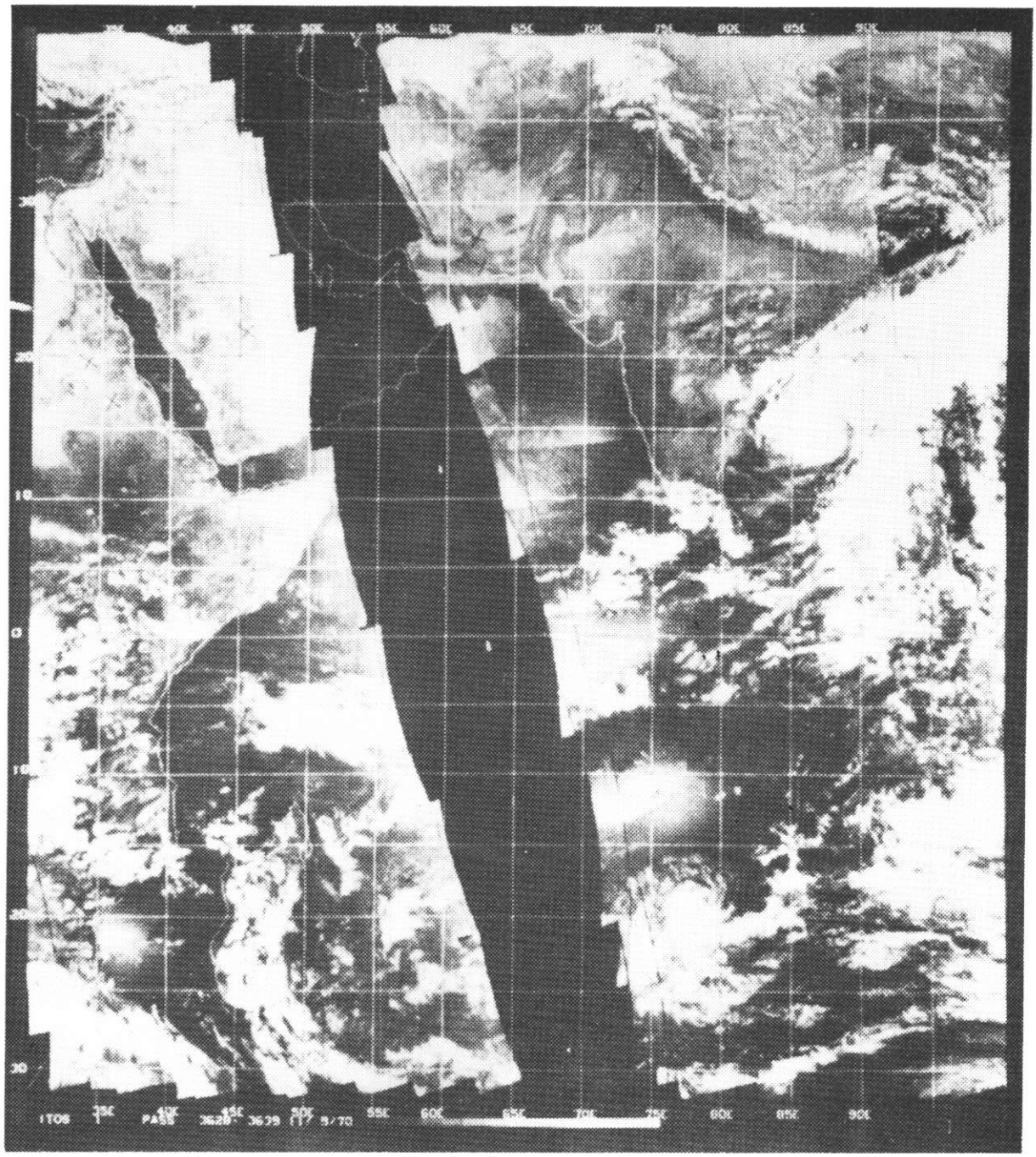

Figure C-9

Figure C-10 (opposite)
Digitized ESSA-9 satellite photograph dated December 8, 1969

Features

There are two primary features of interest. Near 30N, 65E there is a cloud mass associated with a western disturbance of the "overcast mass" type (paragraph 4.7). This formed near the Persian Gulf and moved northeast. The cloud mass affecting the Indian Peninsula is associated with the remains of a tropical storm which reached the coast one day before the photograph. Note the showers/squalls remaining over the Bay of Bengal.

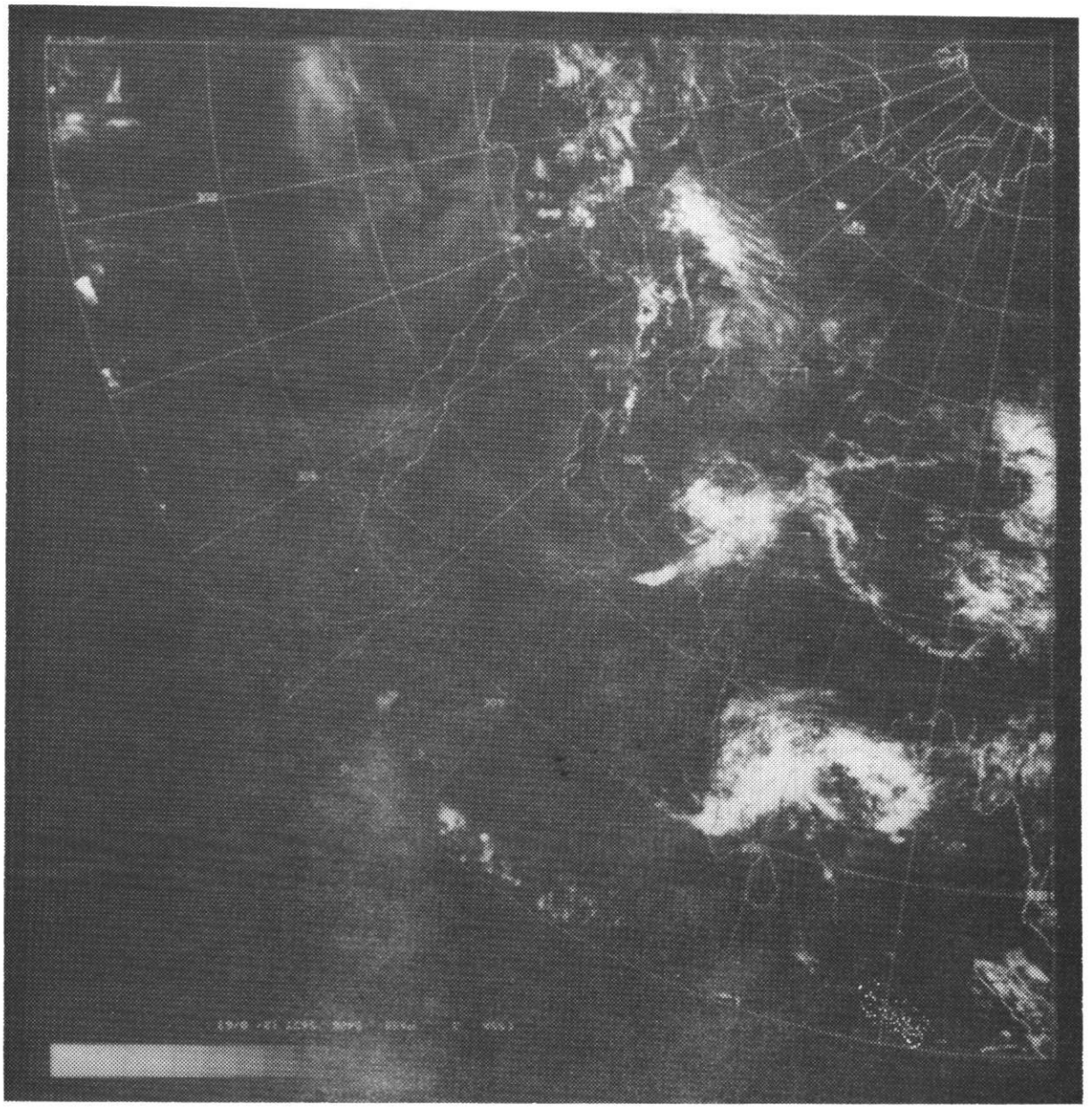

Figure C-10