

Geology, Habitats and Human Impact along Submarine Canyons: Preliminary results and ongoing work from the EUROFLEETS2 ISLAND Cruise (RV Angeles Alvariño, IEO - Spain)

Project Acronym & Title: ISLAND – Exploring Sicilian Canyon Dynamics

Area: NW Sicily

Research Vessel: RV Angeles Alvariño, Spanish Institute of Oceanography (IEO), Spain

Chief scientist: Claudio Lo Iacono, National Oceanography Centre (NOC), UK

Other project partners: CSIC-*Spain*, Univ. of Ghent-*Belgium*, UCD-*Ireland*, Univ. of Barcelona-*Spain*, Univ. of Palermo-*Italy*, Univ. of Rome “Tor Vergata”-*Italy*, Univ. of Cagliari-*Italy*, Univ. of *Malta*, Spanish Institute of Oceanography-*Spain*, Univ. of *Cyprus*, University of Plymouth-*UK*

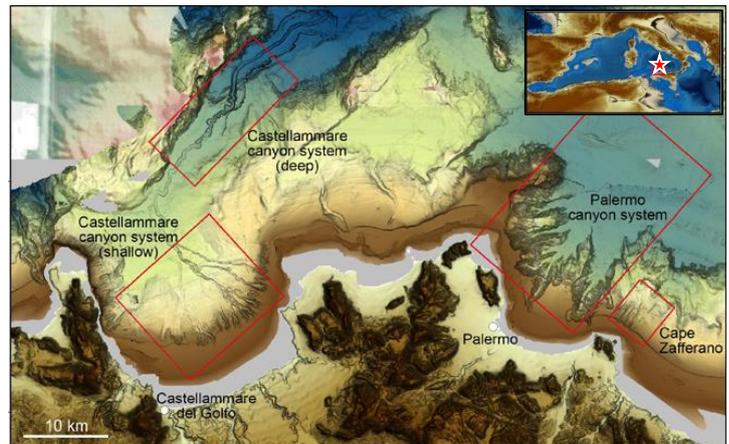
Date: 6-17 August 2016



RV Angeles Alvariño



The ISLAND Team



The ISLAND study areas (red rectangles)



Claudio Lo Iacono

“ISLAND has been a wonderful scientific and personal experience. The need to study submarine canyons using a holistic and multidisciplinary approach has promoted the interaction between researchers from 10 different countries, belonging to 8 European institutes in Marine Sciences, from Northern and Southern Europe.

We all brought our contribution to ISLAND, from early stage PhD students to experienced scientists, working in an amazing “Babel” environment, speaking 6 different languages and unified by the pleasure to work at sea and the interest in better understanding how submarine canyons work”

Claudio Lo Iacono, National Oceanography Centre- UK

Main objectives

Submarine canyons are prominent features of continental margins considered to play a key role in source to sink sedimentary processes. They drive meso-scale oceanographic circulation, organic carbon redistribution and the functioning of ocean ecosystems. The main aim of the ISLAND cruise (6-17 August 2016) was to collect Multi Beam data, high-resolution seismic, gravity cores, multi cores, ROV videos and water column data (CTD, ADCP) along specific submarine canyons of the NW Sicilian Margin. Finally, a near-bottom mooring equipped with a current meter and turbidimeters has been deployed along one of the studied submarine canyons, to assess the natural vs human induced activities on deep sedimentary flows. The mooring will be collected in January 2017.

The three specific ISLAND objectives have been:

- a) To explore how the NW Sicilian canyons evolved during the Late Quaternary (differences in style, frequencies and role of submarine landslides on canyon evolution).
- b) To observe and characterize the benthic habitats of the explored submarine canyons, allowing a first study of their variability in benthic biomass and biodiversity.
- c) To explore the role of bottom trawling fishery in governing the present-day sedimentary dynamics of submarine canyons and open slope environments and eventually assess its impact in altering canyon biodiversity.

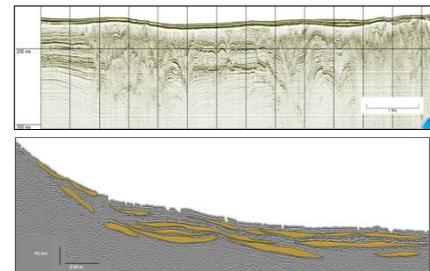
The regions visited with a strong multidisciplinary approach were the Cape Zafferano sector, the Palermo canyon system (Oreto, Eleuterio Canyons), the Castellammare canyon system (shallow and deep sectors).

Work progress and main achievements

The selected area has the advantage of hosting several closely located canyons which display a variety of morphologies as a consequence of their different evolution. Nonetheless, these canyon systems developed on the same margin, controlled by the same large-scale geologic and oceanographic processes. For this reason, the NW Sicilian canyons offer a perfect natural laboratory to examine wider scientific questions about canyon evolutionary models. From a more applied and societal-benefit perspective, the relevance of ISLAND is evident in the production of a comprehensive and multidisciplinary assessment of human-impact in the deep-sea, especially regarding industrial fishing activities at the scale of an entire margin. 13 scientists have joined the ISLAND cruise on board the RV Angeles Alvariño (IEO, Spain), including 2 PhD students and 2 Post-Doctoral researchers. ISLAND represented the first occasion for in-situ observation and sampling of the seafloor offshore the NW Sicilian slope.

During the 10 days of the ISLAND Cruise we collected:

- around 140 km² of Multi Beam swath mapping.
- 32 profiles of high-resolution Simrad **TOPAS** (TOPographic PArametric Sonar) seismic profiler, corresponding to up to 232 km.
- 8 high-resolution **Sparker** seismic profiles, accounting for up to 92 km of new seismic data.
- 24 **Gravity Cores** for a total length of 32 m of subseafloor sediments.
- 26 **Multi Cores** (26 stations of which 5 with 3 replicates, 6 cores for each station).
- 14 **ROV dives** (from 90 to 800 m deep), for a total duration of 32 hrs of video footage along the seafloor.
- 17 **CTDs** along the Eleuterio and Oreto Canyons.
- a **mooring** with 5 turbidimeters and 1 currentmeter deployed at the mouth of the Oreto Canyon (Gulf of Palermo) to record possible human induced (trawling) sedimentary flows during a period of 5 months (Aug 2016 - Jan 2017).
- footage for a **documentary** promoted by Eurocean (www.eurocean.org/) about the ISLAND Cruise and the TNA activities of the EUOFLLEETS2 Project. A first short documentary about TNA activities is available in: <https://vimeo.com/194049026>



Seismic records showing buried valleys and landslides along the explored canyon systems.



Phycis phycis and litters observed in the Eleuterio Canyon (Gulf of Palermo).



Schematic not scaled graphs of the deployed ISLAND mooring. Yellow dots indicate the highest trawling effort along the Oreto Canyon (Palermo).

[For more information:](#)

Facebook Page: <https://www.facebook.com/IISLANDCruise>

Documentary about the Eurofleets2 TNA Activities: <https://vimeo.com/194049026>