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NATIONAL REPORT OF INDIA

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Introduction

Survey of India is the nodal agency of the Government of India having mandate to carry out systematic tidal observations along the Indian coastline and its Islands. It is one of the oldest departments in the world having expertise of more than 130 years in the field of tidal data collection. Since 1877 it has been collecting tidal data through a vast network of tide gauge stations along east and west coast of India.

Aftermath great tsunami of 26th December, 2004, in Indonesia and its colossal impact on Indian Coasts, Survey of India took the initiative for up-gradation of its tide gauge network. Under the Modernization and Expansion program of Indian Tide Gauge Network along the Indian Coast and Islands, it is equipping all its tidal observatories with state-of-the-art digital tide gauges co-located with dual frequency GPS receivers and Real Time Data Transmission facilities. It is decided to establish 36 tidal observatories (in total) along the Indian coastline and islands.

To receive tide gauge and GPS data on real time a central receiving station with VSAT facility has been established at National Tidal Data Centre, Geodetic & Research Branch, Survey of India, Dehradun. 30 tidal observatories have already been established and some more tidal observatories are likely to be made operational in the coming years. Data from remote locations is downloaded by accessing tide gauges remotely from National Tidal Data Centre, Dehradun.

Survey of India also bears the responsibility of annual tide table publication from Suez to Singapore in the Indian Ocean. It publishes following tide tables:

(i) Indian Tide Tables containing predictions of daily high / low tide and time of 76 ports around the world, out of which responsibility of 30 Indian ports and 14 foreign ports lying with Survey of India. Predictions of remaining 32 foreign ports are published in this tide table on the basis of data received from various organizations on mutual exchange basis.

(ii) Hugli River Tide Tables containing 6 ports situated in the Hugli River namely, Sagar, Gangra, Haldia, Diamond Harbour, Mayapur and Garden Reach.

Sharing of Tidal Data with International organizations

Survey of India also collaborates with International community by providing **Monthly** and **Annual Mean Sea Level** data to the Permanent Service for Mean Sea Level (PSMSL), U.K. Data up to 2009 has already been supplied to the PSMSL, U.K. It has been contributing data to PMSL since its inception.


INDIAN TIDE GAUGE NETWORK
NATIONAL GPS AND TIDAL DATA CENTRES
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
UTTARANCHAL
HARYANA
DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL PRADESH
ASSAM
MEGHALAYA
BANGLADESH
MADHYA PRADESH
JHARKHAND
WEST BENGAL
CHHATTISGARH
ORISSA
MAHARASHTRA
ANDHRA PRADESH
KARNATAKA
TAMILNADU
KERALA
KANDLA
OKHA
VADINAR
GUJARAT
PORBANDAR
MAGDALLA
VERAVAL
MUMBAI JN^T
JAIGARH
MARMAGAO
GOA
KARWAR
NEW MANGALORE
BEYPORE
KAVARATTI
COCHIN
MINICOY
KANNIYAKUMARI
TUTICORIN
RAMESHWARAM
CUDDALORE
NAGAPPATINAM
CHENNAI
ENNORE
KRISHANAPATNAM
MACHILIPATNAM
KAKINADA
VISAKHAPATNAM
PARADIP
GOPALPUR
SAGAR
HALDIA
GARDEN REACH
HUGLI POINT
ARABIAN SEA
BAY OF BENGAL
AERIAL BAY
PORT BLAIR
NANCOWRY
CAMPBELL BAY
REFERENCES
TIDAL OBSERVATORY ALREADY INSTALLED
TIDAL OBSERVATORY UNDER CONSIDERATION
TIDAL OBSERVATORY WITHOUT REAL TIME DATA TRANSMISSION FACILITY

DETAIL OF TIDE GAUGE STATIONS AND TYPE OF TIDE GAUGES INSTALLED

Sl. No.	Station	GLOSS Number	PSMSL Code	Latitude	Longitude	Survey of India Pattern Float type Conventional Tide Gauge	Pressure Sensor Tide Gauge	Shaft Encoder Tide Gauge	Radar Sensor Tide Gauge	SGS WEATHER (INCOIS TIDE GAUGE)	Remarks
1	VISAKHAPATNAM	35	500/101	17 41 N	83 17 E	Y	Y	-	-	Y	
2	MARMAGAO	281	500/065	15 25 N	73 48 E	Y	Y	-	-	-	
3	ENNORE			13 15 N	80 20 E	Y	Y	-	-	Y	
4	COCHIN	32	500/081	09 58 N	76 16 E	Y	Y	-	-	-	
5	KANDLA			23 01 N	70 13 E	Y	Y	Y	-	Y	
6	KAVARATTI			10 34 N	72 38 E	Y	Y	-	Y	Y	
7	MINICOY	29	455/011	08 17 N	73 03 E	Y	Y	-	Y	Y	
8	PORT BLAIR	38	540/001	11 41 N	92 46 E	Y	Y	Y	-	Y	
9	NAN COWRY			08 03 N	93 33 E	Y	Y	Y	-	Y	
10	HALDIA			22 02 N	88 06 E	Y	Y	-	-	-	
11	CHENNAI	34	500/091	13 06 N	80 18 E	Y	Y	-	-	Y	
12	TUTICORIN			08 45 N	78 12 E	Y	Y	-	-	Y	
13	MACHILIPATNAM			16 09 N	81 10 E	Y	Y	-	-	Y	
14	PARADIP			20 16 N	86 42 E	Y	Y	-	-	Y	
15	GARDEN REACH			22 33 N	88 18 E	Y	Y	-	Y	Y	
16	KARWAR			14 48 N	74 07 E	Y	Y	Y	-	Y	
17	NEW MANGALORE			12 55 N	74 48 E	Y	Y	-	-	Y	
18	VADINAR			22 27 N	69 41 E	Y	Y	-	-	-	
19	AERIAL BAY			13 17 N	93 02 E	Y	Y	-	-	Y	
20	CAMPBELL BAY			07 00 N	93 56 E	Y	Y	Y	-	Y	
21	KRISHNAPATNAM			14 15 N	80 08 E	Y	Y	-	-	Y	
22	JNPT, NAVI MUMBAI			18 55 N	72 45 E	Y	Y	Y	-	Y	
23	NAGAPATTINAM			10 46 N	79 51 E	Y	Y	-	-	Y	
24	OKHA			22 28 N	69 05 E	Y	Y	-	-	Y	
25	POBANDAR			21 38 N	69 37 E	Y	Y	-	-	-	
26	VERAVAL	31	500/021	20 54 N	70 22 E	Y	Y	-	-	-	
27	KAKINADA			16 56 N	82 15 E	Y	Y	-	-	-	
28	CUDDALUR			11 47 N	79 45 E	Y	Y	-	-	-	
29	RAMESHWARAM			09 16 N	79 12 E	Y	Y	-	-	-	
30	KANNIYA KUMARI			08 05 N	77 32 E	Y	Y	-	-	-	
31	GOPALPUR			19 16 N	84 55 E	-	-	-	-	-	* UNDER CONSIDERATION
32	BEYPORE			11 10 N	75 48 E	-	-	-	-	-	* UNDER CONSIDERATION
33	HUGLI POINT					-	-	-	-	-	* UNDER CONSIDERATION
34	SAGAR			21 39 N	88 03 E	-	-	-	-	-	* UNDER CONSIDERATION
35	MAGDALLA					-	-	-	-	-	* UNDER CONSIDERATION
36	JAIGARH					-	-	-	-	-	* UNDER CONSIDERATION

Note:

* Ports are under consideration for establishment of permanent tide gauge station. and yet to be finalized.

Y ⇨ Tide Gauge installed

Overview of Tide Gauge Technology

Various types of tide gauges are being used in the network for tidal data collection. At least one float type tide gauge and one Pressure sensor tide gauge have been installed at each tidal station under this network. Few of the stations are also equipped with Shaft Encoder and RADAR tide gauges. Float type analogue tide gauges have also been upgraded into digital tide gauges by integrating shaft encoder and digital data recorder.

Overview of GPS technology

All the tide gauge stations are being equipped with dual frequency GPS receivers (Trimble 5700/ Leica GRX 1200) for GPS data recording on 24X7 basis to study the movement of coasts if any due to various reasons.

Real time data communication system

A dedicated VSAT network (Intranet) has been installed for real time transmission of tidal and GPS data from remote locations to the centrally located hub station at National Tidal Data Centre (NTDC), Geodetic & Research Branch of the Survey of India, Dehradun. Data collected at these stations is also contributed with Indian National Centre for Ocean Information Services, Hyderabad for monitoring of extreme events like tsunami and storm surges taking place in the region.

Overview of the data availability and its use

Data collected in the form of analogue charts or digital format is quality checked first and archived in the National Tidal Data Centre, Dehradun. Same is also used for determination of Mean Sea Level and obtaining tidal constituents for carrying out advanced tidal predictions. This data is also provided to various organizations/ scientific community for their studies as per data dissemination policy approved by the Government of India. The historical and current data is being used for hazard line demarcation as part of Integrated Coastal Zone management. Levelling, GPS and Gravity Data is being used for studying the stability of Coasts and estimation of sea level rise, land subsidence etc.

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