



Air-sea Gas Flux Climatology; Progress and Future Prospects Science Workshop

Final Agenda

**Location: IFREMER, Brest, France
24-27 September 2013**

Lucien Laubier Conference Room

Jointly organised by **Ifremer - ESA - EGU - SOLAS**



In association with the OceanFlux GHG project : www.oceanflux-ghg.org



Sponsored by Conseil Général du Finistère, Brest Métropole Océane, and Région Bretagne



The air-sea transfer of gases is a major part of the budget of carbon dioxide and several other radiatively-important gases. While there are other methods for constraining global and basin budgets of the air-sea transfer, we depend on an air-sea gas flux equation for regional and sub-seasonal resolution of fluxes across the surface of the world's ocean.

That flux equation requires accurate values of transfer velocity, in addition to the concentrations of the dissolved gas in the upper ocean and in the lower atmosphere. This endeavour requires the maintenance of major observing systems (shipboard and satellite-borne) and deep understanding of transfer processes. It is a challenging task that will require interdisciplinary collaboration and cost-effective solutions.

Key aims will include

Identifying key challenges facing the air-sea gas flux community

- Maintaining the ship-based observing system
- Maintaining the marine earth observation capability
- Addressing remaining gaps in fundamental knowledge
- Understanding and addressing the full set of uncertainties

Identifying opportunities and setting priorities

- The requirements of the climate science and policy communities
- New earth observation technologies and missions
- New measurement techniques and opportunities for more autonomous measurements
- New modelling and statistical techniques
- The rapidly expanding capacity of cloud and other computing architecture

Contact

Please contact us for further information regarding the meeting agenda. For logistical issues and options for demonstrations, installations or related promotional issues you would like to propose at the meeting please write to : [oceanflux-workshop at ifremer.fr](mailto:oceanflux-workshop@ifremer.fr).

WebSite

<http://www.oceanflux-ghg.org/Workshop>

Session Overview and Detailed Agenda

Day 1 - Sept 24 – Tuesday		
08:10 - 08:50	Bus for Ifremer (bus stop Brest Train Station)	
9:00 - 9:30	<i>Registration in the Hall</i>	
Welcome - Lucien Laubier Conference Room		
9:30 - 9:45	Welcome	David Woolf
9:45 - 10:00	Welcome to Ifremer	Bertrand Chapron, Ifremer, Brest center
Session 1 ESA & SOLAS <i>Chair : Bertrand Chapron, Ifremer</i>		
10:00 - 10:20	ESA and SOLAS	Craig Donlon, ESA
10:20 - 10:40	International SOLAS and OceanFlux	Eric Saltzman, Chair of International SOLAS
10:40 - 11:00	The OceanFlux Greenhouse Gases project	David Woolf Heriot-Watt Univ., UK
11:00-11:30	<i>Coffee break & posters in the Hall</i>	
Session 2 Related projects <i>Chair : David Woolf, Heriot-Watt University</i>		
11:30 – 11:50	OceanFlux Sea Spray	Gerrit de Leeuw FMI & UHEL Netherlands
11:50 - 12:10	OceanFlux Upwelling	Christoph Garbe Univ. of Heidelberg, Germany
12:10 - 12:30	An overview of the Takahashi air sea CO ₂ flux climatology	Richard Wanninkhof, NOAA/AOML
12:30 - 13:50	SOCAT- A global data product for quantification of air-sea exchange of CO ₂	Are Olsen Univ. of Bergen, Norway
13:00 - 14:00	<i>Lunch at Ifremer restaurant</i>	
Session 3; Air-Sea Fluxes (Context and OceanFlux) <i>Chair : Andy Watson, Univesity of East Anglia</i>		
14:00 - 14:20	A flexible processing system for calculation of air-sea gas fluxes	Jamie Shutler PML, UK
14:20 - 14:40	Using satellite altimetry to measure air-sea transfer velocity	Lonneke Goddijn-Murphy ERI, UK
14:40 - 15:00	Enhancement of the oceanic turbulent fluxes estimated from remotely sensed data	Abderrahim Bentamy Ifremer, France

15:00 - 15:20	Extracting fluxes of GHGs at the air-water interface from satellite remote sensing	Christoph Garbe IWR, Germany
15:20 - 15:40	Towards super resolution of air-sea CO ₂ fluxes at the air-sea interface in the EBUS	Véronique Garçon CNRS/LEGOS, France
16:00-16:45	<i>Coffee break & posters in the Hall</i>	
Session 4; Futures <i>Chair : Jamie Shutler, Plymouth Marine Laboratory</i>		
16:50 - 17:10	High Wind Gas Exchange Study, HiWinGS	Chris Fairall NOAA, USA
17:10 - 17:30	An ensemble approach to gas flux climatology	David Woolf Heriot-Watt Univ., UK
17:30 - 18:10	Discussion	
18:15	Bus for Brest City Centre	

Day 2 - Sept 25 - Wednesday		
08:10 - 08:50	Bus for Ifremer (bus stop Brest Train Station)	
Session 5 Climatology and Carbon Dioxide <i>Chair : Are Olsen, University of Bergen</i>		
9:00 - 9:20	The northern hemisphere air-sea CO ₂ flux - its variability and uncertainty	Ute Schuster Univ. of East Anglia, UK
9:20 - 9:40	Prediction of oceanic carbon dioxide levels at observational time series nodes using satellite ocean remote sensing products	Doug Vandemark UNH/EOS/OPAL, USA
9:40 - 10:00	Remote sensing algorithms for sea surface CO ₂ in the Baltic Sea	Gaëlle Parard Uppsala Univ., Sweden
10:00 - 10:20	Effect of mixing and stratification on the summertime carbonate chemistry of the northwestern European shelf	Dorothee Bakker Univ. of East Anglia, UK
10:20 - 10:40	Impact of coastal upwelling on the air-sea exchange of CO ₂ in a Baltic Sea basin	Sindu Raj Parampil Uppsala Univ., Sweden
10:40 - 11:00	Ocean-atmosphere CO ₂ flux variability estimated from SOCAT pCO ₂ observations	Christian Roedenbeck MPI Biogeochemistry, Germany
11:00-11:30	<i>Coffee break & posters in the Hall</i>	
Session 6 Slicks and Fluxes <i>Chair : Helen Czerski, University of Southampton</i>		
11:30 - 11:50	Impact of climatology data geometry on the results of Empirical Orthogonal Function analysis	Ge Chen Ocean Univ. of China
11:50 - 12:10	The effect of surfactants on near-surface concentration fluctuations due to turbulence and wind stress	William Asher Univ of Washington, USA
12:10 - 12:30	Altimeter sigma ₀ bloom and surface slick	Jean Tournadre Ifremer, France
12:30 - 12:50	Air-sea gas exchange and bio-surfactants; low and high wind speed extremes	Alexander Soloviev Nova Univ., USA
13:00 - 14:00	<i>Lunch at Ifremer restaurant</i>	
13:45	<i>Group photo near Ifremer restaurant</i>	
Session 7 Fluxes and k <i>Chair : Anna Rutgersson, Uppsala University</i>		
14:00 - 14:20	Uncertainty and ambiguity in gas transfer coefficients	David Woolf Heriot-Watt Univ., UK
14:20 - 14:40	The relationship between wind speed and gas exchange over the ocean revisited	Richard Wanninkhof NOAA, USA
14:40 - 15:00	Concurrent measurements of DMS and CO ₂ air/sea gas transfer by eddy correlation in the North Atlantic	Tom Bell PML, UK

15:00 - 15:20	Comparison of air-sea gas flux data from three tropical cyclones	Craig McNeil APL/UW, USA
15:20 - 15:40	Air-sea exchange of oxygenated volatile organic compounds over the Atlantic Basin	Mingxi Yang PML, UK
15:40 - 16:00	A perspective of the high surface-wind remote sensing capability with SMOS sensor	Nicolas Reul Ifremer, France
16:00-16:45	<i>Coffee break & posters in the Hall</i>	
Session 8 The bubbly ocean <i>Chair : Craig McNeil, APL/UW</i>		
16:50 - 17:10	Dissipation source terms and whitecap statistics	Fabrice Ardhuin, Ifremer, France
17:10 - 17:30	Remote processing of Ocean Flux climatology on Nephelae	Jean-François Piollé Ifremer, France
17:30 - 17:50	Parameterising the bubble-mediated air-sea flux of a non-ideal gas, DMS	Penny Vlahos Univ. of Connecticut, USA
17:50 - 18:10	Estimating global active and total whitecap coverage for air-sea gas exchange using satellite-derived winds	Aaron Paget Brighan Univ., USA
18:15	Bus for Pointe Saint Mathieu	
19:30	Dinner at Pointe St Mathieu Restaurant	
22:30	Bus departure for Brest city	

Day 3 - Sept 26 - Thursday		
08:10 - 08:50	Bus for Ifremer (bus stop Brest Train Station)	
Session 9 Turbulent processes <i>Chair : Fabrice Ardhuin, Ifremer</i>		
9:00 - 9:20	Do we need to consider water-side convection when calculating air-sea gas transfer?	Anna Rutgersson Uppsala Univ., Sweden
9:20 - 9:40	Vertical and horizontal distributions of wave-induced turbulence	Nicolas Rasclé Ifremer, France
9:40 - 10:00	Statistical properties of breaking waves in field condition; A Gaussian field approach	Alexey Mironov Ifremer, France
10:00 - 10:20	Numerical modelling of the air-sea interaction in wave breaking and consequences in terms of the air-sea gas exchanges	Alessandro Iafrafi INSEAN-CNR, Italy
10:20 - 10:40	The effect of temperature, salinity and natural ocean surfactants on bubble fragmentation and coalescence	Helen Czerski Univ. of Southampton, UK
11:00-11:30	<i>Coffee break & posters in the Hall</i>	
Session 10 Freshwater, rain and ice <i>Chair : Dorothee Bakker, University of East Anglia</i>		
11:30 - 11:50	Rain	Jamie Shutler PML, UK
11:50 - 12:10	Large tropical river plume monitoring with SMOS to better estimate Land-Sea freshwater fluxes	Séverine Fournier Ifremer, France
12:10 - 12:30	Air-sea gas exchange at ice surfaces	Wade McGillis Columbia Univ., USA
12:30 - 12:50	Precipitation and the global air-sea CO ₂ flux	Christopher Zappa, Columbia Univ., USA
13:00 - 14:00	<i>Lunch at Ifremer restaurant</i>	
Session 11; Perspectives on future research <i>Chair : Eric Saltzman, University of California</i>		
14:00 - 14:20	When chemical oceanographers go robotic - towards accurate pCO ₂ measurements on novel autonomous platforms	Bjorn Fiedler GEOMAR, Germany
14:20 - 14:40	Progress on direct air/sea CO ₂ flux observations: results from DYNAMO2011 and TORERO2012	Ludovic Bariteau CIRES & NOAA, USA
14:40 - 15:00	Interfacial transport and turbulent statistics from thermography	Christoph Garbe Univ. of Heidelberg, Germany
15:00 - 15:20	Sensitivity of CO ₂ fluxes in a shelf environment	Ricardo Torres PML, UK

15:20 - 15:40	The observational platforms of PML for air-sea exchange	Tim Smyth PML, UK
16:00-16:45	<i>Coffee break & posters in the Hall</i>	
Session 12 Discussion I: The future of air-sea interaction research <i>Chair : Chris Fairall and Craig Donlon</i>		
16:50 - 17:10	Air-sea exchange in strong winds	David Woolf Heriot-Watt Univ., UK
17:10 - 18:10	Discussion	
18:15	Bus for Brest City Centre	

Day 4 - Sept 27 - Friday		
08:10 - 08:50	Bus for Ifremer (bus stop Brest Train Station)	
Session 13 Discussion II: Maintaining the CO2 Observing System <i>Chair : Richard Wanninkhof and Diego Fernandez</i>		
9:00 - 9:30	Introduction	Andy Watson Univ. of East Anglia, Uk
9:30 – 11:00	Discussion	
11:00-11:30	<i>Coffee break & posters in the Hall</i>	
Session 14 : Discussion III: ESA and SOLAS; the continuing relationship <i>Chair : Véronique Garçon and Christoph Garbe</i>		
11:30 – 13:00	Discussion	
13:00	<i>End of the meeting</i>	
13:00 - 14:00	<i>Lunch at Ifremer restaurant</i>	

Poster Presentations

- Dr BOZEC Yann, Marine Chemistry Unit-SBR/CNRS - France

High Frequency Monitoring of pCO₂ using a CARIOCA sensor on a Marel buoy in a temperate coastal ecosystem: The Bay of Brest (2003-present)

- Ms BRION Emilie, ALTRAN Ouest - France

Estimating the CO₂ fluxes over the North Atlantic subtropical basin

- Dr GODDIJN-MURPHY, Environmental Research Institute, Scotland

The derivation of a CO₂ fugacity climatology from SOCAT's global in situ data.

- Dr HANAFIN Jenny, CNRS-UBO and IFREMER, France

Comparison of WAVEWATCH-III ® model output whitecap fraction with in situ observations

- Ms HARTMAN Susan, NOC -UK

Controls on CO₂ flux variation at a sustained observatory (PAP-SO) in the northeast Atlantic Ocean

- Dr HO David, University of Hawaii - USA

Rain-induced gas exchange: When and where does it matter?

- Dr JONES Steve, University of East Anglia -UK

Decadal trends in surface ocean pCO₂

- Mr LECKLER Fabien, Laboratoire d'Océanographie Spatiale, IFREMER - France

Wave breaking analysis using stereo video system.

- Dr LOURANTOU Anna, Laboratoire des Sciences du Climat et de l'Environnement - France

On the assignment of prior ocean flux errors in CO₂ atmospheric inversions

- Dr MARANDINO Christa, GEOMAR - Germany

Interpretation of eddy covariance measurements of CO₂ and DMS fluxes and gas transfer coefficients using outputs from the OceanFlux Greenhouse Gases project

- Mr MARREC Pierre, Station Biologique de Roscoff - France

Spatio-temporal dynamics of air-sea CO₂ fluxes in the Western English Channel (WEC) based on FerryBox measurements

- Dr WANNINKHOF Richard, NOAA/AOML -USA

The NOAA Ship of opportunity pCO₂ project

- Dr WOOLF David, Heriot-Watt University

Uncertainty and ambiguity in air-sea gas fluxes; a flexible system in response to a debate on transfer velocity.

List of participants

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