GOOS BEST PRACTICE ENDORSEMENT PROCESS

The Global Ocean Observing System (GOOS) best practice 'endorsement' process has been developed in cooperation with the Ocean Best Practices System[1] (OBPS), an Intergovernmental Oceanographic Commission (IOC joint IODE/GOOS) Project which aims to support the ocean community in developing and sharing best practices. The endorsement process was approved by the GOOS Steering Committee 1st October 2020

Any questions on this process can be sent to the GOOS Task Team on Best Practices lead, Juliet@saeon.ac.za.

Why Best Practices?

The benefits of following recognised community best practices are numerous and fundamental to the sustained global ocean observing effort. They improve the reproducibility of science research, as well as interoperability across disciplines and datasets by standardizing methods and data collection, which allows practice in one area to be transferred to another. Best practices enable efficiencies, saving the repeating of work already done, and support future proofing of datasets (the methods collection and processing can be identified). They create transparency within data collection in the ocean science community, making the data more useful, of known and reproducible quality, reusable, and interoperable. Best practices support the transfer of knowledge and capacity building and make the data usable by communities outside of the observing community. Best practices also cover many different types of documents, they can be a standard operating procedure, a field manual, a collection method or, indeed, a best practice. The vision of the Ocean Best Practice System (OBPS) is to have agreed and broadly adopted methods for every activity in ocean observing from research to operations to applications.

The vision of the Global Ocean Observing System 2030 Strategy is a ***'truly global ocean observing system that delivers the essential information needed for our sustainable development, safety, wellbeing and prosperity'***. The creation and use of ocean best practices play a fundamental role in achieving this, they are a vital underpinning to system resilience, interoperability and the delivery of fit-for-purpose data to end users. The Global Ocean Observing System 2030 Strategic Objectives 4, 6. 7 and 10 all rely on ocean best practices.

Why GOOS endorsement?

Within the GOOS key best practices have been harmonised and adopted across components of the sustained ocean observing system communities, for example within Observation Coordination Group (OCG) global ocean observing networks (such as the Argo Programme, GLOSS, GO-SHIP and HF

[1] https://www.oceanbestpractices.org/

Radar), within expert groups and networks under the GOOS Ocean Observing Panel for Climate (OOPC), Biogeochemistry (BGC) or BioEco Panel, and from the Expert Team on Operational Ocean Forecast Systems (ETOOFS). These best practices have been developed within each of these GOOS components through a structured community review process and adopted as 'global' methods by the relevant ocean observing network or community. They can be viewed as globally recognised best practices that have undergone a rigorous process of community review and consensus building for the specified application, Essential Ocean Variable, Essential Biodiversity Variable, Essential Climate Variable, observing platform and/or sensor. These broadly adopted community best practices can be viewed as tested methods that are fit for the purpose defined and fully satisfy the definition of a best practice, as *"a methodology that has repeatedly produced superior results relative to other methodologies with the same objective - to be fully elevated to a best practice, a promising method needs to be adopted and employed by multiple organizations"*[2]*.*

GOOS and its components actively encourage communities to develop best practices across the lifecycle of ocean observation, from mission design through to delayed mode quality control.

The GOOS 'endorsement' process and link to the OBPS

Although GOOS communities have created many best practices they may not be sufficiently or broadly visible, additionally it may not be clear that they have been through a rigorous community process.

The OBPS has been set up to facilitate the dissemination and archiving of best practices in an open and accessible manner. However, there are currently[3] more than 1000 documents across all parts of ocean science available in the OBPS repository, and there is a pressing need to help identify key community tested and adopted ocean observing system best practices across a wide range of application areas.

The need to identify GOOS 'community' adopted best practices within the system has been identified by the GOOS community, and users of the OBPS had also identified the importance of being able to discover best practices which are recommended and adopted by the GOOS/ OCG community[4].

Although a number of GOOS community best practices have already successfully been submitted to the OBPS, e.g. The GO-SHIP Nutrient Manual (http://dx.doi.org/10.25607/OBP-555), a clear community best practice, has been downloaded 2190 from the repository since Sep 2019 and the GLOSS manual (http://dx.doi.org/10.25607/OBP-854) has 2466 downloads since Jun 2020. This needs to be more consistently organised, supported and visible across GOOS and the OBPS. The process and the link between GOOS and the OBPS aims to achieve this and ensure that ALL GOOS related community adopted Best Practices can be found in the OBPS.

Through a close GOOS, OCG and OBPS collaboration, an endorsement process for GOOS community best practices linked to the OBPS, has been created and adopted by both the GOOS Steering Committee and the OBPS Steering Group. This provides an endorsement process within GOOS and a filtering mechanism within the OBPS repository, which enables GOOS community best practices to be

[2] Definition from the initial OBPS Workshop, Paris, December 2017.

[3] 10. June 2020; oceanbestpractices.org

[4] Evolving and Sustaining Ocean Best Practices Workshop 15 – 17 November 2017 Intergovernmental Oceanographic Commission, Paris, France: Proceedings, http://dx.doi.org/10.25607/OBP-3

easily identified within the OBPS. This will aid discovery and access to these key community endorsed best practices.

Process for 'GOOS endorsement'

The process that leads to the selection of documents is defined by the community or expert group that requests an endorsement. In order to ensure that the endorsement is consistent, reliable and efficient a number of steps are identified for the GOOS to endorse what are considered the community adopted best practices, for recommendation to the broader community (e.g. for a particular EOV or a parameter).

To qualify as "GOOS endorsed" a best practice is expected to

a. have completed a rigorous community review process whereby comments are publicly invited, adjudicated and actioned by the author
b. originate from a network that is at least "pilot'' in all the BioEco or OCG network attributes (when applicable, i.e. originating from a BioEco or OCG network);
c. be approved by the leadership of the relevant network, expert team or other community leaders.
d. is fit for the purpose as defined and fully satisfies the definition of a best practice on the OBPS[2]
e. has been recognised as such through the relevant GOOS body, e.g. GOOS BioEco panel, BGC panel, OOPC or OCG or ETOOFS, after the approval of the relevant network leadership
f. Is available and identifiable within the OBPS repository or will be submitted as soon as endorsement is received.
g. is updated ate relevant timeframes

In order to ensure that the best practices remain relevant, GOOS will keep a central record of when a Best Practice has been endorsed, by which community and GOOS Component, and with the lead author contact details. After 3-5 years a reminder will go out to the GOOS endorsing component and author to check for updates.

How will the GOOS endorsement be acknowledged for the best practice document and in the OBPS?

There are 2 possibilities for acknowledging the endorsement depending on the stage of the best practice:
1) If the BP is an unpublished document and not yet in the OBPS, an endorsement certificate will be created and added to the document (Appendix 1) or, if the authors are considering submission to Frontiers[5] or another journal (we would encourage open access), an acknowledgement will be created (as per Appendix 1) within the acknowledgement section on the paper. The document will then be submitted to the OBPS along with the standard required metadata, which includes information for details of endorsement. Through the information in the metadata, the best practices will be tagged with a 'GOOS endorsed' label, which will enable specific endorsed searches to be performed and an 'Endorsed ' filter applied. A future step within the OBPS is to provide a dashboard for specific group endorsed BPs.

[5] https://www.frontiersin.org/research-topics/7173/best-practices-in-ocean-observing

2) If the document is published or already existing in the OBPS, the content cannot be easily amended, hence on completion of the endorsement process, the best practice metadata will be updated with the endorsement information included, allowing the best practice to be tagged with a 'GOOS endorsed' marker in the OBPS. The Endorsement Certificate file will be uploaded to the best practice's record. At the next best practice update, the certificate will be added to the document.

Note, the final tag in the OBPS will state "Endorsed (external) - GOOS", the detail of the network and date etc will be in the endorsed certificate linked to the best practice.
Information will be communicated via the OBP Newsletter and updated on the relevant GOOS websites.
Following the process of endorsement we strongly recommend that the creator consider publishing either the complete best practice or a notice about the endorsement (as a commentary) in *Frontiers in Marine Science, Research Topic Best Practices in Ocean Observing*[6], and link this to their best practice, which will have a DOI, in the repository.

Example of process implementation - GOOS Observation Coordination Group

Within the GOOS OCG best practices are considered vital, OCG has a Vice Chair for Standards & Best Practices (currently the GOOS TT lead for the endorsement process) and they form one of the network attributes. Under the guidance of this Vice Chair and in collaboration with the Biogeochemistry Panel OCG has identified an observation 'lifecycle'[6] and requests that its global and emerging networks develop and endorse best practices, across the range of the observation lifecycle for all the EOVs (and sub-variables), that they sample. The networks have developed governance teams and encourage the development of best practices in their communities. These best practices undergo community review and are then published as papers, manuals, meeting reports and IOC and WMO reports and the network leaders (OCG members) inform the OCG Vice Chair for Standards & Best Practices as they are finalised and made available and are recommended for endorsement. The OCG Vice Chair brings the relevant best practices to the attention of the OCG Executive for approval as GOOS endorsed best practices, based on this recommendation. Finally, the OCG Vice Chair for Standards & Best Practices then liaises with the author for submission of the document into the OBPS or update of the document with the endorsement metadata. The OCG Vice Chair for Standards & Best Practices also then documents the networks availability of best practices across the observation lifecycle for each EOV.

Information for other organisations wishing to create an endorsement process for their community Best Practices

The endorsement process described here has been developed through a specific cross-GOOS Best Practice Task Team, based on earlier work of the Observation Coordination Group with OBPS and in consultation with the Ocean Observations Physics and Climate, BioEco and BGC Panels, OCG and OBPS. It could however be used as a base for considering an endorsement process for communities in ocean science outside of the GOOS. Any groups wishing to develop an endorsement process are encouraged to contact the OBPS to discuss their ideas and needs further (https://www.oceanbestpractices.org/contact/) with the OBPS team. If you are within an expert community, but not within GOOS and feel your community would benefit from such a process, raise this as an opportunity with your leadership and ask them to contact the OBPS.

[6] Deployment and sampling/SOP/operations, pre-mission preparation (e.g., calibration and validation), data retrieval and formatting, primary quality control and secondary quality control

Schema 1: Role of ocean observing communities (green); GOOS Components (blue) and OBPS (orange) in the endorsement process

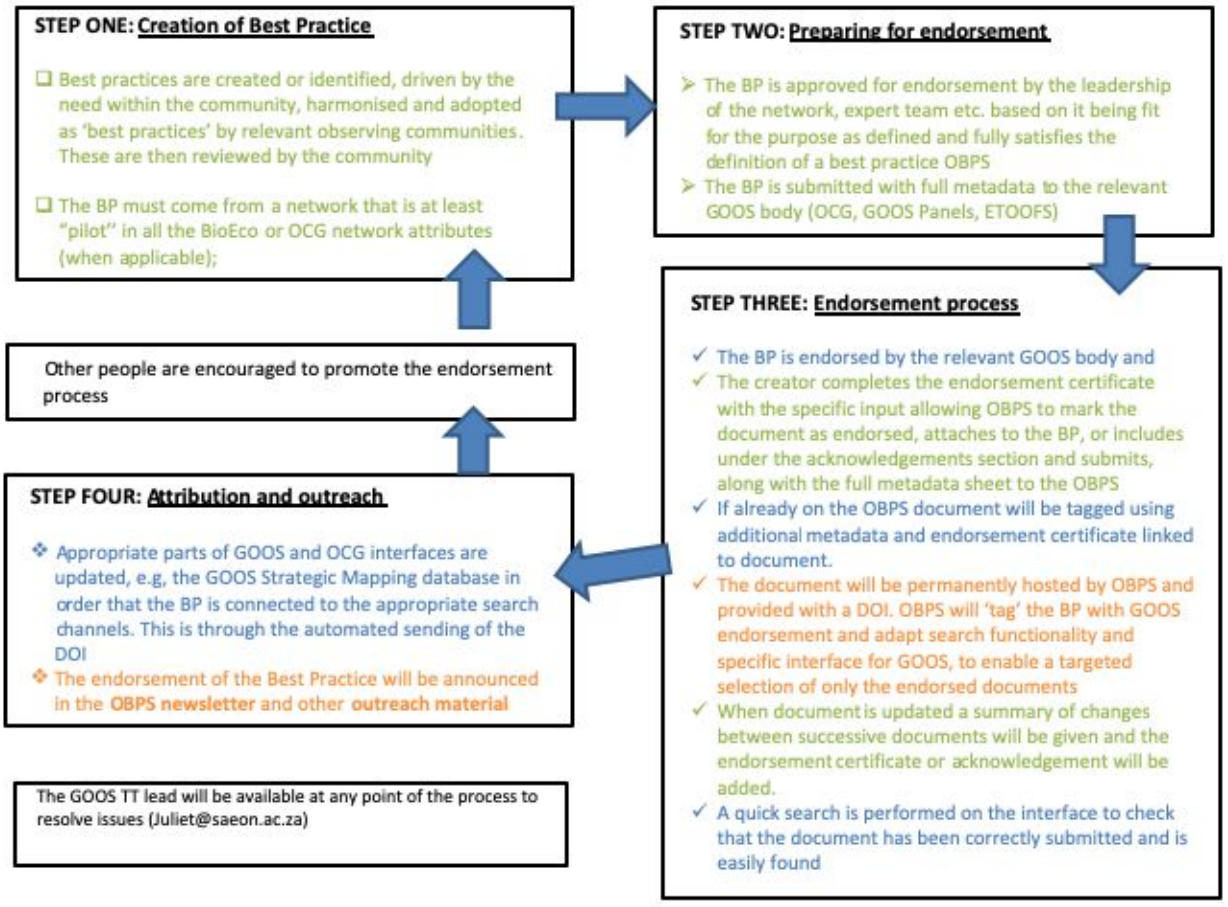

Table 2, Responsibilities of GOOS and OBPS

GOOS responsibility		OBPS responsibility
Set up and implement a mechanism to select and endorse best practice documents (GOOS internal) Ensure the endorsed documents are uploaded to OBPS repository (GOOS internal, support the community) Provide the specific input on new documents and those already in the OBPS that allows OBPS to mark the documents as being endorsed (GOOS internal, support the community) Possible extension: Provide a summary of changes between successive documents (DIFF documents) (GOOS internal - in a dialogue with OBPS)		Host documents permanently (OBPS internal) Provide unique identifier to documents (OBPS internal) Adapt OBPS functionality to enable a targeted search of only the endorsed documents, including a suitable search interface (execution is OBPS internal - but design in dialogue with the group seeking endorsement Possible extension: versioning of documents - either through Github or in the form of a differences doc/commentary in RT. (OBPS internal but requires the input from the group that seeks endorsement) Action automated update reminders after a specific time period

ANNEXE I – CERTIFICATE OF THE GOOS ENDORSED BEST PRACTICE

BELOW IS THE CERTIFICATE FOR THE BEST PRACTICE AND/OR ACKNOWLEDGEMENT TEXT TO INSERT IN DOCUMENT TO BE PUBLISHED. WHEN FILLING IT IN, PLEASE FOLLOW THE SAME FORMAT AS THE ONE USED TO COMPLETE THE METADATA SHEET.

IF BEST PRACTICE IS ALREADY PUBLISHED THIS PAGE WILL BE USED TO PROVIDE METADATA TO THE OBPS TAGGING SYSTEM AND IT WILL BE LINKED TO THE BEST PRACTICE IN THE OBPS

Endorsed

TITLE

Subtitle : if applicable

Author(s):

Essential Ocean, Climate, Biodiversity Variable(s):

Supporting or other variables:

Network(s):

Sensors:

Endorsed by (GOOS PANEL, eg OCG, BIOECO):

Endorsement date:

DOI Identifier:

Links to previous versions or full manuals if this is a summary paper:

This best practice has been endorsed by the Global Ocean Observing System (GOOS).

The GOOS best practice endorsement process has been developed by the GOOS and the Observation Coordination Group (OCG) in conjunction with the Ocean Best Practices System (OBPS).

The aim is for global networks (eg the International Argo programme through GOOS OCG) or groups of experts (eg. the GOOS Biogeochemical Panel) to endorse and share methods which have reproduced superior results for confidence in and uptake by the broader ocean community.

The endorsed methods can range from standard operating procedures to field manuals and have been adopted by community review as 'globally' accepted methods. Following best practices improves the reproducibility of science research, and interoperability across disciplines and datasets by standardizing methods and data collection. It allows for research to be more efficient, leads to quality datasets, and supports future proofing data.

Endorsed GOOS best practices have been through a strong identifying process. They have been adopted and used by established ocean observers and therefore represent a strong basis for the ocean science community. The document will be updated and re-endorsed as appropriate.