

HYDROLOGY OF INSHORE WATERS

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INTRODUCTION

Data collected by the earlier cruises of *Dana* Expedition, RV *Vityaz*, International Indian Ocean Expedition, INS *Krishna* and others on various hydrological parameters pertained to the deeper waters off the Andaman and Nicobar Islands. Further, the observations were mostly restricted to pre-monsoon season. Literature on hydrology of the coastal waters of Andaman and Nicobar Islands is very meagre. Sewell (1928, 1929) observed the pattern of temperature and salinity of the coastal waters of the Andaman Sea. Rangarajan and Marichamy (1972), based on their study during 1964-70 at Port Blair, correlated the seasonal changes of the marine environment with local meteorological conditions. Garg *et al.* (1968) reported that the concentration of oxygen-poor layer was greater in the Andaman Sea than in the Bay of Bengal suggesting a northerly flow at these depths. Kabanova (1964), during the 33rd cruise of *Vityaz*, concluded that the low values of primary production were due to the deficiency of nutrient salts. Reddy *et al.* (1968) observed an incidence of very high concentration of phosphates exceeding 12 μg at/l

during the IIOE cruises of INS *Krishna* in 1963 in all the stations around Andaman Islands. Rao and Rao (1968) found the seasonal variations of the total phosphorus in the Bay of Bengal and Andaman Sea. Zernova and Ivanov (1964) compared the hydrological conditions on the distribution of phytoplankton in Andaman Sea. While assessing the productivity of Andaman coastal waters, certain hydrological aspects were studied by Nair and Pillai (1972). More recently, Sudarsan (1978) noticed a direct relationship between the trawl catches and salinity, temperature as well as standing crop of plankton and an inverse relationship between the rainfall and trawl catches.

MATERIAL AND METHODS

Hydrographic observations include air and surface water temperature, salinity, dissolved oxygen content and pH. Observations were generally made around 0800 hrs. Maximum number of samples were collected from creeks, mangrove swamps, mud flats, lagoons and intertidal coastal zones in the areas surveyed. The data were pooled and the average values have been shown against important centres as given in Table 1.

TABLE 1. Hydrological observations of Andaman and Nicobar Islands during February-April 1978

Places	No. of stations	Temperature °C			Salinity (ppt)		Oxygen ml/l		pH	
		Air	Surface	Bottom	Surface	Bottom	Surface	Bottom	Surface	Bottom
Diglipur	.. 5	27.8	28.3	—	24.76	—	4.9	—	7.93	—
Mayabunder	.. 10	28.4	27.8	27.0	33.99	34.31	4.1	4.3	8.16	8.50
Rangat	.. 3	30.7	29.0	28.0	31.91	32.00	5.3	5.1	8.03	8.20
Havelock Is.	.. 5	29.9	28.2	28.5	31.49	31.24	5.1	4.8	8.02	8.15
Shoal Bay	.. 3	30.2	29.0	29.0	30.95	30.95	4.7	4.6	7.70	7.95
Neill Is.	.. 3	29.7	28.7	28.0	32.13	32.09	5.3	5.0	8.10	8.08
Port Blair	.. 18	30.1	29.7	28.9	32.29	31.85	4.9	4.9	7.97	7.59
Little Andaman	.. 5	30.5	29.3	29.0	32.08	31.83	5.4	5.1	7.64	8.00
Car Nicobar	.. 6	30.2	30.1	29.8	32.38	32.51	6.5	6.0	8.50	8.37
Katchall	.. 3	29.3	29.2	29.4	32.66	33.19	4.1	4.1	8.48	8.45
Kakana	.. 2	31.4	30.6	29.0	32.72	32.72	3.8	3.7	8.40	8.40
Nancowri	.. 4	30.8	30.2	28.8	33.43	33.10	4.3	4.5	8.50	8.00
Trinkat	.. 1	32.0	32.0	31.7	34.00	34.15	6.2	5.9	7.50	7.80
Great Nicobar	.. 2	28.1	29.8	29.3	33.40	33.70	4.8	4.3	7.82	8.40

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Altogether 70 observation centres were covered and these have been represented by 14 prominent bases. Meteorological data on rainfall, temperature and humidity were collected from the Statistical Bureau, Andaman Administration and Meteorological Department, Pune.

RESULTS

The distribution pattern of atmospheric temperature, humidity and rainfall in Andaman and Nicobar Islands during the period 1972-78 (Fig. 1) revealed a more or

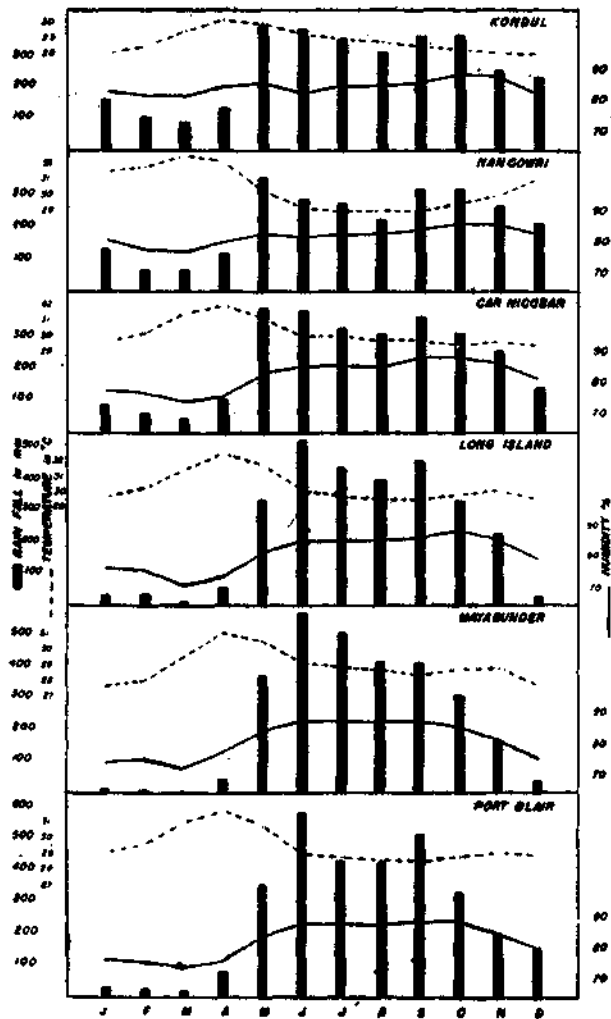


Fig. 1. Rainfall, temperature and humidity data for some centres in the Andaman and Nicobar Islands (data are averages for 1972-1978).

less uniform trend in the entire territory. Temperature reaches the maximum in April and subsides at the onset of monsoon from May onwards. During January-April, the humidity fluctuates in a low range, 71-77%,

in Andaman Islands and slightly higher in Nicobar Islands because of higher rainfall in the southern group. The islands are influenced by both the south-west and north-east monsoons. A long and continuous rainy season extends from May to November, with peak rainfall in June and September.

The results of hydrographical studies are presented in Table 1. The temperature of surface water closely followed the trend of atmospheric temperature at different centres. The range of surface temperature during February-April 1978 was 27.8-32.0°C. At the approach of summer an increasing trend in the temperature was noticed from February to April. The surface salinity was in the range 24.76-34.00 ppt. In Diglipur, observations were made only in creeks and the salinity was in the range 9.98-33.66 ppt with the average at 24.76 ppt. Also in Shoal Bay, salinity was comparatively low due to the influx of fresh water through a number of creeks. The dissolved oxygen content of the surface water was in the range 3.8-6.5 ml/l. The oxygen content was low (3.8-4.1 ml/l) in the coastal waters of Katchall and Kakana. In Trinkat and Car Nicobar, a high value of oxygen (6.2-6.5 ml/l) was noticed. The pH of the surface samples was in the range 7.50-8.50.

REMARKS

Wide fluctuations in the surface salinity may be expected throughout the islands during the months of May to September corresponding to the periods of heavy rainfall as noticed by Rangarajan and Marichamy (1972) in their observations at Port Blair. Based on the trend of salinity, they classified the seasonal changes into (1) a period of high salinity with very little fluctuation during February to April, the pre-southwest monsoon period, (2) a fairly long period of comparatively low salinity with greater fluctuations during May to November, the period of the two monsoons and (3) a period of recovery during December and January, the post-northeast monsoon period. This could be applicable for the entire territory as in the case of meteorological data.

Industrial development is advancing around Chatham Island. The saw mill and power house at Chatham and match works and the timber industry in the Bamboo Flat are dumping the wastes into the sea. The problem of pollution is restricted to the above areas at present. The pH of the bottom water samples here was considerably low probably due to the sedimentation of suspended organic matter.

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