MARINE BIODIVERSITY DATA MANAGEMENT FOR GOOD ENVIRONMENTAL STATUS ASSESSMENTS

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Introduction

Marine Biodiversity Data Management (MBDM) is essential for assessing **Good Environmental Status (GES)**. Rapid access to reliable and accurate data plays a pivotal role in observational research and informs policies and legislation aimed at protecting coastal and marine ecosystems.

MBDM involves multiple steps and relies on interconnected systems. The **National Oceanographic Data Centers (NODCs)** are tasked with receiving and harmonizing data and metadata, following internationally recognized standards. Data storage and access are facilitated by a network of infrastructures that are key to the MBDM process, including **IPT, GBIF, OBIS, and EMODnet**. Once processed, the data adheres to **FAIR** principles, making it Findable, Accessible, Interoperable, and Reproducible.

Using a macro-zoobenthos time-series collection as a case study, this article outlines the MBDM workflow and highlights the critical importance of marine biodiversity data collection and sharing for effective GES assessments.

## Marine Biodiversity Data Management (MBDM)

The MDBM system consists of multiple interconnected platforms and infrastructures.

The **Integrated Publishing Toolkit (IPT)** is a free, open-source software designed to create and manage repositories for sharing biodiversity datasets. Organizations can install and run the IPT on their own servers to perform quality control (QC) and feed harmonized data into the MBDM system.

The IPT is a subsystem of the **Global Biodiversity Information Facility (GBIF)**, an international network and data infrastructure that provides free and open access to biodiversity data, both terrestrial and marine.

Harmonized data from GBIF is integrated into the **Ocean Biodiversity Information System (OBIS)**, the world's largest infrastructure for ocean biodiversity and biogeographic data. The European branch of OBIS is known as EurOBIS.

Additionally, the IPT feeds harmonized data into the **European Marine Observation and Data Network (EMODnet)**, which is the trusted provider of *in situ* and FAIR marine data of the European Commission.
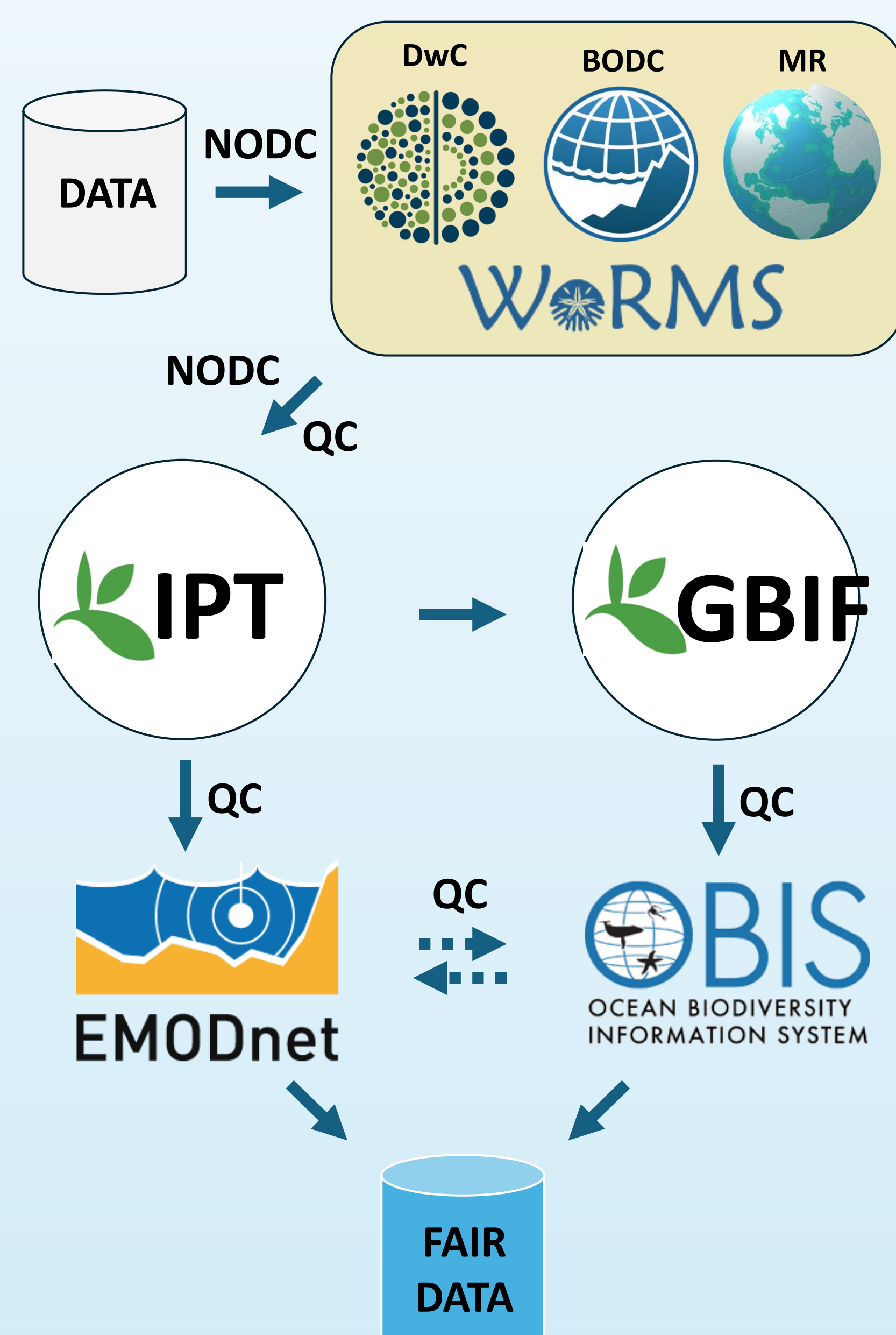

Data and methods

- The collection was taken by the OCE-OGS group at the C1 site in the Gulf of Trieste [45.701, 13.71]. The collection spanned from July 2014 to January 2018.

- Sediments were gathered using a Van Veen grab, sieved at 0.5 mm, and fixed with buffered formaldehyde (final concentration 4%). Species identification and counting were performed using a stereomicroscope.

- Totally, 235 distinct species were counted during 13 collection campaigns.

- Data harmonization was done by the NODC-OGS group using the Darwin Core (DwC), the standardized and controlled NERC Vocabularies (NVS) from the British Oceanographic Data Centre (BODC), the geospatial localization by Marine Regions (MR), and species identification by the World Register of Marine Species (WoRMS).
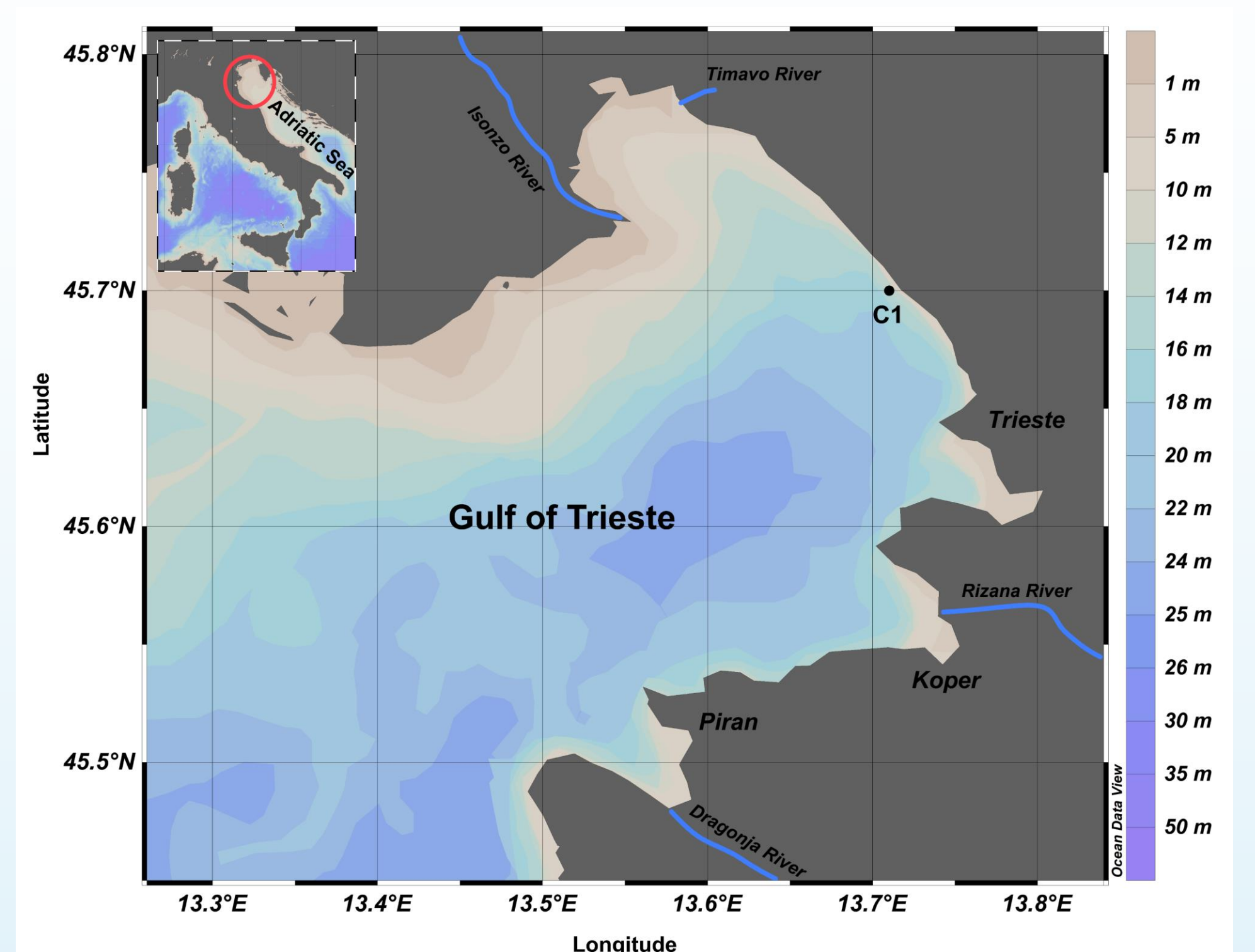
Results

- The t-statistic for the slope coefficient and its associated p-value using the t.cdf function from SciPy's stats module in python was calculated.

- The data showed a statistically significant increasing trend (T-statistic: 5.33; p-value: 0.001) for the species *Amphiura filiformis*.

Trends of *Amphiura filiformis* in the Gulf of Trieste
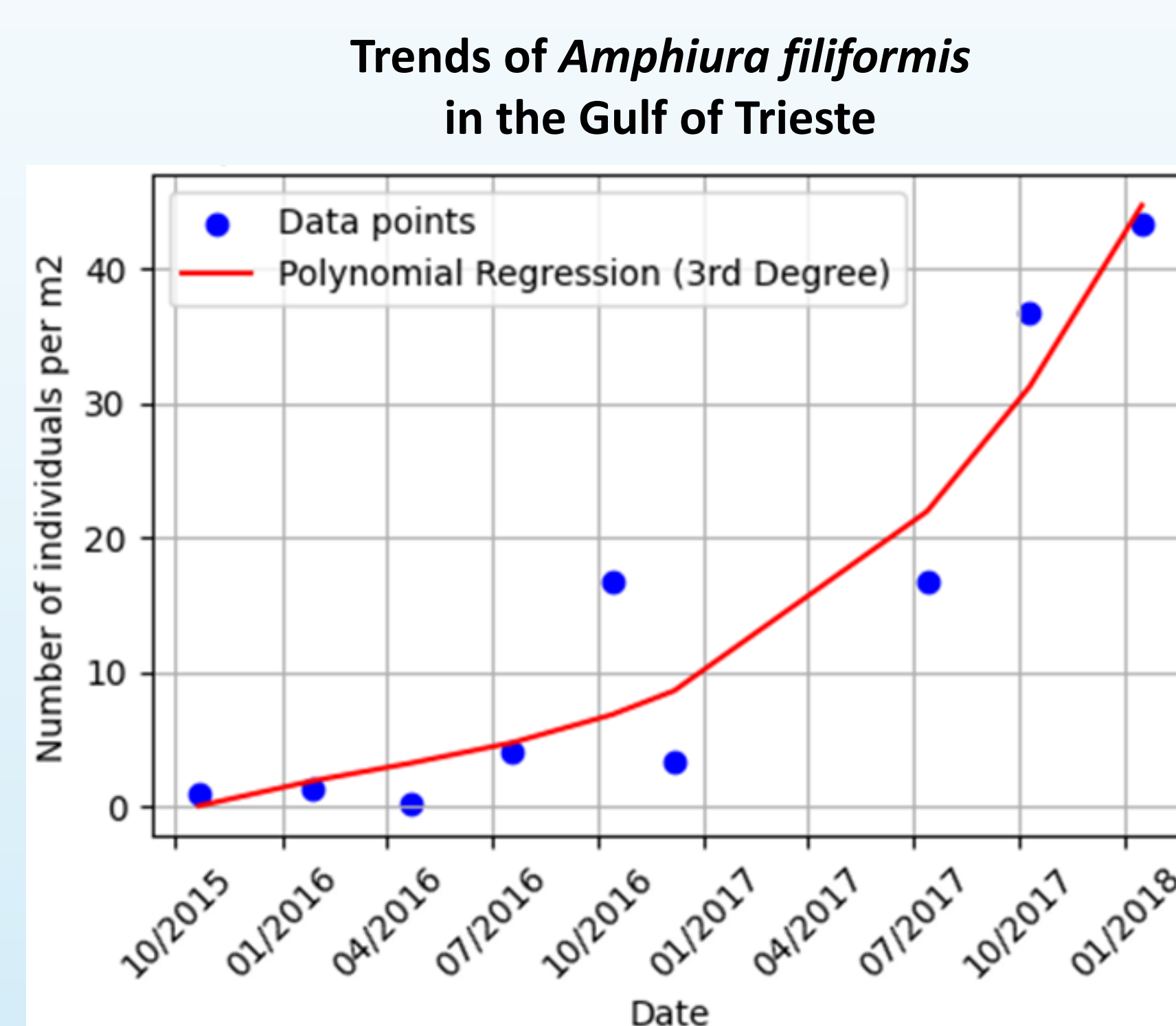
Conclusions

- Our study suggests an increasing trend of the species *Amphiura filiformis*.

- *Amphiura filiformis* plays several significant roles in marine ecosystems, such as bioturbation and nutrient cycling.

- Monitoring populations of *Amphiura filiformis* provide valuable insights into the health and resilience of marine ecosystems.

- The results of this campaign could indicate an improvement of the GES in the Gulf of Trieste.

- MBDM was essential for assessing the GES of the Gulf of Trieste and allows to compare similar trends in nearby areas using standardized and interoperable data.

Acknowledgements