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**EPOCA / BIOACID / CalMarO / OCB**

**Training Workshop**

***Best practices in ocean acidification research***

**March 8-12, 2010**

**IFM-GEOMAR, Kiel, Germany**



**IFM-GEOMAR**

Leibniz-Institut für Meereswissenschaften  
an der Universität Kiel

## Monday, March 8, 2010

Location: Lecture Hall, west-shore building IFM-GEOMAR, Düsternbrooker Weg 20,  
practicals in break-out rooms

	Group I	Group II	Group III	Group IV	Group V	Group VI
09:00 – 09:30	Welcome note and workshop logistics (Ulf Riebesell)					
09:30 – 11:00	<b>Lecture:</b> The seawater carbonate system (Arne Körtzinger)					
11:00 – 11:20	<i>Coffee Break</i>					
11:20 – 12:30	<b>Lecture:</b> Future projections (James Orr)					
12:30 – 14:00	<i>Lunch Break</i>					
14:00 – 14:30	Introduction to CO2SYS (Richard Bellerby)					
14:30 – 15:00	Introduction to seacarb (Jean-Pierre Gattuso)					
15:00 – 15:20	<i>Coffee Break</i>					
15:20 – 16:40	Practical A			Practical B		
16:40 – 18:00	Practical B			Practical A		

Practical A: Carbonate system calculations: seacarb (Jean-Pierre Gattuso)

Practical B: Carbonate system calculations: CO2SYS (Richard Bellerby)

## Tuesday, March 9, 2010

Location: Lecture Hall, west-shore building IFM-GEOMAR, Düsternbrooker Weg 20,  
practicals in various labs

	Group I	Group II	Group III	Group IV	Group V	Group VI
09:00 – 10:00	<b>Lecture:</b> pCO <sub>2</sub> treatment levels (James Barry)					
10:00 – 11:00	<b>Lecture:</b> Carbonate system manipulations (Kai Schulz, Jean-Pierre Gattuso)					
11:00 – 11:20	<i>Coffee Break</i>					
11:20 – 12:10	C	D	E	F	G	H
12:10 – 13:00	D	E	F	G	H	C
13:00 – 14:30	<i>Lunch Break</i>					
14:30 – 15:20	E	F	G	H	C	D
15:20 – 16:10	F	G	H	C	D	E
16:10 – 16:20	<i>Coffee Break</i>					
16:20 – 17:10	G	H	C	D	E	F
17:10 – 18:00	H	C	D	E	F	G
18:30	<i>Pizza and beer</i>					

Practical C: Seawater manipulations: aeration (Jan Büdenbender)

Practical D: Seawater manipulations: acid/base additions (Kai Schulz)

Practical F: DIC/TA measurements (Arne Körtzinger)

Practical G: potentiometric pH measurement with NBS buffers (Lennart Bach)

Practical H: potentiometric pH measurement with TRIS buffer (Vincent Sardene)

### Note:

For practicals G and H participants are encouraged to bring their personal pH meter and buffers

## Wednesday, March 10, 2010

Location: Lecture Hall, west-shore building IFM-GEOMAR, Düsternbrooker Weg 20, practicals in various labs

	Group I	Group II	Group III	Group IV	Group V	Group VI
09:00 – 10:00	<b>Lecture:</b> Metabolic rate measurements (Frank Melzner)					
10:00 – 11:00	<b>Lecture:</b> Development of fish larvae (Catriona Clemmesen)					
11:00 – 11:15	<i>Coffee Break</i>					
11:15 – 12:15	<b>Lecture:</b> Calcification rate measurements (Frédéric Gazeau)					
12:15 – 13:45	<i>Lunch Break</i>					
13:45 – 14:45	<b>Lecture:</b> Molecular approaches (Colin Brownlee)					
14:45 – 15:45	I	J	K	L	M	N
15:45 – 16:00	<i>Coffee Break</i>					
16:30 – 17:00	J	I	L	K	N	M
17:00 – 18:00	<b>Lecture:</b> Biogeochemical assessments (David Hutchins)					
18:30 - ...	<i>Workshop Dinner</i>					

Practical I: OA studies on mollusks and echinoderms (Frank Melzner)

Practical J: Otolith and statolith calcification (Catriona Clemmesen)

Practical K: OA studies on cold water coral (Armin Form)

Practical L: OA studies on predator-prey interaction (Martin Wahl)

Practical M: Approaches in membrane transport studies (Markus Bleich, Kerstin Suffrian)

Practical N: Molecular approaches in OA research (Colin Brownlee, Luke Mackinder)

## Thursday, March 11, 2010

Location: Lecture Hall, west-shore building IFM-GEOMAR, Düsternbrooker Weg 20,  
practicals in break-out rooms

	Group I	Group II	Group III	Group IV	Group V	Group VI
09:00 – 10:00	<b>Lecture:</b> Experimental design (Martin Wahl)					
10:00 – 11:00	<b>Lecture:</b> Statistical approaches (Mark Lenz)					
11:00 – 11:20	<i>Coffee Break</i>					
11:20 – 13:00	Practical O			Practical P		
13:00 – 14:30	<i>Lunch Break</i>					
14:30 – 16:00	Practical P			Practical O		
16:00 – 16:20	<i>Coffee Break</i>					
16:20 – 17:30	<b>Lecture:</b> Good and bad examples in OA research (Jon Havenhand)					

**Practical O:** Designing experiments - group work (Martin Wahl, Martin Zimmer, Mark Lenz)

**Practical P:** Optimizing experimental design and analytical statistics - group work  
(Martin Wahl, Martin Zimmer, Mark Lenz)

## Friday, March 12, 2010

Location: Lecture Hall, west-shore building IFM-GEOMAR, Düsternbrooker Weg 20,

	Group I	Group II	Group III	Group IV	Group V	Group VI
09:00 – 10:00	<b>Lecture:</b> Benefits of data reporting and the EPOCA/EUR-OCEANS ocean acidification database (Anne-Marin Nisumaa)					
10:00 – 11:00	<b>Lecture:</b> Data archiving and data policies (Benjamin Pfeil)					
11:00 – 11:20	<i>Coffee Break</i>					
11:20 – 12:30	<b>Lecture:</b> Use of GLODAP and CARINA data for OA research (Reiner Schlitzer)					
12:30 – 13:00	Debriefing: Lessons learned					
13:00	End of workshop					