

SEA LEVEL ACTIVITIES - PAKISTAN

Mujeeb ur Rahman

(Ex Pakistan Navy Person)

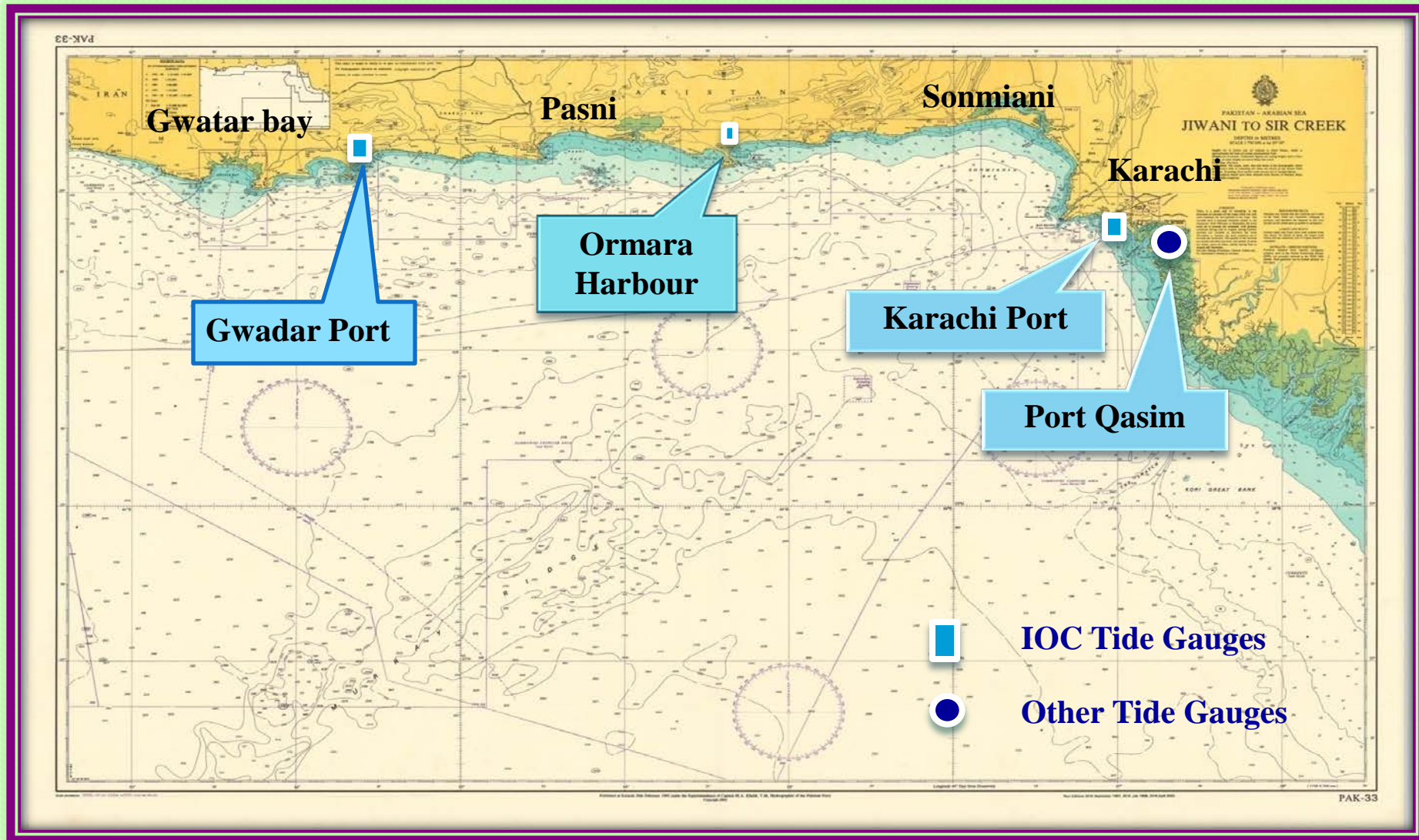
Hydrographic Surveyor

Karachi Port Trust, Pakistan

Sequence of Presentation

- Location Map - Tide Gauges
- Overview of Gauge Technology – Karachi Port
- KPT Tidal Observatory
- Overview of Gauge Technology in other Ports
- Sea Level Data Availability
- Sea Level Products
- Tidal Analysis Package in use
- Data Banks
- Mean Sea Level Trend - Karachi

Location Map – Tide Gauges



Overview of Gauge Technology – Karachi Port

GENERAL

- KPT New Tidal Observatory - Established in December 2006
- Equipment Provided by IOC/UNESCO through Pakistan Navy
- Equipment Installed by KPT/PN – January 2007
- Equipment re-installed in the New Cabin – 2011
- Prompt assistance received from IOC/UNESCO in installation and thereafter in replacement of defective sensors
- Equipment is fully operational since January 2007

Overview of Gauge Technology – Karachi Port

KPT Tidal Observatory consists of:

OTT HDR Tide Gauge:

- **The Sensors**
 - Radar Sensor – Kalesto Type
 - Pressure Sensor -1 (at MSL position)
 - Pressure Sensor -2
- **Main Instrumentation Cabinet** with the data logger LogoSens2, the HDR satellite transmitter, the power control unit including a battery and the lightening protections for the power and data lines.
- The HDR transmitter including a **Crossed Yagi Antenna**, a small **GPS patch antenna** and all mounting materials

Float Type Tide Gauge is also installed at the site and the sea level data from this gauge is transmitted in real time to the KPT dredger and the Survey Boat



Tidal Observatory
Internal View



Radar Tide Gauge



Sea Level Stations
ODINAFRICA Website



Pressure Sensors
Junction Box



Instrumentation Cabinet



Pakistan Navy



KPT



Lt Cdr T Rauf

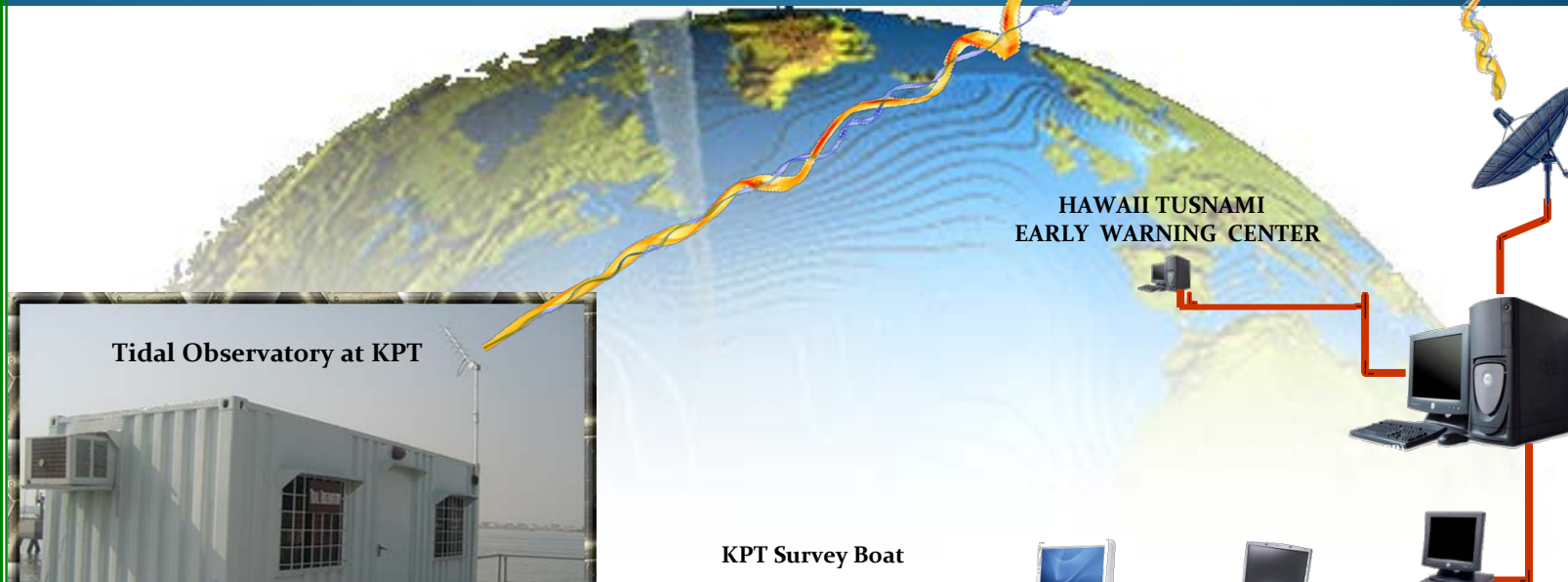
Cdr (R) M Ashraf

Lt Cdr L U Khan

Mujeeb ur Rahman

Date of Installation: 26 - 01 - 2007

TIDAL OBSERVATORY



Tidal Observatory at KPT



KPT Survey Boat



Navy

KPT

Web Server



Logo Sens Data logger



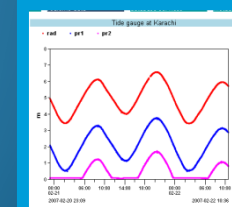
Power Control Unit



High Data Rate Transmitter



Satellite Antenna



Output Graph



TIDAL OBSERVATORY

Karachi Harbour

(2007)





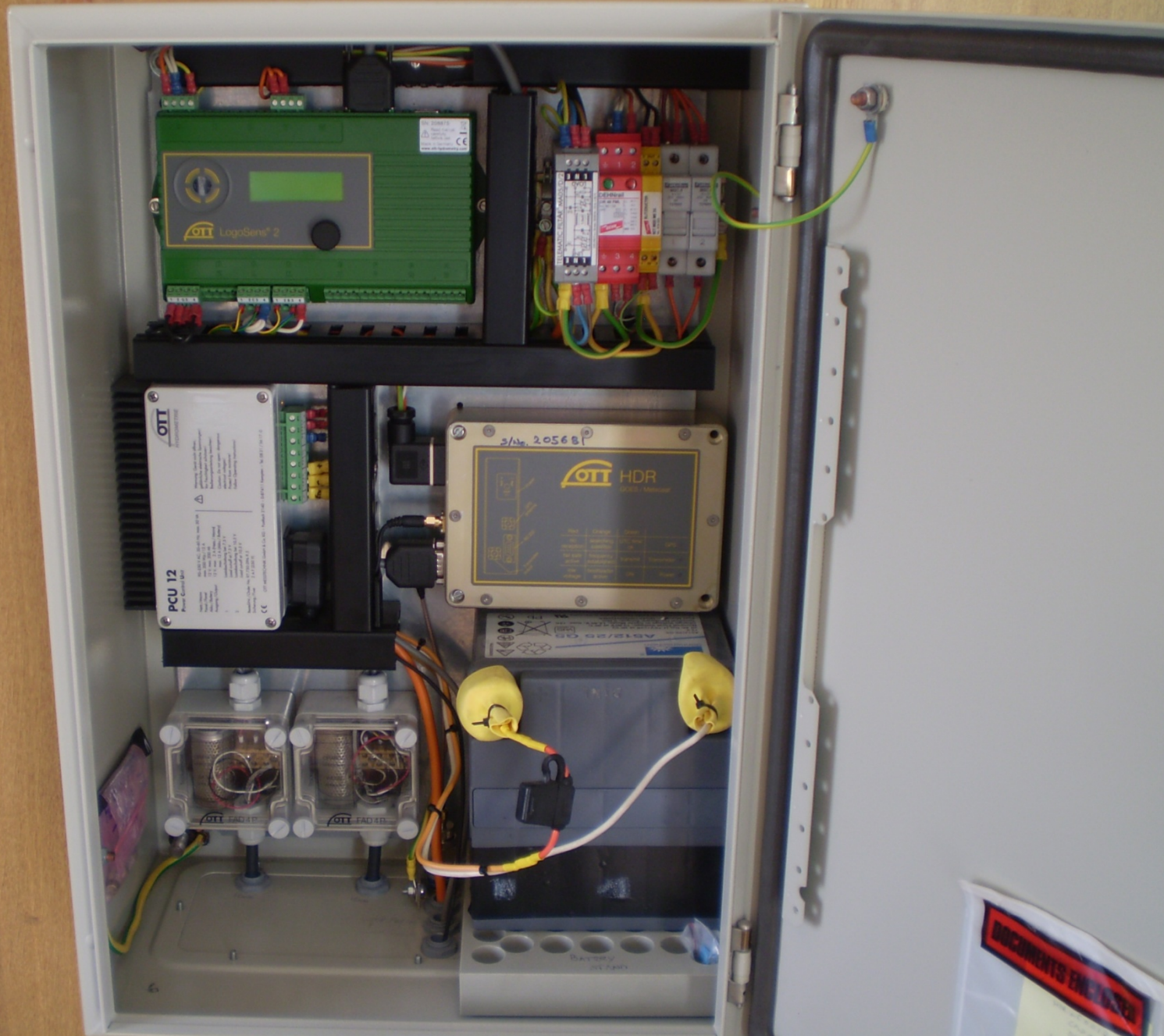
Mounting Arm

Kalesto Radar Tide Gauge

Crossed Yagi Antenna



Instrumentation Cabinet



LogoSens2 Data Logger

SN: 208875
Read manual
carefully
before use
Made in Germany
www.oti-hydrometry.com

OTI LogoSens[®] 2

OTI
HYDROMETRIE



HDR Satellite Transmitter

S/No. 205681



OTT HDR
GOES / Meteosat

Red	Orange	Green	
no reception	searching satellites	UTC time ok	GPS ●
fail safe active	frequency established	transmit	Transmitter ●
low voltage	bootloader active	ON	Power ●

Sonnenschein

A512/25 G5

12 V
25 Ah G20 (1.75V/cell at 20 °C)
Nominal Float Voltage: 13.80V at 20 °C
Charge Voltage in Cycle Mode: 14.40 V, max. 12h
Terminal Hardware Torque: 5 Nm
Part Number: IN GA0120025HS0BA

VDS
CE
Pb
RECYCLE

OTT MESSTECHNIK GmbH & Co. KG · Postfach 2140 · 42699 Solingen
CE

Power Control Unit including the Battery



OTT
HYDROMETRIE

PCU 12
Power Control Unit

Netz / Mains	90-250 V AC; 50-60 Hz; max. 50 VA
Panel / Panel	max. 200 Wp / 12 A
Akku / Battery	12 V; max. 200 Ah
Ausgang / Output	12 V; max. 2 A [Netz / Mains]
	max. 12 A [Akku / Battery]

1 Lastabschaltung bei 7,5 V
Load cut-off at 7,5 V

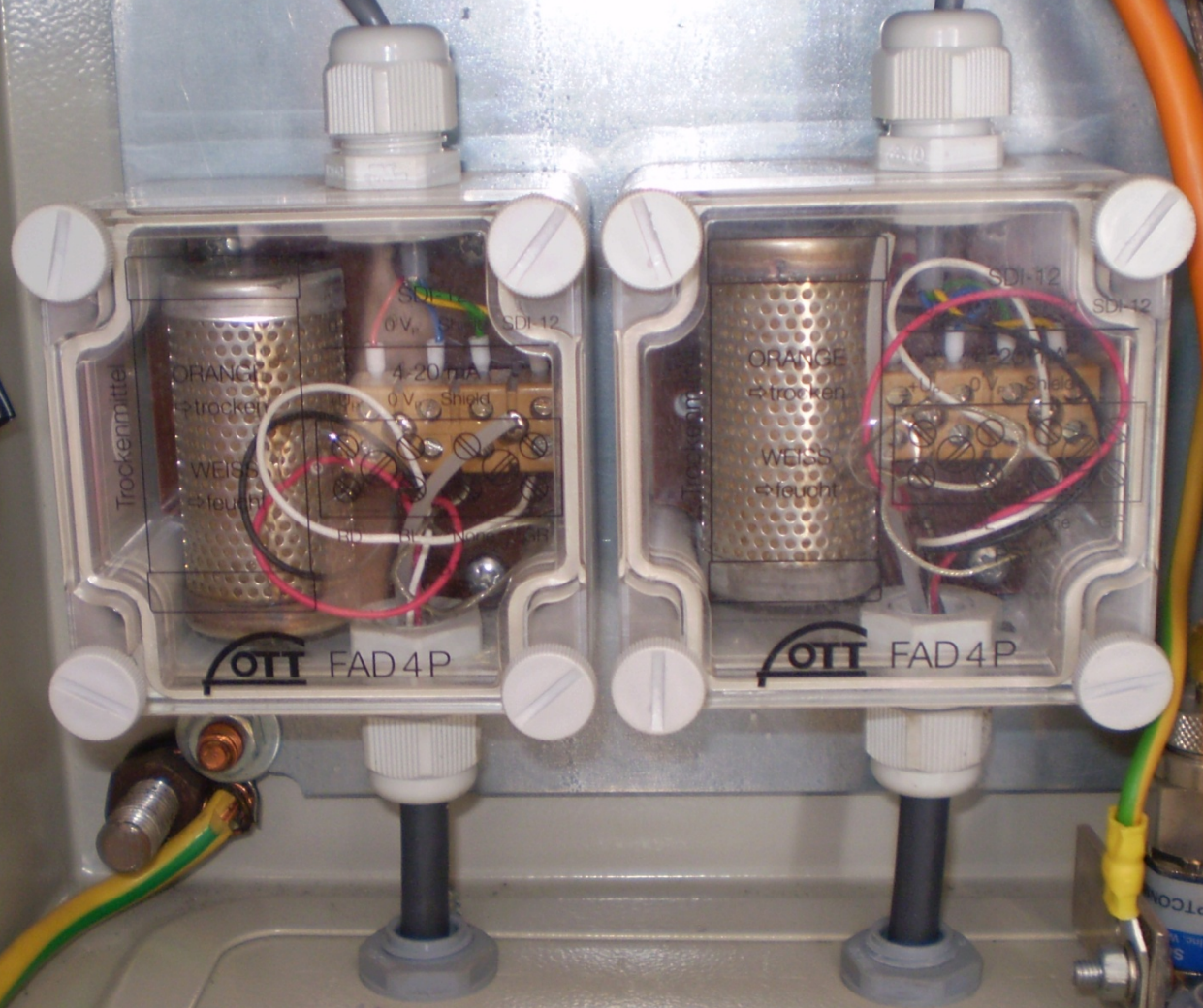
2 Lastabschaltung bei 10,5 V
Load cut-off at 10,5 V

Bestell-Nr. / Order No. 97.750.096.9.5
Sicherung / Fuse 2 A F (250 V)

⚠ **Warnung:** Gerät nicht öffnen;
gefährliche elektrische Spannungen!
Vor Feuchtigkeit schützen!
Bedienungsanleitung beachten!

*Caution: Do not open; dangerous
electrical voltages!
Protect from moisture!
Follow Operating Instructions!*

CE OTT MESSTECHNIK GmbH & Co. KG • Postfach 2140 • D-87411 Kempten • Tel. 08 31 / 56 17-0



Pressure Sensors Junction Box



**Stilling Well for
Float type Sensor**

**Stilling well
for Pressure Sensors**

GPS Patch Antenna



New Fiberglass Tidal Hut installed in 2011



KPT Bench Mark -3



KPT

**TIDAL
OBSERVATORY**



OTT HDR Tide Gauges in other Ports

ORMARA

- The Sensors
 - One Radar Gauge
 - Two Pressure Sensors
- **Main Instrumentation Cabinet** with the data logger LogoSens2, the HDR satellite transmitter, the power supply unit including a battery and the lightening protections for the power and data lines.
- The HDR transmitter including a **Crossed Yagi Antenna**, a small **GPS patch antenna** and all mounting material

Gwadar

- One Radar Gauge RLS
- **Main instrumentation Cabinet** with the data logger LogoSens2, the HDR satellite transmitter, the power supply unit including a battery and the lightening protections for the power and data lines.
- The HDR transmitter including a **Crossed Yagi Antenna**, a small **GPS patch antenna** and all mounting material



Above Tide Gauges are Operational

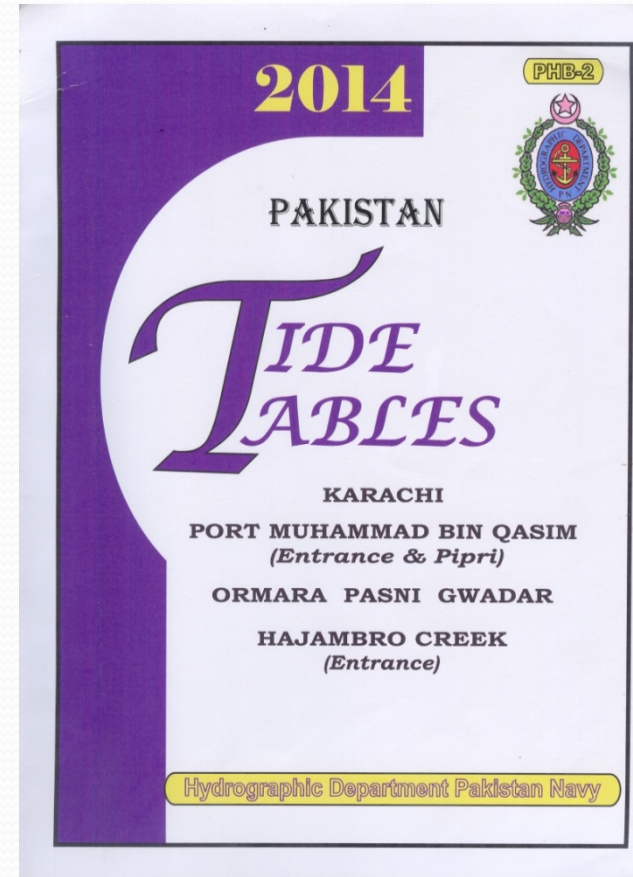
Sea Level Data Availability

- **Sea Level Data for Karachi Port, Ormara Harbour and Gwadar Port is available on IOC/UNESCO website.**
- **Users can download the data from the above website. IOC website link is also provided to the KPT website.**
- **KPT Hydrographic Office collects sea level data, compile it month-wise in Excel format and send the same on yearly basis to Pakistan Navy Hydrographic Department, which is the National Agency, responsible for Printing of Nautical Charts and Publications including Pakistan Tide Tables for Pakistani Ports.**
- **Tsunami Warning Centre at Pakistan Meteorological Department, Karachi also uses sea level data of Karachi Port**
- **National Institute of Oceanography, Karachi also uses the above data for research purposes.**

Sea Level Products

Pakistan Navy Hydrographic Department uses sea level observed data from Pakistani Ports and carries out analysis and prediction of tides for printing of Pakistan Tide tables for:

- Karachi
- Port Qasim (Entrance & Pipri)
- Ormara
- Pasni
- Gwadar
- Hajambro Creek (Entrance)



Tidal analysis package in use

- Pakistan Navy Hydrographic Office has used various softwares over the years for analysis and prediction of tides for Pakistani Ports.
- Presently, they are using GeoTide software for the task.
- Karachi Port needs a dedicated software for analysis and prediction of tides at the port's level.

Data Banks

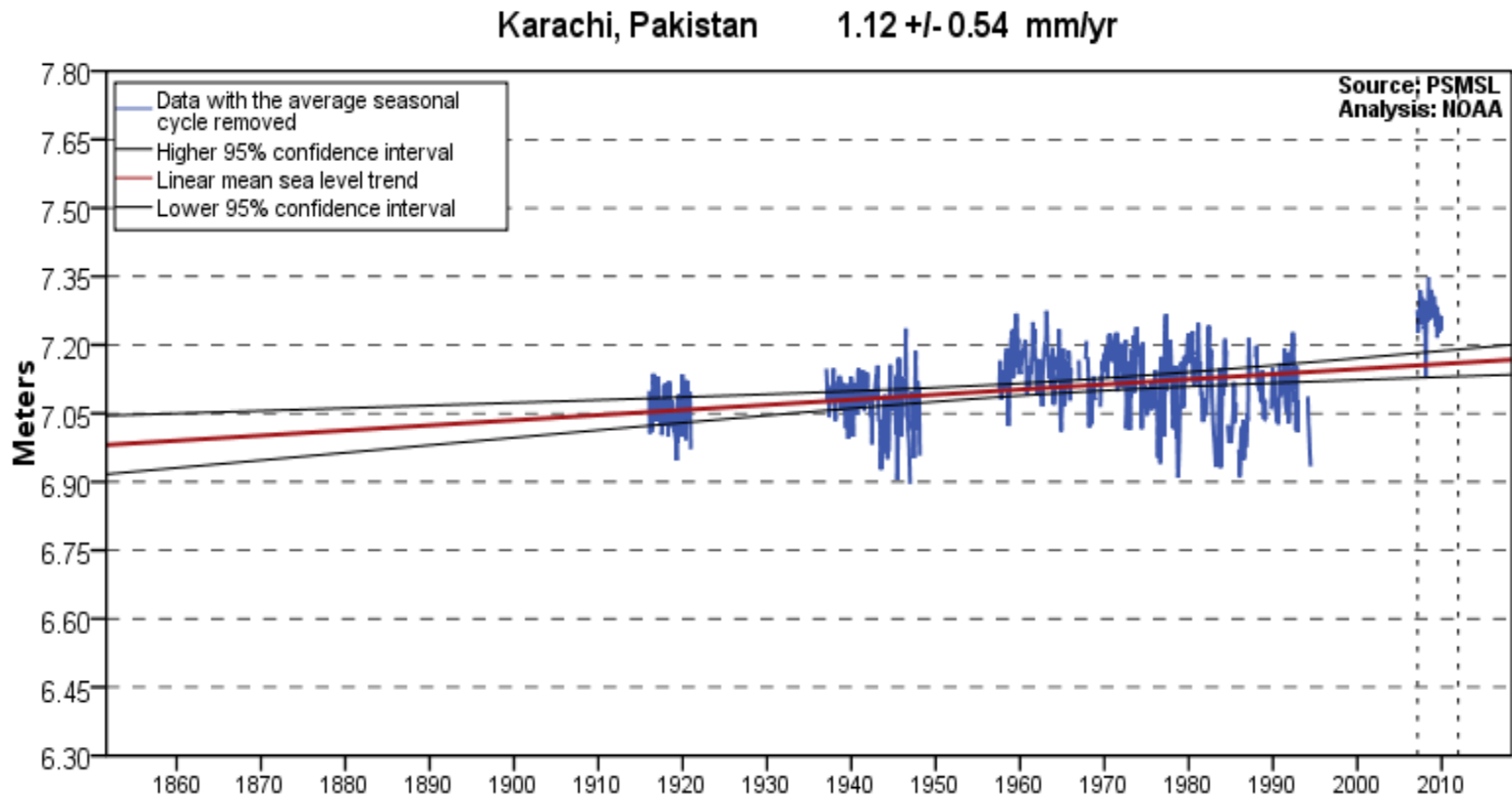
- **KPT**

- The recent sea level data from 2007 till 2013 at one minute interval (year-wise) has been preserved on computer at KPT Hydrographic Office.
- Some old data of tides (1975 – 2006) in gaps is also available on paper sheets. The same is being computerized.

- **NIO, Karachi and PN**

- The data banks of National Institute of Oceanography, Karachi and PN Hydrographic Department also have old data of Karachi and other ports.

Mean Sea Level Trend – Karachi



The mean sea level trend is 1.12 millimeters/year with a 95% confidence interval of +/- 0.54 mm/yr based on monthly mean sea level data from 1916 to 2011 which is equivalent to a change of 0.37 feet in 100 years.



THANK YOU