

Wave Characteristics in the Sea around the Andaman & Nicobar Islands

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Wave data were collected during 51 and 52 cruises (Feb. 1979) and 66 and 67 cruises (Jan. 1980) of *R V Gaveshani* using a shipborne wave recorder. Some wave records were also obtained along the 5°30' N lat. from Ceylon to the Great Nicobar Island during the 51 and 66 cruises. Scatter diagrams relating zero crossing period and significant wave height were prepared. Distribution of zero crossing period, significant wave height and spectral width parameter were also studied. It was observed that the zero crossing period and significant wave heights varied from 6 to 12 sec and 0.6 to 1.4 m around the Andaman and Nicobar Islands while along the equatorial transect they were respectively 7 to 9 sec and 0.8 to 1.8 m.

Studies on the wave characteristics in the Bay of Bengal, until recently, have been mainly based on the visual observations from ships^{1,2}. A few wave atlases³⁻⁵ that cover the Bay of Bengal have also been prepared using visual wave observations. These data though useful are not very suitable in arriving at a detailed picture of the wave characteristics due to the obvious limitations of visual wave observations.

Recently, wave records obtained using the shipborne wave recorder on *R V Gaveshani* have been used to study the waves along the East Coast of India^{6,7}. There is, however, no published work of recorded wave data from the seas around the Andaman and Nicobar Islands. Moreover, since shipping around the Andaman and Nicobar Islands is limited, visual observations of waves is very scanty and as such no reliable information is available.

An attempt was made during different cruises to collect as much wave data as possible to get a clear picture of wave characteristics in this region. This knowledge could be useful for navigational and, more appropriately, some coastal engineering projects. However, wave data need be collected over long periods before any detailed idea of the wave characteristics in any region could be obtained.

Methods

The present study is based on the wave records of 15 min duration each obtained during the 51 and 52 cruises from 1 to 24 Feb. 1979 and 66 and 67 cruises from 1 to 22 Jan. 1980. Wave data obtained were separated into 2 groups: for the 18 stations along 5°30' N lat. and the 39 stations around the Andaman and Nicobar Islands (Fig. 1). At some stations more than one wave record were obtained at intervals of 3 hr. Thus 37 records were obtained along the zonal track and 55 records around the Islands.

The wave records were analysed following the method suggested by Draper⁸. The following

parameters were evaluated from each record (from the mean water line drawn visually): the height of the highest crest (A), depth of the lowest trough (C), the number of upward zero-crossing (N_z) and the number of crests (N_c). The height of the highest wave was then computed as $H = A + C$ and corrected for depth attenuation effect (the sensors being submerged below

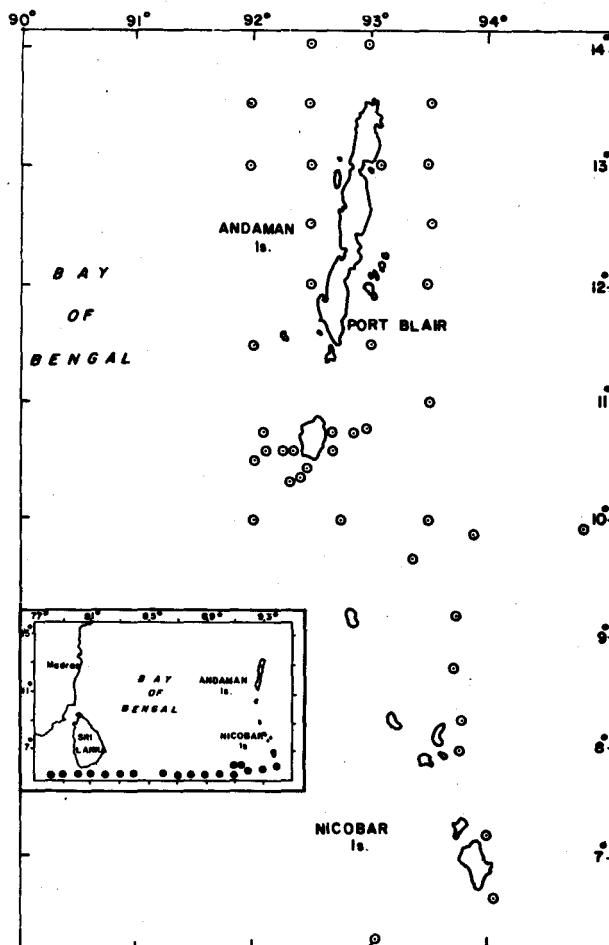


Fig. 1—Stations around the Andaman and Nicobar Islands (Insert shows stations along the zonal transect)

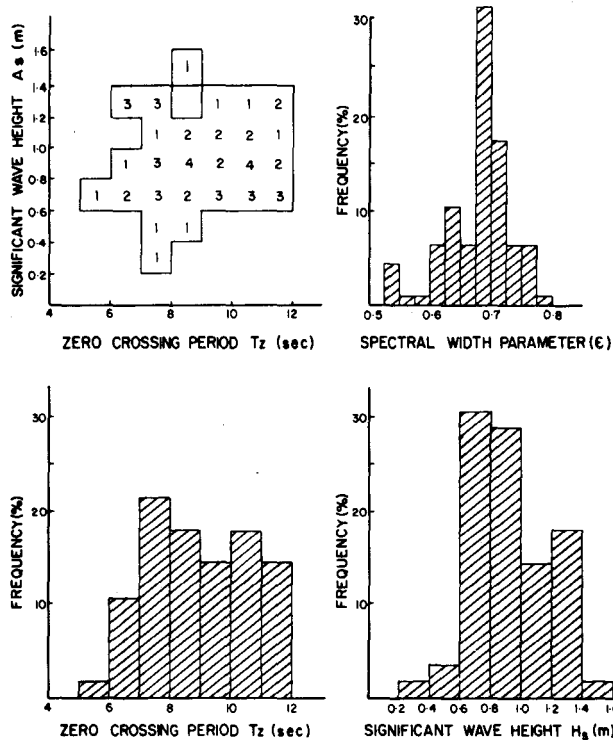


Fig. 2—Wave characteristics in the sea around the Andaman and Nicobar Islands

the sea surface). The significant wave height (H_s), the mean zero-crossing period (T_z) and the spectral width parameter (ϵ) were also computed and are shown in Figs 2 and 3 along with scatter diagrams relating H_s and T_z .

Results and Discussion

In the sea around the Andaman and Nicobar Islands H_s and T_z are almost uniformly distributed from 0.6 to 1.4 m and 6 to 12 sec respectively (Fig 2). There is a fairly wide scatter of wave heights and periods. The character of the scatter diagram indicates a lack of dominance of local seas which would have been the case if the highest waves were associated with shorter periods. The ϵ varies mainly from 0.6 to 0.775 with a peak near 0.7. This distribution of ϵ suggests that in this area the swell waves predominate over the sea waves.

In contrast, along the $5^\circ 30' N$ lat. the scatter diagram (Fig.3) shows a slight dominance of local sea waves since the higher wave heights are associated with lower periods. The ϵ varies from 0.575 to 0.725 with a dominance between 0.625 and 0.7. This also suggests slight local sea conditions superimposed on swell conditions. The T_z shows a peak at 8.5 sec and the H_s

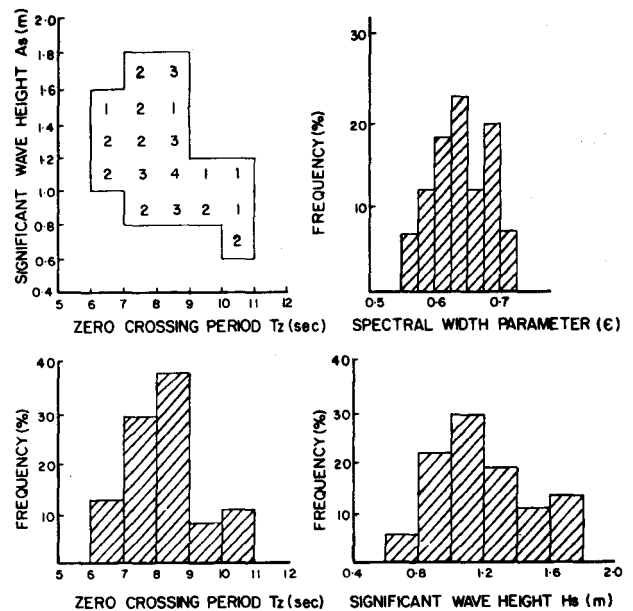


Fig. 3—Wave characteristics along the zonal transect in Fig. 1.

ranges between 0.8 and 1.4 m with a peak around 1 m.

During the same period the wave conditions in the Bay of Bengal is seen to be represented by H_s between 0.5 m and 2 m and T_z between 5 and 9 sec. In general 80% of the waves have heights less than 1.5 m.

In conclusion it may be said that during January-February the wave characteristics around the Andaman and Nicobar Islands are mainly those of swell waves with a slight superimposed local sea waves.

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