

**Contribution to Session S2 (BIO)**

***“Understanding the role of iron in regulating biogeochemical cycles and ecosystem structures in the North Pacific Ocean” with:***



**“The international Surface Ocean-Lower Atmosphere Study (SOLAS) project and its mid-term strategy”**

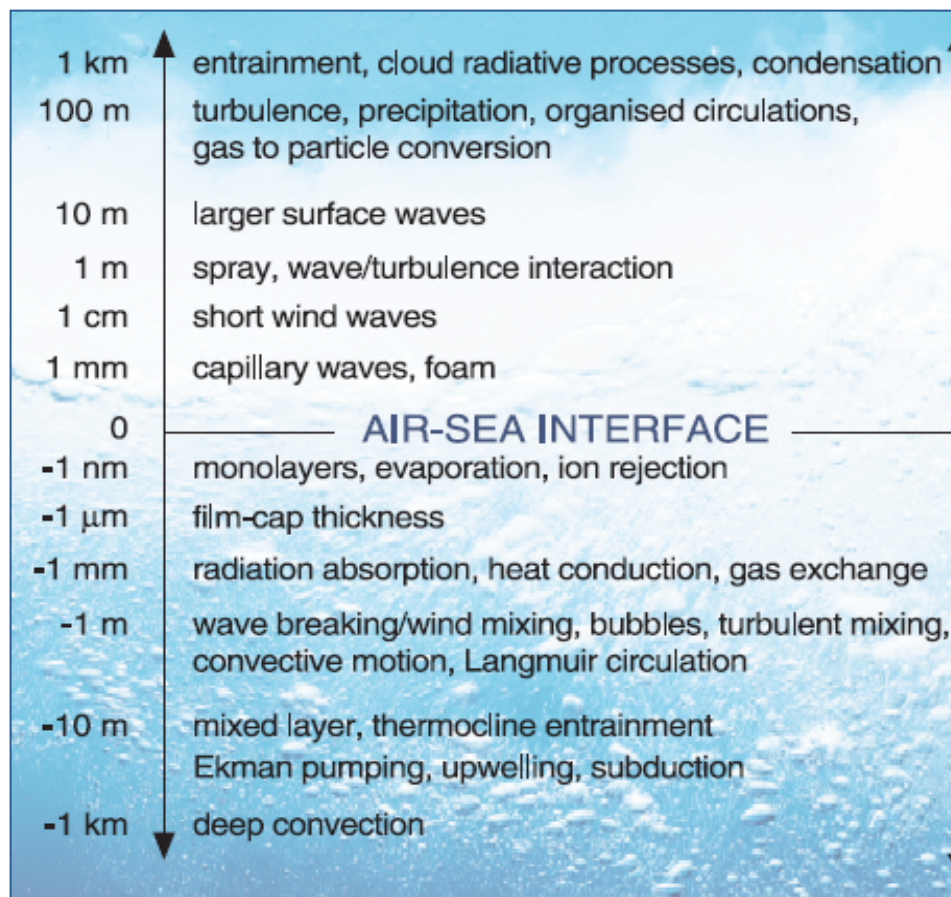
**Dr Emilie Brévière,  
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SOLAS International Project Office  
Leibniz-Institut für Meereswissenschaften  
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ebreviere@ifm-geomar.de**

# Outline



- What is SOLAS?
- SOLAS-PICES interactions
- SOLAS-related iron research in PICES member countries
- SOLAS task team: ADOES
- Other organizations initiatives related to iron involving SOLAS science (COST, SCOR, GEOTRACES, SPM...)
- On-going SOLAS initiatives: the SOLAS mid-term strategy

# SOLAS science goal



- Multidisciplinary, global scale, international research project
- ‘To achieve quantitative understanding of the **key biogeochemical-physical interactions and feedbacks between the ocean and atmosphere**, and how this coupled system affects and is affected by climate and environmental change.’

Sponsors:



# SOLAS mandate

Does not fund research directly!

What the SOLAS international research project is attempting to do?

- Coordinate and plan research
- Communicate
- Promote International cooperation and exchange
- Build/develop capacity
- Promote facility, standards and data sharing

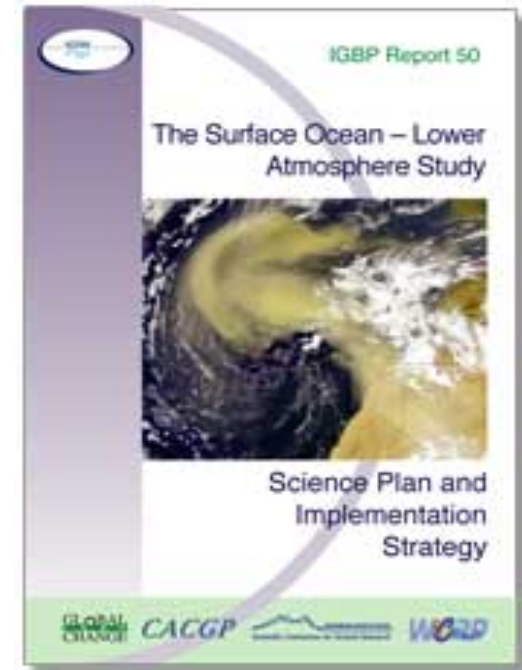
# Scientific framework

## Science Plan and Implementation Strategy- 2004 (year of publication)

**Focus 1:** Biogeochemical Interactions and  
Feedbacks Between Ocean and Atmosphere  
**1.4 Fe and Marine Productivity**

**Focus 2:** Exchange Processes at the Air-Sea  
Interface and the Role of Transport and  
Transformation in the Atmospheric and Oceanic  
Boundary Layers

**Focus 3:** Air-Sea Flux of CO<sub>2</sub> and Other Long-  
lived Radiatively Active Gases



# SOLAS-PICES interactions



Impact of iron on biogeochemistry and marine ecosystem.

- Activities:

1. Between 1999- 2007 via the Advisory Panel on **the Iron Fertilization Experiment in the Subarctic Pacific Ocean**
2. And since 2007 via the WG22 **Working Group on Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific Ocean.**

- Publications:

Special issue in *Deep-Sea Research II* in 2009 on SEEDSII- Second Subarctic Pacific Iron Experiment for Ecosystem Dynamics Study

- Workshops:

SOLAS co-sponsored workshops and topic sessions convened at PICES Annual meetings (2006, 2009, and 2010)

# SOLAS-PICES interactions



Countries	Names	SOLAS	PICES
Canada	Maurice Levasseur	Nat. Rep.	WG-22 member
	Lisa Miller	SSC member	CC-S
China	Minhan Dai	SSC member and Nat. Rep.	CC-S
	Huiwang Gao	ADOES coordinator	
Japan	Mitsuo Uematsu	Nat Rep. and ADOES coord.	WG-22 member
	Yukihiro Nojiri	SSC member	
Korea	Kitack Lee	Nat. Rep.	WG-22 member and CC-S
Russia	Sergey Gulev	SSC member and Nat. Rep.	
USA	Eric Saltzman	SSC member	
	Trish Quinn	SSC member	
	Dave Kieber	SSC member	
	Wade McGillis	Nat. Rep.	

CC-S= Section on carbon and climate

Nat. Rep.= National Representative

SSC member= Scientific Steering Committee member

**PICES 2010 Annual Meeting, 22-31 Oct, Portland, OR, USA**



# SOLAS-PICES future interactions?



## Future interactions:

1. Topic on *Ecosystem responses to multiple stressors: Process and modeling studies*
2. Co-sponsor of the SOLAS Summer School 2011  
29<sup>th</sup> Aug-10<sup>th</sup> Sept 2011  
Application deadline 15th Nov 2010

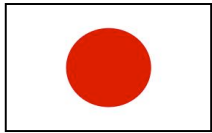
**5th International**  
surface ocean **solas** 2019 lower atmosphere study  
**Summer School**  
Cargèse, Corsica, France  
29th August - 10th September 2011  
To expose graduate students and young scientists to recent developments and methodologies in the study of biogeochemical and physical feedbacks between the ocean and atmosphere in a changing environment  
**Application Open Now**  
<http://www.solas-int.org/summerschool>

**Application Deadline 15 November 2010**  
Lecturers include Mike Berkenfeld, Laurent Bopp, Phil Boyd, Emille Breviere, Eric Galbraith, Véronique Garçon, Debora Iglesias-Rodriguez, Maria Kanakidou, Corinne Le Quéiné, Maurice Levasseur, Peter Liss, KK Liu, Phil Nightingale, Alberto Piola, Eric Saltzman, Roland von Glasow and Doug Wallace  
Photo credits: Monique Albert, Kerstin Richter, Mingqi Yang

Current sponsors include  
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CNRS  
Federal Ministry of Education and Research  
GREENCYCLESII  
MARIE CURIE ACTION



# SOLAS-related iron research in PICES member countries



## **JAPAN:**

1. Successful WPASS project will end in March 2011
2. SEEDS II special issue previously mentioned
3. SOLAS/W-PASS session (B06) during the AGU San Francisco Meeting (2 papers on iron so far)
4. Japan will host the 5<sup>th</sup> ADOES workshop (Asian Dust and Ocean EcoSystem)  
28 Nov - 3 Dec 2010

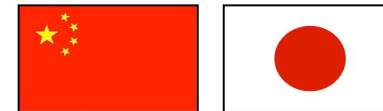
And more...

# SOLAS task team: Asian Dust and Ocean EcoSystem (ADOES)

- 1) METMOP- Response of marine ecological systems in the marginal seas to open ocean of the western North Pacific to climate change (2010-2012)

1<sup>st</sup> kick off meeting held in March 2010

PIs: Gao and Uematsu



- 2) BIAD- Biogeochemical impacts of Asian dust on the North Pacific ecosystem and climate (2009-2011)

PIs: Levasseur and Guipeng



- Working Group WESTPAC/ADOES  
Newly formed (May 2010)  
Chairs: Gao and Uematsu



# Other organizations initiatives related to iron involving SOLAS science



Past interactions with COST Action 735 with future outcome:

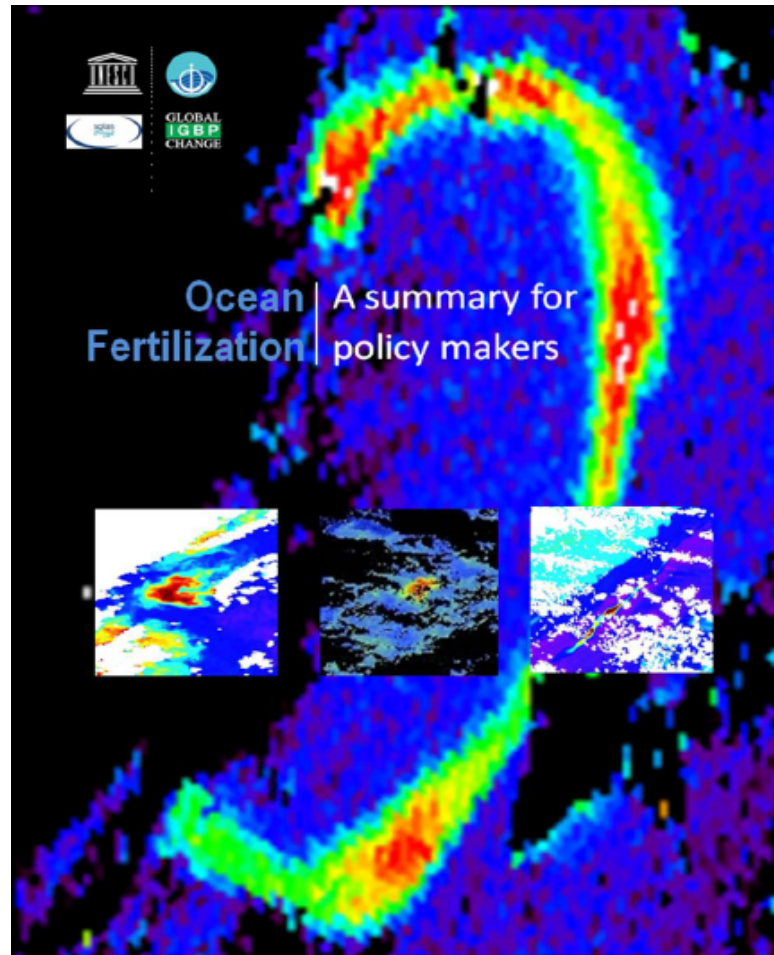
- 1) Aerosol iron solubility and database workshop, Feb 2009 in UK
- 2) Iron bioavailability in the surface ocean workshop, Feb 2010, Germany (***Mark Wells attended the workshop***)  
→ 2 manuscripts are in preparation for *Biogeosciences*, proposing to engage discussions within the community
- 3) Trace metal speciation: current state of the art and towards the construction of a database, Aug 2010, Germany (***Jay Cullen attended the workshop***)

**COST Action  
ES0801**



**SCOR WG 131 The legacy of in situ iron enrichment: data compilation and modeling (2007)**

# Other organizations initiatives related to iron involving SOLAS science



Summary for policy makers on  
Ocean Fertilisation

# Research coordination and planning: SOLAS mid-term strategy

## Thinking process

Are there areas of SOLAS science or key scientific questions that:

- \* require a „push“?
- \* require improved international coordination?

→ 7 topics identified in 2008

## Development

\* „White papers“ drafted by the SOLAS Scientific Steering Committee members in 2009

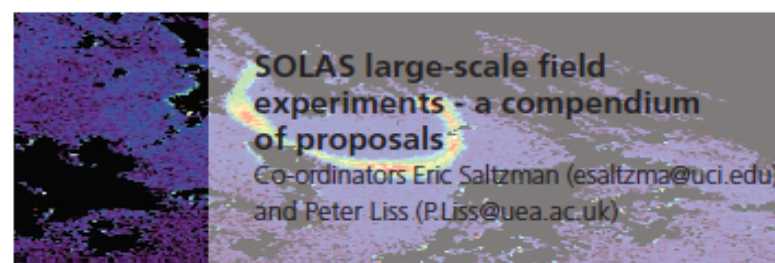
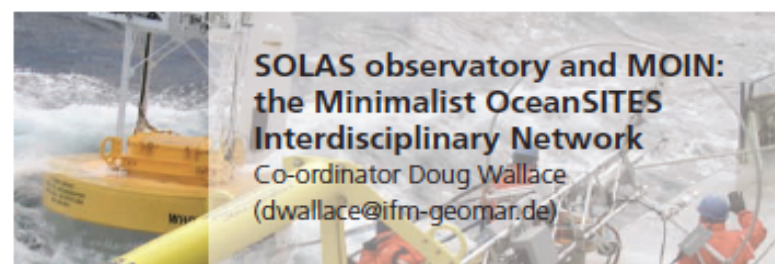
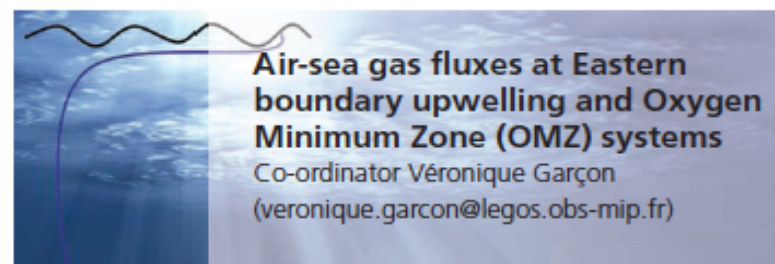
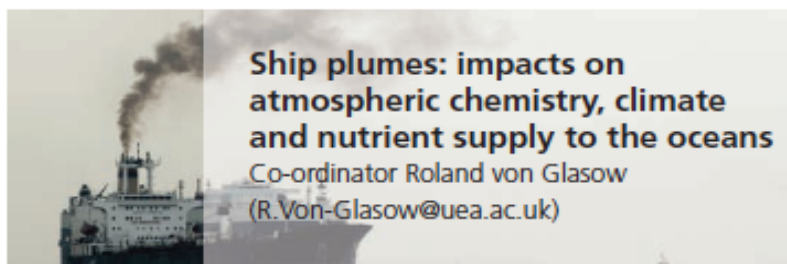
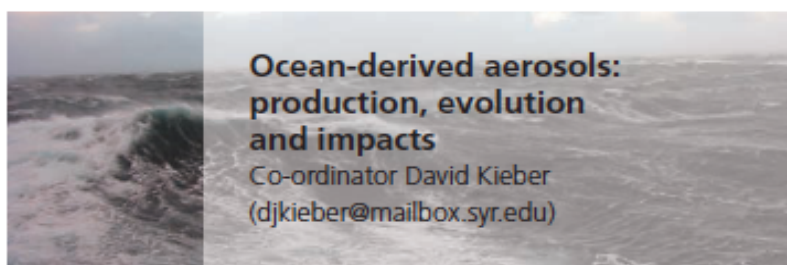
• Community discussions at SOLAS Open Science Conference, Barcelona, 2009

## Goal

Promote coordinated, national proposals built on „group awareness“ and with the potential for **international** cooperation, scientific exchange and joint synthesis.

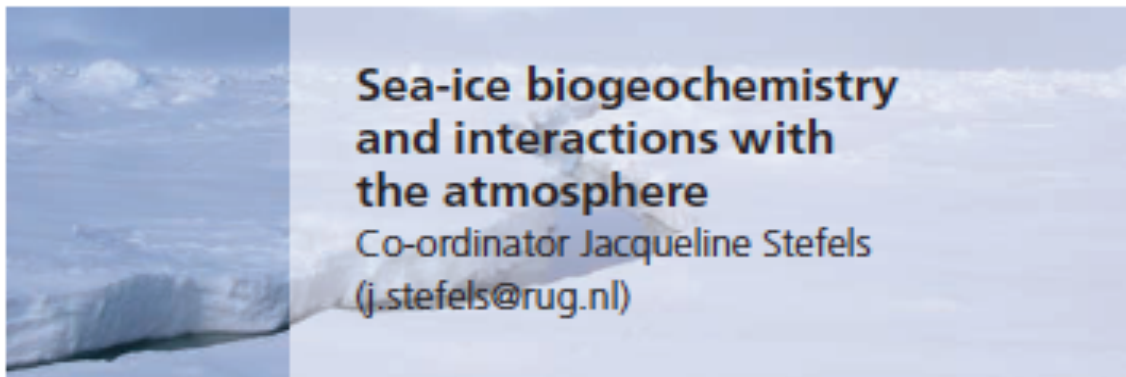
# Research coordination and planning: SOLAS mid-term strategy

Cross-cutting, complex scientific topics relevant to SOLAS  
requiring coordinated, international research





# Research coordination and planning: SOLAS mid-term strategy

A rectangular box with a light blue background. On the left side, there is a photograph of a snowy, icy landscape. On the right side, there is text in black font.

**Sea-ice biogeochemistry  
and interactions with  
the atmosphere**  
Co-ordinator Jacqueline Stefels  
([j.stefels@rug.nl](mailto:j.stefels@rug.nl))

A rectangular box with a light grey background. On the left side, there is a photograph of a turbulent ocean surface with white foam and greenish-brown patches. On the right side, there is text in black font.

**Atmospheric control of nutrient  
cycling and production in the  
surface ocean**  
Co-ordinator Cécile Guieu  
([guieu@obs-vlfr.fr](mailto:guieu@obs-vlfr.fr))



# Research coordination and planning: SOLAS mid-term strategy

Sea-ice biogeochemistry  
and interactions with  
the atmosphere  
Co-ordinator Jacqueline Stefels  
(j.stefels@rug.nl)

## Sea-ice biogeochemistry and the interactions with the atmosphere:

- 1) Workshop, April 2010, Netherlands
- 2) Call from The European Space Agency



Atmospheric control of nutri-  
cycling and production in the  
surface ocean  
Co-ordinator Cécile Guieu  
(guieu@obs-vlfr.fr)

## Atmospheric control of nutrient cycling and production in the surface ocean:



- 1) Workshop, Nov 2010 in UK

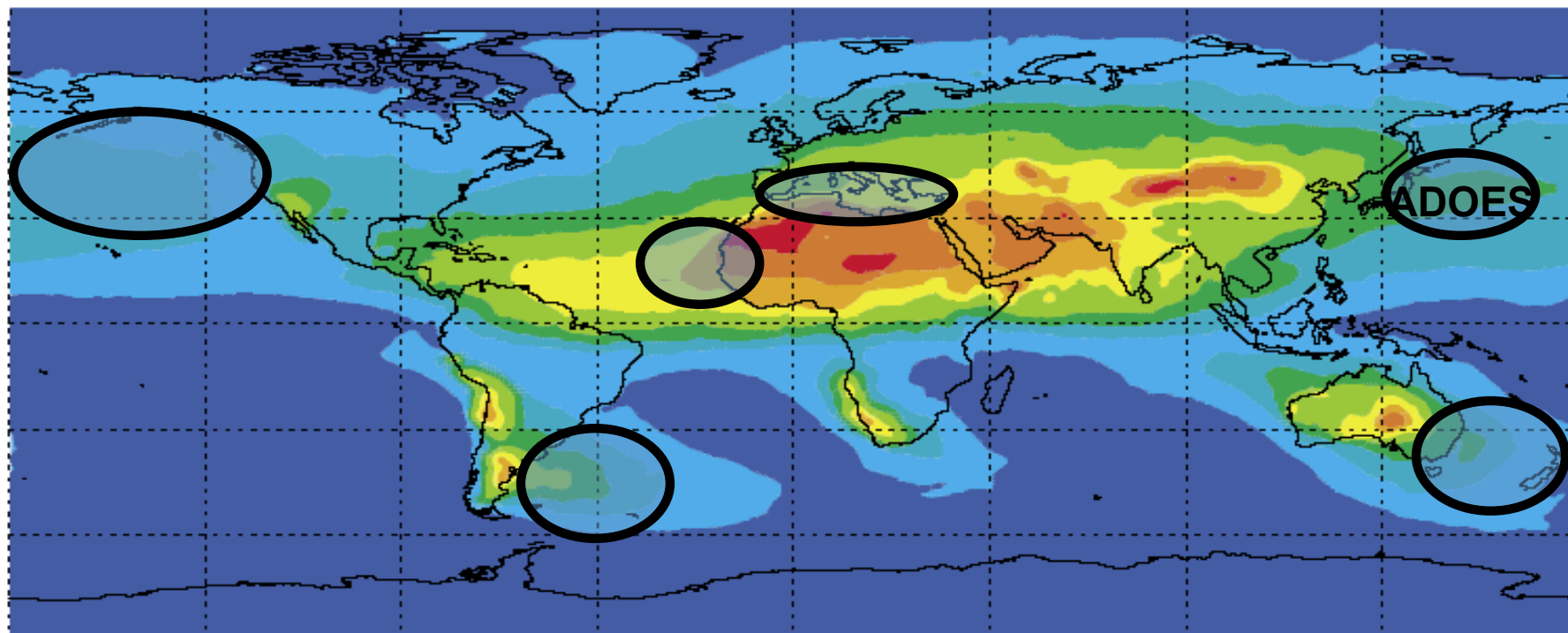


Fast Track Initiative

- 2) Workshop, Dec 2010 in Turkey



# Research coordination and planning: SOLAS mid-term strategy



Jickells T et al. (2005) Science, 308: 67

Communities and opportunities exist for a set of **regional process studies**

**Inter-regional coordination is crucial**



Thank you and visit:  
[www.solas-int.org](http://www.solas-int.org)

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**5th International**

surface.ocean **solas** 20192 lower.atmosphere.study

**Summer School**

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Photo credits: Monique Albert, Kerstin Richter, Mingxi Yang

Current sponsors include









# Additional slides for info

# **IGBP-FTI      *Upper ocean nutrient limitation: processes, patterns and potential for change.***

*Coordinators: Mark Moore (NOCS, UK), Matt Mills (Stanford, US), Doug Wallace (IFM-GEOMAR, Germany and SOLAS), Emily Breviere, (UEA, UK and SOLAS). Current funding: IGBP 13k euro. OCB, US \$7k*

**Biological:** influence of nutrient limitation on **upper ocean ecosystem processes central**. Thus synergies with other studies are clear (e.g. SOLAS, GEOTRACES), but focus differs.

**All** potentially limiting nutrients and supply pathways will be considered.  
i.e. macro- (N,P,Si) micro- (e.g. Fe), organic- (e.g. VitB12) and carbon availability.

## **Aims**

- 1) Synthesise current state of knowledge concerning patterns of upper ocean nutrient limitation.
- 2) Recommendations for future research, taking account of the potential for past and future global change.
- 3) Recommendations for a rigorous definitional framework for describing upper ocean nutrient limitation, with specific reference to cross disciplinary boundaries (e.g. observations, modelling, paleoceanographic).
- 4) Critically evaluate techniques and methods currently used for assessing upper ocean nutrient limitation.

## **Implementation**

- Special session OS (Oregon, Feb 2010) >30 abstracts now received covering: upper ocean biology from molecular mechanisms to community effects, modelling and paleoceanography.
- Dedicated workshop (UK, Oct 2010) 25 invited international participants.
- Product publication: peer-reviewed synthesis papers, recommendations for research