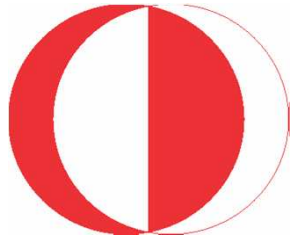# Monitoring
Long Term Variability in the
Eastern Mediterranean

Devrim Tezcan, Volodymyr Myroshnychenko
Elif Yılmaz, Barış Salihoğlu, Zahit Uysal,
Ahmet E. Kıdeyş and Dekosim Team

Institute of Marine Sciences
Middle East Technical University

Institute of Marine Sciences, Middle East Technical University (IMS-METU)

- **Physical Oceanography**
- **Chemical Oceanography**
- **Marine Biology and Fisheries**
- **Marine Geology and Geophysics**

Research Vessels

- **Bilim2**

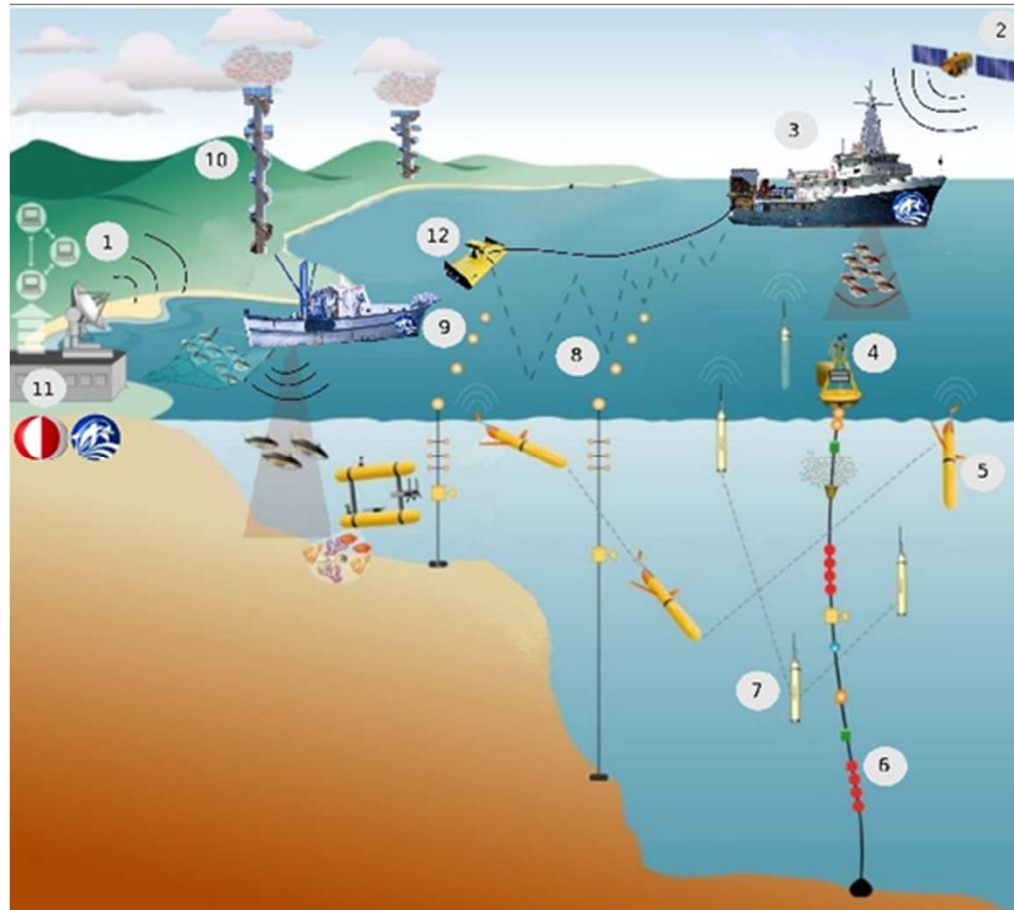- **Lamas1**

- **Erdemli**

Projects

MENAPHY 2013-2014
SEADATANET2 2011-2015
MERMAID 2012-2015
COCONET 2011-2014
PERSEUS 2011-2014
OPEC 2012-2014
ODEMM 2010-2014
MY OCEAN 2009-2013
MEECE 2008-2012
EUROFLEETS 2009-2013
MYTITURK 2011-2012
UPGRADE BSS 2009-2011
SESAME 2006-2011
ECOOP 2007-2010
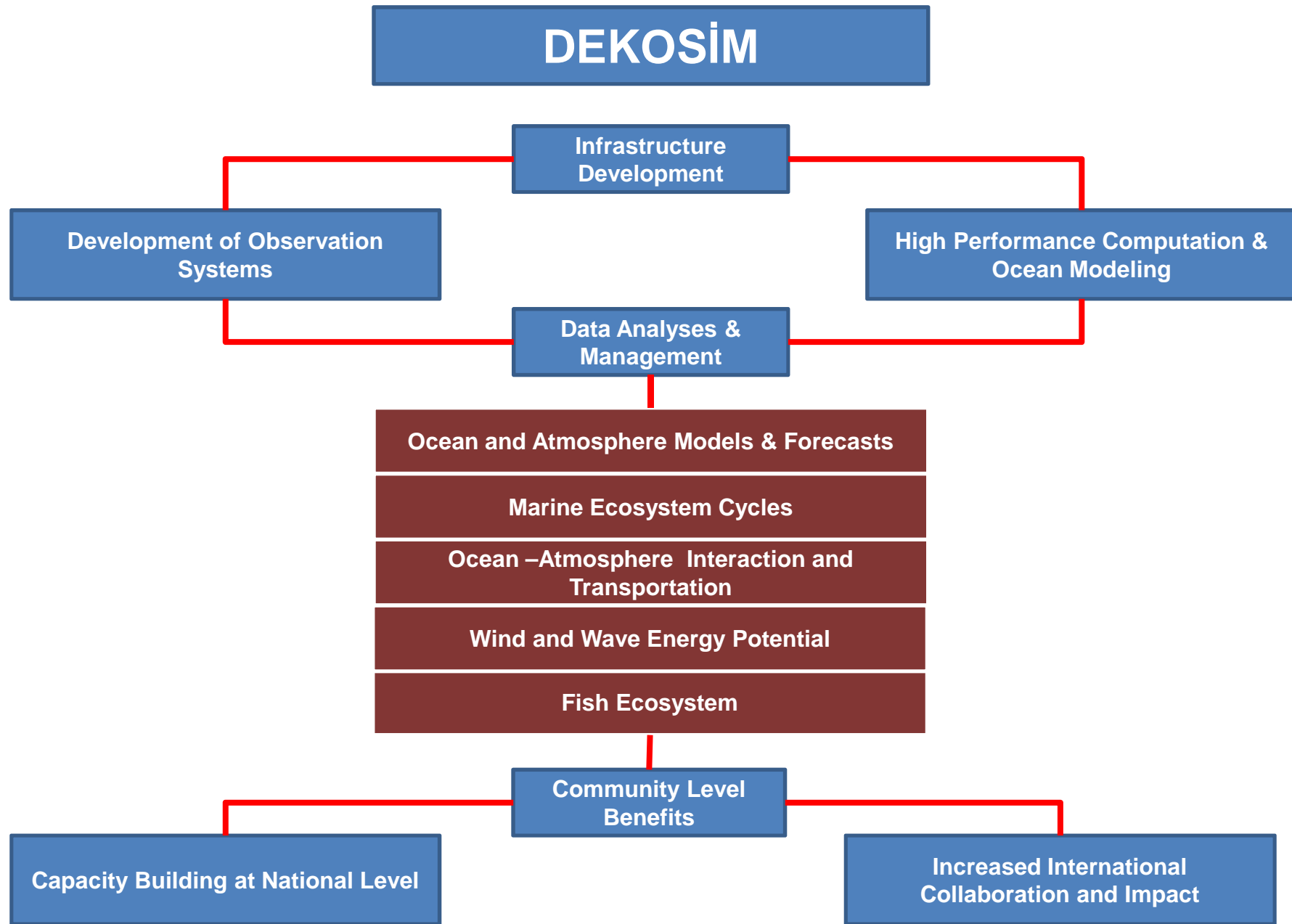BLACKSEA MODE 2007-2009
CITYZEN 2008-2011

BLACKSEASCENE 2005-2008
SEADATANET 2006-2011
EuroGOOS 2004-2007
MERSEA 2004-2008
ASCABOS 2005-2008
MFSTEP 2003-2006
IASON 2005-2006
MACE 2005-2008
ODBMS 1998-2002
ARENA 2003-2006
UNDP – SGF 2000 – 2003
SEA – SEARCH 2002-2005

DEKOSİM

Deniz Ekosistem ve İklim Araştırmaları Merkezi

Marine Ecosystems And Climate Research Center

DEKOSİM

Infrastructure Development

Development of Observation Systems

High Performance Computation & Ocean Modeling

Data Analyses & Management

Ocean and Atmosphere Models & Forecasts

Marine Ecosystem Cycles

Ocean –Atmosphere Interaction and Transportation

Wind and Wave Energy Potential

Fish Ecosystem

Community Level Benefits

Capacity Building at National Level

Increased International Collaboration and Impact

Marine Sciences Laboratory

Chemical Oceanography Labs
- Nutrient Chemistry and Pigments
- Marine Pollution
- Atmospheric Chemistry

Marine Biology and Fisheries
- Fisheries
- Molecular Biology and Biotechnology

Marine Geology
- Sedimentology
- Geochemistry

Marine Sciences Laboratory

Chemical Oceanography Laboratories

I) Nutrient Chemistry and Pigments
- Nitrate, phosphate, silicate, ammonium (Auto-anayzer)
- Particulate Carbon, Nitrogen (CHN), Phosphorus (Spectrophotometry)
- Pigment analyses (HPLC)

II) Marine Pollution
- Trace metals (including heavy metals, AAS)
- PAH and Pesticides (GC)

III) Atmospheric Chemistry
- Water-soluble ions, nutrient chemistry, trace metals, real-time gas (O_3, NO_x, SO_2, NH_3, HNO_3, HCl) and aerosol (major ions) measurements
- (IC, Auto-analyzer, including heavy metals, AAS)

Observation Systems

- Time Series
- Moorings
- Argo floats
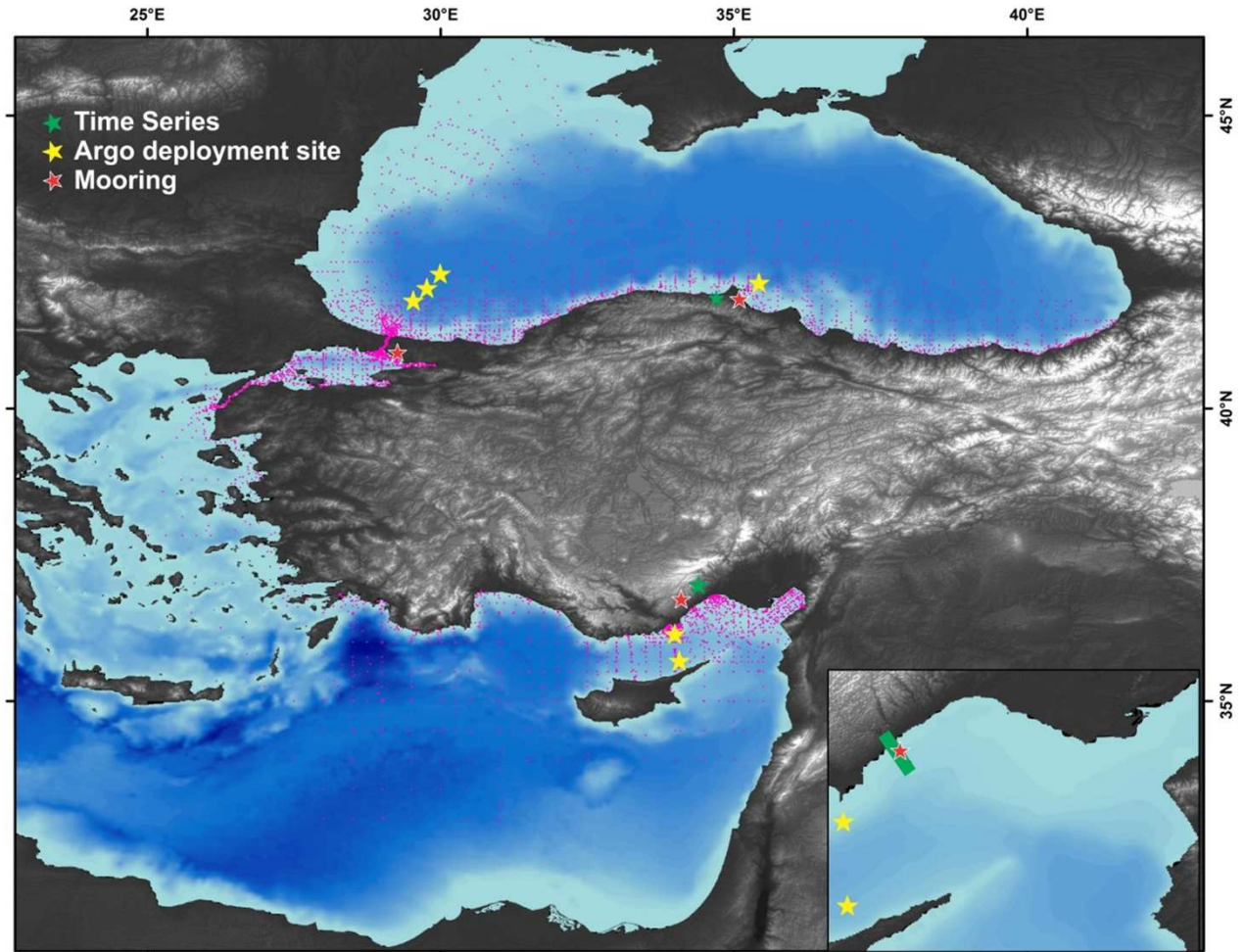
Observation Systems

- **Erdemli Time Series**
  - 1997-2012
  - Two stations at depth:
    - 20 and 200m

Temperature [IPTS-68]
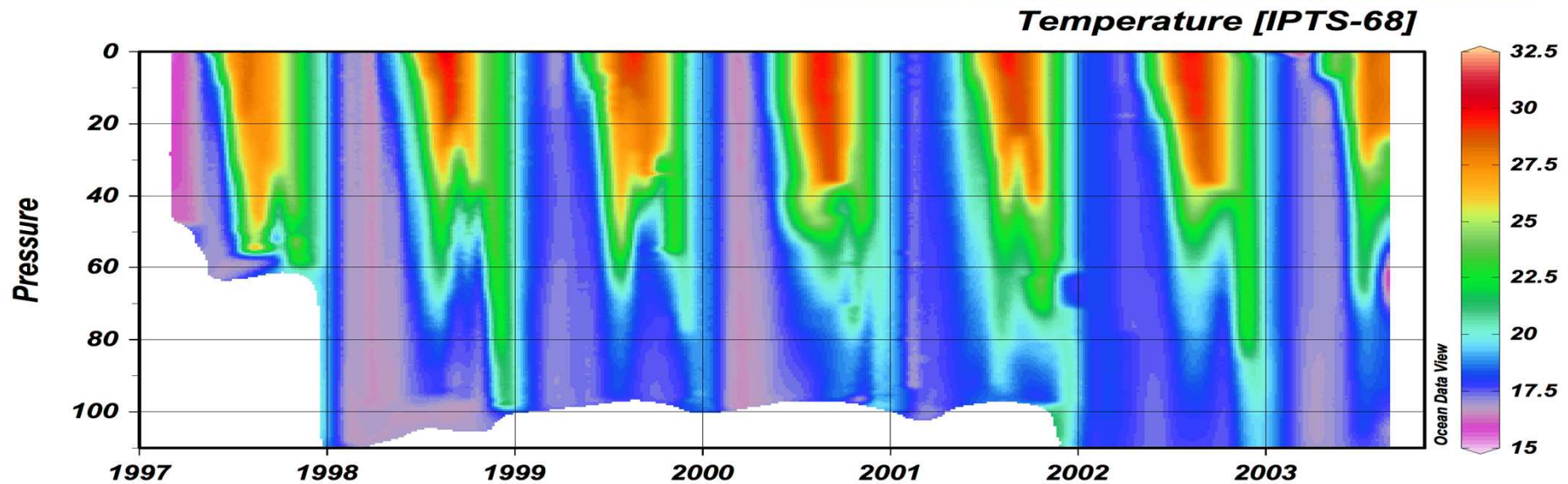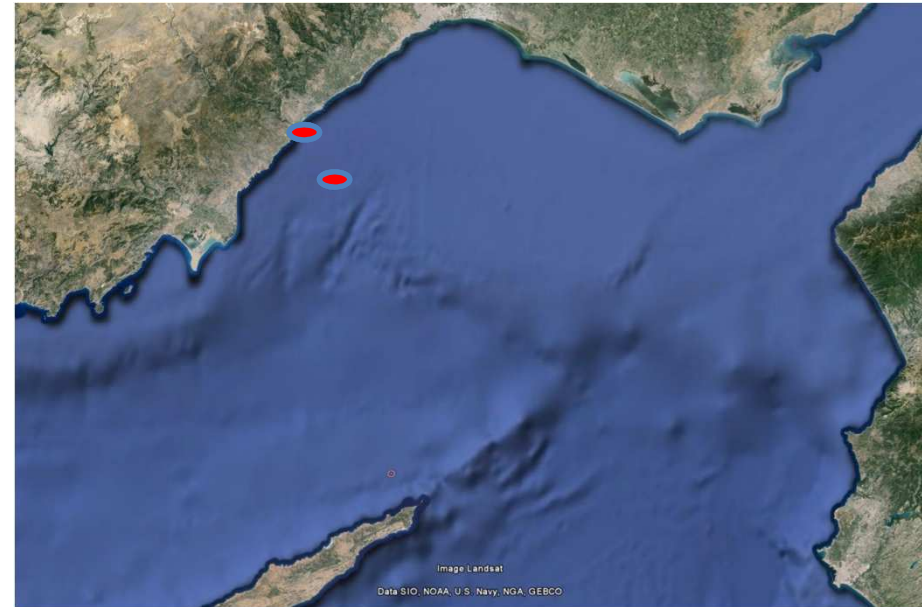
Observation Systems

- **Erdemli Time Series (ETS)**
  - **8 stations at 20, 50, 75, 100, 125, 150, 175 and 200m**
  - **Weekly**
    - **Physical parameter**
  - **Monthly**
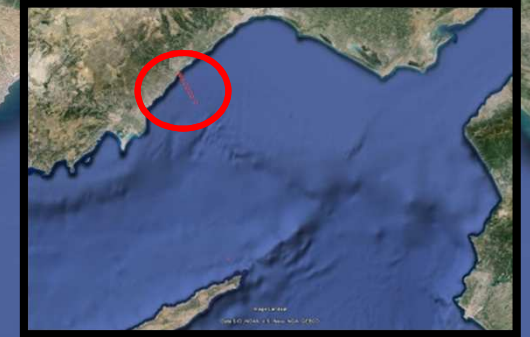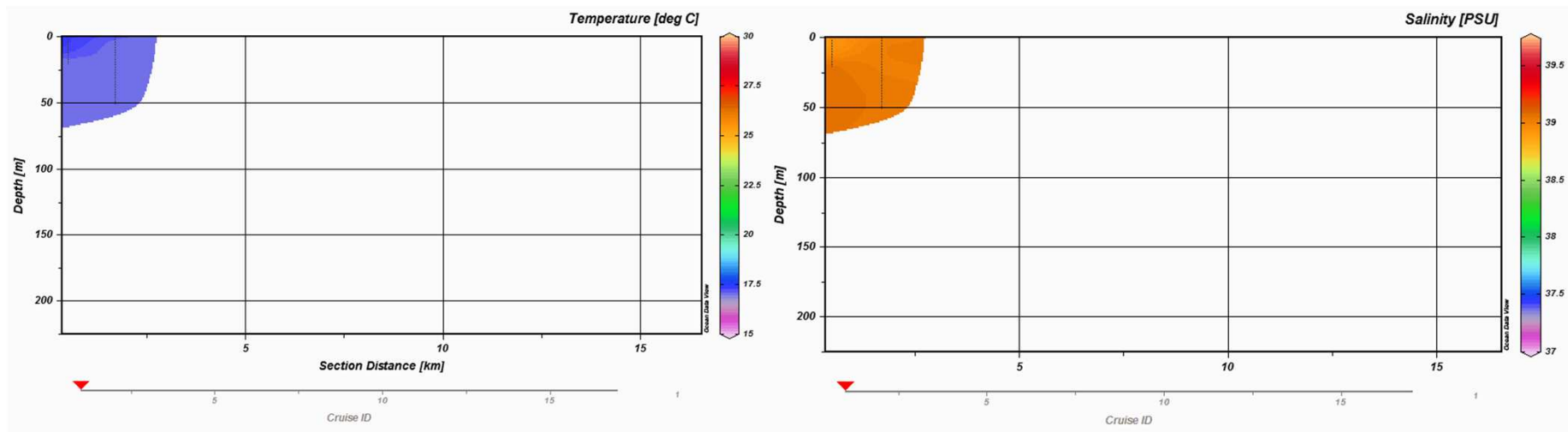   - **Chemical parameters**
    - **Biological parameters**
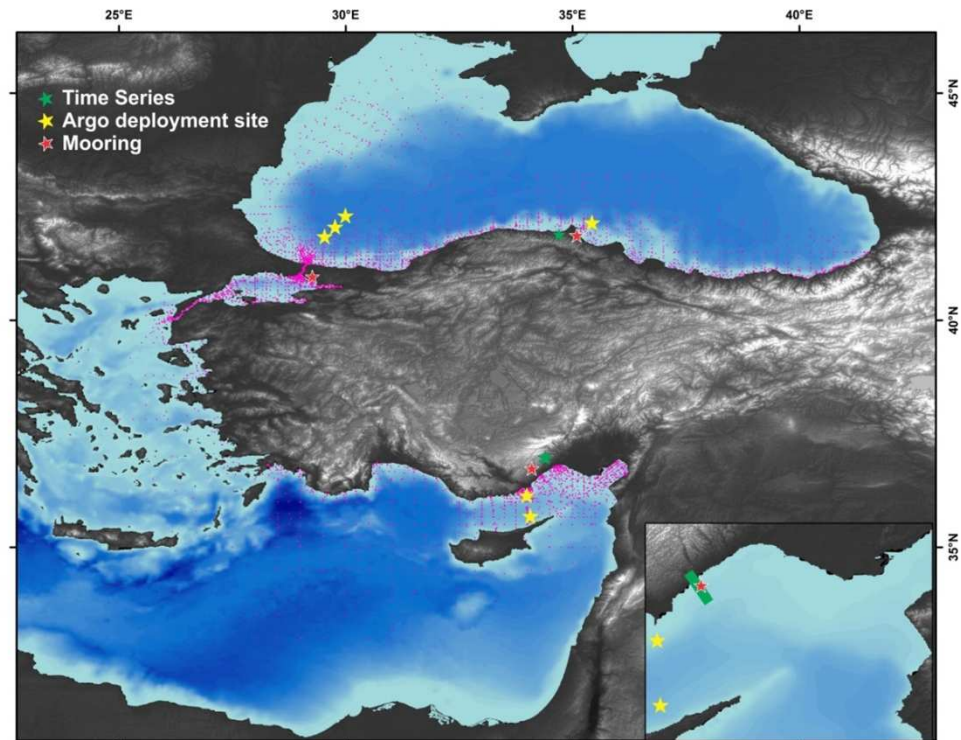
Image Landsat

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Observation Systems

- Erdemli Time Series
  - Temp & Sal sections are available at **dekosim.ims.metu.edu.tr**
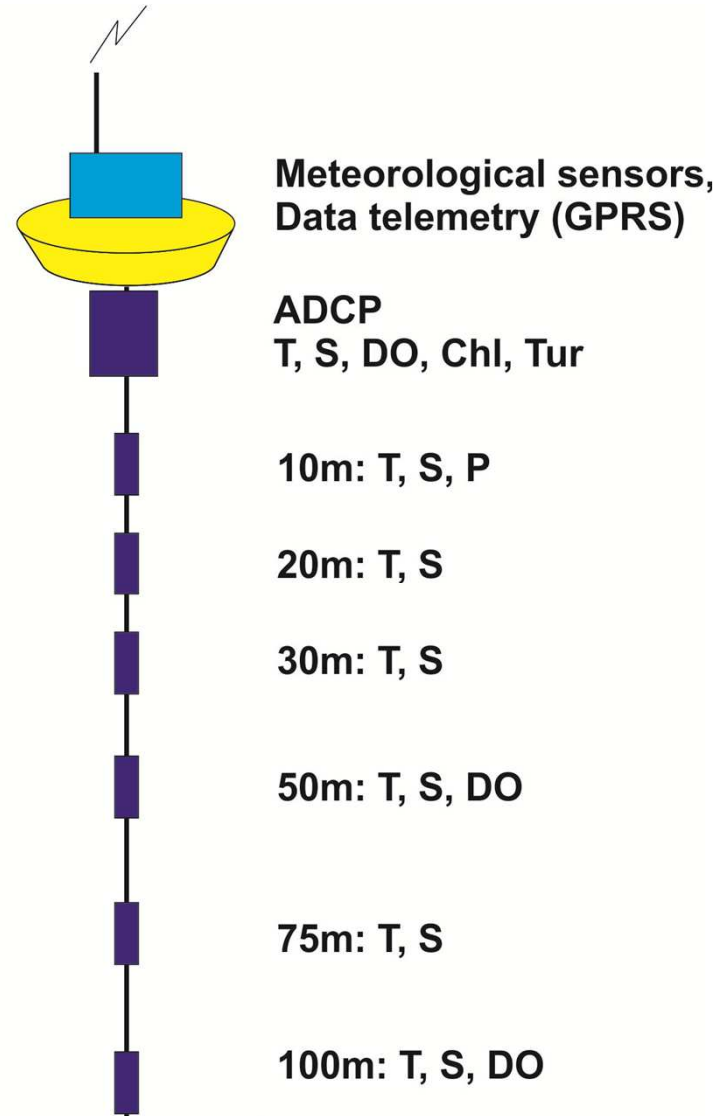
Observation Systems

- Time Series: National projects
  - Erdemli
  - Sinop / Trabzon
  - Northern Cyprus

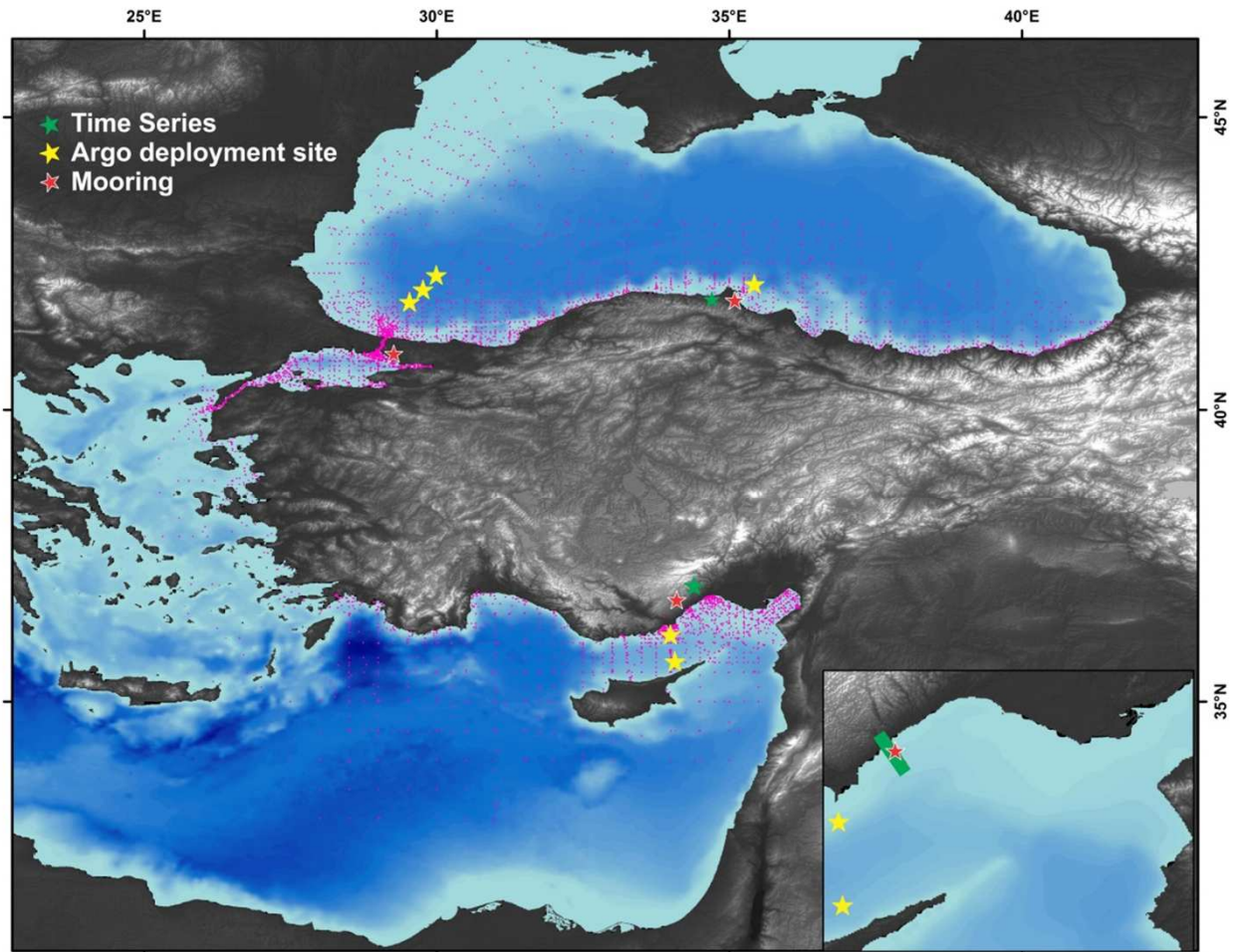   - Technical assistance
    - Lab facilities

Observation Systems

- ## Two Moorings
  - – Black Sea
  - – Mediterranean

    - ▪ Turkish Met Office
    - ▪ Seabird sensors
    - ▪ Near real time data

Meteorological sensors,
Data telemetry (GPRS)

ADCP
T, S, DO, Chl, Tur

10m: T, S, P

20m: T, S

30m: T, S

50m: T, S, DO

75m: T, S

100m: T, S, DO

Observation Systems

- Moorings
  - Black Sea
  - Mediterranean

Observation Systems

- Argo: 6 Argo floats
    - NKE Provor_DO and Provor_DO_I
    - 4 provor with argos tranmission
    - 2 provor with Iridium transmission
    - Aandrea dissolved oxygen sensor: optode 4330

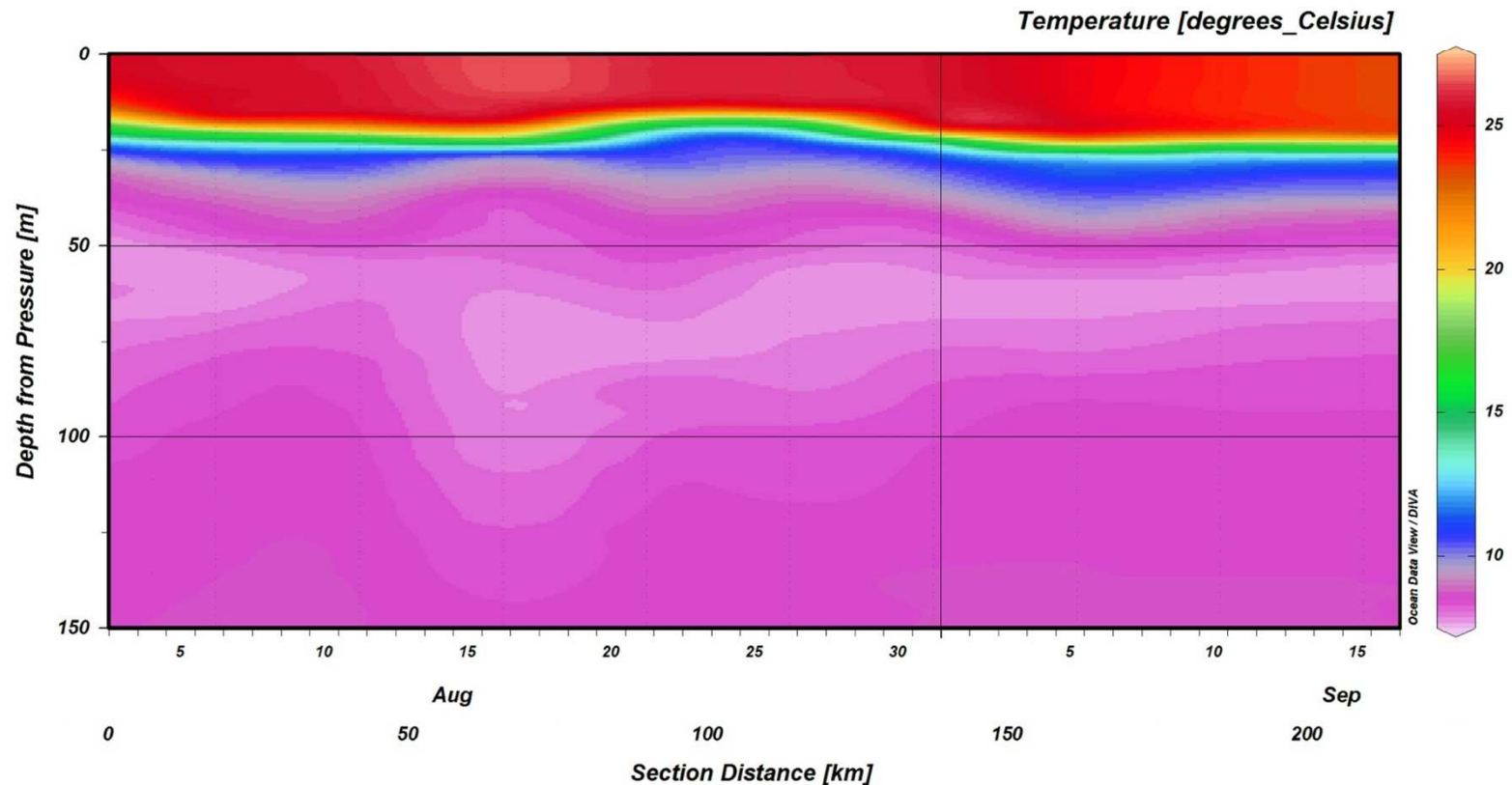# Observation Systems
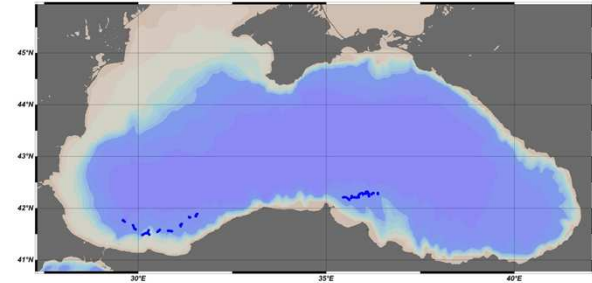
- 2 argo floats in Black Sea
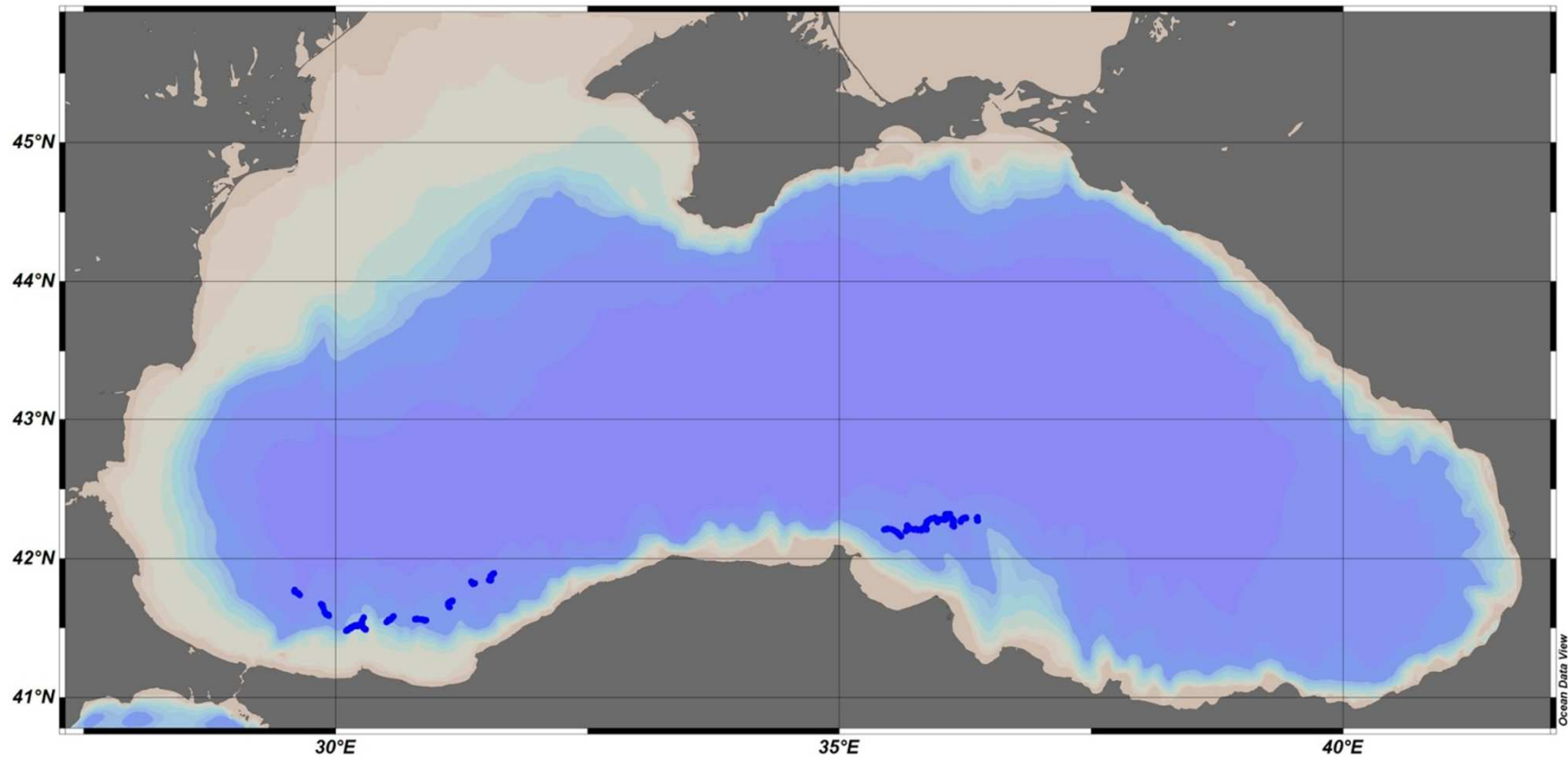
Observation Systems

- Black Sea – 2 Argo floats
  - Parking depths are 200 and 700
  - 2 m resolution above 200m, 25 m between 200-500m 50 m below 700 m
  - 5 days cycle
  - The aim is to investigate the variability of thermohaline current structure and mesoscale features as well as oxygen content across the oxycline, Suboxic Layer, and anoxic layer.
  - Turkey is a candidate member to the EURO-Argo program
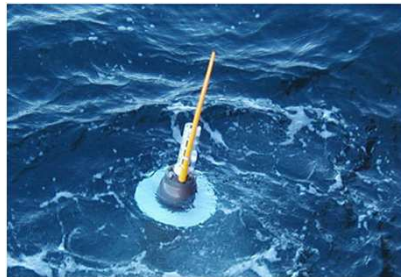
Observation Systems

- Argo: Argo_İstanbul_1

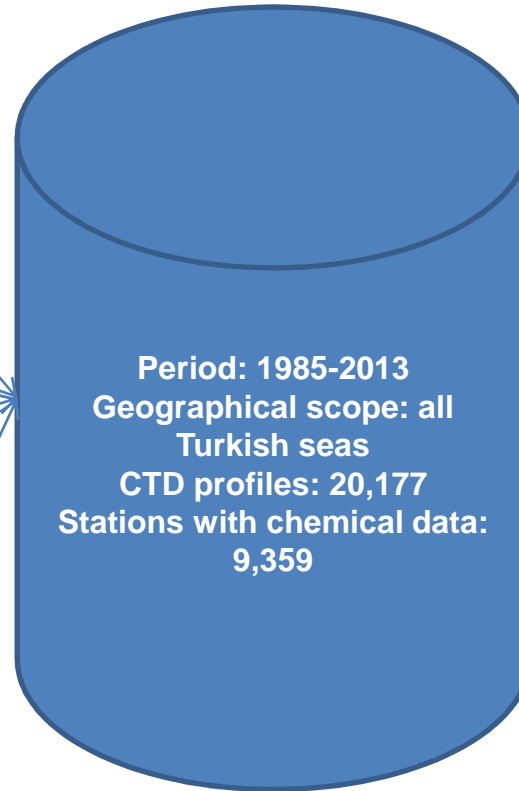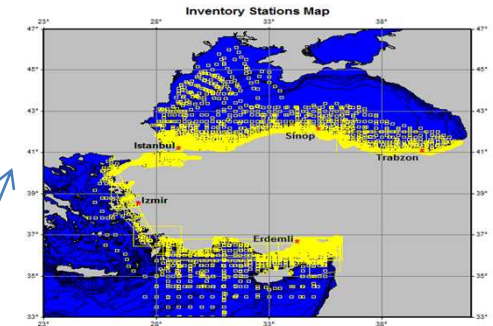Temperature [degrees_Celsius]

IMS Database

IMS Oceanographic Data Inventory

www.ims.metu.edu.tr/ims_inventory/

RV cruises

Monitoring data
- **Time Series**
- **Moorings**

ARGO floats

Period: 1985-2013
Geographical scope: all Turkish seas
CTD profiles: 20,177
Stations with chemical data: 9,359

SeaDataNet CDI
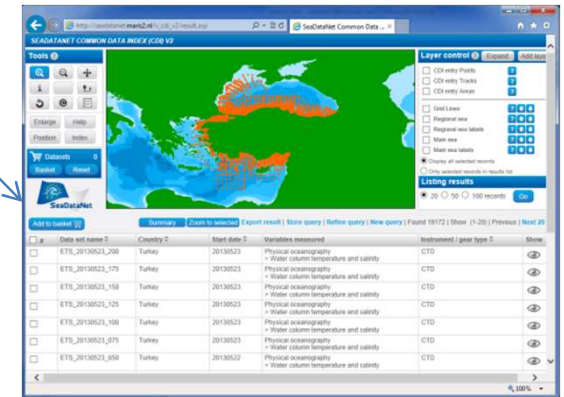
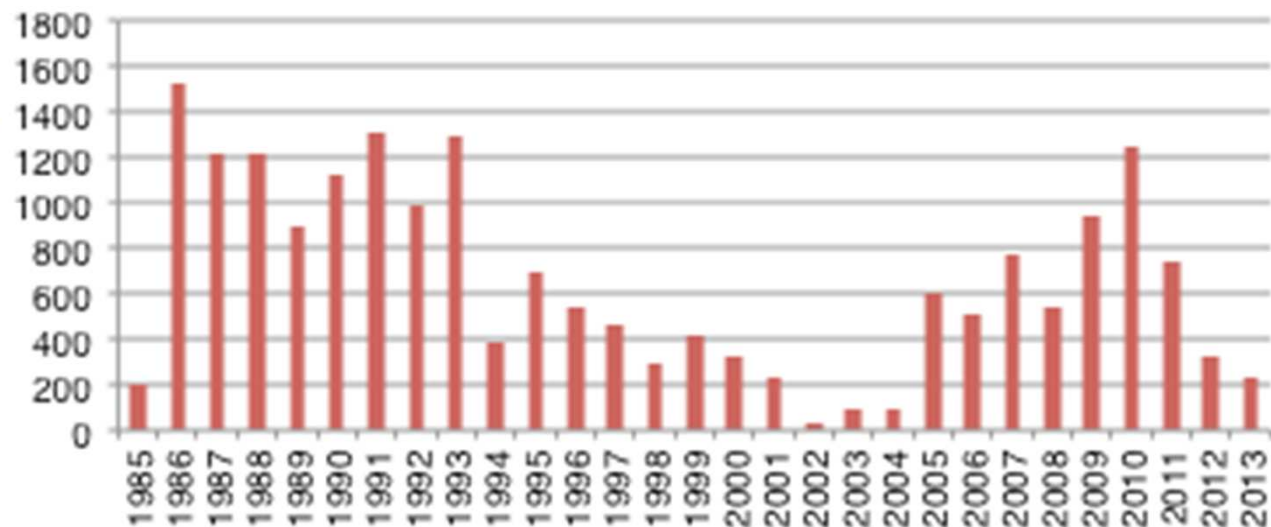# IMS METU CTD data in SDN CDI database
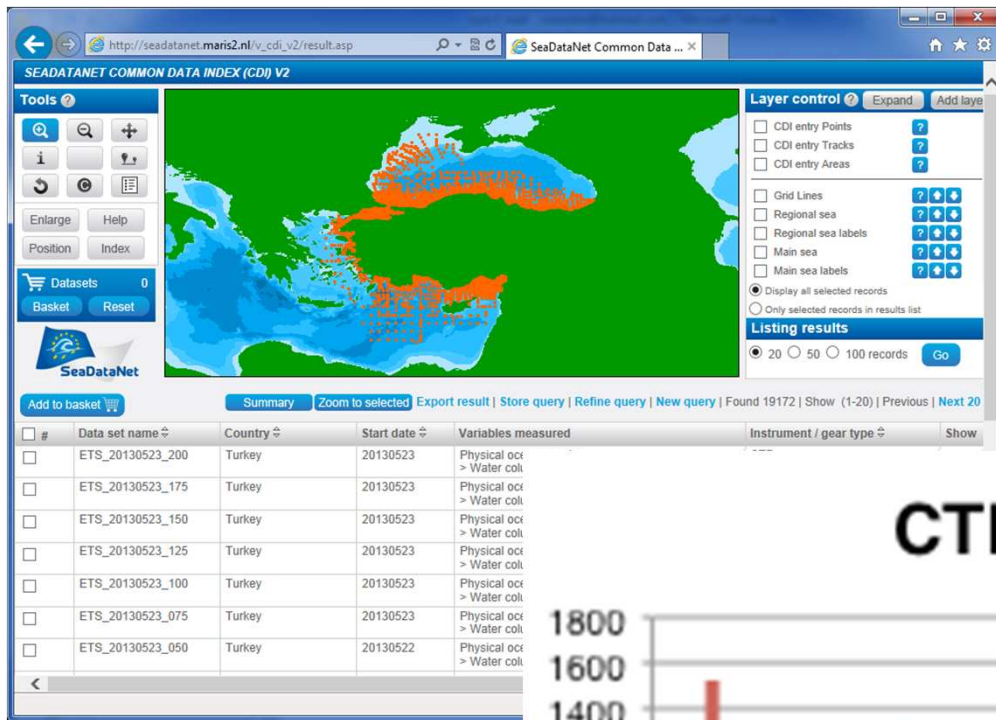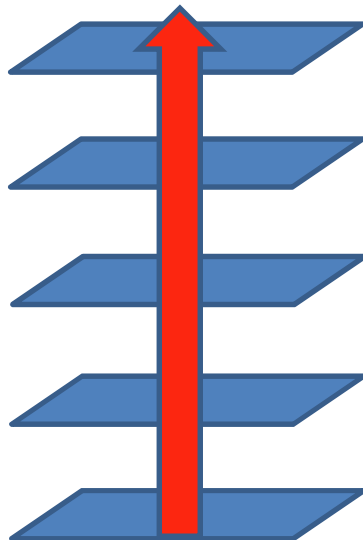

Total **19,172** stations/profiles

IMS METU WebGIS server

- ArcGIS for Desktop Version 10.2
- ArcGIS for Server

I N T E G R A T I O N

Ecosystem model outputs

Observations data from the database (physical, chemical, bio)

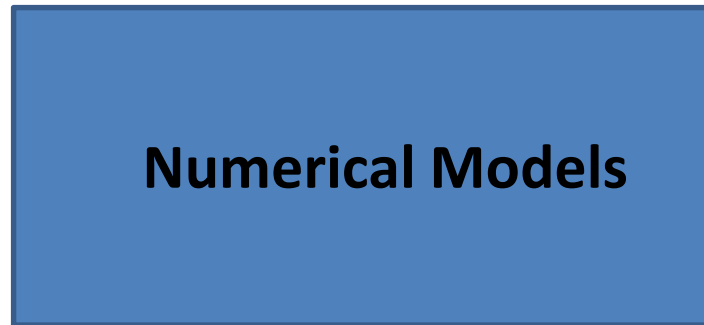Thematic OGC WMS services: e.g. EMODNET layers for hydrography, geology etc.

Specific GIS layers: MPA, Hot Spots etc.

Standard GIS layers: landscape, elevations, rivers, coastline
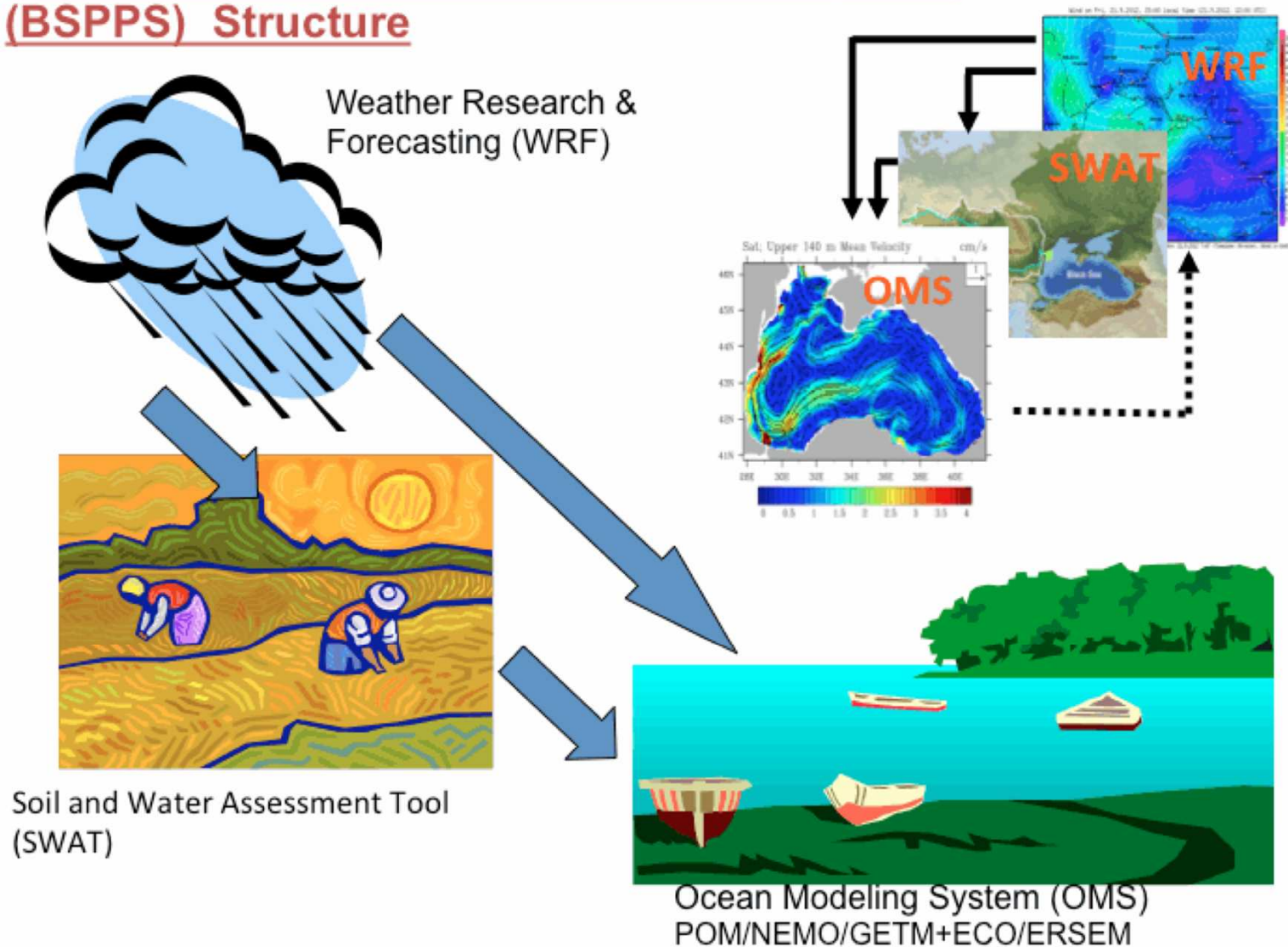
DEKOSIM SERVICES

Observational Data and models

Numerical Models

Integrated products

Currents

Water Levels

Data Assimilation

Chlorophyll

Observations

Other parameters

Analyses & Scenarios

Online Maps

Black Sea Protection and Prediction System (BSPPS) Structure

Weather Research & Forecasting (WRF)

WRF

SWAT

OMS

Sal; Upper 140 m Mean Velocity   cm/s

Soil and Water Assessment Tool (SWAT)

Ocean Modeling System (OMS)
POM/NEMO/GETM+ECO/ERSEM

Contact: Dr. Barış Salihoğlu - baris@ims.metu.edu.tr

Thank You