## DiSSCo–ITINERIS: Digitizing Foraminiferal Collections for Biodiversity and Environmental Monitoring in the Mediterranean

## Roberta D’onofrio1, Luciana Ferraro2, Laura Giordano2, Francesco Riminucci3, Simona Armeli Minicante1, Elisa Camatti1, Edoardo Di Russo1, Valentina Grande3, Irene Guarneri1, Francesca Maggiore1, Marco Sigovini1, Lucilla Capotondi3

### 1 CNR, Marine Science Institute (ISMAR), Arsenale Castello 2737/f, 30122, Venezia, Italy; 2 CNR, Marine Science Institute (ISMAR), Calata Porta di Massa, 80133, Napoli, Italy; 3 CNR, Marine Science Institute (ISMAR), Via Piero Gobetti, 101, 40129 Bologna, Italy.

### Email of communicating roberta.donofrio@cnr.it

**Keywords: Marine Biodiversity, Foraminifera, Environmental Assessment**

Within the DiSSCo infrastructure and ITINERIS project, two reference benthic foraminiferal (BF) collections from the Institute of Marine Science have been harmonized and digitized: the *Linosa Sicily Channel Collection* (LiCSiC) and the *North Adriatic Foraminifera Collection* (NAdFC). As BF are key bioindicators, these collections with their FAIR digital datasets, serve as valuable archives for Mediterranean biodiversity monitoring, environmental quality assessment, and the reconstruction of ecological baselines.

LiCSiC comprises 13 micropaleontological slides containing BF from sediment samples collected around Linosa Island, an ecological area featuring a variety of benthic habitats designated as a priority area under the EU Directive. With a total of 2,755 catalogued specimens, 140 identified BF species, plus a digital image dataset of selected taxa linked to the seabed texture and lithology, LiCSiC reflects the high biodiversity of this marine region. Notably, the collection includes the Indo-Pacific invasive alien species *Amphistegina lobifera*, thriving in shallow waters below 20 meters at temperatures above 14°C, introduced into the Mediterranean via the Suez Canal and whose spread is linked to climate change.

NAdFC originated from benthic ecosystem biomonitoring conducted since 2016 at the LTER Site “Delta del Po e Costa Romagnola” in the North Adriatic, a region shaped by the interplay of natural drivers and anthropic impacts. Digitization, and taxonomic revision produced ~6,000 catalogued specimens across ~100 taxa, including *Virgulinella fragilis*, a non-indigenous species associated to oxygen fluctuations and introduced via shipping. Integration of BF and environmental data revealed that BF diversity is strongly influenced by sediment depositional events (e.g., riverine discharge, storm episodes), offering insight into ecosystem monitoring in this impacted coastal zone.

These case studies demonstrate how the digitization and standardization of BFcollections under DiSSCo-ITINERIS enhance data interoperability and reusability. This facilitates the analysis of biodiversity trends, identification of environmental drivers, and detection of invasive species, ultimately supporting marine biodiversity research, environmental health assessment and conservation efforts. Moreover, they highlight the pivotal role of data infrastructures in guiding policy-making and ecological management.