

A cyclonic wind shift and decreasing surface pressures on Sri Lanka were the first indications of the tropical disturbance which eventually developed into Tropical Cyclone 20-78. Tracking west-northwest along the monsoon trough axis, the disturbance made landfall over the southern tip of India 66 nm (122 km) east of Madura at 1800Z on the 3rd of November 1978. Still in the formative stage, with 20 kt (10 m/sec) intensity, the disturbance tracked westward over southern India during the 3rd and 4th with little intensification. Property damage was limited to, and essentially caused by, flooding on the coastal plains.

After exiting into the Arabian Sea, a westward movement at 07 kt (13 km/hr) and gradual intensification occurred. Satellite data at 050647Z indicated increased organization and feeder band activity had formed south of the center. JTWC thus issued a Tropical Cyclone Formation Alert at 051239Z as the system moved into the Laccadive Islands. During the 5th and 6th, the mid-tropospheric subtropical ridge axis shifted northward from 16N to 20N allowing TC 20-78 to track more north of west from 051400Z through 082000Z.

Increased feeder band activity and good outflow aloft indicated that steady intensification occurred from the 5th through the 8th. Tropical storm intensity was attained by 060800Z with satellite data revealing an eye early on the 7th. As indicated by satellite imagery on the 7th and 8th, upper-level outflow was enhanced by a channel to the strong westerlies existing to the north of the cyclone center. By 080200Z, TC 20-78 had reached typhoon intensity according to the Dvorak visual satellite intensity analysis. Evaluation of the cyclone's position and intensity estimates provided by the USS LaSalle's (AGF-3) TIROS-N APT satellite data proved to be an invaluable addition to the normal DMSP satellite coverage of this area.

By the 9th of November, the mid-level subtropical ridge axis in the Arabian Sea was oriented east-west along 19N. Recurvature around this axis occurred during the 9th concurrent with TC 20-78's maximum intensity of 80 kt (41 m/sec) at 090900Z. TC 20-78 then moved northeastward into an area

dominated by strong westerlies aloft. The strong vertical shear that resulted caused the system to weaken to tropical storm intensity by 100800Z (Fig. 3-33). By the 11th, the strong vertical wind shear had reduced the cyclone to a shallow system noted on satellite imagery as spiral bands of low clouds and minimum to no deep convection - "an exposed low level circulation". Continued dissipation caused the satellite fixes to decrease in accuracy and conventional data, being sparse, aided little in pinpointing the center. As a result, the landfall of TC 20-78 on north-west India could only be approximated.

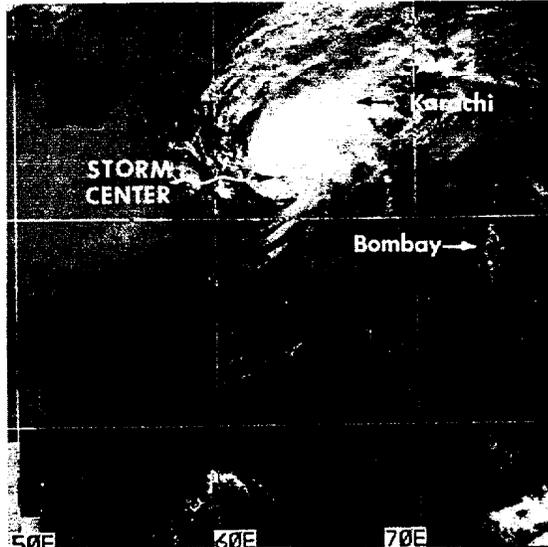


FIGURE 3-33. TC 20-78, 260 nm (482 km) southwest of Karachi on 10 November 1978 at 0659Z. The concentration of convective activity to one side of the cyclone and the cirrus showing unidirectional, upper-air flow are typical of cyclones in strong, vertical shear environments. A cyclonic circulation is becoming evident in the orientation of low clouds over the southern "exposed" portion of the cyclone. [DMSP imagery from AFGWC, Offutt AFB, NE]