Editorial

Martin Visbeck, Anja Reitz, and Laura Ebeler
(GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany)

Sandra Ketelhake (German Marine Research Consortium (KDM), Germany)

After almost four years of the AtlantOS project's lifetime, this last newsletter focuses on 'Impact on Atlantic Ocean Observing – the leverage of AtlantOS beyond the project lifetime'.

Our ambition for AtlantOS, the project, was to improve and innovate Atlantic Ocean observing by using the Framework of Ocean Observing as a guide to work towards a more international, more sustainable, more efficient, more integrated, and fit-for-purpose ocean observing system. We are particularly pleased about the exciting and groundbreaking work that we have done and reported on in a large number of deliverables, the willingness to innovate, to cooperate across disciplines and regions as well as the integration of existing initiatives, improving data flows and establishing a large number of good and best practices. The reports document how improvements and innovations to the current observing system were made, why ocean observing gives plenty of value for money. Work packages have worked hard to improve spatial and parameter coverage, basin scale completeness, quality, authority and ease of access to data. Furthermore, user consultations with ocean information product generating agencies, the private sector, ocean and climate scientists, NGOs and educators and those who provide ocean literacy to citizens have been improved.

The AtlantOS partners and the wider ocean observing community achieved those successes together, some funded by the H2020 project, others by providing national or private sector resources. This allowed to make progress on system design, connecting different observing networks and achieve more cooperation, improve timely data delivery, interoperability, integration and harmonization, and to show the value of integrated ocean observing by exemplary products that fulfil the societal needs. We are particularly pleased to have been able to work with several member states, the IOC, WMO and GEO programs and also initiated a cycle of observing system evaluation and review. Looking ahead, AtlantOS the project has laid the foundation towards a sustained All-Atlantic Ocean Observing whose ambition was articulated in the recently published AtlantOS High-level Strategy (formerly known as the AtlantOS BluePrint process).

The 'Focus' of this newsletter is on a few selected success stories of the AtlantOS project and some views on future perspectives. The contributions range from (i) data harmonization and integration, (ii) monitoring the Atlantic Ocean through joint international efforts to cooperate on operational innovation and enhancement, (iii) data products and (iv) information products to (v) the All-Atlantic Ocean Observing System (AtlantOS) Program.

With these examples, we would like to encourage the Atlantic Ocean observing community to continue and intensify their engagement for the AtlantOS program. The First International AtlantOS Symposium (25 – 28 March 2019, Paris, France) marked the transition from AtlantOS the project to AtlantOS the program. In the coming months, an interim AtlantOS program steering group will work and consult with all of you on the implementation of AtlantOS. At the OceanObs'19 conference (16 – 20 September 2019, Hawaii, USA) these ideas will be further developed and are expected to be a significant contribution the UN Decade of Ocean Science for Sustainable Development.

AtlantOS the project together with its partners has laid the foundation to implement the comprehensive All-Atlantic Ocean Observing System (AtlantOS) program that benefits all of us living, working and relying on the ocean.

Delivering open science for contributing to the societal challenge of climate change

Gianandrea Mannarini (Euro-Mediterranean Center on Climate Change, Italy)

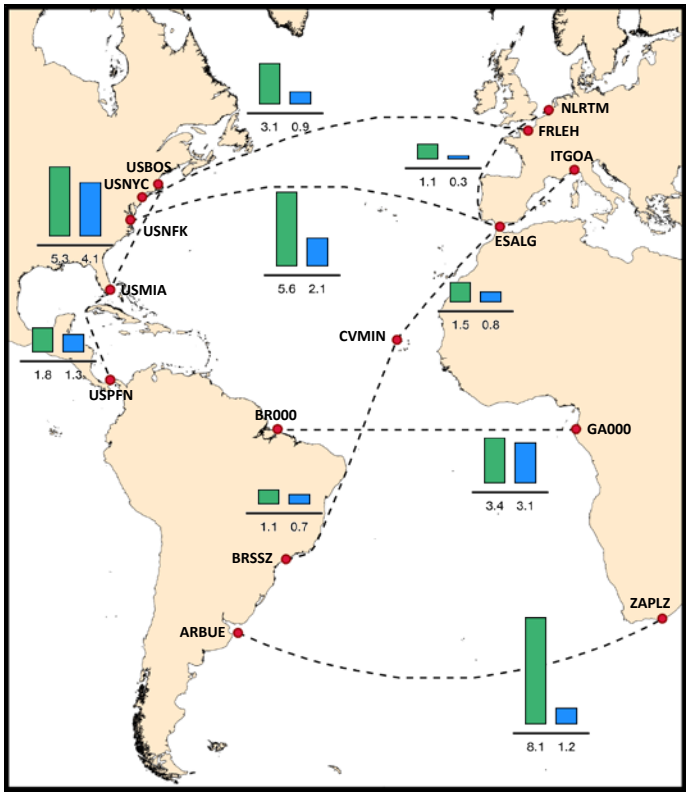
Would you accept that two countries such as Italy and Spain are exempted from climate change mitigation actions? I suppose not. Actually, CO2 emissions from international shipping in 2015 were even larger than the quota of those two countries (i.e., about 2.5% of total). However, only lately the shipping sector has begun to agree on pathways for CO2 emission reduction.

The European Union regulation (2015/757) on Monitoring/Reporting/Verification of CO2 emissions from ships calling at and from EU ports represents the first step before defining reduction targets and applying Market Based Measures (MBM). More recently (2018), the International Maritime Organization (IMO) approved a strategy for CO2 emission reduction with the ambition to halve them by the mid of the century. In the medium and long term, this should be achieved through MBM and the use of fossil-free fuels, but in the short term, the energy efficiency of existing vessels should be raised.

Within AtlantOS WP8 ("Societal benefits from observing/information systems"), we have addressed this urgent topic. Among others, we have further developed the VISIR ship routing model for assessing how ocean currents and surface gravity waves could be exploited for sailing on more energy efficient routes. We made use of open data from the Copernicus Marine Environment Monitoring System (CMEMS, to which AtlantOS also contributes to). These data merge ocean observations with model computations for reconstructing and predicting the ocean state and circulation. We use CMEMS data for computing the maximum speed of vessels, compliant with safety of navigation, at any location in the Atlantic Ocean over the year 2017. Then, a path optimization algorithm computes the shortest and the fastest path between given harbours. Finally, the energy efficiency of the two paths is compared by means of a standard indicator (Energy Efficiency Operational Indicator, EEOI) established by the IMO. We have assessed both the seasonal and regional dependence by varying departure date and harbours in the whole Atlantic. Furthermore, we have distinguished the total gains in energy efficiency of the voyages (green columns in the figure) from the contribution due to ocean currents (blue columns). We have found that in the Northern Atlantic both waves and currents can significantly contribute to the EEOI savings, whereas at the Equator only currents are relevant, while in the Southern Ocean the dominant effect stems from just waves.

The results obtained via VISIR represent an initial step by which we contribute to the analysis of a societal challenge through ocean data and the numerical tools of optimization. However, the mitigation ambitions by both the IMO and the EU call for even greater advancements. In particular, we need to be much more accurate in our capacity to predict the maximum speed of vessels in a seaway. This is hard to achieve without an open access to vessel propulsion and performance data.

In the 2nd AtlantOS Newsletter, we have already recommended a new paradigm of open collaboration between science and industry. As scientists, we have contributed by making all our results, including the VISIR model source code, accessible with an open and free policy: www.visir-model.net. I believe a specular open data policy by the shipping industry would be beneficial to both science and business.



Mean relative EEOI savings [%] for several routes in the Atlantic Ocean. The values displayed in the vertical bars refer to annual average of the mean savings for the return voyages, sailed along the optimal tracks. The green bars refer to total savings, while the blue bars refer to the ocean currents contribution (Credit: Mannarini, G. and Carelli, L.: VISIR-I.b: waves and ocean currents for energy efficient navigation, Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2018-292, in review, 2019).