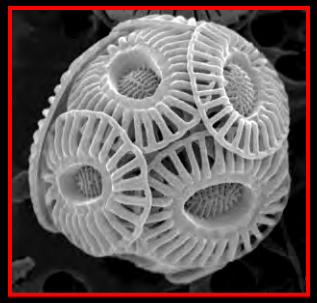
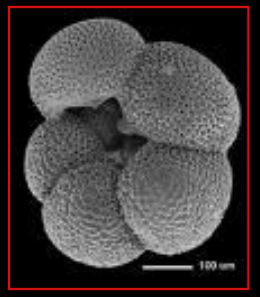
OCEAN ACIDIFICATION AND CLIMATE CHANGE





MedSeA
MEDITERRANEAN SEA ACIDIFICATION IN A CHANGING CLIMATE

COOPERATION

Patrizia Ziveri, Institut de Ciència i Tecnologia Ambientals (ICTA), UAB

What is “ocean acidification”?

CO_2 (g)

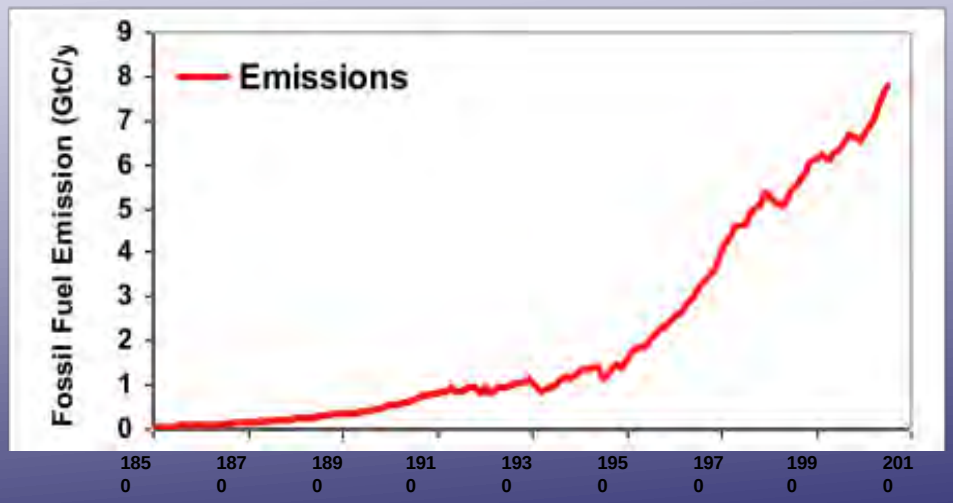
Ocean uptake of CO_2

CO_2 (aq) + H_20 ⇌ H_2CO_3 carbonic acid

H_2CO_3 ⇌ $H^+ + HCO_3^-$ bicarbonate

HCO_3^- ⇌ $H^+ + CO_3^{2-}$ carbonate

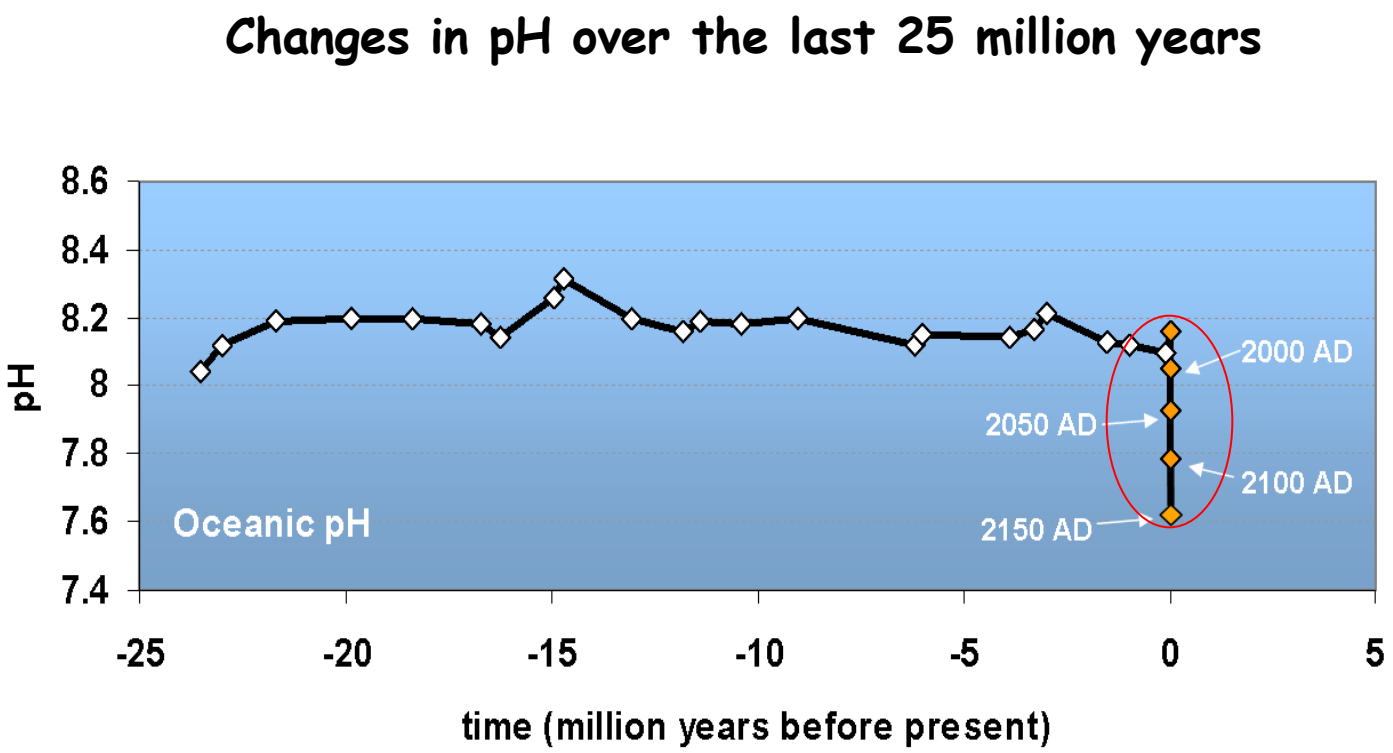
pH



the oceans have become 30% more acidic, lowering the pH of seawater

….by 2060 the oceans could become 120% more acidic

Oceans are Acidifying Fast …….



It is happening now, at a rate and to a level not experienced by marine organisms for ~ 20MY

Turley et al. 2006

Ocean acidification and its impact on the ecosystems and calcifying organisms

Physiological response	Major group	Species studied	Response to increasing CO_2 a	b	c	d
Calcification						
	Coccolithophores[1]	4	2	1	1	1
	Planktonic Foraminifera	2	2	–	–	–
	Molluscs	4	4	–	–	–
	Echinoderms[1]	3	2	1	–	–
	Tropical corals	11	11	–	–	–
	Coralline red algae	1	1	–	–	–
Photosynthesis[2]						
	Coccolithophores[3]	2	–	2	2	–
	Prokaryotes	2	–	–	1	–
	Seagrasses	5	–	–	–	–
Nitrogen Fixation						
	Cyanobacteria	1	–	1	–	–
Reproduction						
	Molluscs	4	4	–	–	–
	Echinoderms	1	1	–	–	–

1) Increased calcification had substantial physiological cost; 2) Strong interactive effects with nutrient and trace metal availability, light, and temperature; 3) Under nutrient replete conditions.

European project on **Mediterranean Sea Acidification in a changing climate**

MedSeA
MEDITERRANEAN SEA ACIDIFICATION IN A CHANGING CLIMATE

COOPERATION

Project coordinator: Patrizia Ziveri
Institute of Environmental Science and Technology, Universitat Autònoma de

MedSeA overall goals

- identifying where the **impacts of acidification on Mediterranean waters will be more significant**, taking into account the sequence of causes and effects, from ocean chemistry through marine biology to socio-economic costs.

- focus on a selected set of key ecosystem and socio-economic variables that are likely to be affected by both acidification and warming, **studying the combination of both effects through ship-based observations, laboratory and mesocosm experiments, physical-biogeochemical-ecosystem modeling, and economical analyses.**

- provide best estimates and related uncertainties of **future changes in Mediterranean Sea pH, $CaCO_3$ saturation states**, and other biogeochemical-ecosystem variables, assessing the **changes in habitat suitability of relevant ecological and economically-important species**.

Work packages

WP 1. Project Management

WP 2. *Past and Present carbonate system dynamics of the Mediterranean Sea*

WP 3. *Effects of ocean acidification and temperature on pelagic ecosystem functioning of the Mediterranean*

WP 4. *Effects of ocean acidification on keystone benthic ecosystems and the impact on benthic biodiversity*

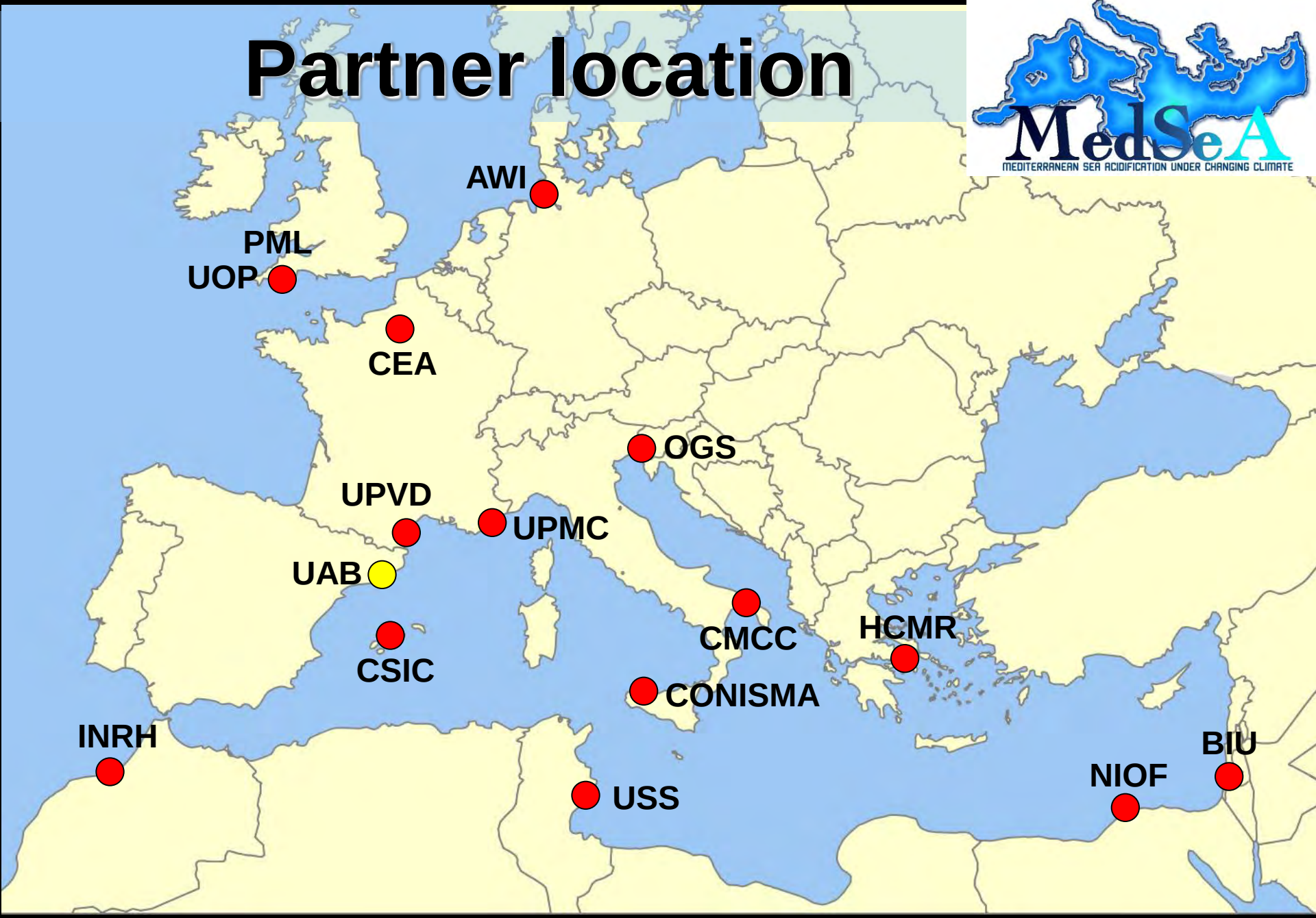
WP 5. *Future projections of acidification of the Mediterranean Sea*

WP 6. *Socio-economic effects of Mediterranean Sea acidification, adaptation strategies and policy tools*

WP 7. Dissemination of the risk of Mediterranean Sea acidification

WP 8. Data management

Partner location

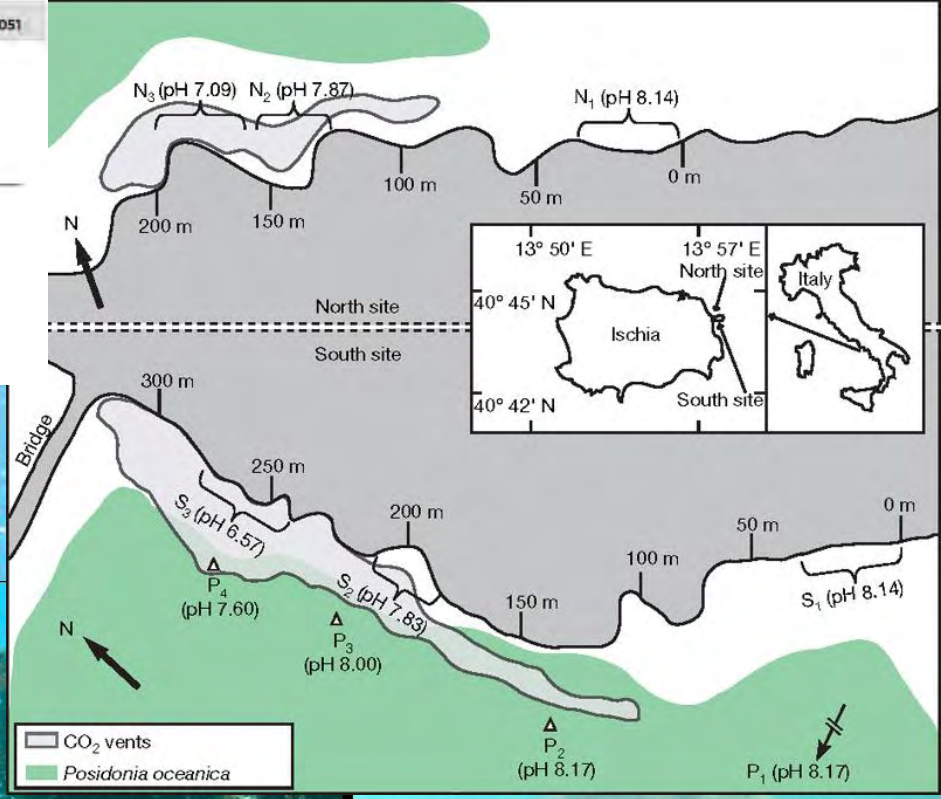


nature Vol 454|3 July 2008 doi:10.1038/nature07051

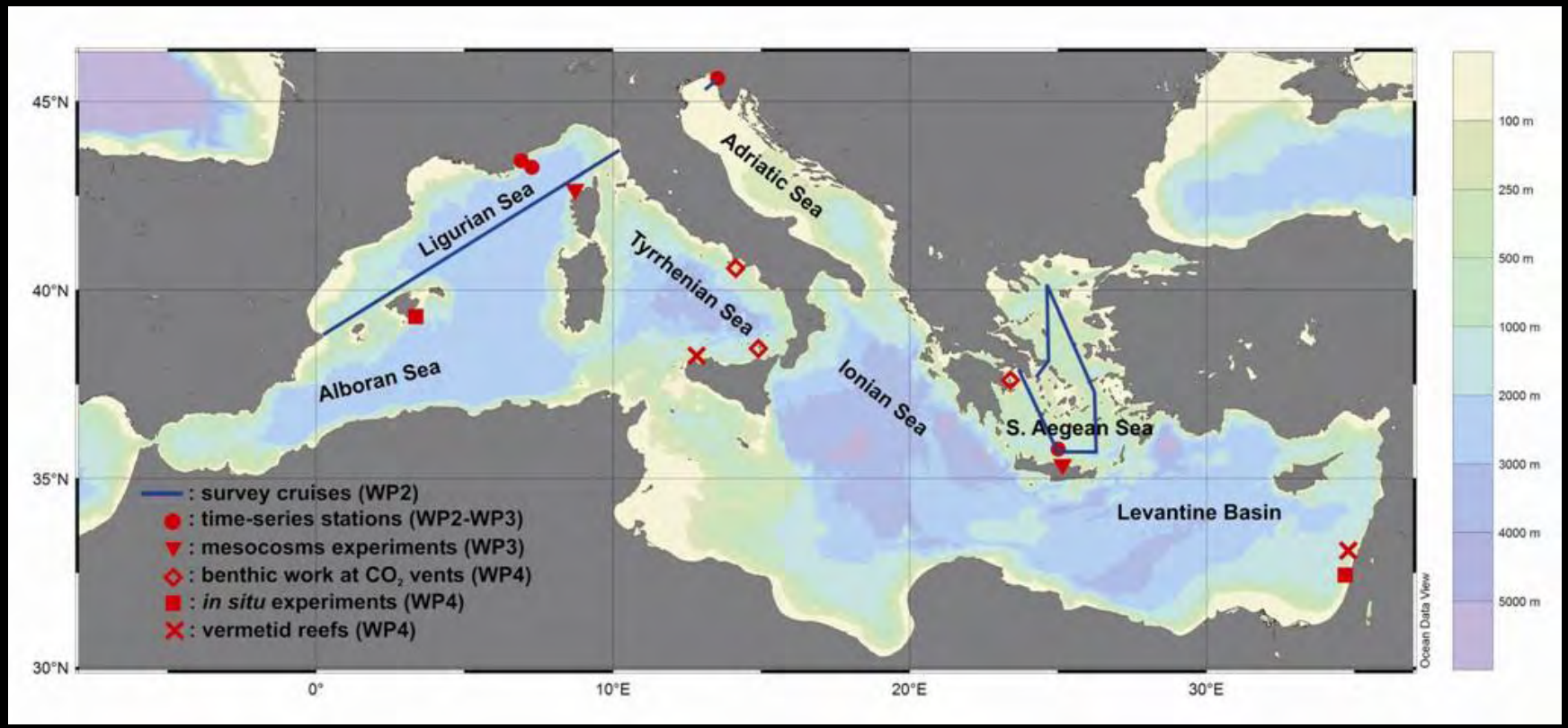
LETTERS

Volcanic carbon dioxide vents show ecosystem effects of ocean acidification

Jason M. Hall-Spencer[1], Riccardo Rodolfo-Metalpa[1], Sophie Martin[2], Emma Ransome[1], Maoz Fine[3,4], Suzanne M. Turner[5], Sonia J. Rowley[1], Dario Tedesco[6,7] & Maria-Cristina Buia[8]



MedSeA project sites and survey cruises



European project on

Mediterranean Sea Acidification in a changing climate

MedSeA

MEDITERRANEAN SEA ACIDIFICATION IN A CHANGING CLIMATE

COOPERATION

Patrizia Ziveri: patrizia.ziveri@uab.cat **tel. 93 586 8485**