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The Geoswim project: snorkel-surveying along 250 kilometres of the Southern and Western Istrian Coast

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The northeastern Adriatic coast is dominated by high limestone plunging cliffs or slopes at wide-ranging angles. Several Authors (Fouache et al., 2000, Antonioli et al., 2004, 2007; Furlani et al., 2011a) reported the occurrence of a well-carved submerged tidal notch at about -0.5/-0.7 m m.s.l. in the central part of the Istrian peninsula, in correspondence of the Limski Kanal. Moreover, Furlani et al. (2011b) studied the coastal features of the northwestern sector, in particular the genesis and development of shore grykes. Anyway, observation carried out along these rocky coasts, but also in general along all the rocky coasts of the world, are punctual and relative to short coastal sectors. As a consequence, it prevents the possibility to provide a global view of the surveyed coastal area.

The Geoswim project, of the Department of Mathematics and Geosciences of the University of Trieste, allowed to survey the morphological features of the whole southern and western Istrian coast (Fig. 1), like notches, sea caves, coastal assemblages of pinnacles, potholes, etc., and to collect physical parameters during the surveying.

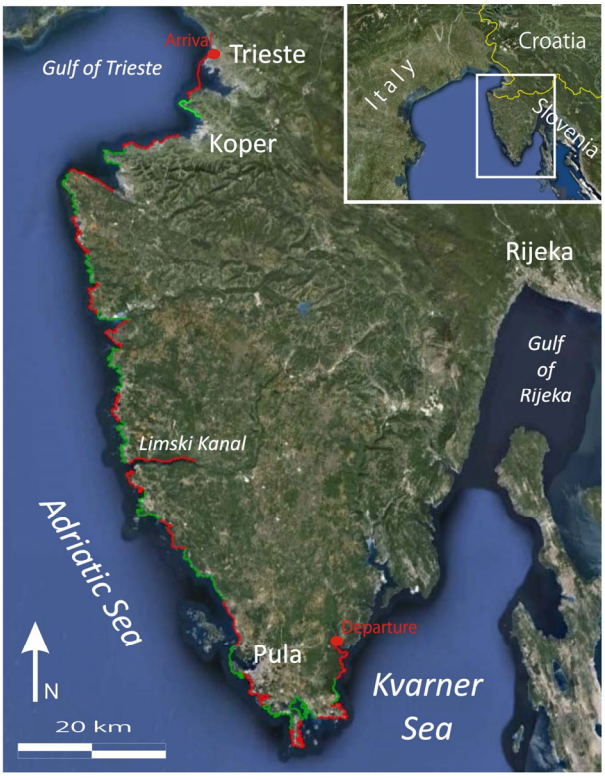

Fig. 1 - Left side: the study area. Red and green lines are the laps. Right side: the route and the length of the laps.

The northwestern Istrian coast is dominated by limestones spanning in time spanning in time from the Late Jurassic to the Eocene (Velić et al., 2002,). Nearly horizontal or slightly inclined limestone bedding planes outcrop all over the western Istria. Limestone beds thickness is higher in correspondence of the Limski Kanal, in the central and most ancient part of Istria (Vlahović et al., 2005).

n	Departur	Arrival	km
1	Sisan	Liznijan	6
2	Liznijan	Kamp Medulin	11
3	Kamp Medulin	Pomer	8
4	Pomer	Kamp Stupice	8
5	Kamp Stupice	Premantura	14
6	Premantura	Banjole	11
7	Banjole	Stoja	12
8	Stoja	Pula	9
9	Pula	Peroj	8
10	Peroj	Bale	13
11	Bale	Rovinj South	8
12	Rovinj South	Rovinj North	10
13	Rovinj North	Valalta	7
14	Koversada	Zelena Laguna	11
15	Zelena Laguna	Porec	7
16	Porec	Cervar	13
17	Cervar	Mirna	9
18	Mirna	Novigrad	6
19	Novigrad	Daila	8
20	Daila	Sv. Pelegrin	7
21	Sv. Pelegrin	Umag	8
22	Umag	Savudrija	9
23	Savudrija	Kanegra	7
24	Kanegra	Strunijan	8
25	Strunijan	Koper	12
26	Koper	San Bartolomeo	6
26	San Bartolomeo	Trieste	12
		Total lenght	**250,17**

Fig. 2 - a) Preparation of the boat used during the surveying in southern Istria (Photo E. Zavagno); b) surveying of coastal features and physical parameters of the sea near Poreč (Croatia).

From a geomorphological point of view, the study area can be classified as a Dalmatian coast (Holmes, 1965). high plunging cliffs dominate the Southwestern and the central part of the Western Istria, while the northern and southern coast is interested by limestone coastal slopes plunging at wide-ranging angles.

The surveying was carried out along 260 km of coast during July 2012 using mask and fins. It can be considered a snorkeling surveying. The route was covered in 27 days (Tab. 1), from Šišan, in Croatia, to Trieste, in Italy. Two cameras, located on a 1.2 m boat specifically adapted for the project (Fig. 2a, b), a CANON G12 set in an underwater housing and the latter a 3D GoPro camera, allowed to collect an ongoing video of large part of the Istrian coast, both above and below sea level. Moreover, a CTD-diver produced by Eijkelkamp was pull in order to collect temperature and conducibility data along the coast.

Data collected, together with the video acquisition, allowed to accurately map the submerged notch and other coastal features, such as sea caves (Fig. 3), potholes, etc, along the whole surveyed coast. Data show that the submerged notch is confined to the central part of the Istrian peninsula (Fig. 4), the area where it was previously pointed out. The preliminary processing of physical data, even if they was strongly affected by the total lacking of rains during the surveying period, seem to indicate the occurrence of few large submarine springs in the same area of the occurrence of the submerged notch.

Future processing of recorded data and their mutual comparison will allow to precisely define the occurrence of limestone coastal features and their relations to coastal topography and physical seawater parameters.

Fig. 3 - A sea cave at Premantura (Croatia), in the southern sector of the Istrian peninsula.

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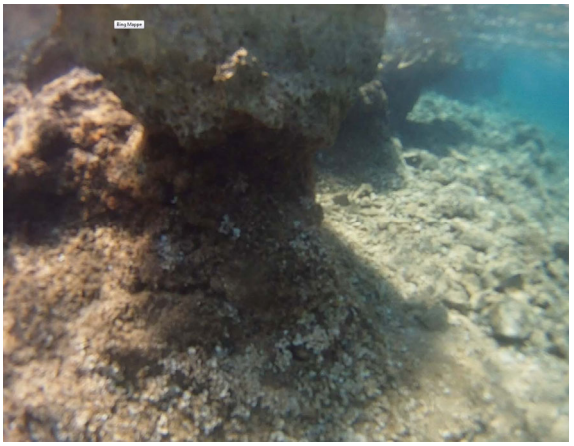

Fig. 4 - Submerged tidal notch along the Northeastern Adriatic coast. The picture is made as a stereoscopic 3D as the results using filters of different colors, in this case red and cyan. Red and cyan glasses are recommended to correctly view this image.

tively participated at different stages of the scientific project, in particular prof. Franco Cucchi of the Department of Mathematics and Geosciences of the University of Trieste for the ongoing support, Rados Furlani for the assistance in the assemblage of the boat, Sara Biolchi, Livio Dorigo, Giulio Guglielmi, Gaia Cusatelli, Federico Furlani, Roberto Odorico, Luca Terribili, Martina Zaccariotto and Enrico Zavagno for the assistance during the swim-survey operations and many others. Many thanks to the “Riserva Marina di Miramare”, the “Circolo Istria” and the “Istituto Nautico di Trieste” for the assistance before and after the survey.

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