



SPLASHCOS Training School on  
**Remote sensing techniques for the survey of submerged prehistoric  
landscapes in tectonically active regions**  
**Rhodes Island, Greece, 13-19 October 2013**

## SCIENTIFIC REPORT

Host Institute: Hydrobiological Station of Rhodes / Hellenic Centre for Marine Research  
(HCMR)

Organizer: Dr Dimitris Sakellariou

Trainees: 7

### **Scientific Rationale / Objectives**

The aim of the SPLASHCOS Training School in Rhodes was to provide early stage researchers coming from the fields of archaeology and geosciences with the opportunity to:

- become familiar with use of marine geological and geophysical techniques (multibeam, side scan sonar, subbottom profiler) and methodologies
- get trained in the use of marine geophysical techniques at sea aboard a research vessel
- visit onshore sites where vertical tectonic movements are documented by submerged antiquities, uplifted notches / paleo-shorelines / marine terraces and active faults
- get trained in the processing and interpretation of marine geophysical data

The Training School was organized by the Hellenic Centre for Marine Research and hosted by the Hydrobiological Station & Aquarium of HCMR in Rhodes Island.

The lectures took place at the Hydrobiological Station and Aquarium of Rhodes (Fig. 1).

Offshore training was conducted aboard the research vessel ALKYON (Fig. 2)

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Fig. 1: The Hydrobiological Station and Aquarium of HCMR located at the northern tip of Rhodes Island.



Fig. 2: The research vessel ALKYON (13.5m long) of HCMR

## Training School Program:

**Sunday, Oct. 13th:** Arrival

**Monday, Oct. 14h:** Lectures at the Hydrobiological Station & Aquarium

The following lectures have been given:

1. By D. Sakellariou: Introduction to the Geology and Tectonics of the Aegean Region with particular emphasis on the interplay of long-term tectonic movements, sea-level fluctuation and short-term movements and their effect on the distribution of land during Pleistocene
2. By N. Galanidou: Introduction to the Prehistory of the Aegean Region
3. By D. Sakellariou: Introduction to the use of remote sensing techniques: swath bathymetry systems (multibeam), side scan sonar, subbottom profiler

**Tuesday, Oct. 15th:** Offshore training - Data acquisition aboard R/V ALKYON

**Wednesday, Oct. 16th:** Offshore training - Data acquisition aboard R/V ALKYON

During these two days the trainees had the opportunity to participate in offshore work aboard the research vessel ALKYON, become familiar with real-time acquisition of marine geophysical data with the use of a hull-mounted multibeam system (RESON 7125 200/400kHz dual frequency), a towed side scan sonar (Geoacoustics, 110/400kHz frequency) and a hull-mounted subbottom profiler (Geoacoustics, 3.5kHz). Stefanos Kalogirou, Panos Georgiou and Grigoris Rousakis were operating the above instruments and explained to the trainees the principles of each method, and the hardware and the software used for the acquisition of the data.

Offshore work was carried out along the east coast of Rhodes Island. Two sites were selected:

1. The basin of the Rhodes harbour and the area off Ladiko Cape.

The harbour basin was selected in order to assess the impact of human activities on the seafloor. The trainees had the opportunity to estimate the erosion of the seafloor due to the turbulence generated by the cruise ships entering the harbour.

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2. The Ladiko area was selected because of the presence of active faults, pro-deltaic sedimentary bodies, submarine canyons and underwater terraces on the seafloor.

#### **Thursday, Oct. 17th: Fieldtrip**

During the fieldtrip the trainees had the opportunity to visit:

1. A tectonically submerged Roman quarry
2. A Lower Pleistocene pro-deltaic body exposed on land, and to discuss the sedimentary processes associated with its evolution: sedimentary environment, top-set / fore-set / bottom-set deposition, relationship with sea-level etc
3. Uplifted marine notches indicating abrupt episodes of tectonic uplift (and subsidence) during the Late Holocene (5000 years to present) and uplifted Pleistocene marine terraces
4. Active faults, and to discuss their effect on the evolution of the morphology
5. Uplifted beach-rocks with trace-fossils of human and animal origin and to discuss the creation of beach-rocks and their use as sea-level indicators.

The Fieldtrip Guide is attached to this report.

#### **Friday, Oct. 18th:**

The last day of the Training School was devoted to the presentation of the processing of the geophysical data acquired aboard R/V ALKYON on the previous days. Multibeam, side scan sonar and subbottom profiler data were processed and their interpretation was discussed thoroughly.

The trainees also had the opportunity to practice for themselves the interpretation of sonar and subbottom profiler records under the supervision of D. Sakellariou, S. Kalogirou and G. Rousakis.

#### **Saturday, Oct. 19th: Departure**

### **List of Trainees**

	Name	Background	Education	Nationality	Gender
1.	Duncan S. Howitt-Marshall	archaeologist	PhD student	UK	M
2.	Konstantina Tsampouraki-Kraounaki	geologist	MSc student	Greece	F
3.	Sila Sokulu	archaeologist	MSc	Sweden	M
4.	Hasan Ozren	geologist	MSc	Croatia	M
5.	Stephanie Said	archaeologist	MSc	Malta	F
6.	Gustavo Sanz Palomera	archaeologist	Dr	Spain	M
7.	Emily Gal	archaeologist	PhD student	UK	F

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## List of Trainers

1	Dr D. Sakellariou	Structural Geologist, Research Director Hellenic Centre for Marine Research
2	Dr N. Galanidou	Prehistoric Archaeologists, Associate Professor, University of Crete
3	Dr G. Rousakis	Geologist-Oceanographer, Researcher Hellenic Centre for Marine Research
4	Dr S. Kalogirou	Marine Biologist, multi beam expert Hellenic Centre for Marine Research
5	P. Georgiou	Geologist-Oceanographer, sides can sonar expert Hellenic Centre for Marine Research
6	I. Pampides	Electronic engineer Hellenic Centre for Marine Research

## Quotes from the Trainees

Duncan S. Howitt-Marshall on 22nd Oct 2013:

..... *I can confidently say on behalf of the all participants that we had an immensely enjoyable time on the course, and benefited a great deal from your expert tuition and guidance. .... Putting your instruction on the first day of lectures into practice during the data collection at sea aboard R/V Alkyon was an amazing experience. .... Furthermore, I would like to extend my thanks to Dr. Nena Galanidou for her marvellous lecture on Aegean Prehistory. ....*  
*The training school in Rhodes was a huge success and a fitting end to four years of the SPLASHCOS network.*

Emily Gal on 22nd Oct 2013:

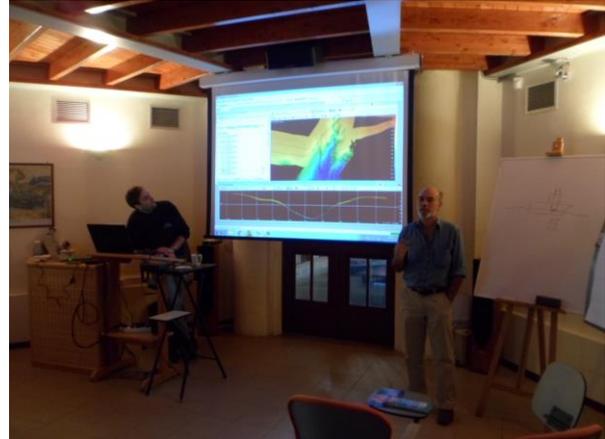
*My thanks for a brilliant week! I learned so much and the experience was made even better by being surrounded by such an enthusiastic, friendly and knowledgeable group of trainers and fellow trainees. I came back with so many ideas for my own research and have spent the last couple of days writing them down so I don't forget them!.....*

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## PHOTO GALLERY



In the lectures room at the Hydrobiological Station / Aquarium of Rhodes



Processing and interpretation of data



Left to right: Duncan, Stephanie, Sila, Konstantina



Left to right: Ozi, Emily, Gustav



Acquisition of data aboard R/V Alkyon: Duncan, Stephanie, Sila, Konstantina



Acquisition of data aboard R/V ALKYON: Ozi, Emily, Gustav

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Ready for the fieldtrip



At Kavourakia beach, submerged Roman quarry



At Kalithea, Oasis Beach: Exposed pro-deltaic body with topsets and foresets.



Faulting and landscape evolution



Lindos: faults, uplifted terraces



Measuring an active fault with a geological compass

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Trace fossils on uplifted beach-rock



Trace fossils on uplifted beach-rock



Fieldtrip lunch



Dinner in Rhodes with Greek music