Geophysical Research Abstracts
Vol. 16, EGU2014-13899-2, 2014
EGU General Assembly 2014

A multidisciplinary environmental integrated approach to better understand the Tegnue Reefs formation, offshore Chioggia, Northern Adriatic Sea.

Andrea Bergamasco (1), Sandra Donnici (1), Luigi Tosi (1), Davide Tagliapietra (1), Luca Zaggia (1), Davide Bonaldo (1), Federica Braga (1), Cristina Da Lio (1), Erica Keppel (1), Giuliano Lorenzetti (1), Giorgia Manfè (1), Gianluca Franceschini (2), Otello Giovanardi (2), Eleonora Carol (3), Elena Fornaro (1,4), and Carley Grant (5)

(1) Institute of Marine Sciences - National Research Council of Italy, ISMAR - CNR, Venezia, Italy, (2) Institute for Environmental Protection and Research, ISPRA, Chioggia, Italy, (3) Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET, Universidad Nacional de La Plata, La Plata, Argentina, (4) Dept. of Environmental Sciences Informatics & Statistics, Università Ca' Foscari, Venezia, Italy, (5) Sacred Heart University, Fairfield, CT, USA

Several hard substrata cover the northwestern Adriatic shelf around 20 m depth as patchy reefs called "*Tegnue*". These submerged reefs form many discrete sets from offshore Grado south to the Po river delta with a large field located off Chioggia. Even if the outer part of the reef is constituted by a thick biogenic formation the underlying structure, mainly buried, is made by cemented sand and this seems to be correlated with its origin not yet fully understood. Different genetic interpretations have been proposed thus far, contemplating among other cementation due to beach-rock like processes (e.g., Stefanon, 1969, Bonardi and Tosi, 2002, Bonardi et al., 2006) or the action of ascending fluids enriched in hydrocarbons (e.g., Gabbianelli et al., 1997, Casellato and Stefanon, 2008). An on-going project, mainly a multidisciplinary integrated approach, combining physical, biological, geological, geomorphological, hydrogeological and geochemical data, supported by a detailed bathymetric mapping, an overall general circulation modeling at high resolution, a robust geophysical evidence, and detailed underwater surveys performed by a team of scuba-diver scientists, aims to better understand the genetic processes backing the distribution, early genesis and evolution of such relevant habitats.

Actually, using all the new available data, our plan is to verify which previous interpretations on the origin of the *Tegnue* core better match with the diagenetic processes that led to the cementation of the sand layers lying at the base of the organic reefs.

Preliminary results suggest that the *Tegnue* reefs formed along paleochannels features related to the former alluvial plain and submerged by the Holocene transgression. Whatever their genesis, once exposed such rocky substrata are then quickly colonized by living organisms, which contribute to the growth and expansion of the reef. Calcareous algae and in general the organic concretion could have a role during the reef accretion, and benthic invertebrates like bryozoans, mollusks, serpulids and corals also contribute to the final building of the status of *Tegnue*'s environment, but we want to demonstrate that the in first stage of consolidation abiotic phenomena could have played a major role.

In order to prove our thesis a series of ground water sampling as well as rock sampling and sediment cores were carried out. The poster illustrates the overall ongoing program as well as some work in progress and first results from field cruise.

Acknowledgments

This work was supported by the Municipality of Chioggia through the Tegnue Project and partially by the Flagship Project RITMARE - The Italian Research for the Sea - coordinated by the Italian National Research Council and funded by the Italian Ministry of Education, University and Research within the National Research Program 2011-2013, and by the Scientific Cooperation Agreement between the CONICET (Argentina) – CNR (Italy), Program 2013–2014, Project "Fresh-saltwaters in high-value coastlands: from the hydrogeophysical/geochemical characterization of the present interactions to the modeling quantification of the expected effects of climate changes".

References

- Bonardi, M., Tosi, L. 2000. Indagini preliminari su alcune formazioni di sabbie cementate nella laguna di Venezia. In: La Ricerca Scientifica Per Venezia. Il Progetto Sistema Lagunare Veneziano, Modellistica del Sistema Lagunare

Studio di Impatto Ambientale. Istituto Veneto di Scienze, Lettere ed Arti, Vol. II, Tomo II, p. 967-974, Venezia, ISBN: 88-86166-82-6.

- Bonardi, M., Tosi, L., Rizzetto, F., Brancolini, G., Baradello, L. 2006. Effects of climate changes on the late Pleistocene and Holocene sediments of the Venice Lagoon, Italy. Journal of Coastal Research, SI 39, 279-284.

- Casellato S., Stefanon A. 2008. Coralligenous habitat in the northern Adriatic Sea: an overview. Marine Ecology, 29: 321–341.

- Gabbianelli, G., Colantoni, P., Degetto, S., Dinelli, E., Lucchini, F. 1997. Contributi sedimentologici, geochimici ed isotopici per una caratterizzazione ambientale dell'Adriatico settentrionale. Atti 1° Forum Italiano delle Scienze della Terra. Bellaria: 242-243.

- Stefanon A. 1969. The role of beachrock in the study of evolution of the Adriatic Sea. Memorie di Biogeografia Adriatica, 8: 79–87.