

## ESTIMATES OF RUN OFF, EVAPORATION AND PRECIPITATION FOR BAY OF BENGAL ON SEASONAL BASIS<sup>†</sup>

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Mean seasonal river discharge rates (R) of the major rivers along the east coast of India, the coasts of Bangla Desh and Burma are computed from basic data published in UNESCO (1969, 1971 and 1971), Rao, K.L. (1979) and Encyclopaedia Britannica (1981, Vols. 9 & 4) for North East Monsoon (NEM) and South West Monsoon (SWM) comprising of December, January and February and June, July and August, respectively. In the cases of Meghna in Bangla Desh and Salween in Burma, run off estimates were not available for the specified land areas. Here, seasonal mean estimates are worked out using data on discharge heights (Baumgartner and Reichel, 1975). The results are presented in Table 1. The total seasonal run offs when distributed uniformly over the Bay of Bengal (north of 6°N) give run off heights as +3.7 cm ( $103.8 \times 10^5$  hectare metres) and +34.0 cm ( $943.22 \times 10^5$  hectare metres) for NEM and SWM, respectively.

Table 1 - Seasonal run off volumes of major rivers

River	Annual mean (m <sup>3</sup> /sec)	NEM ratio	SWM ratio	Total run off volume (x10 <sup>9</sup> m <sup>3</sup> )	
				NEM	SWM
Mahaweli	226	0.42997	0.16267	3.0645	1.1594
Godavari	3180	0.02198	0.55407	2.2043	55.5646
Krishna	1730	0.02089	0.61949	1.1397	33.7977
Mahanadi	1710	0.02109	0.59933	1.1373	32.3198
Pennar	95	0.20271	0.13814	0.6073	0.4139
Damodar	329	0.03059	0.56124	0.3174	5.8231
Ganga	11892	0.06532	0.49260	24.4967	184.7363
Brahmaputra	16186	0.05949	0.49552	30.3672	252.9340
Cauvery	664	0.20271*	0.13814*	4.2447	2.8926
Irrawady	13018	0.04863*	0.52915*	19.9660	217.2345
Salween	5421	0.04863*	0.52915*	8.3143	90.4615
Meghna (in Bangla Desh)	4215	0.05949 <sup>x</sup>	0.49552 <sup>x</sup>	7.9079	65.8666
Total				103.7673	943.204

\* Same as that of Pennar. + Mean value from ratios of Mahanadi, Ganga and Brahmaputra. x Same as that of Brahmaputra

Evaporation rates (E) are computed for 5° lat-long. squares (Varkey, 1986) from data on heat loss due to evaporation presented in Ramage *et al.* (1972) using the formula,  $L = 596 - 0.52 \cdot T_s$  (Sverdrup *et al.*, 1962); where  $T_s$  is the mean monthly sea surface temperature extracted from Ramage itself. The estimated values are

presented in Table 2 and they agree well with values presented by Venkateswaran (1956). The grand mean evaporation rates for the Bay are 33.8 cm and 34.5 cm for NEM and SWM, respectively. In the Bay of Bengal the yearly mean values (100-110 cm/yr), the NEM (~ 30 cm/quarter) and SWM (30-35 cm/quarter) values remain almost uniform throughout the Bay (Venkateswaran, 1956). Comparatively, the Arabian Sea experiences more evaporation in all seasons except in the post monsoon period of Sept-Nov. (Venkateswaran, 1956).

Table 2. Evaporation (cm/season) and Precipitation (cm/season) over Bay of Bengal

Latitude (Deg.N)	Longitude (Deg.E)	Annual Mean Precipitation (cm)	NEM (Dec+Jan+Feb)		SWM (June+July+Aug)	
			E	P	E	P
> 20	85-90	189	34.2	4.5	26.8	105.1
> 20	90-95	290	28.4	5.4	30.5	182.0
15-20	80-85	125	36.5	7.3	34.9	41.6
15-20	85-90	167	31.6	6.4	30.4	51.9
15-20	90-95	259	26.5	6.4	34.1	143.4
15-20	95-100	290	22.6	4.1	27.4	175.7
10-15	80-85	133	37.3	19.1	36.8	27.2
10-15	85-90	169	35.6	17.0	40.2	42.2
10-15	90-95	229	29.3	16.0	33.3	70.8
10-15	95-100	280	33.2	10.6	30.1	127.9
5-10	80-85	144	38.9	37.9	40.0	17.6
5-10	85-90	172	39.4	39.3	41.1	27.7
5-10	90-95	205	37.6	35.2	43.9	40.4
5-10	95-100	268	39.9	30.4	34.8	72.6

Mean yearly precipitation values for 5° lat-long. squares for the Bay are extracted from charts in Baumgartner and Reichel (1975) by space averaging contours for 5° squares. These mean yearly values are multiplied by seasonal indices (Varkey, 1986) computed using monthly rainfall data at stations along the coasts of Bay of Bengal, Andaman-Nicobar islands, Sumatra and Sri Lanka published in Schutz (1967), Rao, Y.P. (1981), India Meteorological Department (1971) and Walter (1975). The results, mean seasonal precipitation (P), are presented in Table 2. Using the above information on R, E and P net (E+P+R) exchange heights for the whole Bay for NEM and SWM are estimated as -11.5 cm and +63.7 cm, respectively.

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