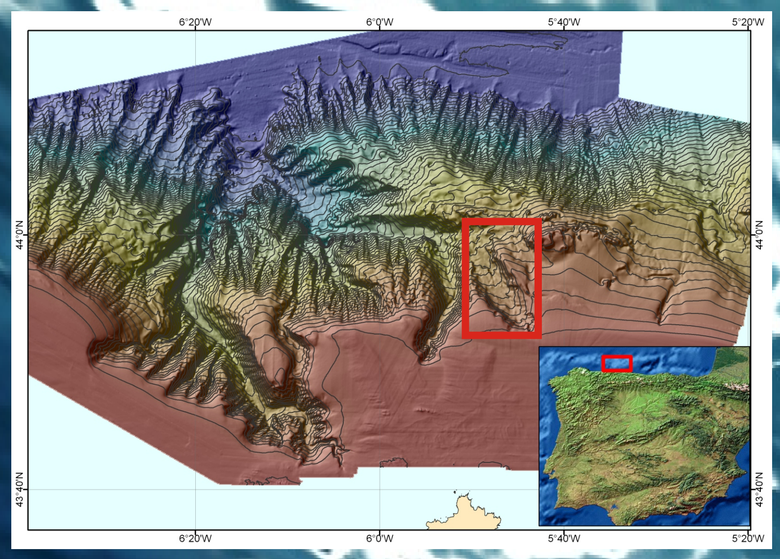
Sponges of Gaviera Canyon (Aviles Canyon System, Cantabrian Sea)

Pilar Ríos[1] & Javier Cristobo[1,2]

1. Instituto Español de Oceanografía. Centro Oceanográfico de Gijón, C/ Príncipe de Asturias 70 bis, 33212 Gijón, Asturias, Spain. pilar.rios@ gi.ieo.es; cristobo@gi.ieo.es
2. Departamento de Zoología y Antropología Física. Universidad de Alcalá de Henares. Madrid, Spain.

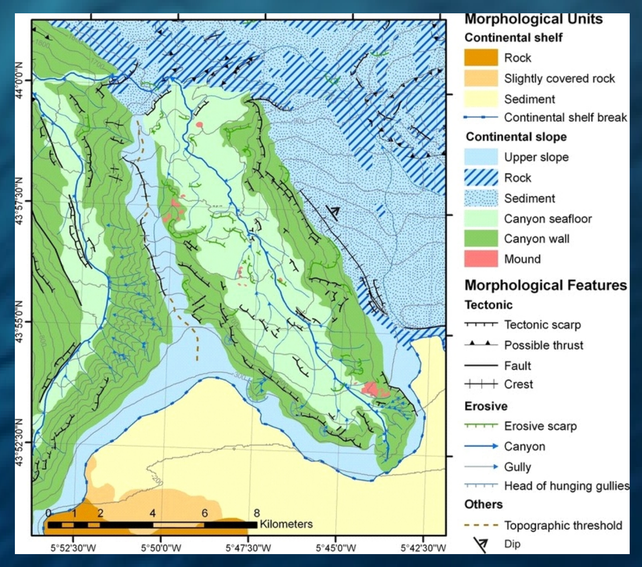


La Gaviera canyon is located in the complex Avilés Canyon System, which is currently being studied in the INDEMARES project. As part of the project's main objective to identify vulnerable habitats and biological communities.

The Avilés Canyon System, is a complex, structurally-controlled area in the Cantabrian Sea (southern Bay of Biscay), constituted by three main canyons, the La Gaviera Canyon being one of these, and some other minor tributaries. There is also a marginal platform and a relevant rocky outcrop in this area of the north Iberian continental margin.

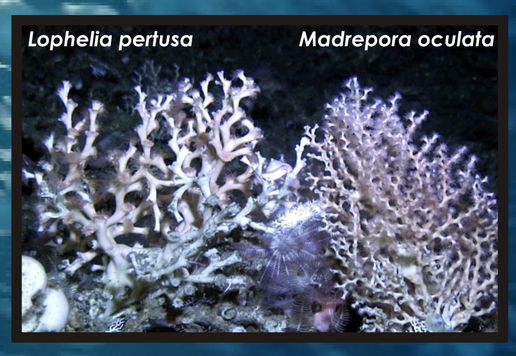
This canyon provides suitable environmental conditions for sponges and cold-water corals to grow (Sanchez et al., 2013). Its general morphology is unusual, as it is totally different from the other canyons of the Avilés Canyon System and Navia Canyon, which have clear cross-sections in a V shape, while GC shows a striking U-shaped cross section. High sampling effort was performed in this area during the INDEMARES project including a complete geomorphological description, direct visual transects, experimental designs based on moorings of landers and current meter lines and samplings using dredges to determine the biodiversity associated with the reef and rocky bottoms.

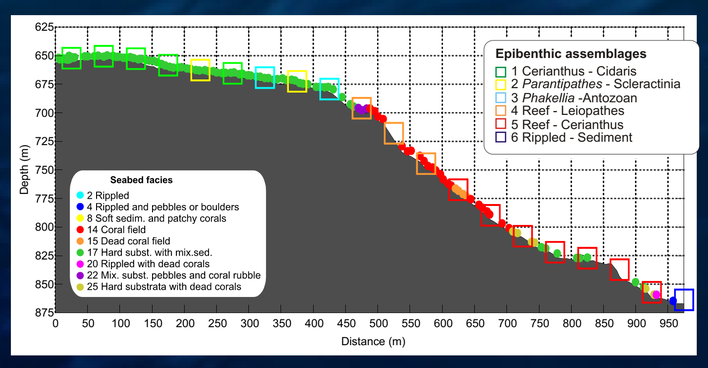
Data were collected during the three INDEMARES-AVILES surveys carried out on board the R/V Vizconde de Eza (SGPM) in April 2010 and May 2011 and R/V Thalassa (IFREMER-IEO) in July 2010, R/V Ramón Margalef (IEO) in May 2012 and R/V Ángeles Alvariño (IEO) in September 2012. The samples only in 2010 and 2011.

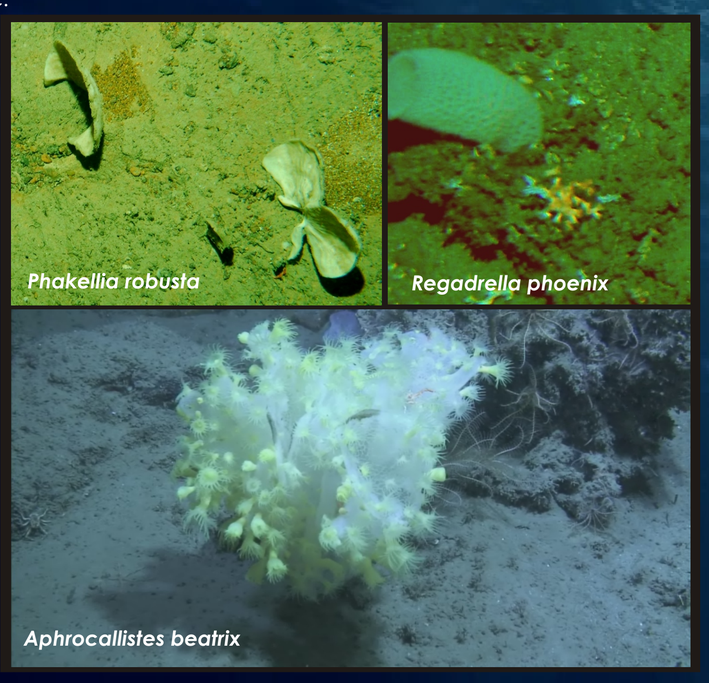


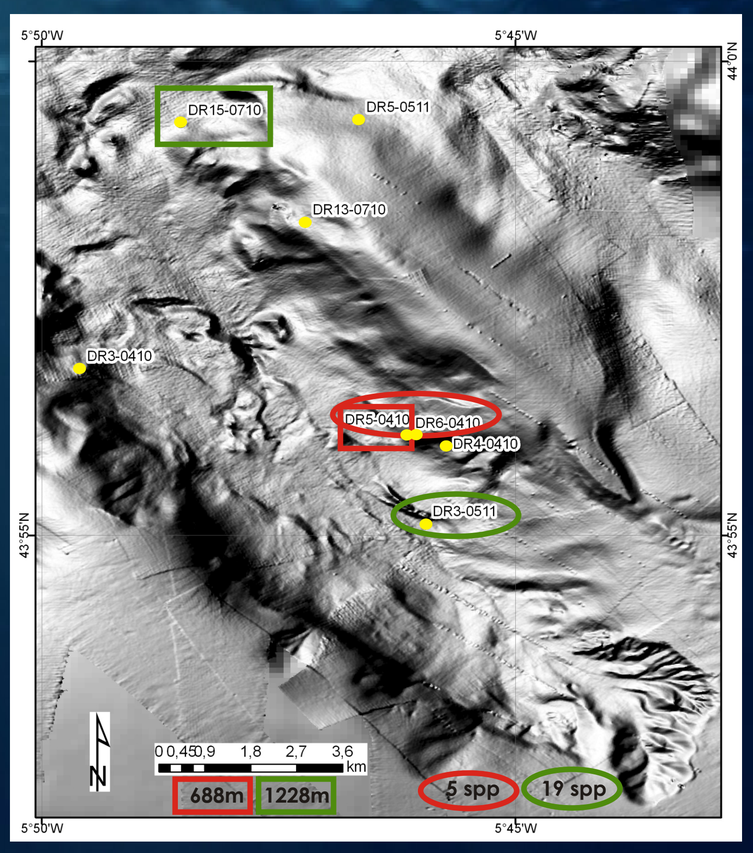
Two living cold-water coral settings were distinguished: a dense coral reef located on stepped rocky bottoms of the eastern and western flanks as well as on the canyon floor, and carbonate mounds (20-30 m high) located on the canyon floor. The dominant species of the reef are *Madrepora oculata* and *Lophelia pertusa*, which considerably increase the habitat's complexity and the biodiversity in relation to other facies described in the canyon.

The presence of cold-water reefs is directly related to a high-energy environment, from just beneath the lower bound of the Eastern North Atlantic Central Water (ENACW) to the core of Mediterranean Water (MW). The canyon setting where living corals have been observed is located in water density range of 27.35-27.65 kg m-3 which is in accordance with the potential density values for cold-water coral distribution in the North Atlantic.









EPIBENTHIC ASSEMBLAGES

As an example of the spatial distribution of epibenthic megafaunal communities that occur in coral reef habitats and surrounding areas the analyses of still images of one transect carried out at the eastern flank of the canyon, show the existence of six assemblages. There is a clear relationship between the assemblages and depth.

Group 1 is typified by a cerianthid, perhaps *Cerianthus lloydii*, and the sea urchin *Cidaris cidaris*, which are characteristic species living on hard substrates with mixed sediments in the upper areas and a low gradient at the flank.
Group 2 is typified by the antipatharian *Parantipathes* cf. *hirondelle* and an unidentified solitary scleractinian species that occurs on hard substrates with low sedimentary coverage of the top of the flank.
The sponge *Phakellia robusta* is a characteristic species from **Group 3** that appears on the upper border of the flank. Coral reef communities are divided into two different groups.
Group 4 corresponds to areas with a lower density of corals, both alive and dead, which enables the development of large antipatharians of the genus *Leiopathes* and some sponges (*Regadrella phoenix*, and *Aphrocallistes beatrix*). It is located in the shallower area of reef development, between 700 and 750 m.
Group 5 is the dense coral reef that is deeper. The species that typify this group are the scleractinians *Lophelia pertusa* and *Madrepora oculata*. Observations of images confirm the presence on the reef of some crustacean species, such as *Bathynectes maravigna*, *Chaceon affinis* and the squat lobster *Munida* spp. (mainly *M. sarsi*).
Finally, **Group 6** corresponds to the community that inhabits the small rocky outcrops located in the area of ripples at the beginning of the canyon floor, and includes discrete colonies of *Madrepora oculata* and *Lophelia pertusa*.

The megafauna observed in the canyon is dominated in both biomass and diversity by the phyla, Porifera, Cnidaria and Echinodermata. According to the latest international standards established by the EU and OSPAR these phyla are considered components of vulnerable ecosystems because they are very exposed to impacts by bottom trawling and other human disturbances.
A total of 38 species of Porifera were recorded, 36 Class Demospongiae and 2 Class Hexactinellida: *Regadrella phoenix* and *Aphrocallistes beatrix*.
All specimens of Demospongiae were identified at genus level and at present 14 at species level (Table).
The most common species, occurring at all the stations (8) where sponges were found, is *Hymedesmia paupertas* appeared 31 times; *Desmacella* (19 specimens, 6 stations), *Ploccamione dirrhopalina* (18 specimens, 5 stations), *Latrunculia* sp. (14 specimens, 6 stations).
The sponge assemblage consists of a high number of small and encrusting species whereas few massive species occur, mainly belonging to the Astrophorida order, (*Geodia* spp, *Pachastrella* spp).
Carnivorous sponges are represented with 5 specimens of genus *Chondrocladia*, *Asbestopluma* and *Cladorhiza*.
Station DR3-0410 (893 m) and DR4-0410 (776 m) were the areas with more species.

Species	DR3-0410	DR4-0410	DR5-0410	DR6-0410	DR13-0710	DR15-0710	DR3-0511	DR5-0511	Depth (m)	Aboundance
Regadrella phoenix Scmidt, 1880	■					■	■	■	776-1228	7
Aphrocallistes beatrix Gray, 1858	■	■			■	■	■	■	700-1228	11
Craniella sp		■							700	1
Poecillastra compressa (Bowerbank, 1866)							■		776	1
Calthropella (*Calthropella*) *geodioides* (Carter, 1876)							■		776	2
Geodia sp		■							700	6
Geodia nodastrella Carter, 1876							■		776	2
Pachastrella sp		■							700	2
Pachastrella ovisternata Lendenfeld, 1894		■	■						688-700	3
Characella pachastrelloides (Carter, 1876)	■	■					■		700-893	5
Nethea amygdaloides (Carter, 1876)	■	■						■	700-908	7
Vulcanella sp							■	■	776-908	6
Vulcanella aberrans (Maldonado & Uriz, 1996)	■						■	■	776-908	4
Vulcanella gracilis (Sollas, 1888)								■	908	1
Thrombus abyssi (Carter, 1873)					■	■	■		769-1228	4
Polymastia sp							■		776	1
Lithistida indet	■								893	1
Iophon sp						■			1228	1
Plocamione dirrhopalina Topsent, 1927	■			■	■		■	■	769-908	18
Clathria (*Microciona*) sp								■	776	1
Desmacella spp	■		■	■	■	■	■	■	688-908	19
Hymedesmia (*Hymedesmia*) *paupertas* (Bowerbank, 1866)	■	■	■	■	■	■	■	■	688-1228	31
Hymedesmia (*Hymedesmia*) spp	■	■		■				■	688-908	9
Hymedesmia (*Stylopus*) spp	■				■		■		769-893	3
Plocamionida sp							■		776	1
Hamigera sp							■		776	1
Chondrocladia sp						■			1228	1
Asbestopluma sp							■	■	776-908	2
Cladorhiza sp								■	908	2
Hamacantha (*Hamacantha*) *johnsoni* (Bowerbank, 1864)	■			■					790-893	4
Hamacantha (*Hamacantha*) *lundbecki* Topsent, 1904	■								893	1
Tedania sp								■	908	2
Latrunculia sp nov	■	■	■	■	■				688-908	14
Phakellia robusta Bowerbank, 1866						■			1228	2
Phakellia sp					■				769	1
Siphonodyction sp							■		769-776	4
Haliclona (*Gellius*) sp1	■							■	776-893	2
Haliclona (*Gellius*) sp2						■			1228	1