GAME
GROUP OF AQUATIC MACROPHYTE ECOLOGY

International hands-on course

Sizing the Blue Carbon: Estimating carbon stocks and fluxes in seagrass and saltmarsh ecosystems

28-30 October 2019, Blanes, Spain

Course Report

JUNTA DE ANDALUCIA
CONSEJERÍA DE MEDIO AMBIENTE Y ORDENACIÓN DEL TERRITORIO

Life

Socios beneficiarios:

JUNTA DE ANDALUCIA
CONSEJERÍA DE MEDIO AMBIENTE Y ORDENACIÓN DEL TERRITORIO
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CSIC
Consejo Superior de Investigaciones Científicas

UICN

HyT

Cofinanciador:

CEPSA

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International hands-on course

Sizing the Blue Carbon: Estimating carbon stocks and fluxes in seagrass and saltmarsh ecosystems

28-30 October 2019, Blanes, Spain

Course Report

From the 28th to the 30th of October 2019, the Group pf Aquatic Macrophyte Ecology (GAME) of the Centre for Advanced Studies of Blanes (Spanish Council for Scientific Research), organized a hands-on course for the estimation of organic carbon stocks and fluxes associated to the sinks formed by certain vegetated coastal ecosystems known as Blue Carbon: mangrove forests, saltmarshes and seagrass meadows.

Justification and aim of the course:

The attention to biospheric carbon sinks has been growing during the last few decades as a means to decelerate the increase of CO_2 in the atmosphere. The potential of Blue Carbon in this endeavor is being actively explored in the last few years with important efforts both in quantifying the stocks and fluxes and in setting the mechanisms for monetization in the international carbon markets. As a first key step, in this course we focused on the necessary technical knowledge to estimate the size and rate of growth of the carbon sink associated to blue carbon ecosystems, including (i) sampling design, (ii) field works, (iii) laboratory works, and (iv) numerical procedures.

This initiative corresponds to the activities within the actions C1 and C2 of the EU project Life Blue Natura (LIFE14CCM/ES/000957), complementing the workshop "Training workshop for managers and technicians in the development of blue carbon projects" celebrated the days 17th and 18th of September in Huelva, Spain, organized by the IUCN and GAME-CSIC. The focus of this last course was set on how the organic carbon stocks captured by blue carbon ecosystems can be utilized to promote conservation and restoration of coastal ecosystems through conservation projects that can be monetized in the voluntary carbon markets.

Course post-hoc comments:

The hands-on course "Sizing the Blue Carbon" has resulted in a success beyond our best expectations. To start with, the course was fully booked the third day after opening the call for registrations. A large waiting list built up during the remaining month to go until the deadline for registrations.

We were blessed with the attendance of 19 participants from all over the world: Canada, Croatia, France, Germany, Indonesia, Italy, Kenya, Japan, The Netherlands, Portugal, Spain, Sweden, Tanzania, and Tunisia (see annex). The profile of these attendees was quite diverse, including government responsibles, NGOs (United Nations), hydraulic engineers, biologists, PhD students, Postdocs, early career scientists, professors, as well as senior scientists. They all credited a high level of knowledge in their fields and an also

high interest in learning the Blue Carbon techniques for implementation in their laboratories, strategies or careers.

Five invited speakers from France, Germany, Spain, and Sweden, provided brilliant contributions with cutting edge topics on Blue Carbon research and markets making it clear that Blue Carbon science is an 'in progress' science with not a few uncertainties and gaps to be solved and closed.

From the very first day, participants, speakers and organizers created a convivial and motivating atmosphere that helped to squeeze the time and to benefit from this unique conjunction of experts and highly qualified attendees.

An initial up-to-date overview of the world of Blue Carbon was provided with emphasis in the dynamics of the BC sinks, the role and importance of BC stocks and fluxes in a global context, or its potential in the voluntary carbon markets.

The participants had the chance to participate in a coring demonstration in the field, and in the opening and subsampling techniques of a core. They were instructed in the main laboratory techniques (drying, grinding, digesting, encapsulating, etc.), sample safe storage ("humid" and "wet" lithotecs) and labelling, and in-full numerical techniques to estimate the stocks and fluxes of the Blue Carbon. Finally, a brief but didactic practicum on how to design a BC sampling mission based on a given ecosystem extension and resources availability, was performed by the participants in groups. Practical hints were also provided (budgeting hints, international laboratories for organic and isotopic carbon analyses, and for ^{14}C and ^{210}Pb dating services, etc.).

The Group of Aquatic Macrophyte Ecology wants to thank all the participants and speakers for their warm endorsement of our course

Annexes

Course satisfaction survey:

An anonymous survey was made to all participants, where 5 is the maximum mark. Out of the 12 complete surveys that were returned, the results were as follows:

A. About the course:

1. Was the structure of the course correct: 4.85
2. Was the time allocated to the various topics adequate: 4.62
3. Do you think you are qualified to estimate blue carbon stocks and fluxes after the course? 3.96

Comments:
- Many of the respondents would have preferred a 5-days course extending the time allocated to field, lab, and carbon markets.
- Some would have preferred to reduce the time of the lectures.
- Some would have liked to have the presentations and a basic reference list to work on the topic some days in advance before attending the course.
- It has been mentioned that ecosystem services provided by BC ecosystems other than carbon capture could also be addressed in the course.

B. Introduction (a global context for Blue Carbon):

1. The lecture was clear and easy to follow: 4.69
2. The content given enabled to understand the following sections of the course: 4.69
3. The time allocated was adequate: 4.62

Comments: N/A

C. Sampling design and techniques:

1. The lecture was clear and easy to follow: 4.78
2. The content given enabled to understand the following sections of the course: 4.62
3. The time allocated was adequate: 4.54

Comments:
- The lecture on non-destructive techniques given the last day of course, could be inserted here.
- This lecture could have more time allocated.

D. Laboratory techniques:

1. The lecture was clear and easy to follow: 4.75
2. The content given enabled to understand the following sections of the course: 4.54
3. The time allocated was adequate: 4.42

Comments:
- This lecture could have more time allocated.
- The retro-dating technique of lepidochronology could be included here.

E. Stocks and fluxes estimation:

1. The lecture was clear and easy to follow: 4.46
2. The content given enabled to understand the following sections of the course: 4.38
3. The time allocated was adequate: 4.62

Comments:
- Some would have liked to have the information some days in advance before attending the course to have some background before starting the course.
- Emphasize on the differences between stocks and fluxes and on the importance and role of each one of these parameters.
- Allocate more time to explain and practice on the elaboration of chronological models.
- Alternate theoretical introductions and practicums.

F. Field trip and laboratory visits:

1. Were they well design and easy to follow: 4.54
2. The activities clarified previous contents in the lectures: 4.69
3. The time allocated was adequate: 4.38

Comments:
- Most of the respondents would have liked more time allocated to field and lab practice.
- Some would have liked to include a practice on how to pre-treat the samples for ^{14}C analyses.

G. Sample design and computer practicum:

1. Were they well design and easy to follow: 4.91
2. The activities clarified previous contents in the lectures: 4.63
3. The time allocated was adequate: 4.63

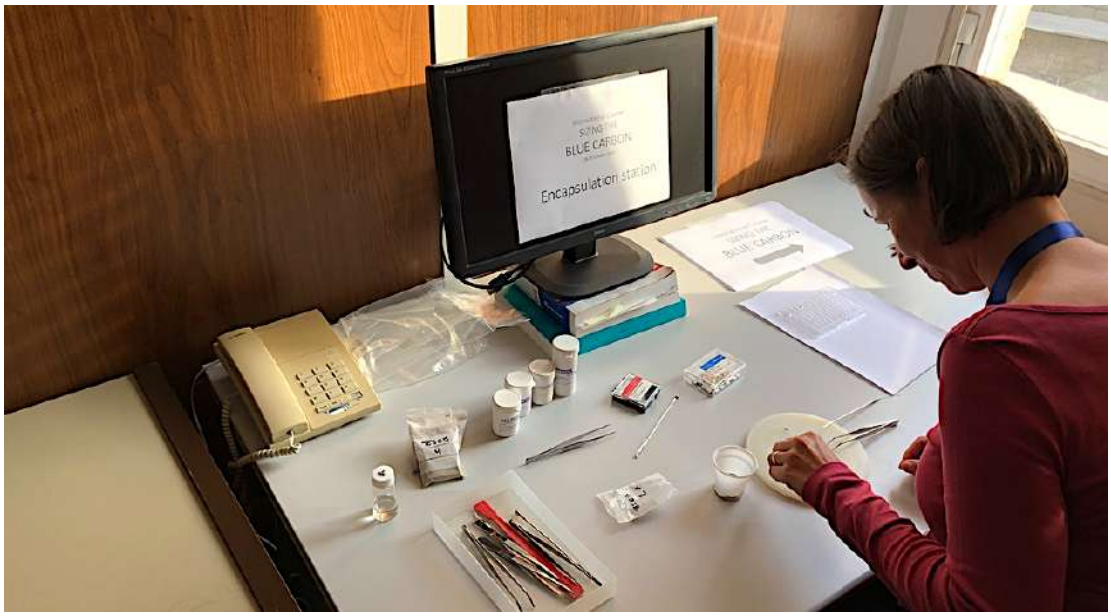
Comments:
- A practicum to write a PIN (project idea note) on a compensation project has been suggested.
- A practicum to elaborate a chronological model using the free software in the www has been suggested.

Global evaluation of the course: **4.58**/5

It has become obvious that the attendees have appreciated the practical approach of the course but would have liked to extend even more the “hands-on time” of the course to:

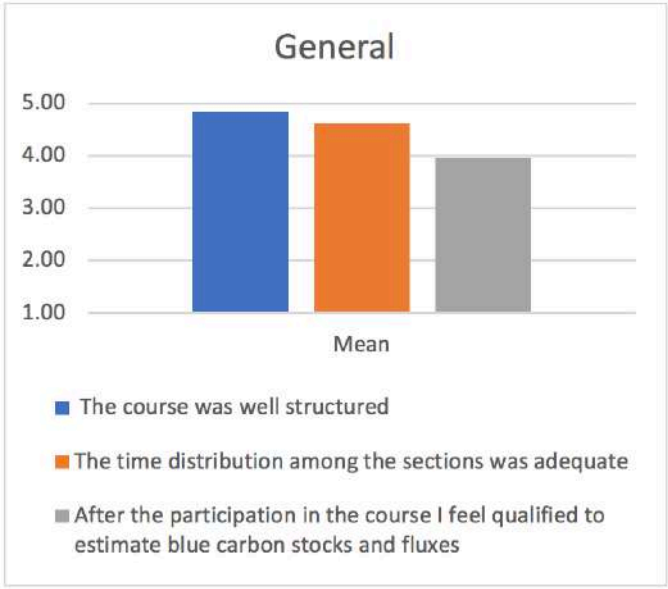
- Better learn field techniques
- Better learn basic lab procedures
- Practice the elaboration of chronological models
- Practice the elaboration of a compensation project.

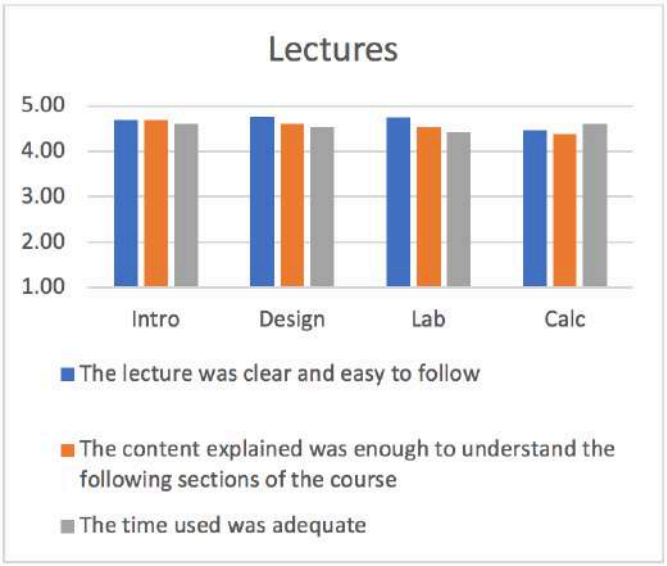
With respect to the last comment, “A practice the elaboration of a compensation project would have been desired”, it has to be said that this was the main focus of the IUCN/CSIC course held in Huelva in September 2019, clearly evidencing the perfect complementarity of that course and ours.

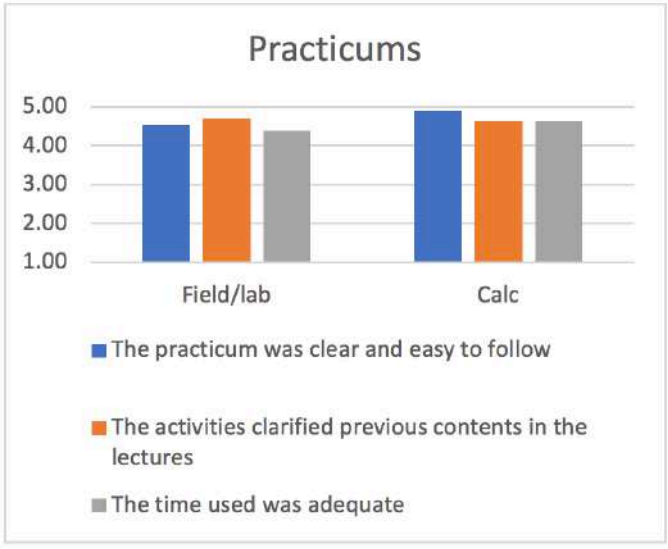


Melita Mokos (Zadar University, Croatia), practicing the encapsulation of sediment samples prior to C_{org} and isotopic analysis during the SBC2019 course at CEAB-CSIC

Graphic summary of the survey:







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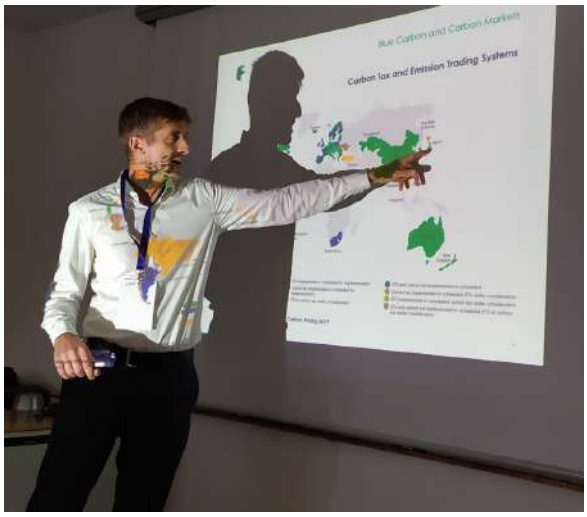
Briac Monnier	Università di Corsica Pasquale Paoli	France	briac.monnier@gmail.com
Mats Björk	University of Stockholm	Sweden	mats.bjork@su.se

Left: Inés Mazarrasa (Environmental Hydraulics Inst. Cantabria, Spain), lecturing on the controversy of the role of carbonates in blue carbon ecosystems and Right: Mats Björk (Stockholm University, Sweden) lecturing on the emissions of GHG in seagrass meadows, during the SBC2019 course at CEAB-CSIC.



Left: Florian Eickhold (Factor CO_2, Spain), lecturing on carbon markets and Right: Santi Giralt (ICTJA-CSIC, Spain) lecturing on dating techniques and chronological models, during the SBC2019 course at CEAB-CSIC.

Course programme

Monday 28th of October

9:00-10:30 Welcome and introduction to the course and blue carbon overview

10:30-11:00 Carbon cycle in marine meadows and salt marshes

11:00-11:30 Coffee break

11:30-13:00 Sampling design and techniques

13:00-13:30 Laboratory techniques overview

13:30-14:30 Lunch

14:30-18:00 Field trip, core opening and subsampling demonstration, and lab. visits

Field trip: A bus will be leaving from CEAB at **14:30**
Manual sampling in a 'saltmarsh'

The bus will come back to CEAB and then leave to the drop-off site

Tuesday 29th of October

9:00-11:00 Stocks and fluxes estimations, overview

11:00-11:30 Coffee break

11:30-13:30 Stocks and fluxes estimations practical session I

13:30-14:30 Lunch

14:30-16:00 Stocks and fluxes estimations practical session II

16:00-16:30 Coffee break

16:30-17:30 Other estimation techniques

Wednesday 30th of October

9:00-10:00 Nondestructive methods of ecosystem characterization.

Briac Monnier, Università di Corsica Pasquale Paoli, France

10:00-11:00 Dating techniques and chronological models.

Santiago Giralt, CSIC, Barcelona,Spain

11:00-11:30 Coffee break

11:30-12:30 Beyond CO_2, other greenhouse gases.

Mats Björk, Univ. Stockholm

12:30-13:30 The role of inorganic carbon in CO_2 budgets.

Inés Mazarrasa, Environmental Hydraulics Institute, Cantabria, Spain.

13:30-14:30 Lunch

Wednesday 30th of October

14:30-15:30 Carbon markets.

Florian Eickhold, Factor CO_2, Bilbao, Spain

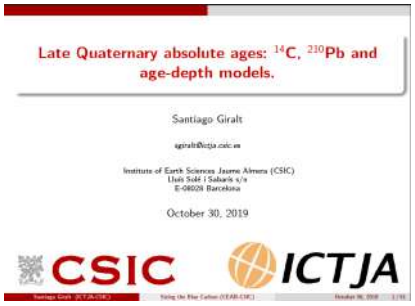
15:30-16:00 Questions and final discussion

16:00-16:30 Coffee break

16:30-17:30 Questions, final discussion, and closure of the course.

Course presentation frontpages

Click on the frontpage to download the pdf presentation



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