3rd High-Level Industry-Science-Government Dialogue on Atlantic Interactions
Parallel Workshops: Challenges for the AIR Centre's Scientific Program
Tuesday, 8th May, Praia, Cape Verde

Highlights and Conclusions

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Workshop 1 - Clean, healthy and sustainable oceans: Observing, modelling and monitoring oceans and coasts

Coordinator:

- Ramiro Neves (MARETEC/IST), Portugal

Presenters:

- Ramiro Neves (MARETEC / IST), Portugal – Clean Healthy and Sustainable Oceans: Observing, Modelling and Monitoring, Oceans and Coastal Zones;
- Luiz Paulo Assad (LAMCE / COPPE RJ), Brazil – Numerical Modelling and Data Assimilation applied to the South Atlantic Ocean;
- Paula Sobral (MARE / FCT UNL), Portugal – Microplastics;
- Josep Pelegrí (CSIC), Spain – Some examples of Spanish monitoring initiatives.

Rapporteur:

- Ramiro Neves (MARETEC/IST), Portugal

Highlights:

Most of the existing models follow the downscale perspective, from global to local models. An innovative approach would be to use data from local and regional studies carried at national/regional level to improve the global models, products and services (upscaling), such as CMEMS (Copernicus Marine Environment and Monitoring System), which in turn can be subsequently used to improve local/regional solutions. This approach would have three major benefits: a) development of an improved global solution for the Atlantic Ocean; b) development of a common data platform; and c) development of products and services better tailored for local needs. The AIR Centre should explore the possibility of using Atlantic islands as test beds for new services and products.

The health of the world's oceans is a matter of concern. Amongst others, a major problem derives from the exponential increase in the amount of plastics produced worldwide, part of which ends up in the oceans constituting a global problem, as they a) have been detected in all levels of the marine environment causing diverse harm to marine life (ingestion, entanglement, etc); b) may transport non-indigenous marine species, which threaten marine biodiversity and the food chain; and c) can accumulate toxic substances or act as a vector of toxic pollutants in the food chain, with potentially severe health implications. The study of the generation, distribution and fate of the microplastic in the ocean will not only contribute to the better understanding of the problem and help with the solution, but it can also improve

other models such for oil spills and eutrophication. The AIR Centre must build upon other projects in the same domain and add value to all of the Atlantic Ocean, avoid overlapping and duplication of efforts.

Conclusions:

A joint initiative, Clean and Healthy Oceans Mission, which will focus on observe, modelling and monitoring plastics pollution in the Atlantic Ocean, was considered a priority within the context of the AIR Centre. This initiative is a long-term, transnational and multidisciplinary effort that will integrate several activities and provide tools that could be adapted to other scientific domains. This initiative builds upon the integration of global and local processes (upscale modelling) and the provision of a comprehensive visualization tool that will allow experts and non-experts to experiment, simulate and support informed decision making.

Workshop 2 – Earth observation in the Atlantic Ocean and coasts: from deep sea to outer space: Developing tools for informed policy making, business development and citizen participation

Coordinator:

- João Lorenzetti (INPE), Brazil

Presenters:

- Nuno Catarino (Deimos), Portugal
- Francisco Vilhena (Tekever), Portugal
- Julio Pimenta Lima (INMG), Cape Verde
- Luiz Landau (LAMCE / COPPE RJ), Brazil
- Eduardo Pereira / Tiago Miranda (IB-S), Portugal

Rapporteur:

- Samy Djadvinia (Geo Blue Planet), Italy

Highlights:

Earth observation infrastructures, products and services must switch from a technology driven approach to a demand (user) driven approach where the needs and requirements of the users are adequately identified, analysed and understood before implementation. But intermediate and final users, on the other hand, must be capable to proactively articulate requirements, to locally appropriate Earth observation tools and to develop new layers of services and products. Therefore, capacity building in all domains related to Earth Observation was considered a critical factor of success since quantitative and qualitative data for monitoring the Atlantic Ocean and coastal areas is complex, needing specific competences for acquiring, transforming, analysing and interpreting the respective information.

Technological platforms are the key component of effective Earth observation and they must be actively promoted, but the resulting services and products must be evaluated in terms of its social benefits and response to global challenges. For the AIR Centre to have a measurable,

positive impact in the life and work of people along and across the Atlantic Ocean, there must be a clear added value in relation to other national / regional projects and initiatives.
Conclusions:

The AIR Centre must develop a pragmatic, concrete and measurable Earth observation working plan to move from ideas to implementation, which will be presented in the meeting in the Canary Islands. This working plan should be aligned with the UN 2030 Agenda for Sustainable Development and focus on the user needs and impacts on society.

Workshop 3 – Sustainable Marine Resources and Biodiversity: Fisheries, offshore aquaculture and renewable energies, ecosystem valorisation

Coordinator:

- Jose Joaquín Hernadez Brito (PLOCAN), Spain

Presenters:

- Pedro Afonso Santos (University of Azores), Portugal – Open-ocean and Deep-sea research priorities;
- Pablo Abaunza (IEO), Spain – AIR Centre Workshop: Sustainable Marine Resources and Biodiversity;
- Antonio Sarmento (AIR Centre), Portugal;
- Rui Patricio Freitas (University of Cape Verde), Cape Verde – Challenges of Coastal Oceanography in Cape Verde.

Rapporteur:

- Jose Joaquín Hernadez Brito (PLOCAN), Spain

The AIR Centre should stimulate the constant, integrated monitoring of the biodiversity of the South Atlantic, finding hot spots in deep waters, proposing new technologies for mapping these hot spots and assess the completeness of information already available with the aim of identifying the gaps, collecting new data and eventually integrating the data in global networks. The same approach would also apply to fisheries and aquaculture, without overlapping with other national / international organizations and taking into account local needs.

Super energy grids will be ubiquitous around the globe. The AIR Centre could be a test bed for these technologies

The example of Cape Verde, using very simple, but very effective, methods of sampling must be an example. The AIR Centre must establish parameters for collecting the same type data with the same frequency that could be also integrated in other European data sets.

Workshop 4 – Data Science and systems for ocean, atmosphere and climate issues: Matching data producers and user needs: developing the AIR_DataNet

Coordinator:

- Rui Oliveira (MACC / INESC TEC), Portugal

Presenters:

- Josep Martorell (BSC), Spain – Some thoughts on the AIR Data Net implementation;
- Ivo Vieira (Lusospace), Portugal – AtON Project;
- Jose Fortes (iDigBio), USA – iDigBio: data management systems and opportunities for collaboration;
- Luiz Landau (LAMCE / COPPE RJ), Brazil – HPC4E Project
- Anabela Oliveira (LNEC), Portugal – The OpenCoasts Service: On-demand Operational Coastal Circulation Forecast Services;

Rapporteur:

- Nick Veck (Catapult Satellite Applications), UK

Highlights:

The AIR_DataNET will act as the AIR Centre data foundry, enabling the fulfilment of its research objectives. It will include a Data Catalogue to maximize the impact of AIR Centre research outputs, aligning with the Open Science agenda in the Pan-European Research Area. The objectives of the AIR_DataNET are to enable and support a very large capacity federated data infrastructure providing ready-to-use data focused on the scientific domains of the AIR Centre and to provide a one-stop shop data management facility for Open Data storage, processing and retrieval facility, a FAIR Data & Metadata Catalogue, Persistent IDs and versioned mid & long-term storage.

The AIR_DataNET will host other initiatives such as Atlantic Data Cube, which will provide analysis ready multidimensional data sets for user-oriented ocean / land services and applications that will transform the use of satellite data and in-situ observations. The Atlantic Data Cube will be the first one with ingestion of ocean data, adding complexity significantly since 3D data will be indexed to multitemporal series.

Other three data intensive projects were also discussed. The Atlantic GEOSS will be part of the Global Earth Observation System of Systems (GEOSS). It will bring together all of the Earth observation resources available in Atlantic region so that they can be used more effectively and become the main data gateway for the Atlantic Ocean and coastal areas, with strong focus on the Sustainable Development Goals. It was suggested that the AIR Centre could build an on-demand circulation forecast system for user-selected sections of the Atlantic coast and maintaining them running operationally for the timeframe defined by the user. This daily service generates forecasts of several indicator, such as water levels, 2D velocities and wave parameters over the spatial region of interest for periods of 72 hours, based on numerical simulations of all relevant physical processes. Another interesting proposal is the federation of biodiversity collections data of the Atlantic Ocean region, such as SpeciesLink from Brazil and iDigBio from the University of Florida and provide a portal access to biodiversity data in a cloud computing environment addressing key environmental and economic challenges.

Conclusions:

Validation and calibration of the data sets are considered a possible (very important) role for the AIR Centre that should promote the integrations, or at least the interoperability, of existing data sets.

There is a pressing need to develop use cases that would show how can these data infrastructures for the benefits of society.

Comments and Conclusions from Co-Chairs

Co-chairs:

- Paulo Ferrão, Portuguese Foundation for Science and Technology, Portugal
- Juan María Vázquez, Secretary General for Science and Innovation, Spain
- Cecil Masoka, Director, Multilateral Cooperation, Department of Science and Technology, South Africa

Conclusions:

The Sustainable Development Goals must be taken seriously, otherwise the AIR Centre would do better making explicit that the SDG are not included focus.

Two very important Quick Wins were identified and should be immediately implemented:

1. Workgroup on Capacity Building – and a programme for funding mobility of researchers in the Atlantic area. The work group on capacity building should present an immediate working plan that would encompass all societal benefit areas identified.
2. Research Mobility Programme – provide the necessary conditions, including funding, for international mobility of researchers starting new partnerships or extending existing partnerships for the development of projects and initiatives related to the AIR Centre scientific agenda.

When discussing user needs, it must be clear if we are discussing intermediate or end user, since their needs do not necessarily coincide.

All of the AIR Centre stakeholders need to work together to develop effective scientific networks that bring clear benefits for the society.