The Global Ocean Observing System

unesco
Intergovernmental Oceanographic Commission

WORLD METEOROLOGICAL ORGANIZATION

UN environment
United Nations Environment Programme

International Science Council

OOPC contribution to SO5: Authoritative guidance on design

s* Ocean Indicators task is also reflected in GOOS Implementation Plan, but under another Strategic Objective.

Actions

Provide authoritative guidance on integrated observing system design, synthesising across evolving requirements and identifying gaps

SO5: Authoritative guidance on design

Activity	Status	Priority	Lead	Timeline	Year	Partners Internal	Partners External
5.2 GOOS EOV Paper and Spec Sheets 3	Ready for re...	High	HQ Office	Apr 1, '21 - Dec 31, '23	3	BGC +2	
5.6 Observing System Design around EOVs	Unknown	Low	HQ Office	Apr 1, '21 - Dec 31, '25	5	BGC +3	
5.1 Essential Ocean / Climate Variables Stewardship 2	Working on it	Medium	OOPC	May 31, '22 - Jun 30, '22	1	BGC BioEco	GCOS +2
5.3.1 Strategy for Ocean Heat and Freshwater Cycles	In Planning	Low	OOPC	Apr 1, '21 - Dec 31, '23	3		WCRP CLIVAR +2
5.5 Regional network coordination/OO19 synthesis 1	In Planning	Medium	OOPC	Feb 29, '24	3	BGC +2	RCN O... WCRP CLI...
5.3.2 Evaluation for Ocean-Atmosphere Interface and Boundary Layers	Working on it	High	OOPC	Jun 1, '21 - Mar 1, '24	3	BGC +2	GCOS +2
5.3.3 Evaluation for Boundary Systems 2	Near Compl...	Medium	OOPC	Apr 1, '21 - Sep 30, '23	3	GRAs	WCRP CLIVAR +3
5.3.4 Optimal carbon flux observing system blueprint 2	Working on it	High	BGC	Apr 1, '21 - Dec 31, '23	3	OCG/OceanOPS	ICOS +2
5.7 Ocean Observing Co-Design Decade Programme 2	Working on it	High	Ocean Dec...	Apr 1, '21 - Dec 31, '30	10		OceanPredict +15
5.4 GOOS Evaluation and Review Framework				Apr 1, '21 - Dec 31, '23	3	BGC BioEco	

1- Achievements(1)

5.1 Essential Ocean/Climate Variables Stewardship

- New template produced, which can be used both to EOV and ECVs
- ECVs requirements publicly reviewed and updated in 2022 including 11 physical, 6 geochemical and 2 biological)
- Ocean Actions in GCOS IP, COP27

5.2 GOOS EOV Paper and Spec Sheets

- 1st draft ready for a discussion with GOOS Exec.
- New EOVs and EOVs subvariables: Marine Debris, Ocean Sound, Seagrass, Bottom Pressure.

5.3.1 Strategy for Ocean Heat and Freshwater Cycles

- Preparatory work: concept paper being written; this needs interaction across GOOS panels and with CLIVAR

5.3.2 Evaluation for Ocean-Atmosphere Interface and Boundary Layers (OASIS)

- OASIS is funded as a SCOR Working Group and endorsed as a UN Ocean Decade programme +large multidisciplinary community engaged to to advance our capacity to monitor air-sea interactions globally

1- Achievements(2)

5.3.3 Evaluation for Boundary Systems

- 6 webinars and 6 dialogues (observation and modeling) around 6 boundary systems, papers in Conferences
- Change of membership and connection with Observing Co-design exemplar
- Community White paper presenting main recommendations in a close to final draft

5.3.4 Optimal carbon flux observing system blueprint

- This activity is well underway in collaboration with G7/FSOI, ICOS-OTC, US NOAA among others, and connected with WMO GHG monitoring initiative, submitted to WMO Congress (June 2023).

5.4 GOOS Evaluation and Review Framework □ integrated in Observing Co-Design programme—G7 FSOI????

G5.5 Regional network coordination/OO19 synthesis

- Preparatory work Attempt a truly global pan-tropic ocean observing system design. It requires a strong coordination with CLIVAR, and a high-level meeting took place in March 2023.

1- Achievements(3)

5.7 Ocean Observing Co-Design Decade Programme

- HUGE mobilisation of communities around 6 exemplars up and running
- Strong efforts to engage with stakeholders (Forum)
- High visibility and connections with other GOOS components.

  Boundary currents —> connected with **5.3.3 Evaluation for Boundary Systems**

  5.4 GOOS Evaluation and Review Framework and **5.6 Observing System Design around EOVs** could also be integrated under the Observing Co-Design umbrella.

2. Outcomes & Assessment

SO5 Outcomes

1. Refined designs for observing the essential global observations required for global societal needs that maximize return on investment
2. A modular design approach to guide and support implementation decisions at regional and national level
3. Greater efficiency in investment towards enhancing observing capacity
4. Transparency in establishing and communicating on design requirements

Assessment

1. **More progress is needed** (30%)

Criteria: Many examples of refined designs in different degrees of accomplishment: TPOS, OASIS, BSTT… however, this is mostly around climate applications and physical variables.

1. **Low progress** (10%)

Criteria: only a few steps have been taken. E.g. GOOS/CLIVAR Workshop and Observing Co-Design approach

1. **On track** (50%)

Criteria: Achieved, amongst other means, through the EOV process and building observing networks around EOV, which also foster new developments. Examples like TPOS, ocean surface carbon AND???

1. **More progress is needed** (30%)

Criteria: EOVs and ECVs specification sheets available. ECVs reviewed publicly and updated regularly, but guidelines not published and there isn't a homogeneous approach to system reviews

3. Gaps *(around goals)*

1.A Publishing recommendations does not suffice to change the observing system

- While many reviews are published, this does not mean that implementing agents react to them. Some lessons can be learnt from TPOS and from the Observing Co-design approach.

1.B The observing system needs to consider the modeling community

- More engagement is needed with different operational services. Synops is taking part of this challenge now.

2 From global to local: not so easy

- The recommendations from the global system are not necessarily ready to be used by national/regional actors. Observing Co-Design may help here.

3 Optimising investment: yes but still not sustained…

- Investment from nations/funding agencies will not be easy if 2 does not happen and the benefits of global systems are made clearer.

4 Requirements definition still not 100% transparent

- EOVs and ECVs requirements are published online, but still lacking visibility to the operational agencies, unless we embark in the WMO RRR process.
- Selection criteria is not totally transparent.

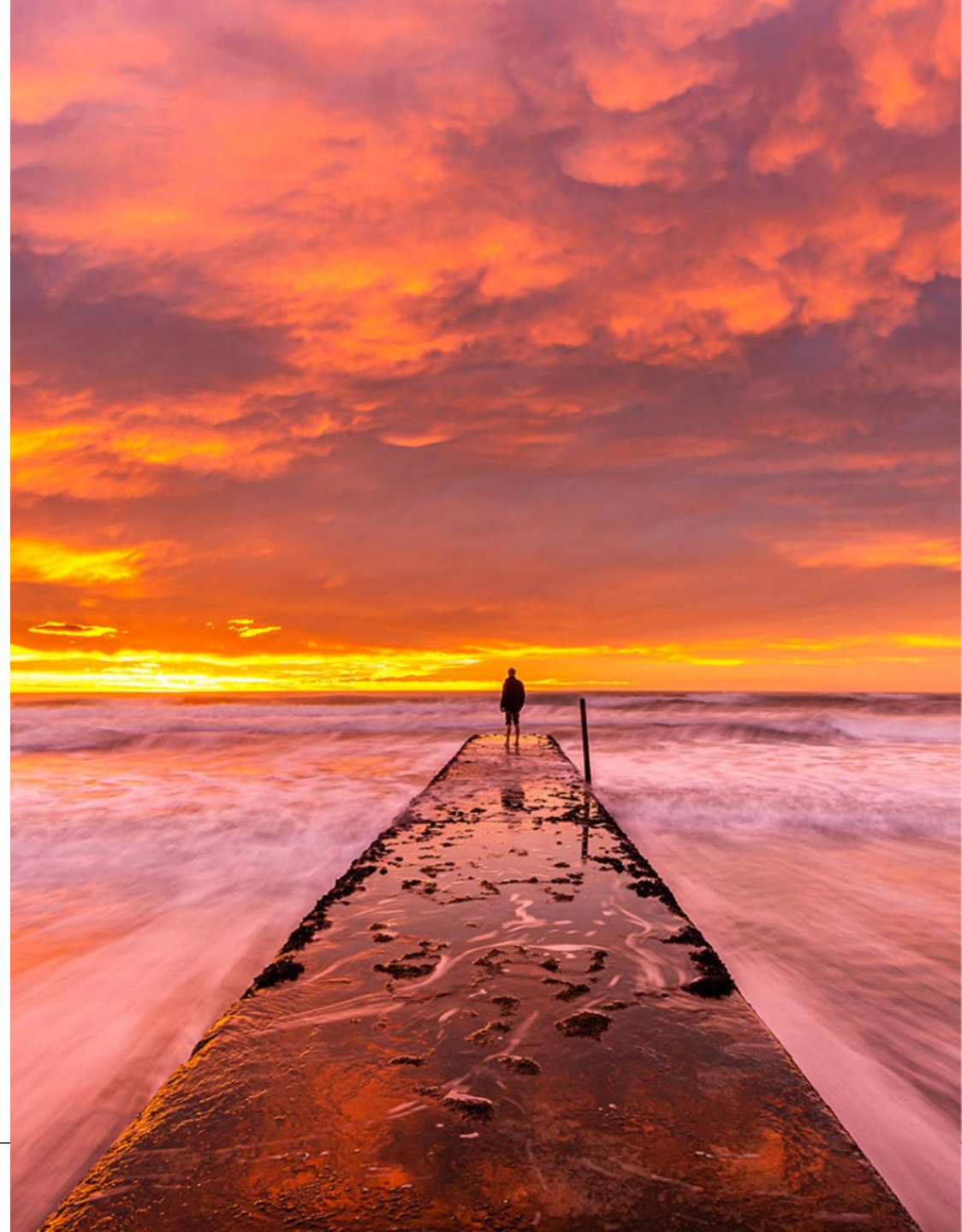
4. Future steps *(around goals)*

1. In terms of refined design:

- **Activities continue**: OASIS, BSTT, Regionalization of Earth Cycles etc/Heat and Freshwater budget and fluxes. Most of them are cross-GOOS.
- **Focus the cross-panel efforts on specific activities**. E.g provision of input into GCOS Status Report and Implementation Plan (Climate Application area) or provision of guidance/input on potential EOVS new platforms could observe (e.g. surface vehicles)
- **Bridges** need to be consolidated between the i**n situ and the modelling community** around a clear activity
- Improve connection between panels and OCG

2. In terms of engagement with nations/regions

- Encouraging the creation of national GOOS and/or better connection with GOOS NFP
- Taking advantage of EU grants (if successful), where several projects are related to GOOS, namely using the EOV/ECVs requirements and explore other sources at national level.



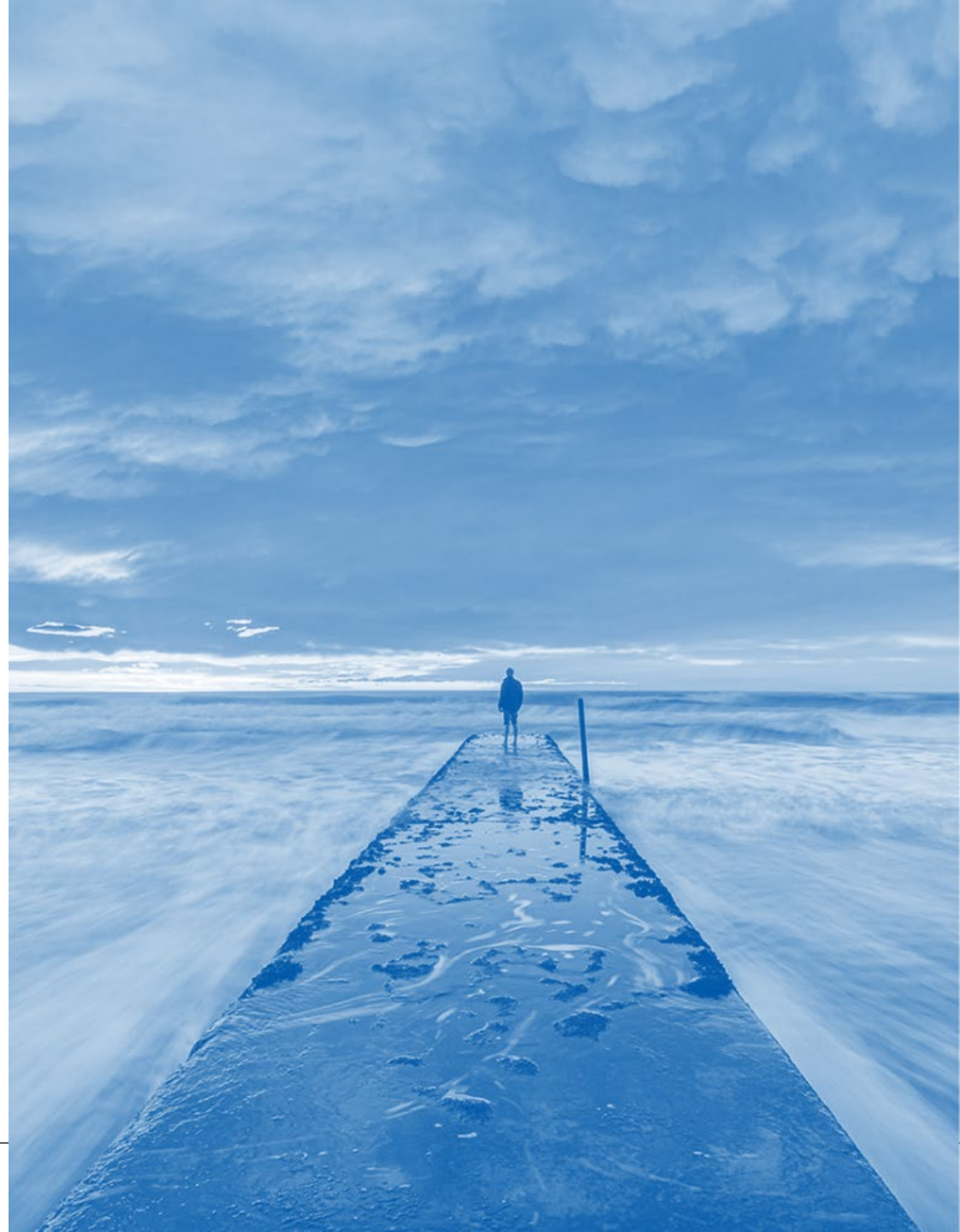
4. Future steps *(around goals)*

3. In terms of greater efficiency of investment

- Following with the approach using EOVs to focus investment, a more integrated, cross-domain approach could be pursued
- Connections with OECD could be explored (cost-benefit analysis)

4. In terms of transparency on establishing and communicating on design requirements

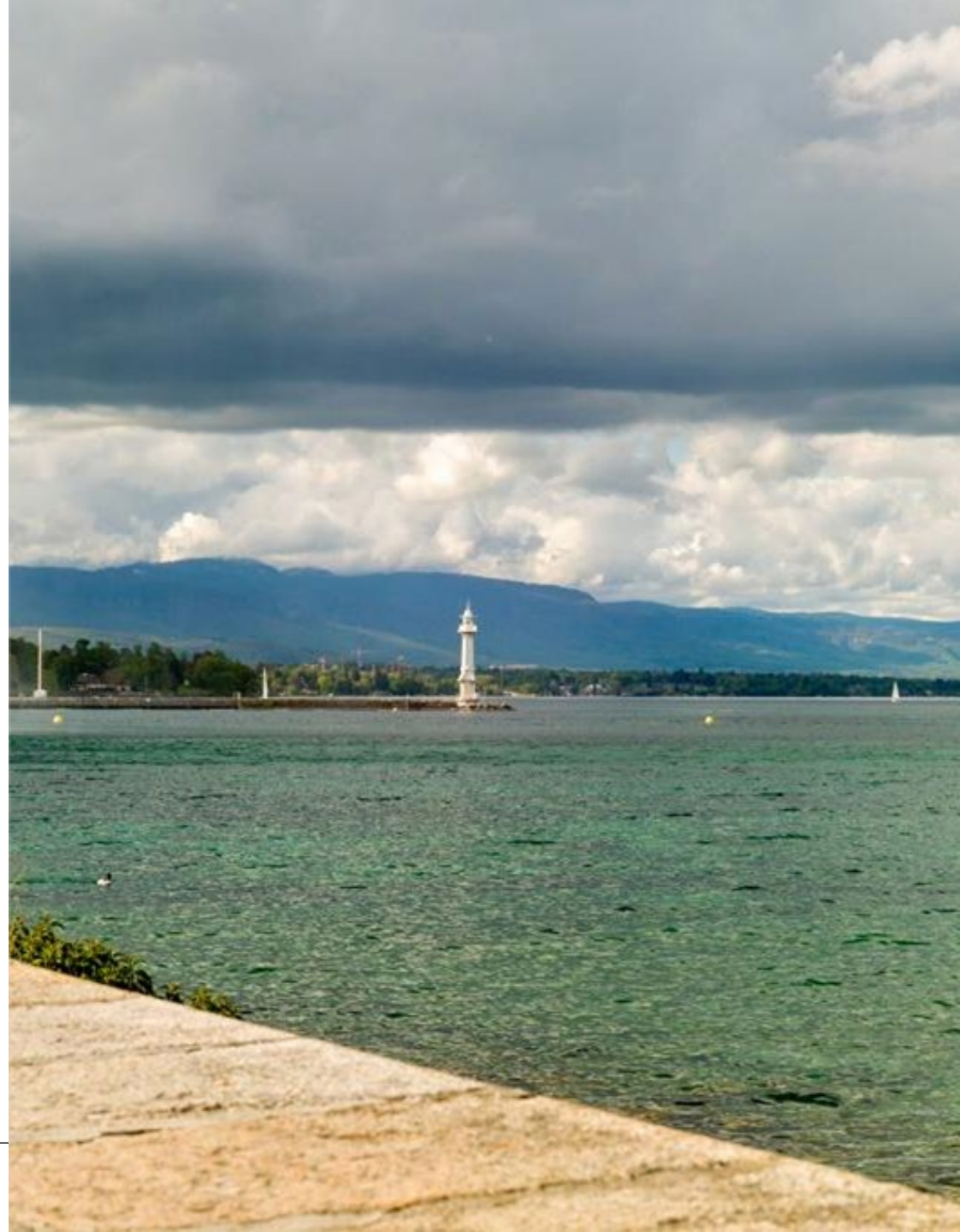
- Important to get the EOV paper published, after sufficient discussion at the level of GOOS Exec.
- The (probably) new EU-funded projects on EOVs/ECVs will improve the visibility of the requirements process at a European level. But we need to identify how this could be expanded in other regions for adoption, if successful and relevant outcomes arise.
- The engagement in the WMO RRR process (including ocean carbon requirements) will probably have a large impact, as it will be reflected in regulatory material which is binding for WMO members.



5. Resource implications

- **More personnel is needed to** support the establishment of linkages between the myriad of on going activities and to ensure that synergies are taken advantage of, communication is in place etc.

This applies very particularly to the Observing Co- Design programme and to the 3 EU Horizon Europe projects related to EOVs where GOOS is involved and are likely to be funded



6.Questions/Thoughts Suggested changes

1. **Are there alternatives to meetings?** The activities are proliferating, and greater communities are getting involved, how can we manage that?
2. In particular, **how can we make sure we keep each other informed**, between the panels and with OCG, to work together towards and integrated truly global ocean observing system?
3. If we envisage that we will not be able to get more resources to support coordination, where should we **prioritize**?
4. Should we **clarify better who does what** under this SO5? (ToR)