

# National Report (PAKISTAN) DBCP-30

By M Arshid Javed

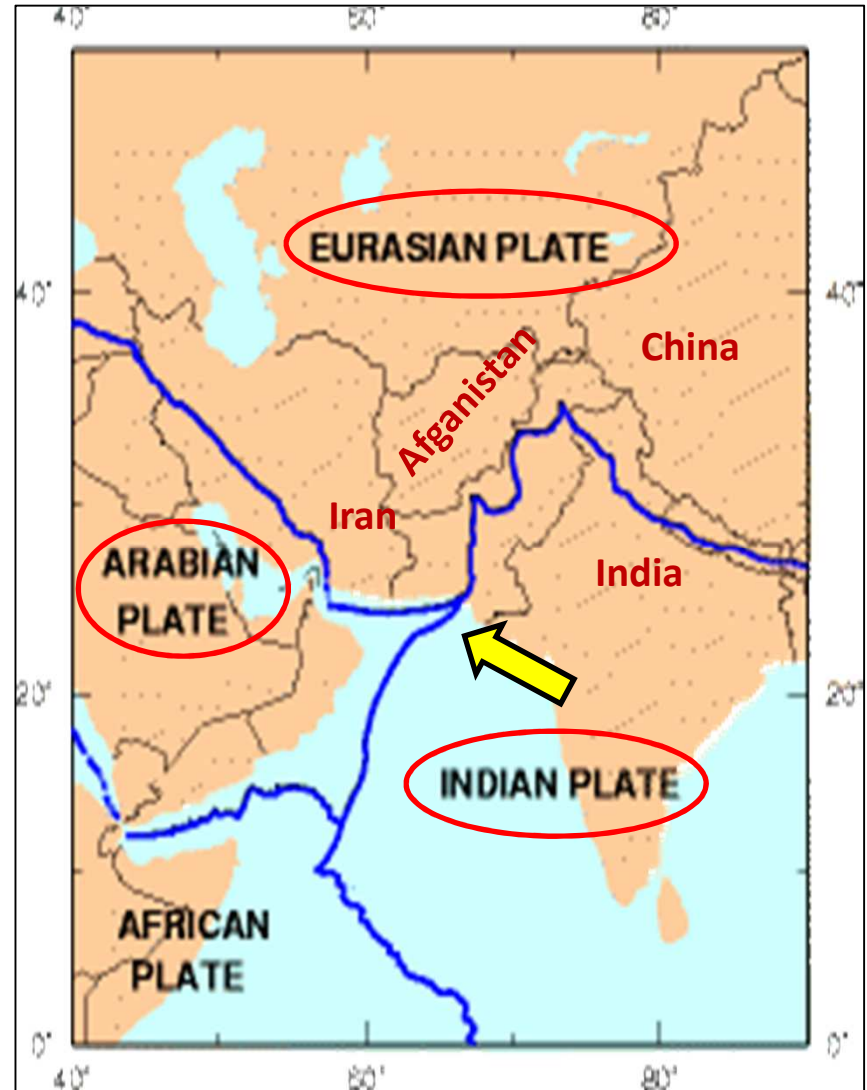
27 – 31 Oct 14  
Weihai, China

# Sequence

- Geography
- Coastal and offshore topography
- Sea level variation and monitoring mechanism
- Special offshore and coastal features
- Oceanographic activities
- Future plans

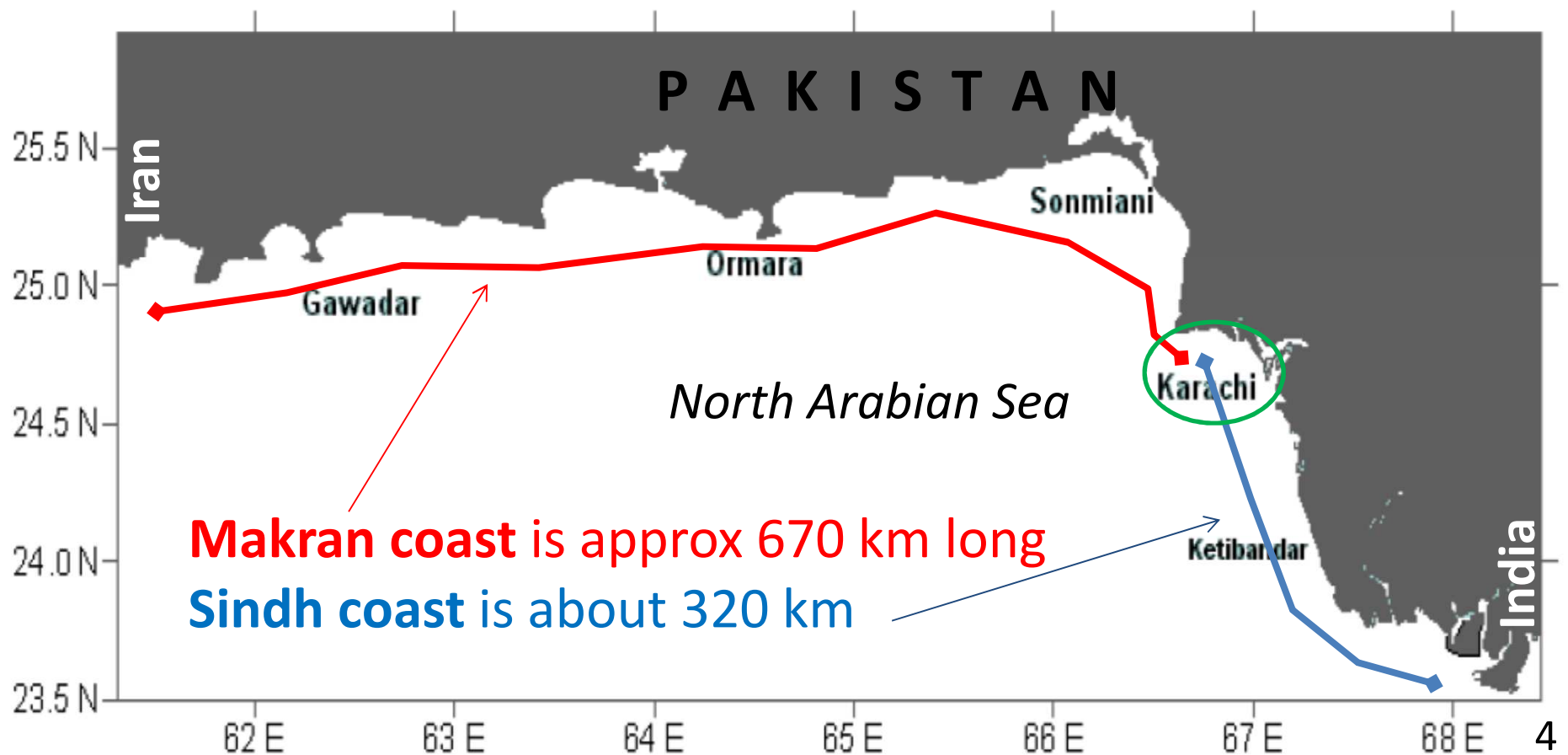
# Geography

- Pakistan coast is located at the tri-junction of tectonic plates
- Land area overlaps with Indian and Eurasian plates
  - 2 provinces lie on the NW corner of the Indian plate
  - Other 2 provinces lie at the southern end of Eurasian plate

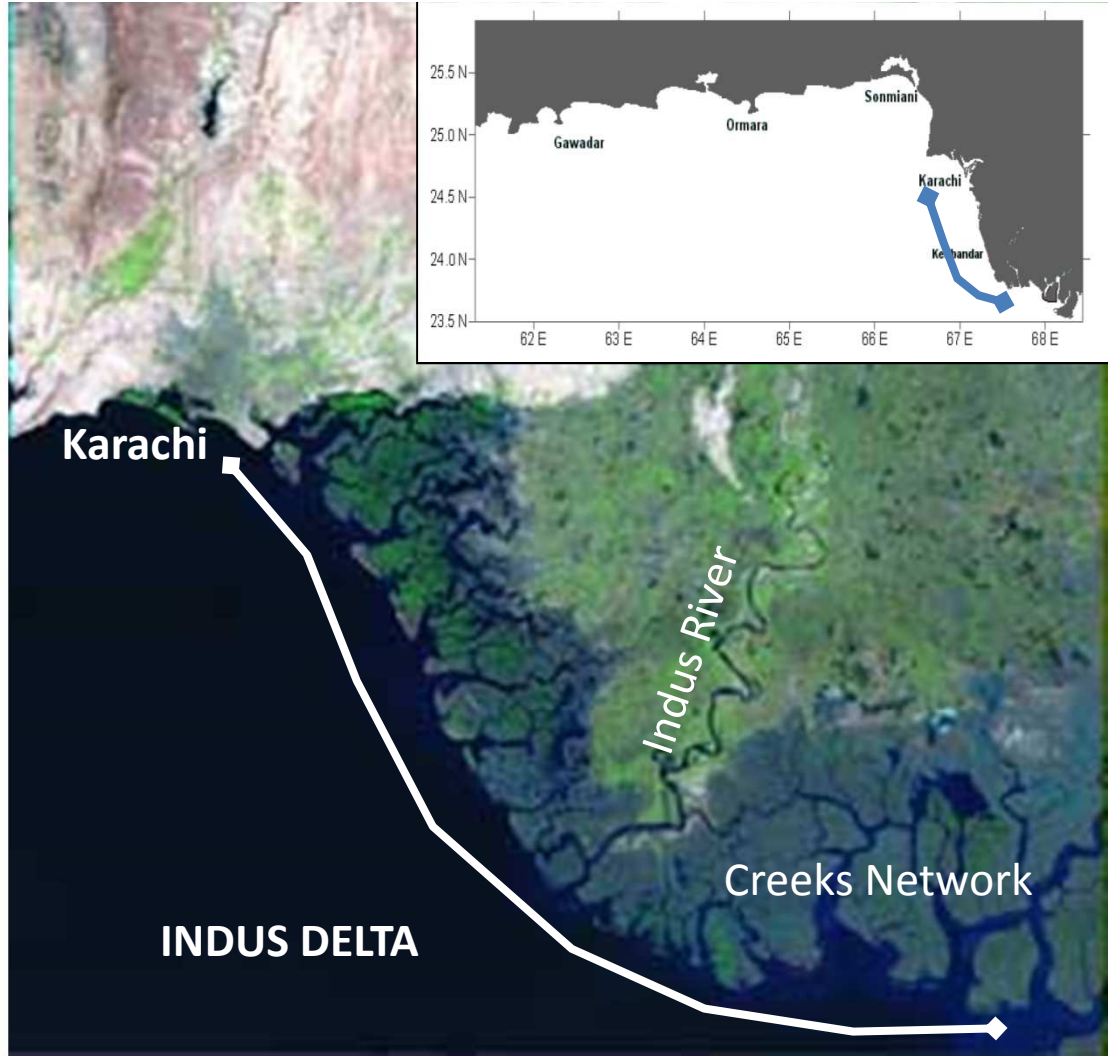


# Coast Line of Pakistan

- Pakistan coast is 990 Km long extending from Indian border in the southeast to the Iranian border in the west

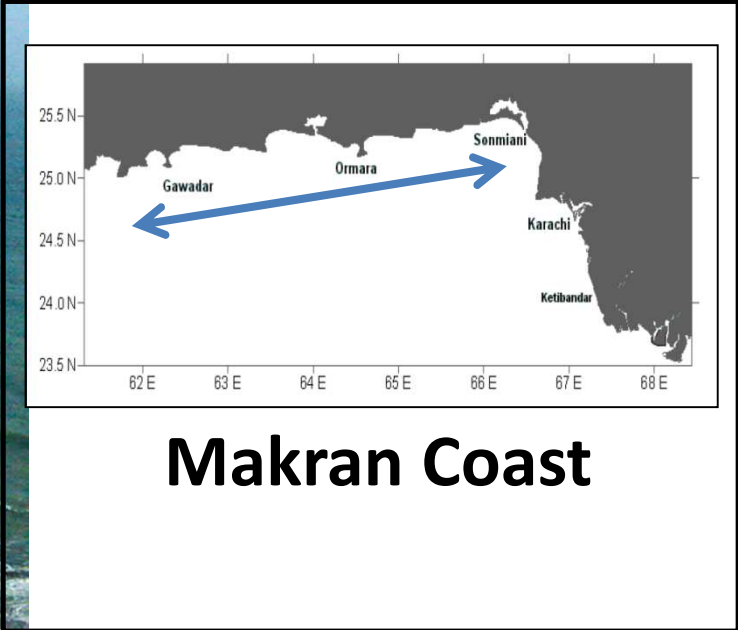


**Low lying Area (LW)**



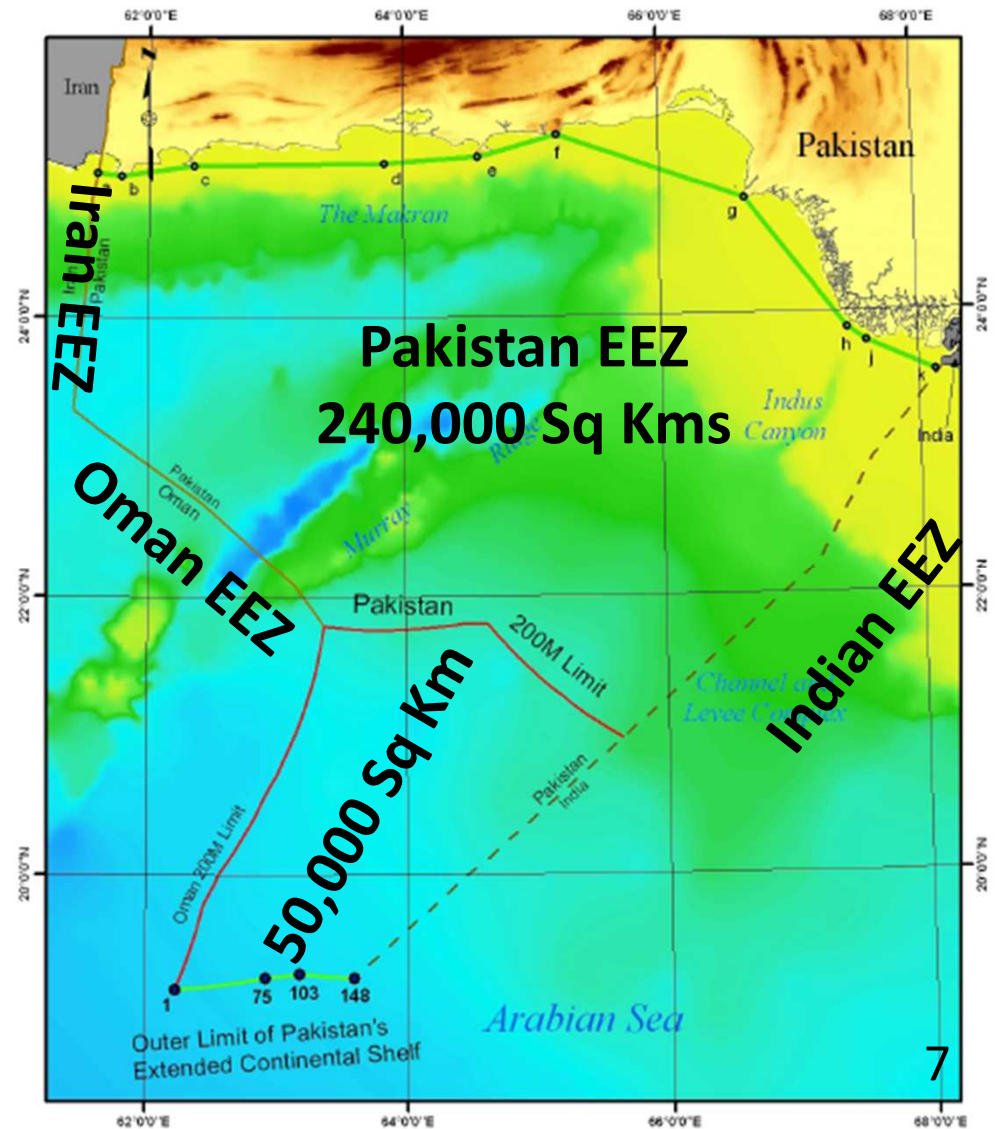
## **Low lying Sindh Coast**

**Prone to storm/ cyclones  
and floods in the low  
lying areas**

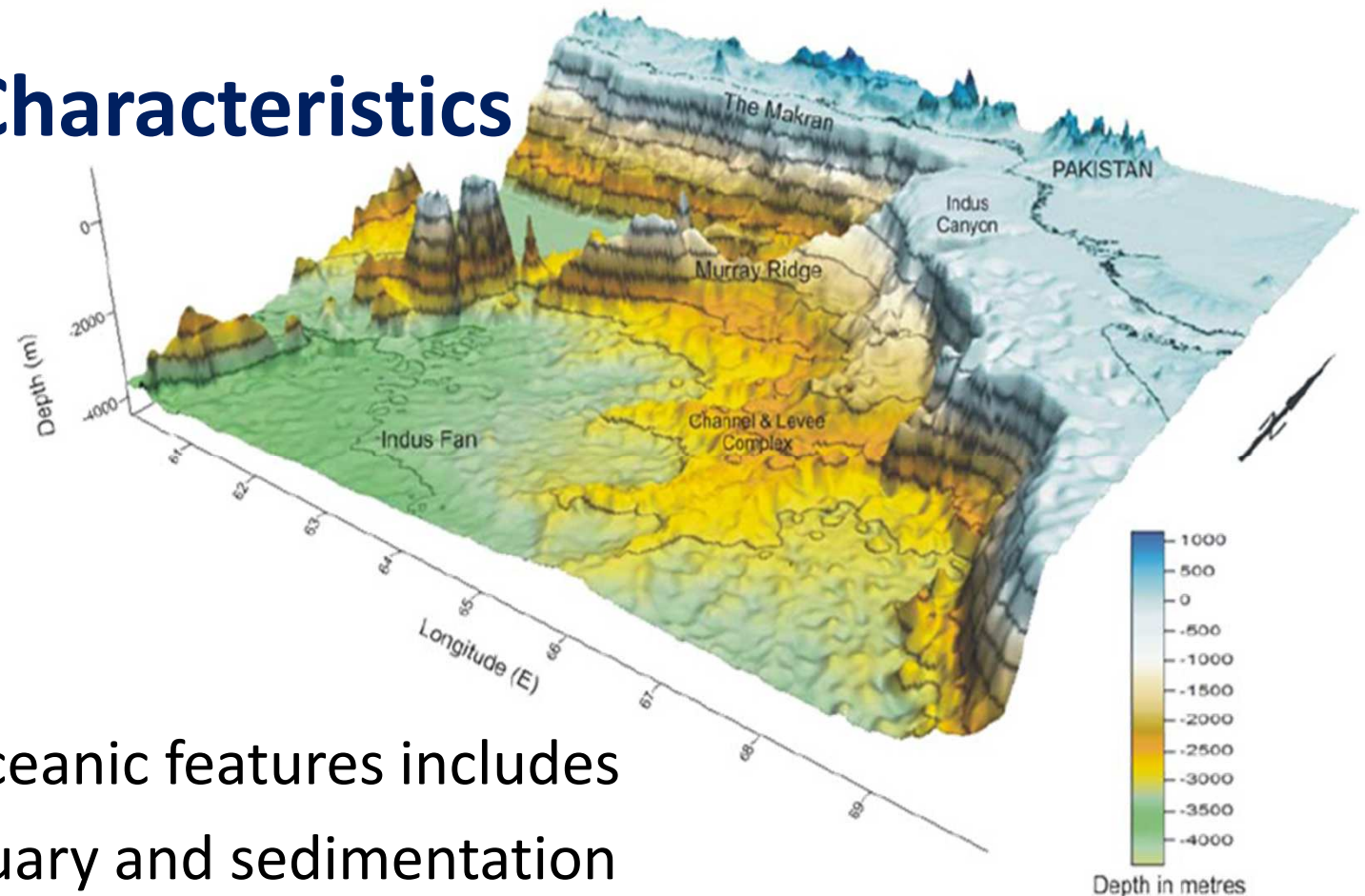


# Offshore Area

- EEZ is about 240K Sq Km
- Potential extension of Continental Shelf area of about 50,000 Sq Km
- As such, the total maritime zone of Pakistan is over 30% of the land area



# Regional Characteristics



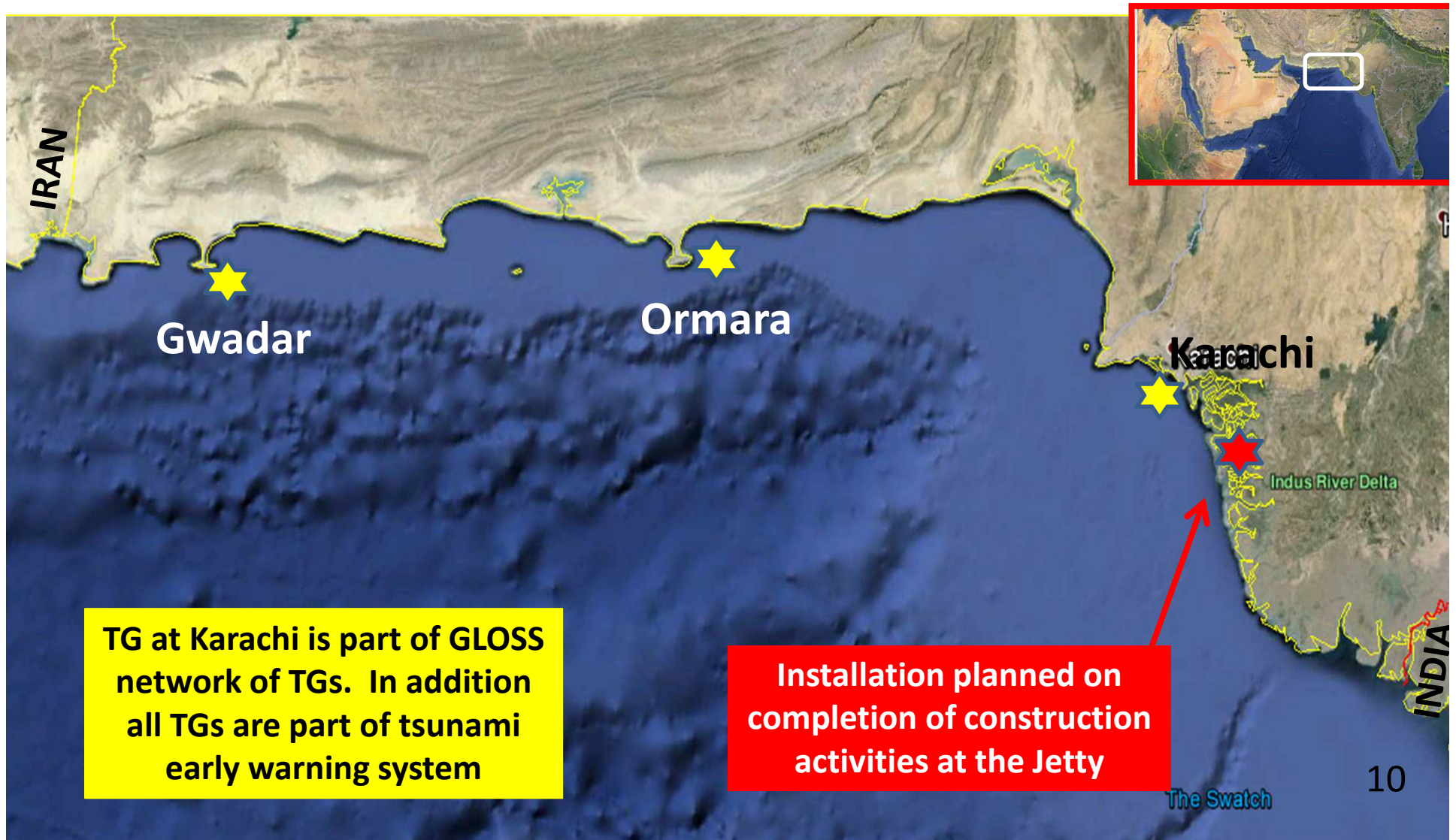
- Important oceanic features includes
  - Indus estuary and sedimentation
  - Monsoon and climatic change
  - Upwelling and circulation
  - Murray ridge and
  - Makran subduction Margin



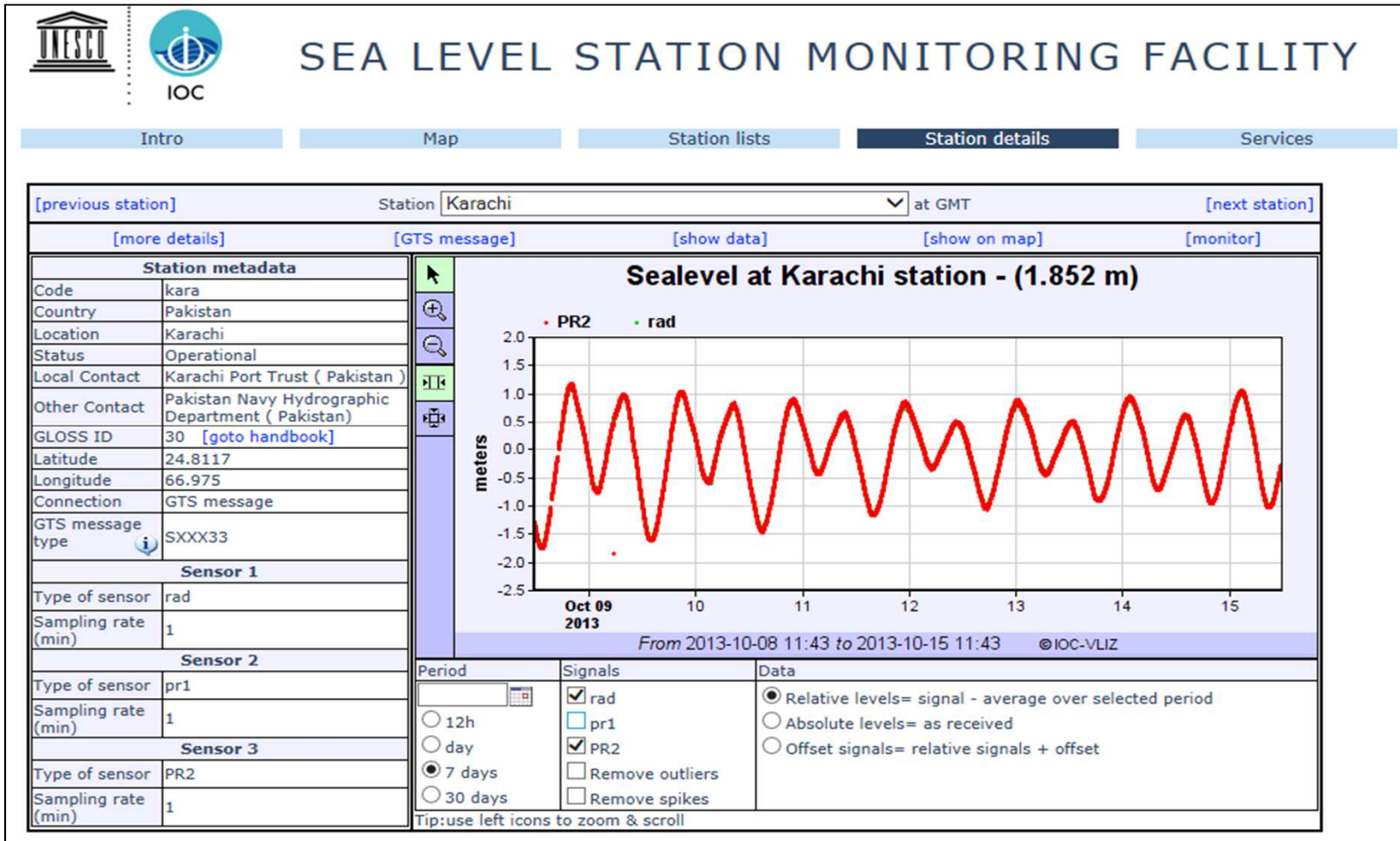
# Sea Level Variations

- UNEP has included Pakistan in a group of countries which are vulnerable to the impact of SLR
- Rising rate of sea level at Karachi is within the global range of 1-2 mm/year
- Historical air temperature and SST data in the offshore area of Pakistan has shown increasing pattern
  - An increasing trend of **0.67°C** has been registered in the air temperature **over the last 35 years**
  - **Mean SST** has also registered an increasing trend of **0.3°C in a decade**

# Tide Gauges Network along the Coast



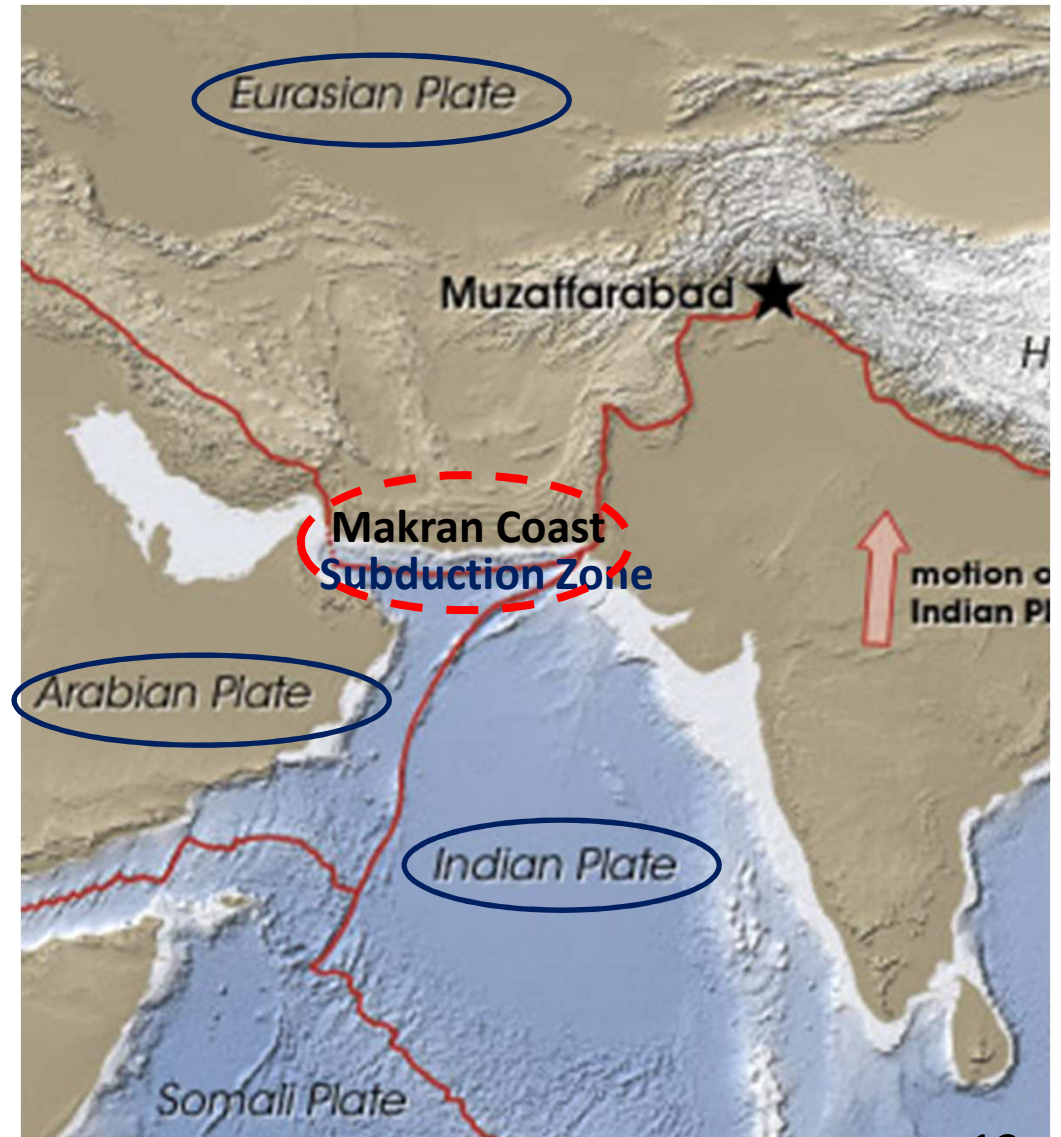
# Tide Gauge at Karachi



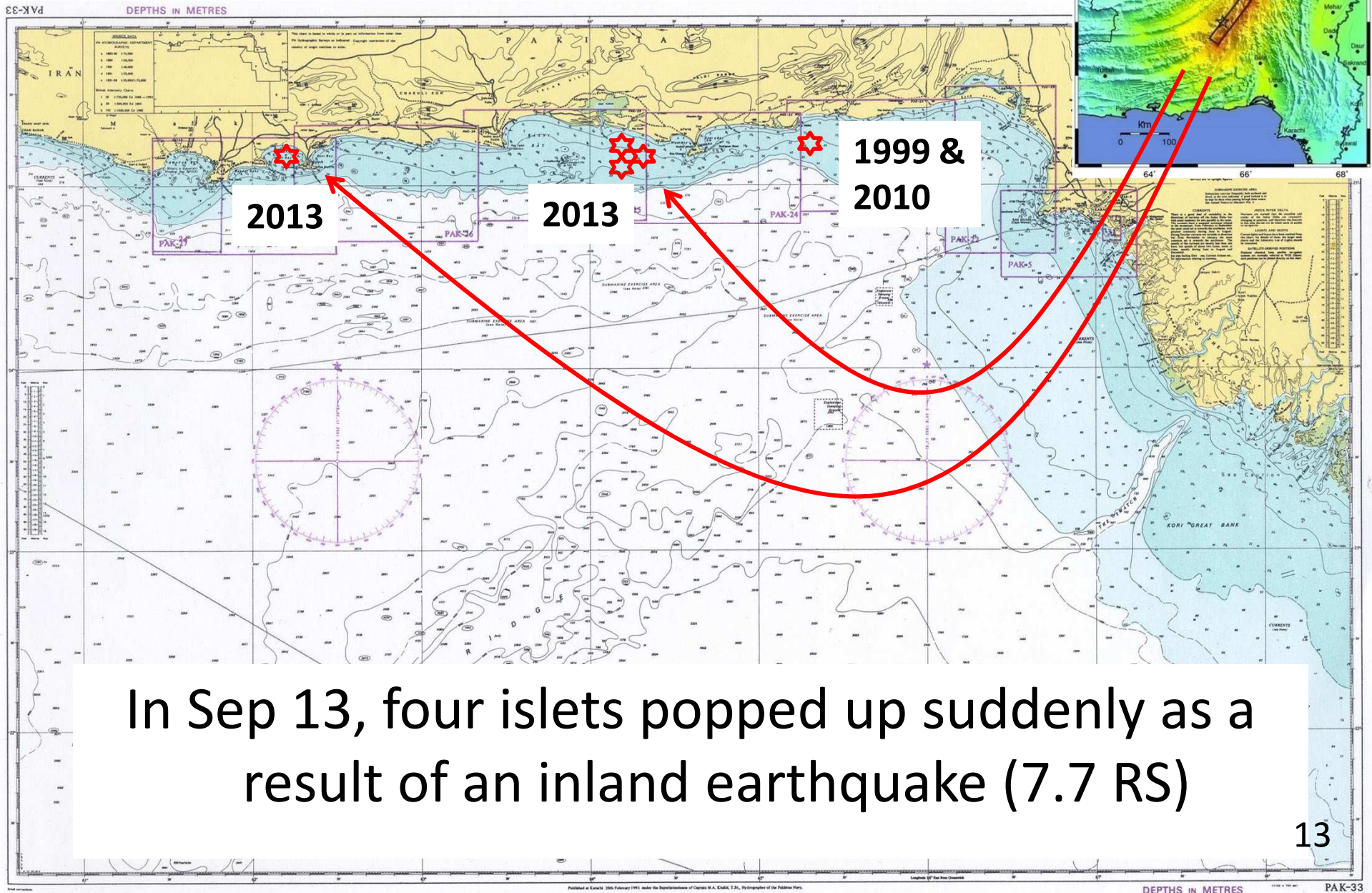
- Tidal curve recorded at Karachi
- Similar tide gauges are installed at Ormara and Gwadar also 11

# Subduction Zone along Makran Coast and Emergence of Islets

- Makran coastal belt lies over a subduction zone
- Repeated events of islets emergence have been recorded in the past due to tectonic activity



# Sudden Emergence of Islets



In Sep 13, four islets popped up suddenly as a result of an inland earthquake (7.7 RS)

# Emergence of Islet/ Island/ Mud Volcano



# Emergence of Islet/ Island/ Mud Volcano



September  
2013



Dim about 250 X 200 X 20m

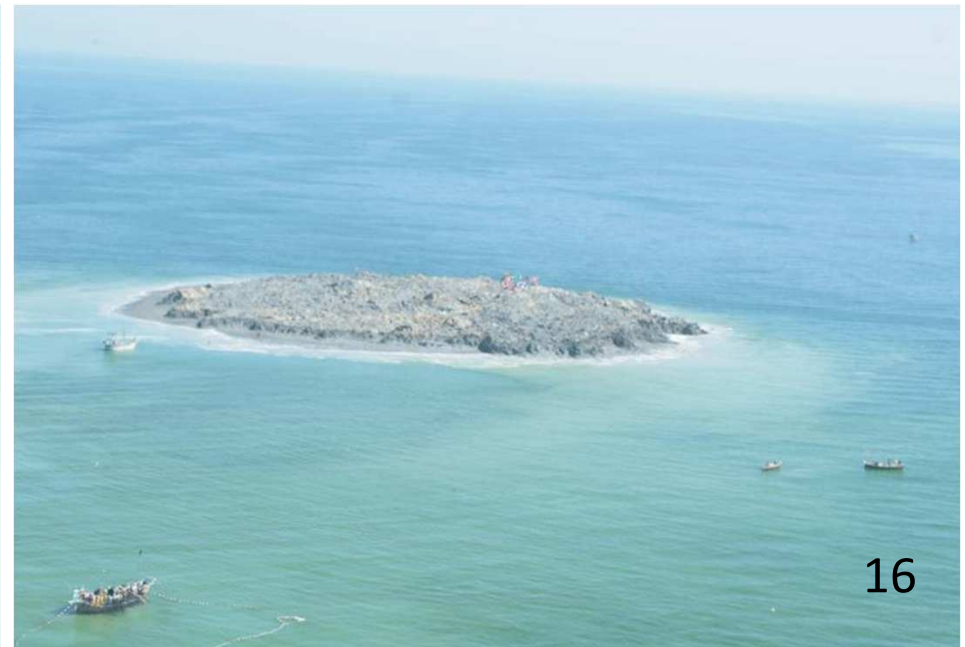




**Dim 220 X 150 X 15m**



## **Views of Malan Island - 2010**







## Coastal features



**300 feet above sea level**  
**World's highest active mud volcano**  
**(Chander Gup)**



# Marine Observations – Research Vessel

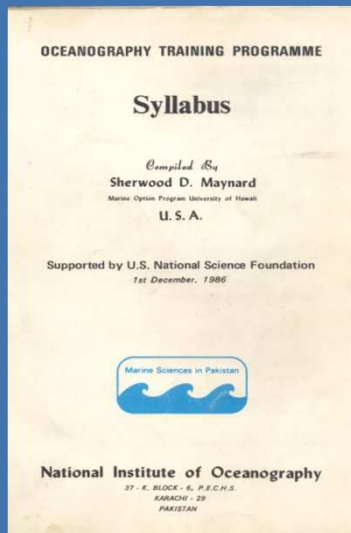
- S V BEHR PAIMA supports oceanic research activities
  - Regional capacity building
  - Entire coast surveyed
  - Surveys for INT Charts in progress
  - Oceanographic observations
  - ENCs & Publications
  - Data sharing with other Organisations

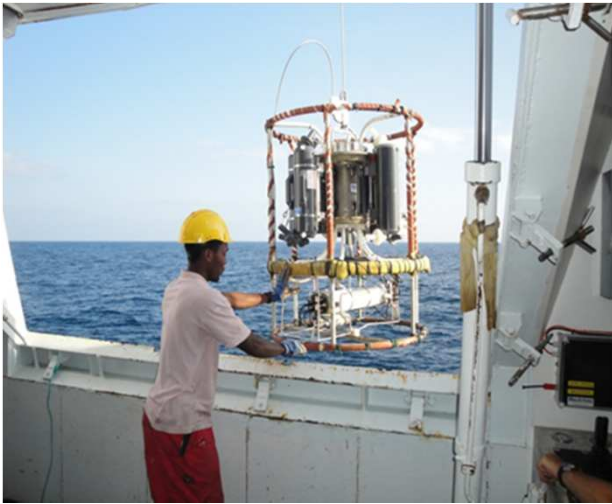


# Research Activities



# Research Related Activities

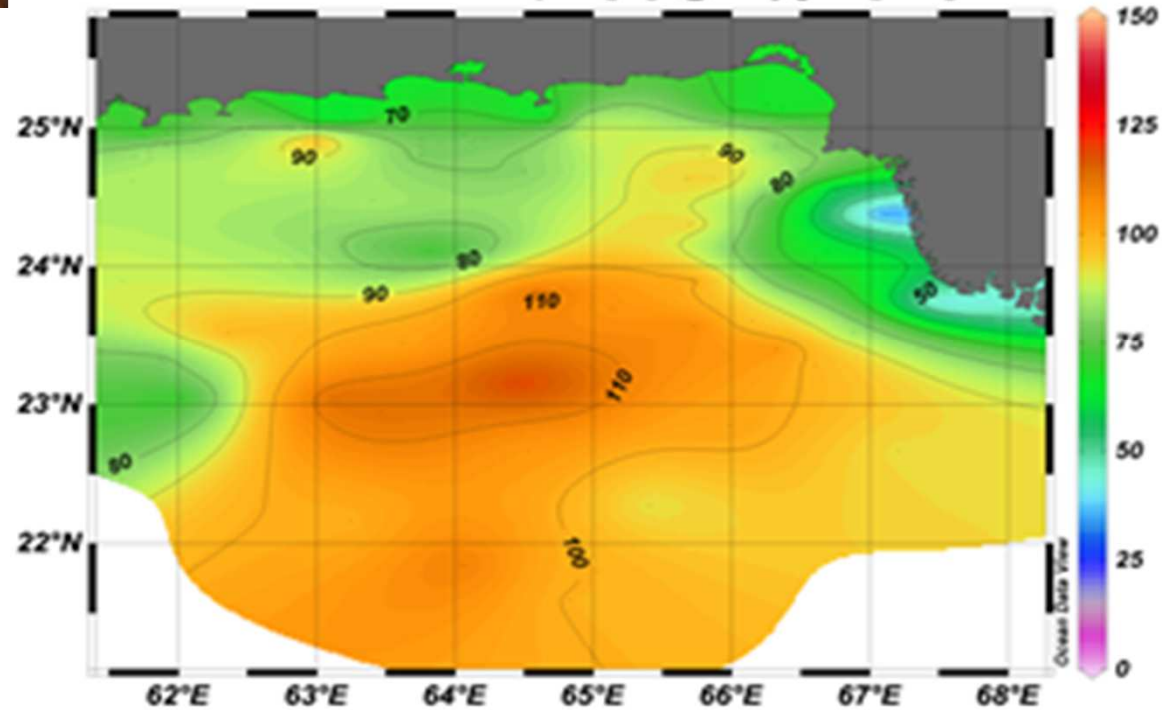
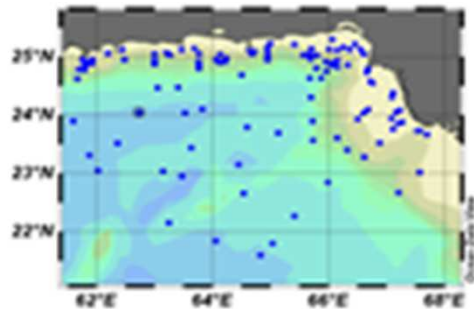




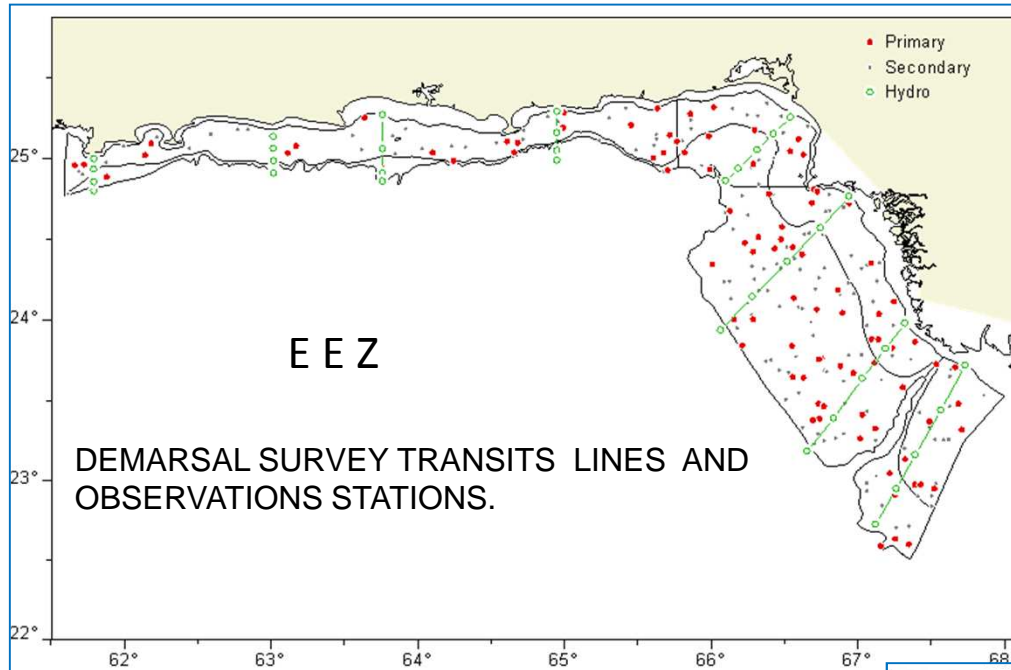
**LOWERING OF  
MULTI-ROSETTE  
WITH CTD**



**Depth [M] @ Oxygen [ml/l]=0.5**



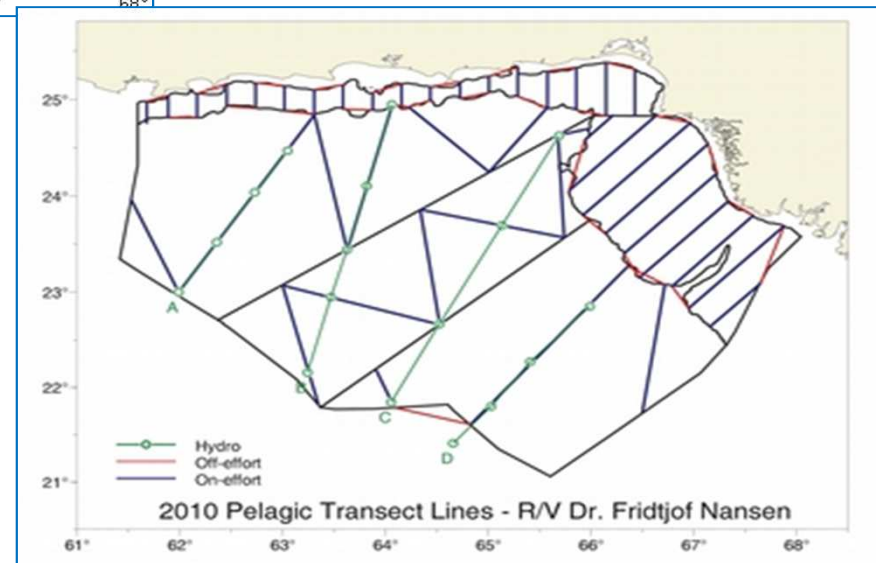
**CTD plus was used to obtain vertical profiles of temperature, salinity and oxygen by *R/V Dr. Fridtjof Nansen* in 2011**



## Activity by Research Vessel Dr. Fridtjof Nansen



Lowering of Multinet



# Regional Collaborations







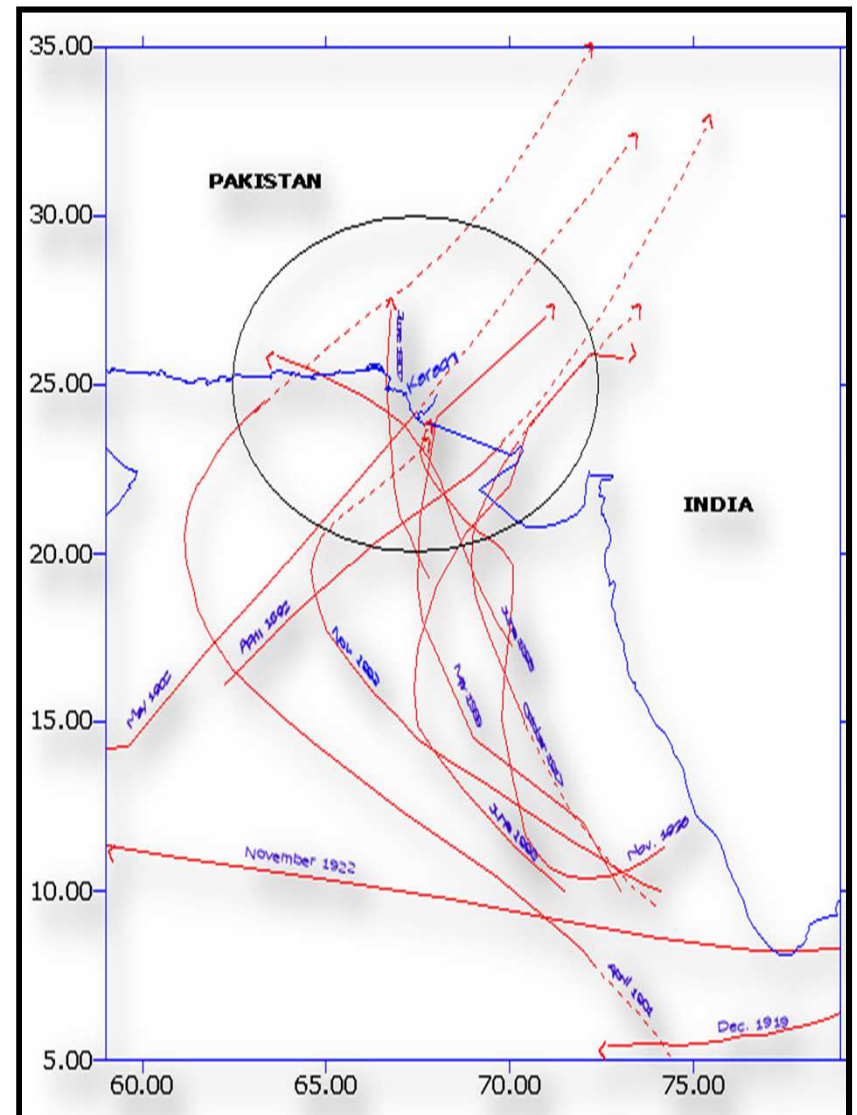
# Antarctic Research Programme - Pakistan

- Undertaken 2 scientific expeditions to Antarctica
  - First in 1990-91
  - Second in 1992-3
- Cabinet has given approval for joining Antarctic Treaty



# Increased Frequency of Cyclones - Arabian Sea

- Cyclones have increased b/ w 1979 and 2011, both in frequency and strength
- Some major cyclones in recent past with extensive damage are
  - **Jun 98**, winds up to 120 mph smashed Gujarat coast
  - **May 99**, winds up to 125 mph battered Sindh coast
  - **May 01**, winds up to 125 mph made landfall at Gujarat



# Conclusions

- Geographic location of Pakistan and associated offshore region merits special considerations
- Following are important aspects
  - Variation of MSL, rise in temperature and SST
  - Tectonic aspects (uplifting/ subduction of coast) and non-existence of monitoring mechanism
  - Emergence of islets which disturbs seabed and may act as potential source for tsunami generation
  - Increase in cyclonic activities in the area
  - Non availability of weather/ climate monitoring

# Short & Long Term Plans

- Acquisition of Hydro cum oceanographic research vessel
- Inclusion of additional TGs in the existing network
- Seabed TGs for relative monitoring of offshore water column
- Measures for better monitoring of sea level variations
- Considering installation of HF Weather Radars and Automatic Weather Stations to acquire offshore meteorological parameters (SST, wave/ swell height, currents etc)
- Offshore buoys/ drifters programmes as per following priorities
  - Capacity enhancement of relevant departments
  - Placement of buoys/ drifters

Thanks for your attention