GeoSpace-Sea

Singapore Roadmap the for Implementing Marine Science Data Standards

Maritime and Port Authority of Singapore (MPA)

IHO MSDI WG 14

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Background and Current Challenges

There are currently different Marine Science Standards national level for Singapore

Difficult to integrate across various standards to ensure interoperability

To develop a common integrated standard and produce guidelines for Marine Science Data

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Step 1: Categorisation of Marine Science Datasets

Level 1	Level 2	Level 3
Physical	Coastal geography	Coastal and marine habitat
	Atmosphere	Sea surface temperature
Ecological	Biodiversity	Population surveys
		Species Distribution and/or Occurrence
	Ecosystem Services and Functions	Marine protected areas
Biological	Genomics	DNA/RNA Sequencing
		Amplification
		Gel image
		Genome assembly
	Proteomics	Amino acid sequencing
		Immunofluorescence
		Western Blot
	Metabolomics	-
	Environmental tolerance	Bioassays
Ecological/Biological	Metagenomics	Environmental DNA (eDNA) sampling
		Metabarcoding
		DNA barcoding
		Viral compostion
	Ecosystem Health	Biomonitoring
	Biogeochemistry	Water Quality
Human	Management	Coastal erosion

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Step 2: Interdisciplinary Integration of International Standards

❑ International standards are available but at a **granular basis**

❑ To **integrate** across various disciplines and **harmonise** related data standards

❑ Proposed adoption of international standards to support such efforts

Vocabulary	Abbreviation	Namespaces and abbreviations
Darwin Core	DwC	dwc: http://dwc.tdwg.org/list/
Dublin Core	DC	dc: http://purl.org/dc/elements/1.1/, dcterms: http://purl.org/dc/terms/
Audubon Core	AC	ac: http://ac.tdwg.org/termlist/
EPSG Geodetic Parameter Dataset	epsg	epsg: https://epsg.org/home.html
International Council for the Exploration of Sea (ICES)	AreaType (example)	http://vocab.ices.dk/
Sea Data Net	A05 (example)	http://seadatanet.maris2.nl/v_bodc_vocab_v2/welcome.asp

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Standardisation Timeline

Phase 1

Consultation with Institutes of Higher Learning (IHLs) on Marine Science data categories and potential datasets

Phase 2

Design and development of modular Marine Science Data templates based on proposed international standards (controlled vocabularies)
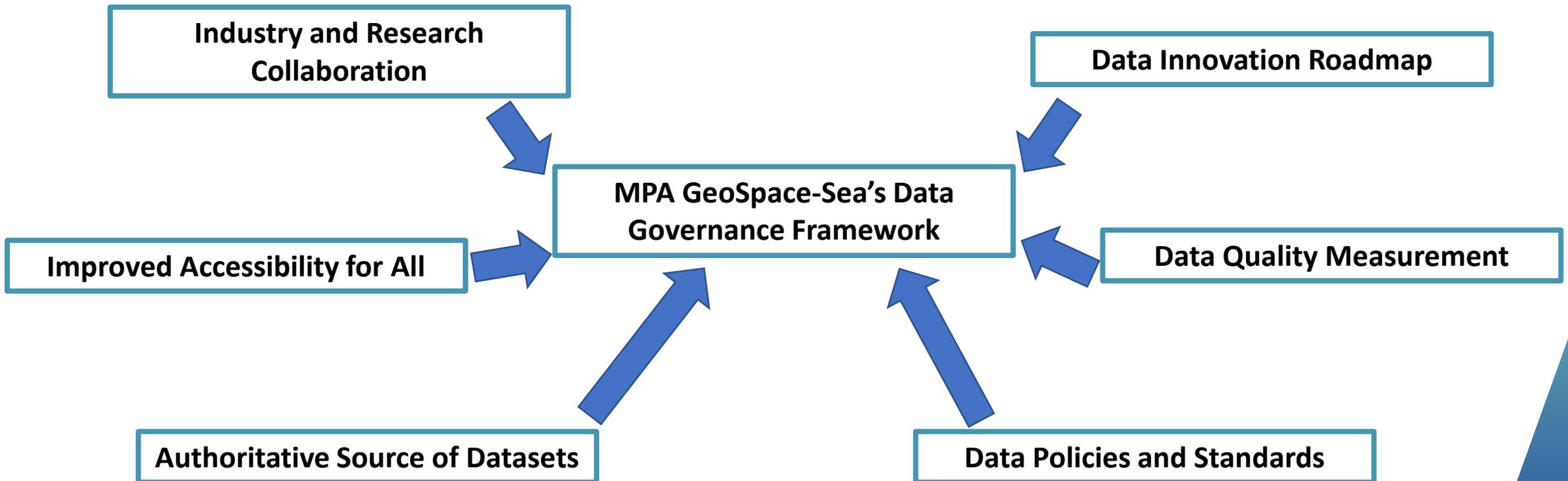
Phase 3

Implementation of Marine Science Data Standards as the authoritative source

Note*: Consultation with Govt Agencies completed

Advantages of Standardisation

Industry and Research Collaboration

Data Innovation Roadmap

Improved Accessibility for All

MPA GeoSpace-Sea's Data Governance Framework

Data Quality Measurement

Authoritative Source of Datasets

Data Policies and Standards

Outcomes of Implementation:

- Marine Science Data Standards to be implemented at the national level and will be **harmonised by various international standards**.

- **FAIR data principles** to be extended to Singapore's marine science research community.

- Future sharing of Marine Science data to the public fora can be **done meaningfully** through standardised datasets.

- MPA GeoSpace-Sea will continue to enforce data governance through maritime and marine science data, enabling it to be the **authoritative source** for these datasets.

Thank You