SCOR Working Group 141 Sea-Surface Microlayers – Annual Report 2016

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Summary of activities 2015/2016.
During this reporting period, the WG members have been busy with three activities; the SML science opinion/position paper (TOR 2), planning and executing an SML-focused session at Ocean Sciences in New Orleans (TOR 3), and initiating a journal special edition on the SML (TOR 4). Several members of the WG have been involved in the final stages of planning for the SML-dedicated Schmidt Ocean Institute cruise from Australia to Guam. There has also been PhD student exchange between laboratories of WG members.

TOR 1. Review sampling techniques and provide best practice sampling protocols. Such protocols will support new scientists entering the field of SML research to produce reliable and comparable data among different research groups/oceanic regions. The best practice sampling document will be made freely available online.

This TOR is complete. We have published the guide to sample the sea surface microlayer (http://www.scor-int.org/Publications/SCOR_GuideSeaSurface_2014.pdf). The guide is available for free download from several websites, including the Plymouth Marine Science Electronic Archive. Even though the TOR is complete, method development remains an ongoing process. Members of the WG will update the guide if any major improvements in SML sampling are made. During the upcoming SML cruise on the *Falkor* (see below), activities will include method testing and potential improvement. We will review the activities after the cruise and update the guide if needed.

TOR 2. Create a consensus definition of the SML in terms of physical, chemical and biological perspectives for a better understanding within the ocean science community, and discuss the SML's role in a changing ocean. This will be delivered as an opinion/position paper in a peer-reviewed journal and will support future international projects concerning the SML and ocean change.

A final draft of the paper is now complete and is being reviewed by the members of the WG. This TOR benefitted greatly from an SML-focused workshop organized by Anja Engel at GEOMAR (Germany) that included several WG members. As a result, non-WG members have also played an active role in writing the paper, including several highly experienced SML scientists. The target journal is *PNAS*.

TOR 3. Initiate sessions on SML research during major meetings (e.g., Ocean Sciences Meetings), to increase the awareness of the importance of the SML within the general ocean science community.

This TOR is complete. The open session *"Linking the Ocean with the Atmosphere - Exploring the Importance of the Ocean-Atmosphere Interface and Near Surface Waters in Global Scale Processes"* at the Ocean Sciences Meeting in New Orleans was a great success. For this multidisciplinary session we invited participants from all research

disciplines that are interested in the SML and its effect on surrounding environments. The session brought together ideas and results from field observations, laboratory experiments and models. We explored the interactions between physical, chemical and microbiological processes at the ocean-atmosphere interface to develop a holistic perspective and promote the development of new collaborations between research fields. Topics presented ranged from assessments of natural surfactants in the Atlantic Ocean SML to modelling bubble bursting and microbial diversity in the SML. The session was very busy, with a large number of participants engaged with all the presenters. Many of the presenters have been encouraged to submit their research to the SML special issue (TOR 4 below).

TOR 4. Summarize and publish the latest advances in microlayer research in a special issue of a peer-reviewed journal, including consolidation of existing sea surface microlayer datasets among different disciplines (chemistry, biology, atmospheric, physics). The publication will promote new research ideas and projects at an interdisciplinary level.

The SML special issue will be in the journal *Elementa: Science of the Anthropocene* and will open for submissions on the 1st September 2016. We are particularly excited by some of the special features that *Elementa* have to offer that will allow us to present SML research in a unique, engaging way, with additional images, podcasts, and videos to supplement the research. After discussion with Ed Urban during the New Orleans meeting, we have extended the lifetime of the WG to accommodate for the journal special addition (TOR 4).

SML-dedicated Schmidt Ocean Institute cruise

Four of the WG members (Cunliffe, Wurl, Landing, Zappa) secured a Schmidt Ocean Institute research cruise application. The cruise will be the first international research cruise dedicated to study the SML and air-sea interaction. The RV Falkor will leave Darwin in mid-October and perform a series of coast to open open transects off Northern Australia, followed by sampling at a series of open ocean stations in the Southern Pacific Ocean and finishing in Guam. Onboard experiments will also be conducted when the ship is transiting between stations. The key research driver of the cruise is multidisciplinarity, we have brought together a range of disciplines, including physical, chemical and biological oceanography, marine microbiology and modelling. There is a strong emphasis on PhD student training, with several students taking part in the cruise. It is important to highlight that this international collaboration was developed because of the SCOR WG.