

2022-2023 Annual SCOR Working Group Report: OASIS

1. Name of group

Developing an Observing Air-Sea Interactions Strategy (OASIS)

2. Activities since previous report to SCOR (e.g., virtual or in-person meetings, email discussions, special sessions). Limit 1000 words

- The SCOR Working Group (WG) #162 for Developing an Observing Air-Sea Interactions Strategy (OASIS) has held regular meetings and means of communication that can be summarised in 5 main categories over the past year. These have been telecons in the form of (1) bi-weekly SCOR WG #162 + OASIS Project Office (UCAR Center for Ocean Leadership) staff meetings (typically ~3-6 Working Group members and 2 project office members and a liaison from NOAA Office of International Activities attend these meetings); (2) OASIS Theme Team meetings occurring regularly (approximately every 2 months) that progress the core themes of OASIS, (3) OASIS webinars, such as the OASIS webinar series for developing a Community of Practice for the emerging Uncrewed Surface Vehicle network of the Global Ocean Observing System, (4) OASIS sessions and townhalls at open conferences (e.g. SOLAS International Conference, AGU 2023 Annual Meeting, EuroSea Workshop for Autonomous Surface Vehicles), and (5) approximately quarterly newsletters distributed to a broad mailing list of approx 180 people.
- The UN Ocean Decade has endorsed 3 UN Decade Projects under the auspices of the UN OASIS Decade Program. These include “A regional coupled atmosphere-ocean model” (led by Lucas Harris, NOAA GFDL, USA), “Southern Ocean Flux Capability Working Group” (led by the Southern Ocean Observing System, Australia), and “Uncrewed Surface Vehicle Network for GOOS” (led by Adrienne Sutton, NOAA PMEL, USA).
- SCOR WG #162 and community members have presented OASIS activities and strategy at several meetings/programmes including: * AGU OASIS Big Asks and Grand Ideas Poster & OASIS Townhall (Dec 2022); * OGC Round Table (Oct 2022); * OOPC Presentation, Darmstadt, Germany (Oct 2022); * AMS Meeting, Denver, US (Jan 2023); * OASIS Webinar for ‘Winds & Currents Satellite’ (Jan 2023); * Clivar meeting (Feb 2023); * 2nd GCOS Conference (Oct 2022); * OASIS USV Vision at Eurosea USV Workshop, PLOCAN, Spain (Apr 2023), * OCG meeting OASIS - virtual, Cape Town (June 2023), * USV Emerging Network at OCG, Cape Town (June 2023); * IOCCP Summer School OASIS Pitch (June

2023); * GSK-2 Scientific Symposium, Thailand (June 2023), * IUGG OASIS poster, Berlin, Germany (July 2023).

- OASIS Community Youtube Channel has 49 videos, 7 of which were added in this past year.

3. Documents published since previous report to SCOR (e.g., peer-reviewed journal articles, reports, Web pages) and should be limited to publications that resulted directly from WG activities and which acknowledge SCOR support

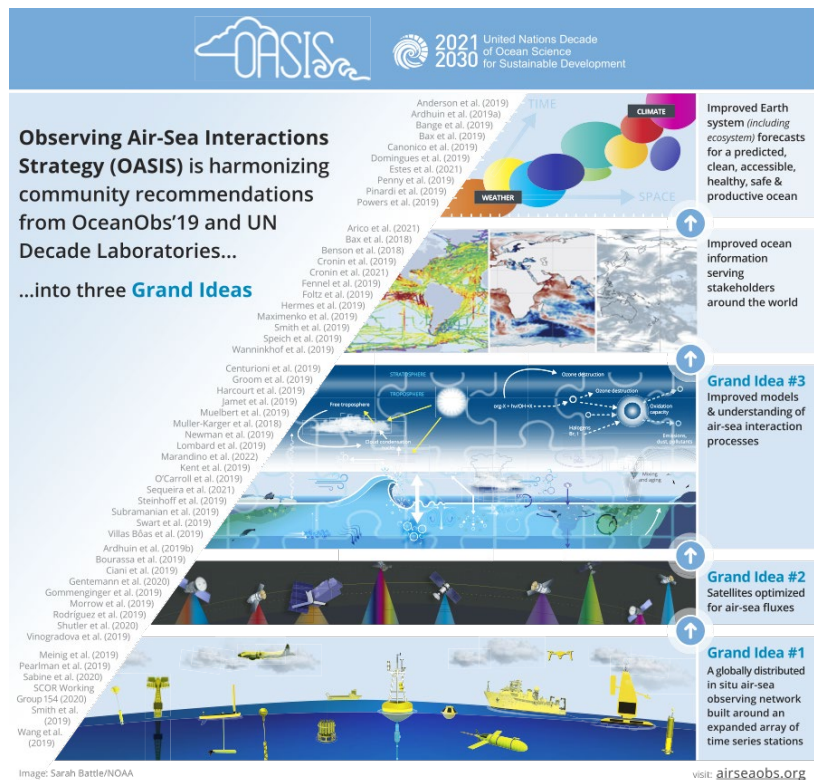
- Cronin; Swart, Marandino and others. Developing an Observing Air–Sea Interactions Strategy (OASIS) for the global ocean, *ICES Journal of Marine Science*, Volume 80, Issue 2, March 2023, Pages 367–373, <https://doi.org/10.1093/icesjms/fsac149>

This paper developed out of the SCOR WG and broader community (>40 authors) has summarised more than 40 OceanObs19 Community Strategy Papers to help define the 10 year OASIS and its Theme Teams.

- OASIS website: www.airseaobs.org
- OASIS continues to publish its community wide newsletters approximately each quarter with approximately 180 email recipients.
- As part of OASIS Best Practice activities, a manuscript is in final preparation ‘Ocean Surface Radiation Best Practices’ on best practice towards radiation measurements with 33 authors (Riihimaki et al. in prep).

Venkatesan, R., Cronin, M. F., Addey, C., Anderson, C., Aucan, J., Aydelett, M. L., Boulay, S. O. C., Chardon-Maldonado, P., Chory, M., Edmondson, M., Gommenginger, C., Jones, C. E., Marandino, C. A., Wills, S. und Wilson, C., eds. (2022) Workshop Report for the Air-Sea Observations for a Safe Ocean, a satellite event for the UN Decade of Ocean Science for Sustainable Development - Safe Ocean Laboratory. Open Access . SCOR Working Group #162 for developing an Observing Air-Sea Interactions Strategy (OASIS), Newark, USA, 13 pp. DOI 10.3289/SCOR_WG_162_2022_2. .

4. Progress toward achieving group’s terms of reference. List each term of reference separately and describe progress on each one. Limit 1000 words



Main figure from Cronin et al., 2023 (<https://doi.org/10.1093/icesjms/fsac149>.) providing a key visual related to several topics/objectives listed below.

Here we list progress towards each of the OASIS TOR listed in the OASIS prospectus.

1. Harmonize the recommendations from the OceanObs'19 CWP's into a unified Observing Air-Sea Interaction Strategy (OASIS)

This ToR has been completed through the efforts to synthesize the recommendations of >40 OceanObs19 Community White Papers. The summaries of these recommendations has been condensed in the recent OASIS paper by Cronin et al., 2023.

From this effort, three interlinked grand ideas emerged, namely:

#1 develop a globally distributed network of mobile air-sea interaction observing platforms built around a network of fixed stations that provide long-term time series in key regions; #2 develop a satellite virtual constellation designed to achieve high spatial and temporal coverage while providing simultaneous measurements of sea surface and atmospheric boundary layers; and #3 leverage improved understanding to enhance process representation of coupling in a hierarchy of Earth System models.

These main Goals, as well as depiction how OASIS is organised across its 5 Theme Teams (Observing Network Design & Model Improvement, Partnership & Capacity

Strengthening, UN Decade OASIS Actions, Best Practices & Interoperability Experiments, Findable-Accessible-Interoperable-Reusable (FAIR) models, data, and OASIS products) is summarised in the above mentioned paper.

2. Produce a capacity building strategy that enables developing nations (including least developed nations and island nations) to actively participate in and benefit from local-to- global air-sea interaction observations.

Capacity Strengthening and Partnerships is one of the five main Theme Teams within OASIS. Capacity strengthening remains a core aspect and discussion point in all forms of meetings, workshops and discussions within the OASIS Theme Teams. The spin up of the UN Ocean Decade and OASIS being accepted as a Decade programme has expanded the visibility and needs of capacity building initiatives for surface ocean and air-sea observations and understanding. Recent focus has been placed on building partnerships with Small Island Developing States (SIDS) that are seen as crucial communities to benefit from and support future air-sea related observations and networks. Some specific highlights/events include:

- OASIS co-chairs, WG members and community at large engaged with the South African and other community members from the Global South during the SOLAS Open Science Conference in Cape Town in September 2022. OASIS sees the 'Global South' getting involved and contributing to future activities as key to fulfilling the needs of a truly effective air-sea/surface ocean observing system, particularly in the Southern Hemisphere Ocean which lacks data coverage and capability. A number of key points came out this discussion, including the need to exchange technical knowledge and infrastructure (e.g., standards, repairs) and support early career scientists with publications and learning opportunities.
- OASIS received funding from NOAA to support ECOPs heavily involved in OASIS activities, namely as Theme Team leaders and first authors of OASIS publications. In addition, ECOPs will receive support from OASIS to attend OASIS meetings in the upcoming year.
- The OASIS agenda was represented during the SOLAS Summer School 2023, which was organized by Christa Marandino. The summer school was held in Mindelo, Cabo Verde and this was the first time the school was conducted in Africa. There were 66 students and 30 lecturers/organizers from over 25 countries present. Several of the Global South ECOPs who attended the OASIS discussion session in South Africa were among the participants. The participants received lectures on a variety of air-sea interactions topics and participated in practical trainings.

3. Develop and assess network designs that optimize air-sea interaction observations

1) As part of the UN Ocean Decade second Action Call, a project linked to OASIS "The Southern Ocean Air-Sea Flux working group" submitted an application and was subsequently endorsed.

2) Sarah Nicholson & Ruth Patterson (ECOPs), with contributions from many SCOR WG & Community members, presented "Uncrewed Surface Vehicles (USV) -- An emerging network for GOOS and OCG

3) As part of the UN Ocean Decade Third Action Call, a project linked to OASIS "An Uncrewed Surface Vehicle Network for the Global Ocean Observing System" was accepted. This project aims to create a Community of Practice that includes an International Science Steering Team and a Data Management Team for overseeing this network. See further detail below.

4. Develop a strategy for air-sea interaction process studies

Through our synthesis effort describe in item #1, we have folded this TOR into the Network Design and Model Development theme described in item #3 above.

5. Develop a strategy for assessing interoperability of surface observing platforms.

This topic has emerged strongly within OASIS over the past year. The OASIS proposal for an "Uncrewed Surface Vehicle Network for the Global Ocean Observing System" was endorsed as a project of the UN Ocean Decade. This proposal has brought key players from around the world together to start realizing the needs, challenges and network design requirements for Uncrewed Surface Vehicles. In OASIS, this new network needs to be well aligned to existing core observational platforms, such as ships and moorings to be an effective and integrated observing system for the surface ocean. We have held monthly webinars (attendance 35-50 people) dealing with topics related to this USV Network: <https://airseaobs.org/resources/webinars>. These webinars have been highly energetic and stimulating, with new ideas emerging on how this network should function and what its priorities should be.

Interoperability relies upon use of best practices. OASIS the SCOR WG #162 has developed its Theme Team on Best Practices and Interoperability. Key examples making progress are around Ocean Surface Radiation Best Practices, which has resulted in a scientific manuscript currently being finalised by over 33 authors, as well as Eddy Covariance systems for ships and USVs.

6. Build community and capacity for using, operating, and developing air-sea interaction observational platforms that allow collaborative partnerships

At the core, OASIS believes in the value of having multifunctional platforms that measure many co-located, co-incident variables. This lends itself towards working in collaborative partnerships. SCOR WG #162 actively works to build community (and

partnerships) through its website (airseaobs.org) which has a “Get Involved” button that invites community to join an OASIS slack workspace.

5. WG activities planned for the coming year. Limit 500 words

Several conferences and meeting opportunities are planned for the year ahead, including:

- In Feb 2024, OASIS is organising a SCOR WG face-to-face meeting at Ocean Sciences Meeting in New Orleans. This two-day meeting will ratify a re-organised structure of OASIS – combined plenary and breakout sessions of the different OASIS groups/ teams will be workshopped and discussed to form a cohesive trajectory for OASIS for the forthcoming 1-3 years.
- Several OASIS-spurred papers are expected to be submitted and published in the coming year, including (1) Surface ocean radiation best practise manuscript (Riihimaki et al. in prep),(2) Direct eddy covariance flux measurement best practices (Bell, Marandino, Rutgersson, et al. in prep)
- Several OASIS led or initiated science sessions/town halls will be conducted at OSM, Feb 2024.

6. Is the group having difficulties expected in achieving terms of reference or meeting original time schedule? If so, why, and what is being done to address the difficulties Limit 200 words

The WG emerging in COVID times meant delayed face-to-face meetings and discussion. However, this has been mitigated by effective communications (bi-weekly leadership meetings, monthly SCOR WG meetings, other virtual meetings of OASIS Theme Teas, etc; newsletters, up-to-date website).

We look forward to the exciting OASIS community engagement and planning at our planned face-to-face meeting in New Orleans in Feb 2024.

7. Any special comments or requests to SCOR. Limit 100 words.

We would like to wholeheartedly thank SCOR for the support over the past 3 years for the WG. OASIS has come a long way since its inception and we can see it has a healthy and exciting lifetime ahead regarding global air-sea and surface ocean observations and understanding.

Additional information can be submitted and will be included in the background book for the SCOR meeting at the discretion of the SCOR Executive Committee Reporter for the WG and the SCOR Secretariat.