The Ocean InfoHub Project and the Ocean Data and Information System: Developing a Digital Ocean Ecosystem

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Pre-2020 Challenges identified

- A proliferation of online sources of data and information (ODISCat currently contains over 3100 records https://catalogue.odis.org/)

- A diversity of online data systems

- Global data and information resources have useful content, but local users might not know about them

- Challenges of trust in some regions

- ODISCat is now an integral part of ODIS, and registering with ODISCat will be the first step in the workflow for joining the ODIS federation.

In response to these challenges, the Ocean InfoHub Project had a number of objectives:

To develop interoperability between existing information systems, thus improving the flow of information to end users.

Improve discoverability & access to marine and coastal data for multiple purposes, but especially to inform sustainable management and informed policy development.
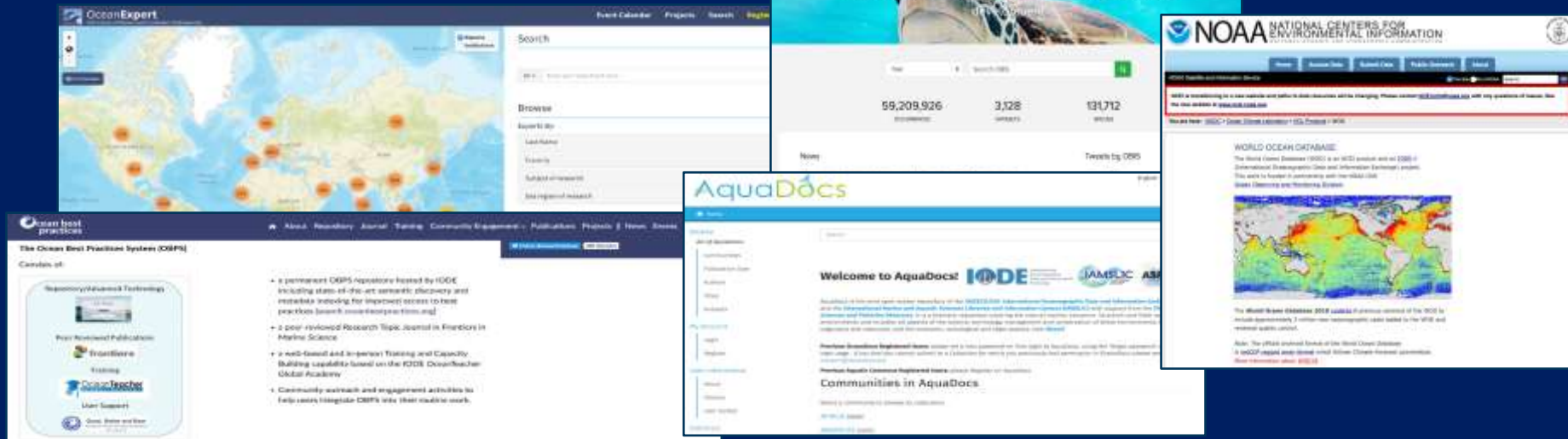
Facilitate equitable access to Ocean information and knowledge products

Connect independent digital initiatives to form a diverse, but interoperable and inclusive, Ocean Data and Information System.

Approach

The Ocean InfoHub Project worked with a number of founding partners including the University of Ghent, WIOMSA, SPREP, SPC, EUROCEAN, EMODnet and other sister projects within IODE, including:

- Ocean and Data information system Catalogue of data sources (ODISCAT)
- OceanExpert : *People, institutions and events*
- AquaDocs : *Documents and Publications*
- The GOOS/IODE Ocean Best Practices System (OBPS)
- The Ocean Biodiversity Information System (OBIS)
- The World Ocean Database (WOD)

Approach: Three pilot regions

We also worked initially within three pilot regions

Latin America and the Caribbean

Africa

Pacific Small Island Developing States

Exchange of technologies not N -> S, but a true co-design process between partners, brokered by the OIH Project

Results 1. The ODIS architecture

Core Profiles

Six key categories of interest:

1. Experts and Institutions
2. Documents
3. Spatial Maps
4. Projects
5. Training
6. Vessels

Supporting Profiles

In support of these five thematic types above, these cross cutting types and properties were selected for attention. They represent some key patterns people may wish to leverage when describing their resources:

1. Spatial Geometry
2. Services
3. Term Lists
4. Languages
5. Linking to Principles
Identifier Patterns

OIH developed the first phase of the Ocean Data and Information System architecture.

that can help any organisation or individual to share their ocean (meta)data with the world, as well as to access a growing ecosystem of Ocean data.

The system is lightweight, easy to implement, and resilient to gain/loss of parts.

Partners aligned to ODIS are also discoverable by Google Dataset search and others.

Partners retain their own data and complete control over what they share through their node or nodes.

All documentation is online, free and open
https://book.oceaninfohub.org/index.html
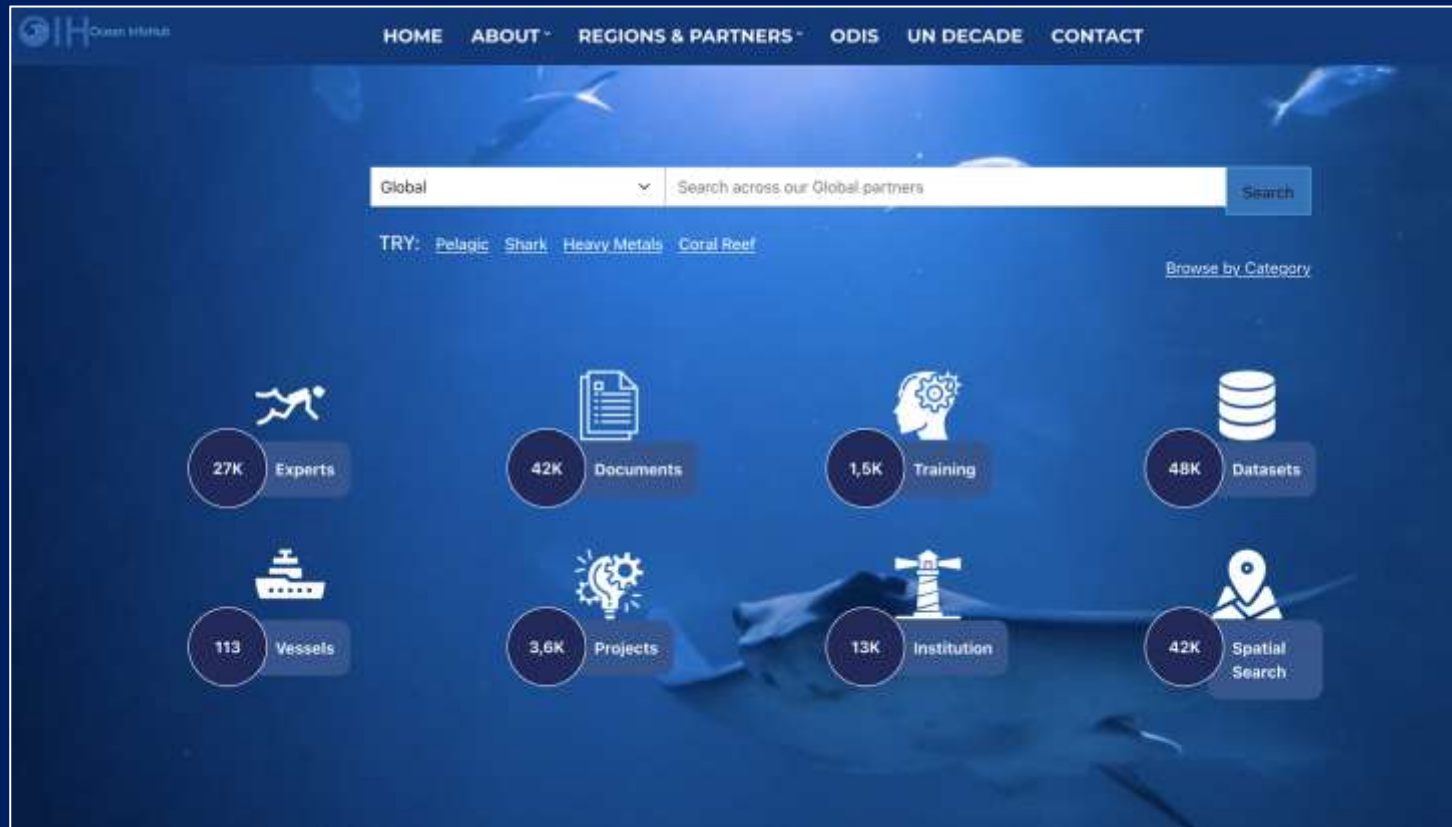
Results 2. A partner network
developing in white, indexed in green

We currently link 32 databases from 28 partner organisations. These 32 nodes are contributing openly discoverable content.

Strait of Georgia Data Centre	Peace Boat US	POLDER	South African Institute for Aquatic Biodiversity (SAIAB)	Anthropocene Institute	IDEM-DHN Brazil	SDG Federated Data System
Protected planet	NOAA OneStop	OpenOceanCloud	Marine Information Management System (MIMS)	NOAA / Open-GTS / GOOS Observations Coordination Group	Global fishing watch	Hakai Institute
MarCOSIO (formerly MarCoSouth)	Aquatic Sciences and Fisheries Abstracts (ASFA) + FAO	MEDIN (Marine Environmental Data and Information Network)	Research Data Australia	Better Biomolecular Ocean Practices (BeBOP) as part of Ocean Biomolecular Observing Network (OBON)	Population Health domain (cross-domain interoperability)	IOOS
CCLME Eco-viewer	Blue Planet / BIOPAMA (RCMRD)	EMODnet	CLME+ training portal	OBIS	WIO Symphony project	DOOS (Deep Ocean Observing Strategy)
OBON (Ocean Biomolecular Observing Network)	Leibniz Center for Tropical Marine Research (ZMT)	EUROCEAN	SeaDatanet	Caribbean Marine Atlas	ICAN	Digital Earth Africa
IUCN (International Union for Conservation of Nature)	GEO Bon-in-a-box	INVEMAR (LAC regional portal)	OceanScape Project	CORDIO / MASPAWIO	World Environment Situation Room (WESR)	PICES
Nairobi Convention (clearinghouse)	Heimholtz (PLB)	BCC data portal (Benguela Current Commission)	Flanders Marine Institute (VLIZ)	Aquadocs	Copernicus Marine Environment Monitoring Service (CMEMS)	HUB Ocean
DITTO	IW_Learn 5	Canadian Integrated Ocean Observing System	Indonesian NODC	Sargassum Hub	Foundation for Industrial and Technical Research (SINTEF)	BCO-DMO (Biological & Chemical Oceanography Data Management Office)
Argentina, NODC	CODATA	OBPS	Marinetraining.eu	SPC (Pacific Data hub)	Australian Ocean Data Network (AODN)	Mozambique Oceanographic Institute
Colombia DIMAR NODC	GEMS Ocean (UNEP)	OceanExpert	IOC/Africa data portal	SPREP (Pacific Environment Data Portal)	Integrated Marine Observing System (IMOS)	Global Platform for Marine Litter (GPML)
Colombia National Natural Parks	MSP project IOC	METS RCN - Research Coordination Network for Marine Ecological Time Series	National Marine Data and Information Service (NMDIS) - China	World Ocean Database	UNESCO Convention on the Protection of the Underwater Cultural Heritage	Plastic-i
UNEP (UN Environment Programme)	Marine debris data harmonization workshop (WS) Japan	British Oceanographic Data Centre (BODC)	Belgian Marine Data Centre (BMDC)	El Salvador Ministry of Environment	IOCARIBE catalogue	SOCIB - Balearic Islands Coastal Observing and Forecasting System
Tsunami	INCOIS	SARGASSUM Hub	Marine Institute Data Catalogue	SCOR	Permanent Commission of the South East Pacific (CPPS)	Virtual Institute for the Sustainable Development (IVIDES.org)
University of California San Diego, SCRIPPS	GEBCO Seabed 2030	Ocean Acidification (OA) UNESCO	MARISMA			

Results 3. An OIH Global Search portal

A Global Search portal has been developed as a demonstration of ODIS (https://oceaninfohub.org). The portal currently contains over 130,000 content items in seven content categories: (i) Experts (27,000); (ii) Institutions (13,000; (iii) Documents (42,000); (iv) Training (1,500); (v) Vessels (113); (vi) Projects (3,600); and (vii) Datasets (48,000).

We now have four initiatives that work very closely together:

- **OIH** brought user communities together, developed ODIS and a global demonstration

- **ODIS-Cat** catalogued systems pre-ODIS, now part of ODIS

- **ODIS** is the Ocean Data and Information System (ODIS)

- **Ocean Data 2030** is a Programme, to expand ODIS, support the Ocean Decade and connect more widely to Ocean Data systems.

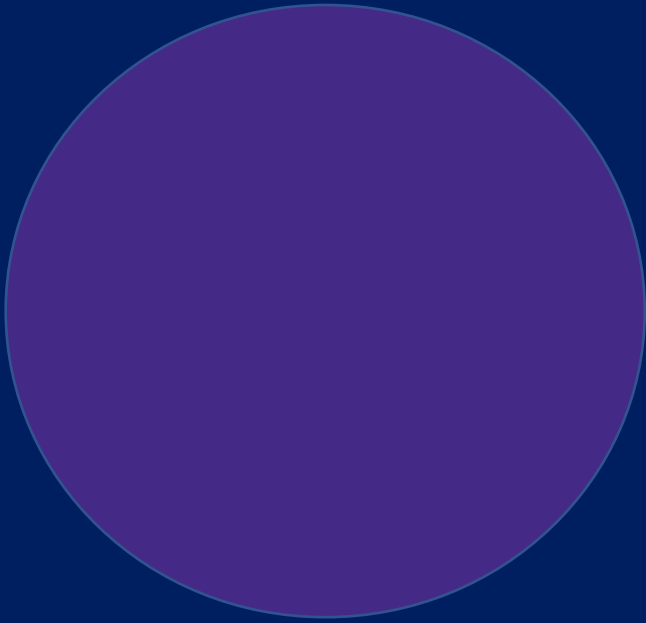**The ODIS catalogue of sources**

The Ocean Data and Information System

Ocean Data 2030
A registered Programme of the UN Decade for Ocean Science for Sustainable Development

The Ocean InfoHub Project

Two main types of users:

Users of content. Over 130,000 content items discoverable

- Access via global search or regional pilot hubs

- Examples: MSP: spatial data; Students: training opportunities; Literature reviews; Peer-to-peer expertise; Analysis of current / past projects.
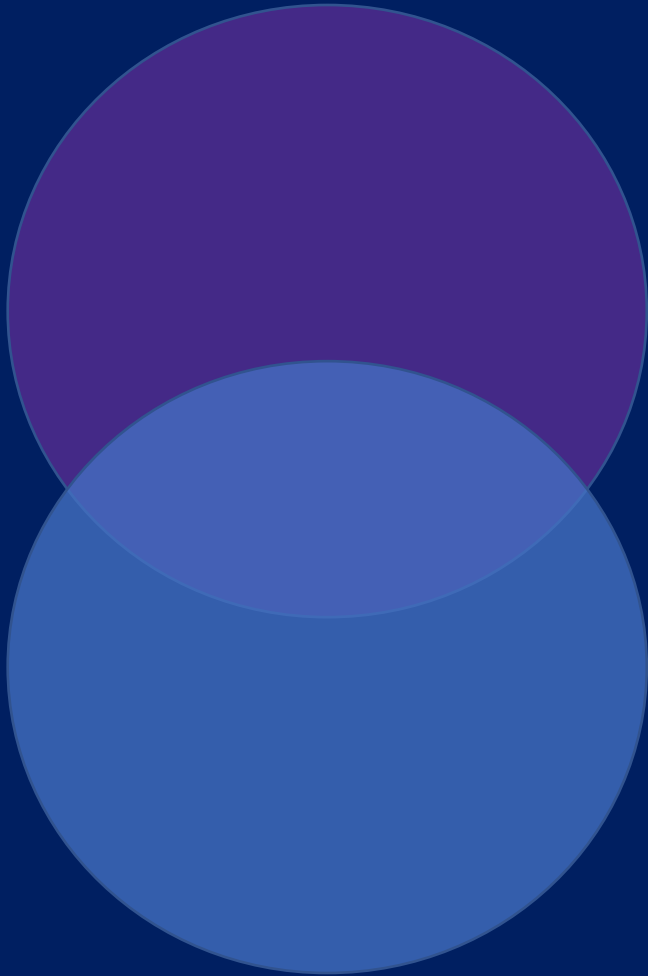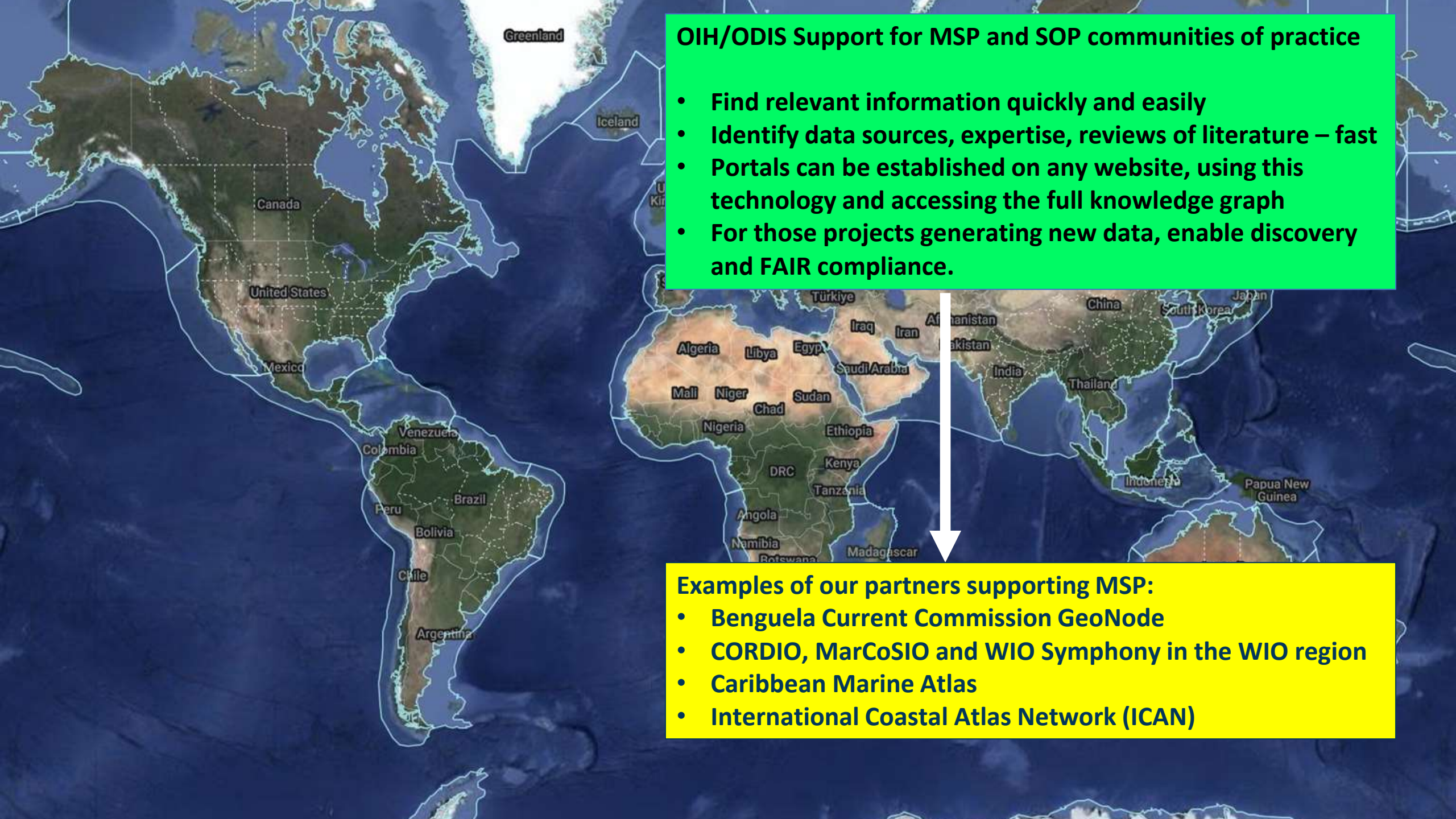
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Users of technology. Open access and free to adopt by anyone.

- ODIS patterns can be used to make metadata discoverable to this network and to others (Google Dataset Search etc).

- All the records in the ODIS knowledge graph can be accessed by anyone – shared to existing information systems (eg SPREP)

- ODIS can be used to create new regional or thematic portals (eg IOCAfrica).

- All records link back to the original authoritative source, and the source keeps control over the sharing action.

OIH/ODIS Support for MSP and SOP communities of practice

- **Find relevant information quickly and easily**
- **Identify data sources, expertise, reviews of literature – fast**
- **Portals can be established on any website, using this technology and accessing the full knowledge graph**
- **For those projects generating new data, enable discovery and FAIR compliance.**

Examples of our partners supporting MSP:
- **Benguela Current Commission GeoNode**
- **CORDIO, MarCoSIO and WIO Symphony in the WIO region**
- **Caribbean Marine Atlas**
- **International Coastal Atlas Network (ICAN)**

Resources

OIH Website https://oceaninfohub.org/

ODIS Documentation https://book.oceaninfohub.org/index.html

Video: https://drive.google.com/file/d/1YvEMcETZlt-E4aHTad4K1jopbF6ODi4u/view?usp=share_link

Brochure: https://drive.google.com/file/d/1TeWhcciX6UVcQMh9HAsfxG-jKd-3BOlj/view?usp=share_link