

## Report for the year 2022 and future activities

### SOLAS UAE

**compiled by: 'Dr. Diana Francis'**

*This report has two parts:*

- **Part 1:** reporting of activities in the period of January 2022 - Jan/Feb 2023
- **Part 2:** reporting on planned activities for 2023 and 2024.

*The information provided will be used for reporting, fundraising, networking, strategic development and updating of the live web-based implementation plan. As much as possible, please indicate the specific SOLAS 2015-2025 Science Plan Themes addressed by each activity or specify an overlap between Themes or Cross-Cutting Themes.*

- 1 Greenhouse gases and the oceans;
  - 2 Air-sea interfaces and fluxes of mass and energy;
  - 3 Atmospheric deposition and ocean biogeochemistry;
  - 4 Interconnections between aerosols, clouds, and marine ecosystems;
  - 5 Ocean biogeochemical control on atmospheric chemistry;
- Integrated studies of high sensitivity systems;  
Environmental impacts of geoengineering;  
Science and society.

**IMPORTANT:** *This report should reflect the efforts of the SOLAS community in the entire country you are representing (all universities, institutes, lab, units, groups, cities).*

**First things first...Please tell us what the IPO may do to help you in your current and future SOLAS activities. ?**

**It would be good to organize a SOLAS conference or meeting so we get to know each other and engage in more productive discussions. It would be good to have this conference in a relatively new country to the network to boost participation and engagement.**

### **PART 1 - Activities from January 2022 to Jan/Feb 2023**

#### **1. Scientific highlight**

ENGEOS, Khalifa University:

- Investigating the drivers and impacts of tropical cyclones making landfall in southeast Arabian Peninsula.
- Investigation dust storms drivers and impacts.

ACCESS center NYUAD:

- Investigated hypoxia in the Gulf, both in shallow coastal reefs and in the deepest part of the Gulf.

**2. Activities/main accomplishments in 2022 (e.g., projects; field campaigns; workshops and conferences; model and data intercomparison; capacity building; international collaborations; contributions to int. assessments such as IPCC; collaborations with social sciences, humanities, medicine, economics and/or arts; interactions with policy makers, companies, and/or journalists and media).**

ENGEOS, Khalifa University:

Monitoring of atmospheric parameters continuously

Earth Observations for weather and climate.

Atmospheric modelling at regional scale

Study of polar ice; its melt and link to the atmospheric conditions (Antarctica).

ACCESS:

- Performing monthly transects from the Abu Dhabi coastline up to 40 miles offshore (CTD, Chla, Turbidity, Dissolved O2)

- Has dataloggers at 6 coastal stations continuously collecting data at the bottom of the water column (CTD, Chla, Turbidity, Dissolved O2)

- Developed a ROMS model of the Gulf with 1/2 arcminute resolution.

- Participation in COP27 as UAE delegate.

- Participation the 28 for 28 webinar series:

<https://www.youtube.com/watch?v=il5brK-cmMk>

<https://www.youtube.com/watch?v=QZVhHWPnrLM>

**3. Top 5 publications in 2022 (only PUBLISHED articles) and if any, web links to models, datasets, products, etc.**

**ENGEOS – KU:**

Francis, D., Fonseca, R., & Nelli, N. (2022). Key Factors Modulating the Threat of the Arabian Sea's Tropical Cyclones to the Gulf Countries. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD036528. <https://doi.org/10.1029/2022JD036528>

Francis D, Fonseca R, Nelli N, Teixido O, Mohamed R, Perry R, 2022, Increased Shamal winds and dust activity over the Arabian Peninsula during the COVID-19 lockdown period in 2020, *Aeolian Research*, Volume 55, 2022, 100786, ISSN 1875-9637. <https://doi.org/10.1016/j.aeolia.2022.100786>

Nelli N., D. Francis, R. Fonseca, E. Bosc, Y. Addad, M. Temimi, R. Abida, M. Weston, C. Cherif (2022) Characterization of the atmospheric circulation near the Empty Quarter desert during major weather events. *Front. Environ. Sci. - Atmosphere and Climate*. <https://doi.org/10.3389/fenvs.2022.972380>

Weston, M., Francis, D., Nelli, N. R., Fonseca, R., Temimi, M., Addad, Y., The first characterisation of fog microphysics in the United Arab Emirates, an arid region on the Arabian Peninsula. <https://doi.org/10.1029/2021EA002032>

Zittis G., M. Almazroui, P. Alpert, P. Ciais, W. Cramer, Y. Dahdal, M. Fnais, D. Francis et al., Climate change and weather extremes in the Eastern Mediterranean and Middle East, *Reviews of Geophysics*. <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2021RG000762>

**ACCESS- NYUAD:**

Lachkar, Z., Mehari, M., Lévy, M., Paparella, F., & Burt, J. A. (2022). Recent expansion and intensification of hypoxia in the Arabian Gulf and its drivers. *Frontiers in Marine Science*, 1616.

Paparella, F., D'Agostino, D., & A. Burt, J. (2022). Long-term, basin-scale salinity impacts from desalination in the Arabian/Persian Gulf. *Scientific reports*, 12(1), 20549.

de Verneil, A., Burt, J. A., Mitchell, M., & Paparella, F. (2021). Summer oxygen dynamics on a southern Arabian gulf coral reef. *Frontiers in Marine Science*, 8, 781428.

**4. Did you engage any stakeholders/societal partners/external research users in order to co-produce knowledge in 2022? If yes, who? How did you engage?**

Engaged with the Climate Change Research Network (CCRN), an academic society sponsored by the UAE's Ministry of Climate Change and Environment.

**PART 2 - Planned activities for 2023 and 2024**

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

- Will deploy (by June) an oceanography buoy with near-real time meteo and subsurface measurements.
- Will begin (by June) water samples along the transect for nutrient measurements and phytoplankton classification.
- Expand the ROMS Gulf model with a biogeochemical module based on observations.
- Register as an early user of the PACE satellite to provide ground truth measurements.

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

- ACCESS is organizing for November 2023 the conference: "The Gulf Environment and Beyond: Global Change, Regional Impacts and Solutions"
- The second CCRN conference will take place TBA.

**3. Funded national and international projects/activities underway.**

- ACCESS was funded until 2026 by a Tamkeen grant.

**4. Plans / ideas for future national or international projects, programmes, proposals, etc. (please indicate the funding agencies and potential submission dates).**

- Participation in the 2023 UAEREP call.

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

**Comments**