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Benthic habitats in a highly impacted tidal inlet

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Coastal transitional ecosystems like lagoons, deltas and estuaries are complex and dynamic systems, highly valuable in terms of biodiversity and productivity. Therefore, they require constant monitoring, but at the same time, they represent a challenge for direct observation because of operational issues such as high turbidity, strong currents, bathymetric constraint, etc.

The Venice Lagoon is the widest transitional ecosystem in the Mediterranean. The average depth is about 1 meter but some trait of the tidal channels exceeds 20 meters in depth. The lagoon is connected to the open sea by three inlets (Lido, Malamocco and Chioggia) that since 2006 have been strongly modified by the construction of mobile barriers (MoSE Project) to protect the historical city of Venice from high water. This debated project could affect in the near future the lagoon hydrodynamic and alter the seafloor habitats and morphologies.

This research focuses on the Chioggia inlet with the aim of describing this system and highlighting the main changes induced by the anthropogenic interventions.

MultiBeam EchoSounder (MBES) high resolution data (bathymetry and acoustic backscatter) and ground-truth samples (sediments and underwater photos), gathered by CNR-ISMAR in 2013 within the National Flagship Project RITMARE (Ricerca Italiana per il Mare), were used to map the seafloor shapes, the grain size distribution, the biota presence and to classify the seabed into benthic habitat classes. We used the MBES data to identify interesting habitats, for example seagrass patches or bio-construction. Finally, we also applied the CoCoNET classification scheme (COast to COast NETworks), a pilot method modified for coastal shallow water, that combines physiography, morphology, substrate and biological information to clusterize the seabed into habitat classes. The main goal is developing a standard protocol of Habitat Mapping to study and characterize these systems based on geological and biological descriptors.