Addendum to the SOLAS 2013/14 Annual Report to SCOR:
National SOLAS networks 2013 annual reports

Version of 30 May 2014 by Dr Emilie Brévière

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Annual Report for the year 2013:

SOLAS Australia

compiled by: Sarah Lawson and Andrew Bowie

Notes:
Reporting Period is January 2013 – December 2013
Information will be used for: reporting, fundraising, networking, strategic development & outreach

1. Scientific highlights

Science Highlight 1 – VOCs and aerosol properties on SOAP voyage

Biologically-active regions of the surface ocean influence aerosol particle production, composition and properties in the overlying marine boundary layer. In February–March 2012 the SOLAS-endorsed SOAP (Surface Ocean Aerosol Production) voyage examined biotic influences on aerosol production to the east of New Zealand, by targeting phytoplankton blooms along the Sub-Tropical Front, with the aim of constraining the relationships between DMS and aerosol flux and characteristics, and phytoplankton biomass and community composition, by multi-disciplinary research.

Initial analyses show that a range of biogenic gases were associated with summer phytoplankton blooms. Very high atmospheric concentrations of DMS up to ~ 1 ppb were observed (Fig 1), and DMS and acetone were correlated over bloom 1 and bloom 3, suggesting a common biological source (Lawson et al. 2011)

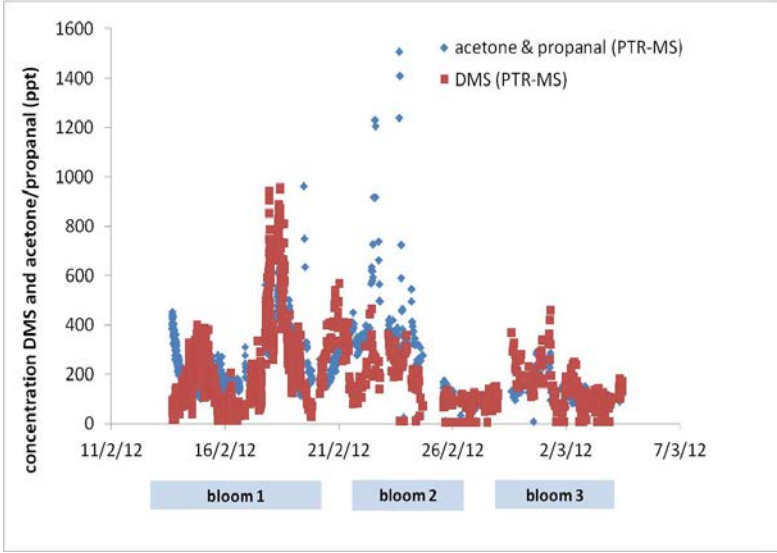


Figure 1: Time series of DMS and acetone/propanal during voyage showing individual bloom periods

Observed hygroscopic growth factors (HGF) of Aitken and accumulation mode particles suggest marine aerosol was dominated by moderately hygroscopic particles suggesting non sea salt sulphates, with contributions from sea salt and organics (Cravigan et al 2013) broadly consistent with observations from other locations using hygroscopicity methods (Swietlicki et al 2008)

Over phytoplankton blooms, particles were consistently volatile at ~150°C, providing further evidence for the dominance of non-sea salt sulphates (Fig 2). HGF were reduced over blooms, suggesting presence of secondary organics along with sulphates. Bubble bursting experiments

indicated the organic volume fraction of the primary marine aerosol ranged from approximately 3-18% (Cravigan et al 2013).

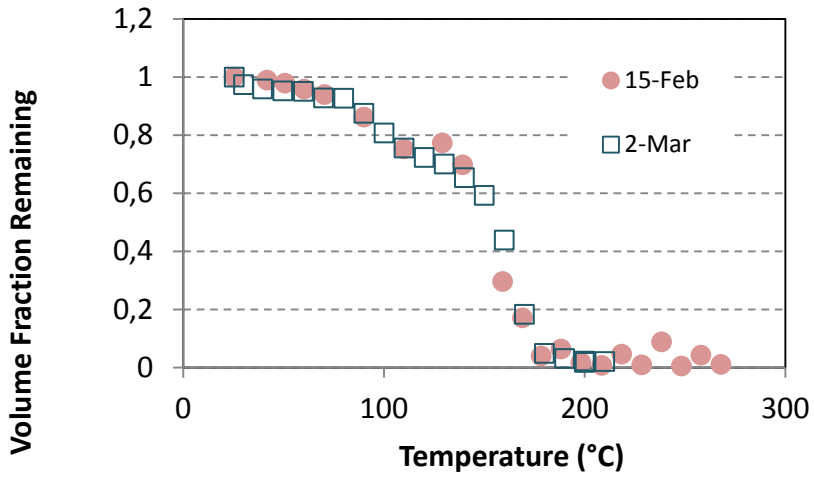


Figure 2: Volatility of 50 nm marine aerosol particles

Lawson, S.J., Keywood, M.D, Galbally, I.E., Harvey, M., Law, C., Selleck, P.W., Cheng, M. and Ristovski, Z (2012) Characterising VOCs in the Marine Boundary Layer During the SOAP Voyage, Chatham Rise, 44ºS. SOLAS Open Science Conference, Cle Elum, Washington State 7-10 May 2012.

Cravigan, L.; Mallet, M.; Ristovski, Z.; Vaattovaara, P.; Talbot, N.; Olivares, G.; Harvey, M.; Law, C. (2013). "Marine Aerosol Hygroscopicity and Volatility, Measured on the Chatham Rise (New Zealand)." The European Aerosol Conference (EAC 2013), Prague, Czech Republic 1 – 6 Sep 2013.

Swietlicki, E., Hansson, H. C., Hämeri, K., Svenningsson, B., Maßling, A., McFiggans, G., Mcmurry, P. H., Petäjä, T., Tunved, P., Gysel, M., Topping, D., Weingartner, E., BALTENSPERGER, U., Rissler, J., Wiedensohler, A. and Kulmala, M.: Hygroscopic properties of submicrometer atmospheric aerosol particles measured with H-TDMA instruments in various environments - A review, Tellus, Series B: Chemical and Physical Meteorology, 60 B(3), 432–469, 2008.

2. International interactions and collaborations (including contributions to international assessments such as the IPCC, links with observation communities, links with policy makers or socio-economics circles, etc.)

1. Australian scientists from CSIRO Marine and Atmospheric Research and Queensland University of Technology (QUT) are involved in the SOAP international collaborative effort in marine biogeochemistry air-sea exchange and atmospheric chemistry along with experimenters in New Zealand (NIWA), U.S. (UCI, U Chapman, SUNY), Germany (IFM-G), Eire (NUIG), U.K. (U Camb), Canada (U Laval), & Finland (UEF). A Special Issue of *Atmospheric Chemistry & Physics, and Ocean Sciences,* has been initiated for presentation of the SOAP results Sarah Lawson (CSIRO) and Luke Cravigan (QUT) attended the SOAP workshop in Wellington, New Zealand in March 2013 to discuss preliminary results. SOAP results have also been presented at the following international conference and workshops in 2013:

Cravigan, L., Mallet, M., Ristovski, Z., Vaattovaara, P., Talbot, N., Olivares, G., Harvey, M., Law, C. (2013) Marine aerosol hygroscopicity and volatility, measured on the Chatham Rise (New Zealand): 19th International Conference on Nucleation and Atmospheric Aerosols. Fort Collins, CO, AIP Publishing: 1527 (1547). Doi: 10.1063/1.4803329

Cravigan, L.; Mallet, M.; Ristovski, Z.; Vaattovaara, P.; Talbot, N.; Olivares, G.; Harvey, M.; Law, C. (2013). "Marine Aerosol Hygroscopicity and Volatility, Measured on the Chatham Rise (New Zealand)." The European Aerosol Conference (EAC 2013), Prague, Czech Republic 1 – 6 Sep 2013.

Lawson, S., Keywood, M., Galbally, I., Harvey, M., Law, C., Selleck, P., Cheng, M., Ristovski, Z. (2013). The Surface Ocean Aerosol Production (SOAP) voyage: Characterising Volatile Organic Compounds (VOCs) over Chatham Rise, 44ºS. 21st International Clean Air and Environment Conference, 7 – 11 September, 2013, Sydney, Australia

Cravigan, L., Milic, A., Miljevic, B., Mallet, M., Vaattovaara, P., Harvey, M., Law, C., Olivares, G., Lawson, S., Keywood, M., Ristovski, Z.; (2013). Marine aerosol composition from organic rich waters in the South East Pacific. The 9th Australia and New Zealand Aerosol Workshop. 12-13 September, Australian Nuclear Science and Technology Organisation, Darling Harbour, Sydney.

2. Sarah Lawson (CSIRO) attended the Future SOLAS Early Career Scientist workshop at PML Plymouth UK, 3-5 Dec 2013

3. Galbally, Ian E. and Martin G. Schultz (2013) Guidelines for Continuous Measurement of Ozone in the Troposphere, GAW Report number 209, World Meteorological Organisation, Geneva Switzerland.

4. Holly Winton and Marc Mallet attended the 2013 SOLAS Science School in Xiamen China.

3. Activities/main accomplishments (research projects, cruises, special events, workshops, remote sensing used, model and data intercomparisons etc)

<u>Research cruises</u>

Measurements of greenhouse gases and ozone during a circumnavigation of Australia on the RV Southern Surveyor (Kubistin et al 2013)

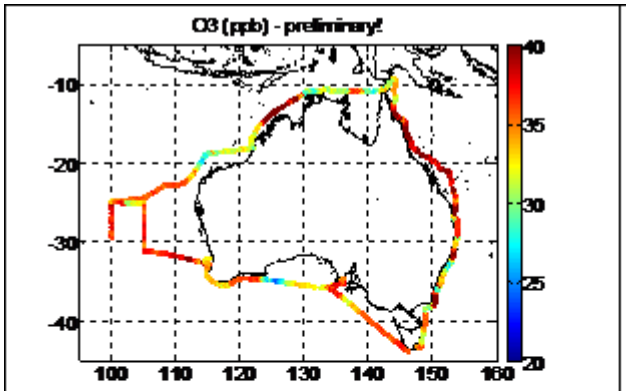
Climate change is one of the most pressing global environmental issues of our time, driven in particular by the large growth in greenhouse gases. However the data coverage in the southern hemisphere is still extremely sparse and the impact of the Australian continent on the southern hemispheric background atmosphere has not been well characterised. Comprehensive measurements of the key greenhouse gases in the Australasian marine boundary layer can improve

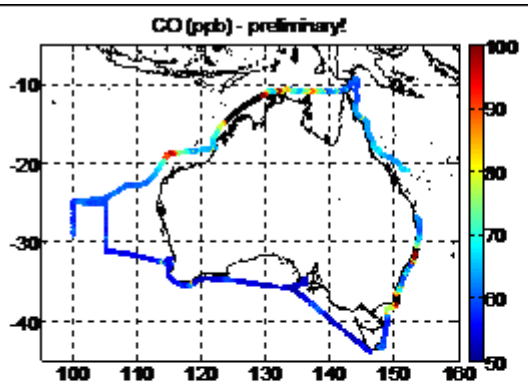
our current knowledge of their budget in this region.

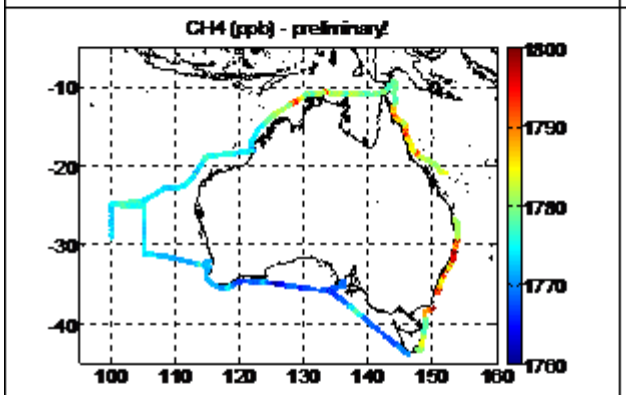
Continuous in situ measurements of methane, carbon dioxide, nitrous oxide and ozone as well as carbon monoxide were performed during a circumnavigation around Australia on board the Australian research vessel RV Southern Surveyor form June till October 2013. The data were collected by using a fully automated Fourier Transform Spectrometer for CH_4, CO_2, N2O, ^{13}C, CO and a UV absorption instrument for O_3. The preliminary data are shown in the figures below.

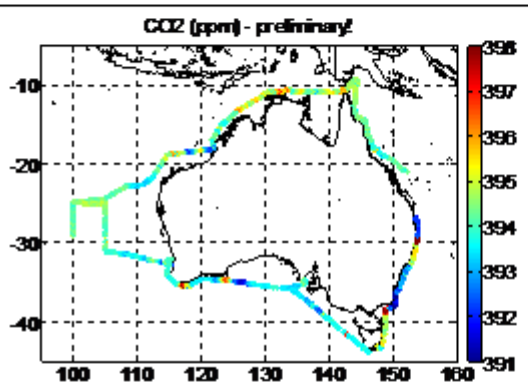
Predominantly air downwind of Australia was sampled throughout the cruises, showing signatures of emissions and photochemistry from large metropolitan areas, desert and rain forest, as well as biomass burning. Strong enhancements in the trace gas concentrations were predominant when back trajectories indicate that the air mass has travelled over biomass burning regions. This unique dataset will be used in future comparison with global and regional models to characterise the different source attributions and to improve the emission inventories of the Australasian region.

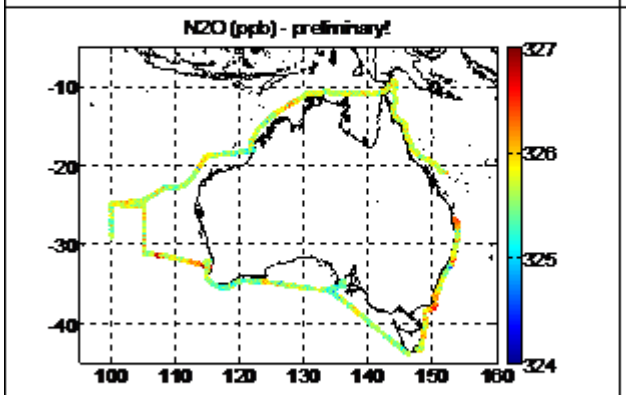
D. Kubistin, C. Paton-Walsh, J. A. Fisher, G. Kettlewell & D. W. T. Griffith (2013), Greenhouse Gas Emissions and Ozone from Australia to the Marine Boundary Layer: Measurements from a Circumnavigation of Australia on the RV Southern Surveyor. Abstract: Atmospheric Composition & Chemistry Observations & Modelling Conference proceedings, incorporating the Cape Grim Annual Science Meeting 2013, Aspendale, Australia











Dagmar Kubistin, University of Wollongong

New Research Vessel – RV Investigator update

Australia's new research vessel, the RV Investigator, is nearing completion and is currently undergoing sea trials in Singapore. In early 2014 it will sail to Hobart, Australia for final scientific fit out. The RV Investigator has dedicated atmospheric chemistry and aerosol laboratories onboard, and permanent measurements of aerosol properties and composition, greenhouse gases, and reactive gases. The Australian atmospheric science community (including CSIRO Marine and Atmospheric Research, University of Melbourne, University of Wollongong, Queensland University of Technology, ANSTO, Macquarie University) and trace element oceanographic community (University of Tasmania, Antarctic Climate & Ecosystems CRC, Australian National University, Australian Institute of Marine Science), will undertake a number of short (5 day) commissioning voyages from Hobart in the first half of 2014 to gain experience at sea.

Sea Time Applications for 2015-16 are closed and currently under review. The call for pre proposals for 2016-17 will be made in July-August 2014. Collaboration between Australian and International Research groups is encouraged.

http://www.marine.csiro.au/nationalfacility/application/index.htm

SOLAS- relevant Atmospheric Field Campaigns

1. The Measurements of Urban, Marine and Biogenic Air campaign (MUMBA) took place in Wollongong (lead by Uni of Wollongong), NSW from 21st December 2012 to 15th February 2013. The campaign aimed to study gaseous and aerosol composition at the ocean/forest/urban interface. The main measurement site was located approximately half a kilometer from the ocean, with prevailing north easterly winds bringing predominantly clean marine air to the site. Characterization of the marine air sampled during the campaign is underway and may be of interest to the SOLAS community (Paton Walsh et al 2013)

2. The Sydney Aerosol Study was a measurement campaign involving collaboration between CSIRO, QUT, ANSTO, Uni Wollongong which investigated the processes leading to particle formation via a comprehensive observation program during February 2011. During measurements of aerosol chemical composition in summer sea salt was found to make a substantial contribution (up to 75% of total) to PM2.5 in a residential area 36km inland from the coast in summer over 4 weeks. Chemical analysis of the sea salt showed it was a mixture of 64% fresh emissions and 36% aged particles. This study used a chemical transport model to assess the contribution of the aged sea salt component to health effects on the Sydney population. This concluded that the chemical ageing of sea salt particles results in significant human exposure to nitrate and sulphate particulate matter in Sydney. Given that sea salt contributes over 3000 Tg per year to total global aerosol this is likely to be a significant finding for coastal cities around the world. This study highlights the interaction between urban and marine emissions as having an impact both on air quality management and policy and also on human health (Emmerson et al 2013).

Emmerson, K.M., Cope, M.E., Galbally, I.E., Keywood, M.D., Selleck, P.W. (2013). 'Aged sea salt in the urban Sydney environment: a cause for concern?' 21st International Clean Air and Environment Conference, Sydney Australia, 7-11 September 2013. Preparation of a full manuscript is underway.

Paton-Walsh, C. Guérette, É.-A., Humphries R., Kubistin D., Wilson S.,. Griffith D,. Buchholz R, Velazco V.,. Shi X, Galbally I.,. Keywood M, Lawson S., Selleck P., Cheng M., Molloy S., Bhujel M., Griffiths A., Chambers S & Davy, P. (2013) Overview of the MUMBA Campaign: Measurements of Urban, Marine and Biogenic Air. Abstract: Atmospheric Composition & Chemistry Observations & Modelling Conference proceedings, incorporating the Cape Grim Annual Science Meeting 2013, Aspendale, Australia

SOLAS – relevant Workshops and meetings

1. 21st International Clean Air and Environment Conference, Darling Harbour Sydney 7-12 September 2013
2. 9th Australia and New Zealand Aerosol Workshop, Darling Harbour, Sydney, from 12-13 September 2013, hosted by ANSTO.
3. The Atmospheric Composition Observations and Modelling Conference & Cape Grim Annual Science Meeting, 28-30 Nov 2013, hosted by CSIRO Aspendale
4. Strategic Science in Antarctica. A joint Australian & New Zealand Conference 2013. Hobart, 24-26 June 2013. http://conference.antarctica.gov.au/

Development of SOLAS- relevant background measurement facilities

1. The Gunn Point Tropical Atmospheric Observatory (lead by CSIRO) located 1 km from the coast in tropical northern Australia has expanded to a second measurement container in 2013 for reactive gas and aerosol measurements (in additional to greenhouse gas measurements). The site experiences clean marine air from SE Asia for several months during the monsoon season so provides opportunity for SOLAS-related science. Current international collaboration includes short-lived halocarbons measurements by U Cambridge.

4. Human dimensions (outreach, capacity building, public engagement etc)

RV Investigator blog

http://csirofrvblog.com/tag/rv-investigator/

News story in local media about launch of RV Investigator

http://www.themercury.com.au/news/tasmania/launch-of-csiro-research-vessel-investigator-a-complicated-affair/story-fnj4f7k1-1226783993435

TV story on Catalyst Science Program about decommissioning of Southern Surveyor and commissioning of replacement, RV Investigator http://www.abc.net.au/catalyst/stories/3816267.htm

5. Top 10 publications in 2013 (Reports, ACCEPTED articles, models, datasets, products, website etc)

Roger J. Francey, Cathy M. Trudinger, Marcel van der Schoot, Rachel M. Law, Paul B. Krummel,Ray L. Langenfelds, Paul Steele, Colin E. Allison, Ann R. Stavert, Robert J. Andres and Christian Rödenbeck Atmospheric verification of anthropogenic CO2 emission trends (2013), *Nature Climate Change*, Vol 3 May 2013 DOI: 10.1038/NCLIMATE1817

Tessa R. Vance,, Andrew T. Davidson, Paul G. Thomson, Maurice Levasseur, Martine Lizotte, Mark A. J. Curran, Graham B. Jones *(2013)* Rapid DMSP production by an Antarctic phytoplankton community exposed to natural surface irradiances in late spring *Aquat Microb Ecol* Vol. 71: 117–129, 2013, doi: 10.3354/ame01670

Leahy, S., Kingsford, M and Steinberg, C. (2013). Do clouds save the Great Barrier Reef? Satellite Imagery Elucidates the cloud-SST relationship at the local scale *PLoS ONE* 8(7): e70400. doi:10.1371/journal.pone.0070400

Graham Jones (2013), Coral animals combat stress with sulfur, *Nature*, News and Views, 31 Oct 2013, Vol 502

Cropp RA, Gabric AJ, Levasseur M, McTainish, GH, Bowie AR, Hassler CS, Law CS, McGowan H, Tindale N, Viscarra Rossel R, 2013. The likelihood of observing dust-stimulated phytoplankton growth in waters proximal to the Australian continent. *Journal of Marine Systems*, 117-118, 43-52. ISSN 0924-7963 (2013)

Morton PL, Landing, WM, Hsu S-C, Milne A, Aguilar-Islas AM, Baker AR, Bowie AR, Buck CS, Gao Y, Gichuki S, Hastings MG, Hatta M, Johansen AM, Losno R, Mead C, Patey MD, Swarr G, Vandermark A, Zamora LM, 2013. Methods for the sampling and analysis of marine aerosols: Results from the 2008 GEOTRACES aerosol intercalibration experiment. *Limnology and Oceanography*: Methods, 11 (FEB) pp. 62-78. ISSN 1541-5856 (2013)

6. Goals, priorities and plans for future activities/events

1. RV Investigator: The Australian atmospheric science community (including CSIRO Marine and Atmospheric Research, University of Melbourne, University of Wollongong, Queensland University of Technology, ANSTO, Macquarie University), will participate in a number of short (5 day) commissioning voyages from Hobart in the first half of 2014 to gain experience at sea.
2. In Jan 2014 CSIRO CMAR and IMAS are hosting the annual meeting of the Partnership for Observation of the Global Oceans (POGO) and will involve around 50 heads of agencies active in oceanography from 21 countries. The meeting is mainly a forum for member heads of agency to discuss ways in which we collectively can work to influence, improve, or expand

international programs to observe the ocean. There will be a series of small workshops associated with the main meeting to discuss the Southern Ocean Observing System (SOOS), observations of the tropical Indo-Pacific, developing autonomous devices for observing the deep ocean (e.g. below 2000m), and mechanisms of improving provision of data streams from the array of national and international observing programs.

7. Other comments

Annual Report for the year 2013:

SOLAS BELGIUM

compiled by:Christiane Lancelot

Notes:
Reporting Period is January 2013 – December 2013
Information will be used for: reporting, fundraising, networking, strategic development & outreach

1. Scientific highlights

Measurement and modelling of Argon dynamics within sea ice provide insights on gas transport in sea ice

We measured Ar concentration in landfast ice (Barrow, AK) from January to June 2009. We observed that Ar responds differently to brine dynamics than the other biogeochemical compounds. This contrast is attributed to the specific effect of bubble nucleation on inert gas transport. Mechanism for Ar bubble formation and transport in sea ice was explored with a sea ice model. Ar dynamics is dominated by uptake, transport by brine dynamics and bubble nucleation in winter and early spring; and by an intense and rapid release of gas bubbles to the atmosphere in spring.

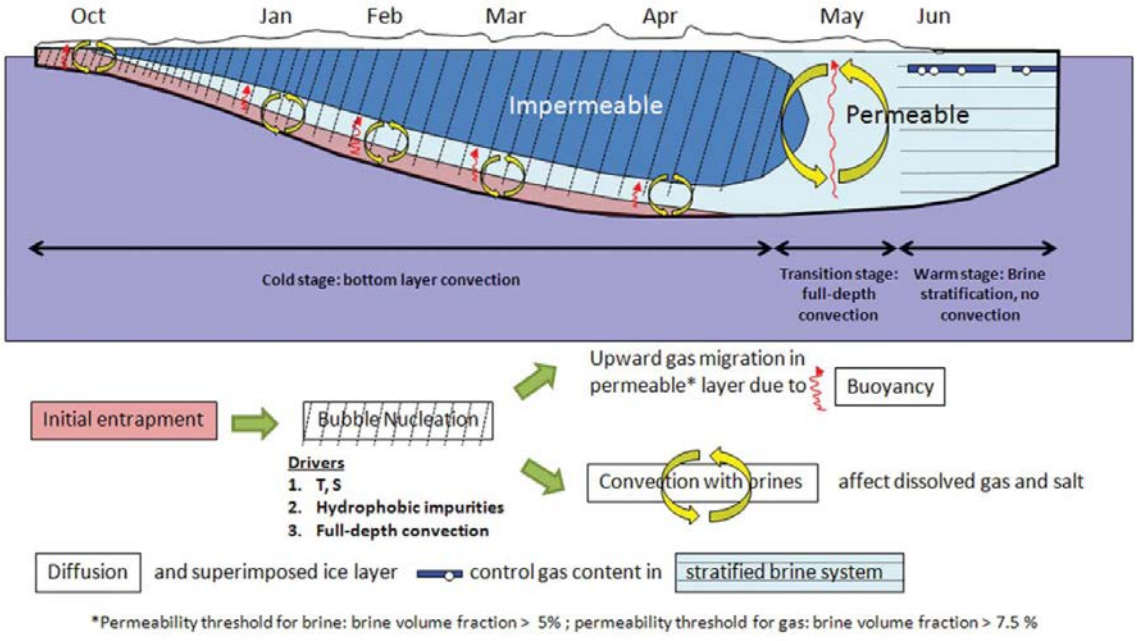


***Figure**: Schematic view of gas entrapment and evolution in sea ice through the three stages of brine dynamics. After the entrapment, changes in temperature (T) and salinity (S), the presence of hydrophobic impurities, and full-depth convection contribute to bubble nucleation. Bubbles could then migrate upward in permeable layers due to their buoyancy compared to the brines, while gas dissolved in brine would migrate as salt does, due to brine convection. Diffusion and the formation of superimposed ice layers may also control gas content in permeable sea ice.*

2. International interactions and collaborations (including contributions to international assessments such as the IPCC, links with observation communities, links with policy makers or socio-economics circles, etc.)

A.V. Borges and G. Munhoven are contributing authors to Chapter 6 of the 2013 IPCC report

A.V. Borges contributed to the SOCAT synthesis :
- Pfeil et al. A uniform, quality controlled Surface Ocean CO2 Atlas (SOCAT), Earth System

Science Data, 5, 125-143, doi:10.5194/essd-5-125-2013, 2013
- Sabine et al. Surface Ocean CO_2 Atlas (SOCAT) gridded data products, Earth System Science Data, 5, 145-153, doi:10.5194/essd-5-145-2013

A.V. Borges and B. Delille contributed to Chapter 3 (Air-Sea Interactions of Natural Long-Lived Greenhouse Gases (CO_2, N_2O, CH_4) in a Changing Climate) of the SOLAS synthesis "Ocean-Atmosphere Interactions of Gases and Particles" (P. Liss and MT Johnson, Eds).

3. Activities/main accomplishments (research projects, cruises, special events, workshops, remote sensing used, model and data intercomparisons etc)

Cruises and research projects

We completed a one-year survey of sea ice biogeochemistry in landfast ice in Mc Murdo Sound in the frame of the Bigsouth/YROSIAE (Year-Round Ocean-Sea Ice-Atmosphere Exchanges). Focus was given to the link between sea ice physics and biogeochemistry especially the fluxes of climate gases (CO_2, DMS, CH_4, N_2O) to the atmosphere. This project results from a tight collaboration with T. Haskell from Callaghan Innovation and Antarctica New Zealand.

We participated in AWECS (ANTARCTIC Winter Ecosystem Climate Study) cruise on board the RV Polarstern (Alfred Wegner Institute, Germany). The cruise was an integrated multidisciplinary study of pack ice biogeochemistry in the Weddell Sea during the winter 2013 (June-August). Samples were collected in the atmosphere above (gas fluxes), in the snow cover, in the bulk ice (ice cores), in the brines (sackholes) and in the sea water below (0m, 1m, 30 m).

Meeting organisation and session chairs

A.V. Borges and N. Gypens as SC members of the 45th International Liege Colloquium on "The variability of primary production in the ocean: from the synoptic to the global scale" held from 13-17 May 2013.

A.V. Borges co-chaired a session on "Biogeochemistry of coastal seas and continental shelves" at EGU 2013.

A.V. Borges co-chaired a session on "Ocean Acidification at ICES 2013 Annual Science Conference, 23-27 September 2013, Reykjavik, Iceland

N. Gypens co-chaired a session on "Coastal ecosystem under anthropogenic pressure: impact on ecosystem structure and services" at EGU 2013.

4. Human dimensions (outreach, capacity building, public engagement etc)

5. Top 10 publications in 2013 (Reports, ACCEPTED articles, models, datasets, products, website etc)

De Jong JTM, Schoemann V, Maricq N, Mattielli N, Langhorne P, Haskell T, Tison J-L, 2013, Iron in land-fast sea ice of McMurdo Sound derived from sediment resuspension and wind-blown dust attributes to primary productivity in the Ross Sea, Antarctica, *Marine Chemistry*, 24-40, doi:10.1016/j.marchem.2013.07.001

Geilfus N-X, Carnat G, Dieckmann GS, Halden N, Nehrke G, Papakyriakou T, Tison J-L, Delille B, 2013, First estimates of the contribution of $CaCO_3$ precipitation to the release of CO_2 to the atmosphere during young sea ice growth, *Journal of geophysical Research – Ocean,* doi:10.1029/2012JC007980

Gledhill M, Hassler CS and Schoemann V, 2013, The environmental bioinorganic chemistry of aquatic microbial organisms. *Frontiers in Microbiology*, 4, 100, doi: 10.3389/fmicb.2013.00100

Vancoppenolle M, Meiners KM, Michel C, Bopp L, Brabant F, Carnat G, Delille B, Lannuzel D, Madec G, Moreau S, Tison J-L, van der Merwe P, 2013, Role of sea ice in global biogeochemical cycles: Emerging views and challenges, *Quaternary Science Reviews*, 79:207-230, doi:10.1016/j.quascirev.2013.04.011

Zhou J, Delille B, Eicken H, Vancoppenolle M, Brabant F, Carnat G, Geilfus N-X, Papakyriakou T, Heinsesch B, Tison J-L, 2013, Physical and biogeochemical properties in landfast sea ice (Barrow, Alaska): insights on brine and gas dynamics across seasons, *Journal of geophysical Research – Ocean*, 118(6):3172-3189

Salt L.A., H. Thomas, A.E.F. Prowe, A.V. Borges, Y. Bozec & H.J.W. de Baar, 2013 Variability of North Sea pH and CO2 in response to North Atlantic Oscillation forcing, JGR-Biogeosciences, 118, doi:10.1002/2013JG002306

Cai W-J, C.-T.A. Chen & A.V. Borges, 2013. Carbon dioxide dynamics and fluxes in coastal waters influenced by river plumes, Chapter 7, pp. 155-173, Biogeochemical Dynamics at Large River-Coastal Interfaces: Linkages with Global Climate Change (Editors: T.S. Bianchi, M.A. Allison, and W.-J. Cai), 704 pp., Cambridge University Press

Regnier P, P Friedlingstein, P Ciais, F.T. Mackenzie, N. Gruber, I. Janssens, G.G. Laruelle, R. Lauerwald, S. Luyssaert, A.J. Andersson, S. Arndt, C. Arnosti, A.V. Borges, A.W. Dale, A. Gallego-Sala, Y. Goddéris, J. Hartmann, C. Heinze, T. Ilyina, F. Joos, D. E. LaRowe, J. Leifeld, F.J.R. Meysman, G. Munhoven, P.A. Raymond, R. Spahni, P. Suntharalingam & M. Thullner , 2013. Anthropogenic perturbation of the carbon fluxes from land to ocean, Nature Geosciences, doi: 10.1038/NGEO1830

Gypens, N, Borges, AV, Speeckaert, G, Lancelot,C, 2014. The dimethylsulfide cycle in the eutrophied Southern North Sea: a model study integrating phytoplankton and bacterial processes. PloS ONE 9(1) e85862. doi10.1371/journal.pone.0085862.

Moreau S, Vancoppenolle M, Zhou J, Tison J-L, Delille B & Goosse H, Modelling argon dynamics in first-year sea ice, Ocean Modelling, in press

6. Goals, priorities and plans for future activities/events

Experimentation and modelling

Further analysis and synthesis of data (trace metals, Fe organic complexation and isotopic composition (Fe, Zn, Cu), gases, nutrients, POC, DOC) collected in snow, sea ice, brines and seawater as well as dusts during the land-based sampling program YROSIAE at Cape Evans (McMurdo Sound, Ross Sea, Antarctica) from Nov-Dec 2011 and from Aug-Dec 2012, the IceARc cruise (Polarstern XXVII-3) in Central Arctic (Aug-Oct 2012)(only trace metals analysi) and during the AWECS (Antarctic Winter Ecosystem and Climate Study) cruise (Polarstern ANTXXIX-6) in the Weddell Sea during the winter 2013 (June-August).

Laboratory study of the variability of the DMSP content and DMSP lyase activity of selected key species of the Southern North Sea for further integration in the recently published DMS-MIRO model.

Laboratory experiments using diatoms are being conducted to investigate the influence of atmospheric dust addition and of pCO_2 on phytoplankton growth. A joint VUB-ULB cruise aboard RV Belgica is planned, aiming at assessing the different biogeochemical processes controlling the nitrogen cycle, in particular the N_2 fixation, in the oligotrophic NE Atlantic waters (Biscay and Iberian margins). In addition, the impact of the marine iron biogeochemistry on the phytoplankton and diazotrophs will be investigated.

Meeting organisation and session chairs

Organisation (A.V. Borges) of the 46th International Liège Colloquium on “Low oxygen environments in marine, estuarine and fresh waters” (5-9 May 2014)

Co-chair (A.V. Borges) of Session on “Biogeochemistry of coastal seas and continental shelves” (EGU May 2014)

Co-chair (N. Gypens) of Session on “Coastal ecosystem under anthropogenic pressure: impact on ecosystem structure and services (EGU May 2014)

Co-chair (V. Schoemann) of Session on " Dust in the Sea- impact on biogeochemistry and climate" at DUST 2014 International Conference on Atmospheric Dust, Castellaneta Marina (TA), Italy, June 1-6.

Conference participation with abstracts

EGU 2014

IGS International Symposium on Sea Ice in a Changing Environment 2014

7. Other comments