

# First Training on Ecohydrology “ECOTRAIN” in North Africa

## Marine and Hydrological Database and GIS

Thursday October 10<sup>th</sup>, 2024 (In person)

INSTM, La Goulette Center, Tunisia

### I. Goals of the training session on GIS

The Geographic Information System (GIS) helps people visualize and create information that can be used to make decisions and solve problems. Get an introduction to the basic components of a GIS. Learn fundamental concepts that underlie the use of a GIS with hands-on experience with maps and geographic data.

- Primary Goals: Study and manage the lagoonal environment, focusing on ecological, hydrological, and socio-economic aspects.
- Main Questions: What are the key environmental changes in the Ghar El Melh lagoon? How can GIS help monitor water quality, sedimentation, land use, and human activities affecting the lagoon?

### GIS Training main steps

#### Step 1: Data Collection

- Remote Sensing Data: Acquire satellite images (e.g., Landsat, Sentinel-2) for time series analysis of the lagoon's land cover, water quality (e.g., turbidity, chlorophyll-a concentration).
- Topographic and Bathymetric Data: Collect DEMs (Digital Elevation Models) and bathymetric data to map the lagoon's depth, shoreline, and any morphological changes.
- Environmental Data: Include data on water salinity, temperature, and pollution levels, gathered through field sensors or historical datasets.
- Socio-Economic Data: Information on population, land use, fishing activities, and tourism around Ghar El Melh can provide insights into human impacts.

#### Step 2: GIS Software and Tools

- Software: Use GIS platforms such as ArcGIS, QGIS, or specialized tools for coastal zone management.
- Plugins/Extensions: Incorporate specific tools for coastal analysis, such as shoreline extraction (e.g., DSAS - Digital Shoreline Analysis System in ArcGIS), or remote sensing analysis (e.g., Semi-Automatic Classification Plugin in ENVI).

#### Step 3: Risk Assessment and Environmental Monitoring

- Land Use/Land Cover (LULC) Mapping: Use GIS to map historical and current land use changes.

- Water Quality Analysis: Monitor the water quality parameters using GIS tools to interpolate data collected from various sensors. The Kriging or Inverse Distance Weighting (IDW) methods can be used for spatial interpolation.
- Coastal Vulnerability Assessment: Apply models that evaluate vulnerability to sea-level rise, erosion, and storm impacts.
- Marine & Coastal Habitat Mapping: GIS can help assess biodiversity in the lagoon and the surrounding area, mapping sensitive habitats and identifying conservation areas.
- Climate Change Impact: Use GIS to model the effects of climate change, including sea-level rise and extreme weather patterns.

## II. Goals of the training session on Hydrological Databases H-DATABASE

This training session deals about how hydrological data are available in databases. It covers all aspects of hydrological data: in-field measurements, storage of raw data, data processing for quality check, discussion about types of data –from raw data to derived products data, data dissemination and accessibility, and eventually some examples of large-scale data storage. This training session opens discussions about the more global topic of the current way of sharing free data within the scientific community.

### H-DATABASE Training main steps

**Step 1:** How hydrological data are measured in the field, the different types of data and how data are stored before being processed, and types of errors linked. Data processing at the laboratory: data quality check to remove main types of errors. Discussion about what is a raw data and what is a derive product of data, and the implications in terms of data quality and privacy.

**Step 2:** Storage of hydrological data: discussion about the different formats for storing data, depending on the different uses: simple data processing, uses for different types of engineering purposes, uses for hydrological modelling –also depending on the purpose of the modelling, discussion about time and scale.

**Step 3:** Accessibility to hydrological data. Discussion about the different types of access to hydrological data. Where to find hydrological data, from local to global scale, IAHS Digital Water Globe, GRDC database, Hydrosheds database, SIEREM and ADHI database, MCH - Meteorology, Climatology and Hydrology Database Management System of WMO-World Meteorological Organization. Sharing data: how things have evolved in the scientific community.

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**Target group:** Young researchers, PhD students & GIS institutional users.

The detailed agenda will be sent later to selected candidates.

**It is requested to bring personal computers.**

**Important dates:** **25 September 2024** deadline of the applications for the training course.

**Application:** CV & Motivation letter to be sent to Dr. Afef Fathalli Email: [afef.fathalli@instm.rnrt.tn](mailto:afef.fathalli@instm.rnrt.tn)