

Report for the year 2015 and future activities

SOLAS Ireland compiled by: **Brian Ward**

Please note that this report has two parts!

Part 1: reporting of activities in the period of January 2015 – December 2015

Part 2: reporting on planned activities for 2016 to 2018/19.

The information provided will be used for reporting, fundraising, networking and strategic development. In particular, **in 2016 SOLAS will develop its Implementation Plan, which will be largely based on the information from part 2 of the national reports, as well as input from international SOLAS initiatives and activities.** This info will be crucial in order to draft a realistic Implementation Plan representative of SOLAS, internationally.

IMPORTANT: May we remind you that this report should reflect the efforts of the SOLAS community in the **entire country** you are representing (all universities, institutes, lab, units, groups)!

PART 1 - Activities from January 2015 to December 2015

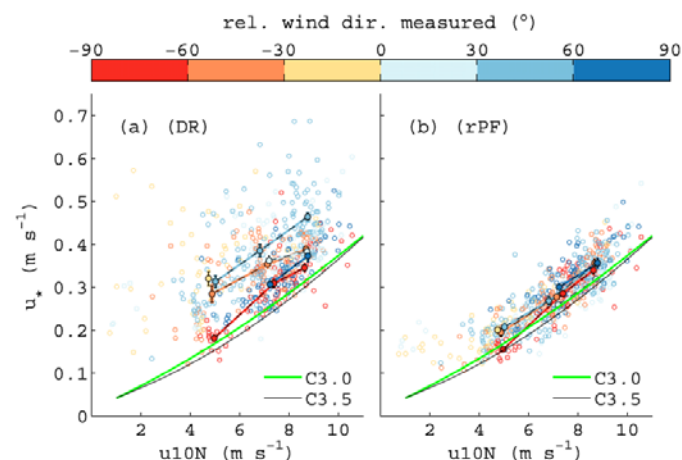
1. Scientific highlight

Describe one scientific highlight with a title, text (max. 200 words), a figure with legend and full references. Please focus on a result that would not have happened without SOLAS, and we are most interested in international collaboration.

Example to be deleted:

Direct flux measurements from mobile platforms at sea

Ship-based measurements of wind speed and direct fluxes are affected by airflow distortion that can lead to a tilt of the wind vector as well as acceleration or deceleration of the wind speed. Direct flux measurements are additionally affected by the fluctuating velocity of the platform. The classic approach is to first correct the wind speed for angular and translational platform velocities and



Direct measurements of u^* as a function of u_{10N} and the measured relative wind direction: (a) results obtained using the standard motion correction and rotation into the stream and (b) results using the new improved method.

thereafter rotate the wind vector into the mean flow. This study finds that for ships under way, this leads to an overestimation of the vector tilt and biased flux estimates. This may explain the

common observation that flux estimates from ships in transit have lower quality than measurements taken on station. Here an alternative approach is presented, where the flow-distortion-induced tilt of the wind vector is estimated from the 3D wind speed measurements and applied to the apparent wind vector. The tilt correction is carried out after correction for the fluctuating part of the platform velocity but before removing the ship's mean translational velocity. This new method significantly improved the agreement of direct momentum flux measurements made from a ship under way with the parameterization of the COARE3.5 bulk model. The sensitivity of the eddy covariance measurements of momentum and scalar fluxes to the choice of the tilt-motion correction method is analyzed, and this study proposes that a reanalysis of previous direct flux measurements with the new method discussed here can improve researchers' understanding of air-sea interaction.

Landwehr, S., N. O'Sullivan, and B. Ward, 2015. Direct flux measurements from mobile platforms at sea: Motion and air flow distortion corrections revisited. *J. Atmos. Oceanic Technol.*, 32 :1163–1178. doi:10.1175/JTECH-D-14-00137.1

2. Activities/main accomplishments in 2015 (projects, field campaigns, events, model and data intercomparisons, capacity building, international collaborations, contributions to int. assessments such as IPCC, interactions with policy makers or socio-economics circles, etc.)

- BW: Oilbay Experiment: Study of the impact on oil on surface waves and turbulence in August 2015 in Galway Bay.

- BW: Svalbard: Study of wave dampening due to the presence of ice (March 2015)

- BW: Participation in the 4th WCRP Data Advisory Council in Reading UK (July 2015)

- BW: Participation in the Southern Ocean Air-Sea Fluxes workshop in Frascati (September 2015)

- TMG: Post-doctoral Project: Biogeochemical cycling of carbon and nutrients in Irish marine and estuarine waters (NUIG funded by the Marine Institute and EPA). Sampling and analysis from project complete and dataset of seasonal and temporal inorganic carbon and nutrients produced for three inshore sites.

- TMG: Research survey completed in February 2015 where a range of biogeochemical parameters (dissolved inorganic carbon, total alkalinity, inorganic nutrients, oxygen, salinity) were sampled in Irish coastal waters (Dublin north about to Galway).

- TMG: Continued international collaboration with National Oceanographic Centre, Southampton on the UK Shelf Sea Biogeochemistry Project.

3. Top 5 publications in 2015 (only PUBLISHED articles) and if any weblinks to models, datasets, products, etc.

For journal articles please follow the proposed format:

Author list (surname and initials, one space but no full stops between initials), year of publication, article title, full title of journal (italics), volume, page numbers, DOI.

O'Dowd, C, Ceburnis, D, Ovadnevaite, J, Bialek, J, Stengel, DB, Zacharias, M, Nitschke, U, Connan, S, Rinaldi, M, Fuzzi, S, Decesari, S, Facchini, MC, Marullo, S, Santoleri, R, Dell'Anno, A, Corinaldesi, C, Tangherlini, M, Danovaro, R, Connecting marine productivity to sea-spray via microscale biological processes: Phytoplankton Dance or Death Disco? *Nature Scientific Reports*, DOI 10.1038/srep14883, (2015).

Walesby, K., J. Vialard, P. Minnett, A. Callaghan, and B. Ward, 2015. Observations indicative of rain-induced double diffusion in the ocean surface boundary layer. *Geophys. Res. Lett.*, 42 . doi:10.1002/2015GL063506

Wain, D. J., J. Lilly, A. H. Callaghan, I. Yashayaev, and B. Ward, 2015. A breaking internal wave in

the surface ocean boundary layer. *J. Geophys. Res.* , 120 . doi:10/6p8

McGrath, T., McGovern, E., Cave, R. and Kivimäe, C. 2015. The Inorganic Carbon Chemistry in Coastal and Shelf Waters Around Ireland. *Estuaries and Coasts*, 1-13, DOI: 10.1007/s12237-015-9950-6.

U. Nitschke*, S. Dixneuf, M. Schmid, A.A. Ruth, D.B. Stengel, "Contribution of living and degrading kelp to coastal iodine fluxes", *Mar. Biol.* 162 (2015) 1727-1738.

PART 2 - Planned activities from 2016 to 2018/19

1. Planned major field studies and collaborative laboratory and modelling studies, national and international (incl. all information possible, dates, locations, teams, work, etc.)

- BW: participation in the Retrospect experiment in a Norwegian fjord to study air-sea fluxes and their dependency on waves and turbulence (April 2016)
- BW: Experiment in Svalbard to study the impact of ice on the wave field
- TMG: Post-doctoral Project: Biogeochemical cycling of carbon and nutrients in Irish marine and estuarine waters (NUIG funded by the Marine Institute and EPA). This project will continue until August 2016. Results from the project are being prepared for publication.

2. Events like conferences, workshops, meetings, schools, capacity building etc. (incl. all information possible)

- BW: Whitecap conference to be held at NUIG in 2016/2017
- BW: ESA/SOLAS workshop on remote sensing (June 2016)
- BW: Keynote address at the ESA/SOLAS project Oceanflux (September 2016)
- TMG: TEDx presentation at TEDx Fulbright Dublin event, February 2016. <https://www.youtube.com/watch?v=8m1X26Auw6Q>
- TMG: Quasimeme Workshop on Ocean Acidification, Southampton, February 2016. Poster: Trends of ocean acidification in the NE Atlantic.
- TMG: Marine Chemistry Working Group, March 2016. Oral presentation: The inorganic carbon chemistry in Irish coastal, shelf and offshore waters.

3. Funded national and international projects / activities underway (if possible please list in order of importance and indicate to which part(s) of the SOLAS 2015-2025 science plan the activity topics relate – including the themes on ‘SOLAS science and society’ and ‘Geoengineering’)

**4. Plans / ideas for future projects, programmes, proposals national or international etc.
(please precise to which funding agencies and a timing for submission is any)**

- BW: Possible proposal to ESA for Southern Ocean flux study 2017

5. Engagements with other international projects, organisations, programmes etc.

- BW: WCRP Data Advisory Council
- BW: WDAC Surface Fluxes Task team
- BW: Steering Committee on Souther Ocean Air-Sea Fluxes

Comments

Contributors:
Brian Ward (BW)
Triona Mcgrath (TMG)
Colin O'Dowd (COD)
Andy Ruth (AR)