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St. Lawrence
Global Observatory

St. Lawrence Global Observatory

Interoperability and cooperation for the sustainable management of the St. Lawrence global ecosystem

chc2010
21-23 juin | June 21-23
Québec, QC, CANADA
www.chc2010.ca

Context / Needs

To get timely access to the best data available
environment, climate, resource distribution & abundance, …

To be more efficient
sharing knowledge, expertise & means among data producers, reducing duplication, ID information gaps,…

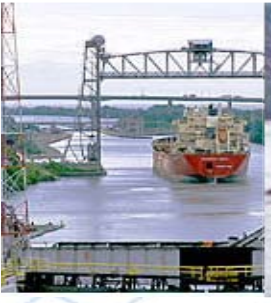
To better understand the ecosystem
climate changes, erosion, endangered & invasive species…

To make the best decisions
public safety, security, health, conservation, protection, …

To support integrated ecosystem management
fisheries, coastal development, navigation, transportation, tourism, natural resource exploitation,…

characteristics of the St. Lawrence

- large & productive ecosystem, rich biodiversity, covering over 250,000 km^2 + watersheds
- extreme physical characteristics: tides (1-7 m), currents, ice, winds, temperature, hypoxia, …
- sensitive shores – multiple uses : erosion, storm surges, dredging, coastal engineering, etc.)
- 80% of population in coastal regions



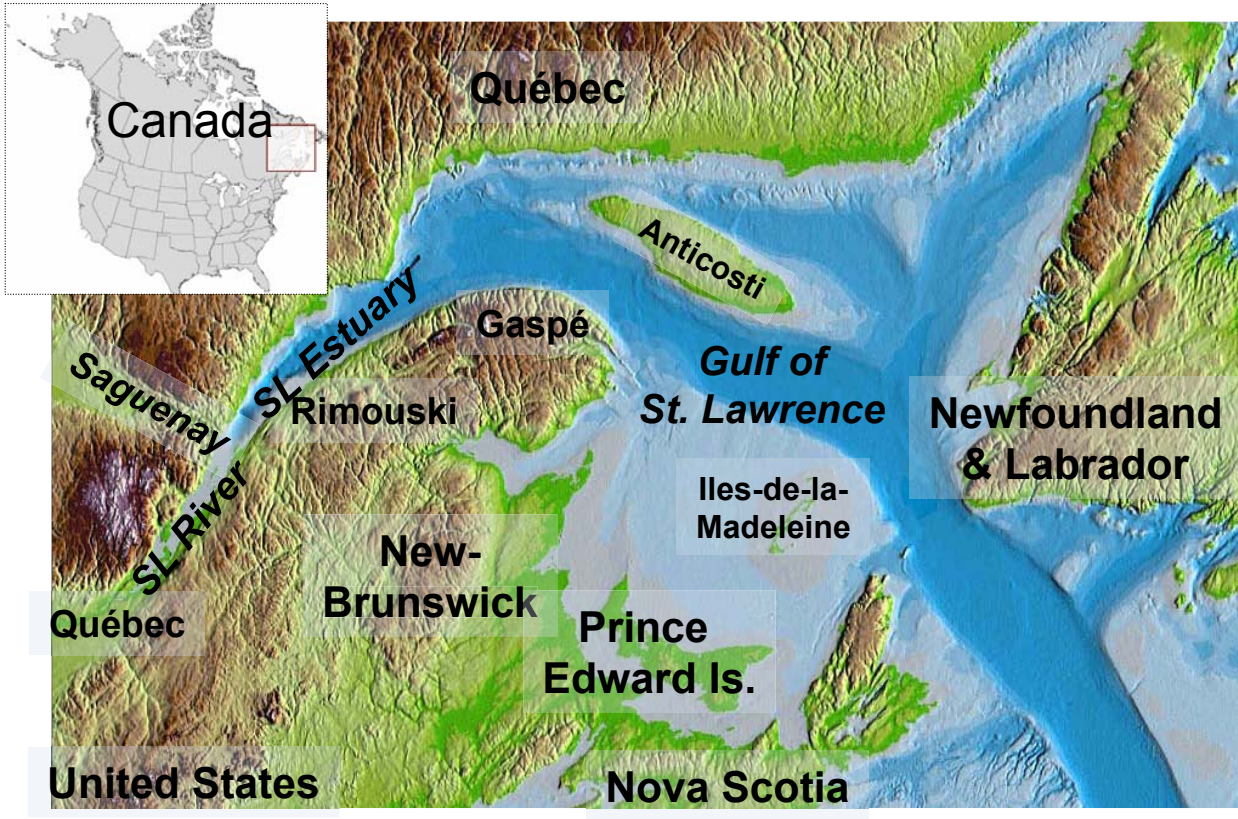



Vision & objectives of SLGO

To offer an **integrated Web access** to the most accurate and complete data and information about the St. Lawrence ecosystem

through **clustering and networking of data producers** (government, academic, communities, etc)

in **response to the needs** of member organizations and their client communities.



Territory including the St. Lawrence River, Estuary and Gulf and the watersheds

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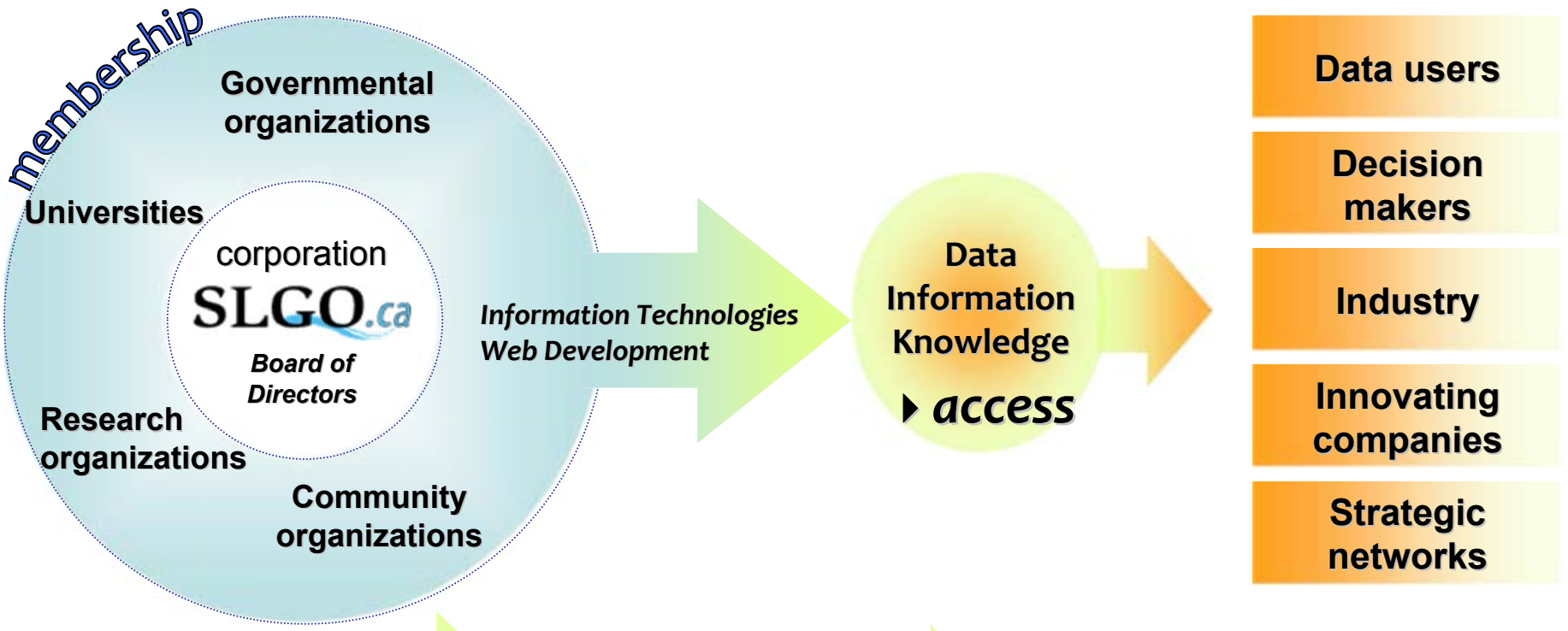
Collaborative model



Collective means, infrastructures, information & expertises of member organizations

Efficiency
Savings
Value-added

Socio-economic benefits
Development
Visibility & exposure

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SLGO Members

ACTIVE MEMBERS

- Université du Québec à Rimouski
- Université Laval
- Institut National de la Recherche Scientifique
- Fisheries & Oceans Canada — Pêches et Océans Canada / Fisheries and Oceans Canada
- Environment Canada — Environnement Canada / Environment Canada
- Université du Québec à Montréal
- Parks Canada — Parcs Canada / Parks Canada
- Natural Resources Canada — Ressources naturelles Canada / Natural Resources Canada
- Université du Québec à Trois-Rivières
- Agriculture & Fisheries Quebec - MAPAQ — Agriculture, Pêcheries et Alimentation Québec

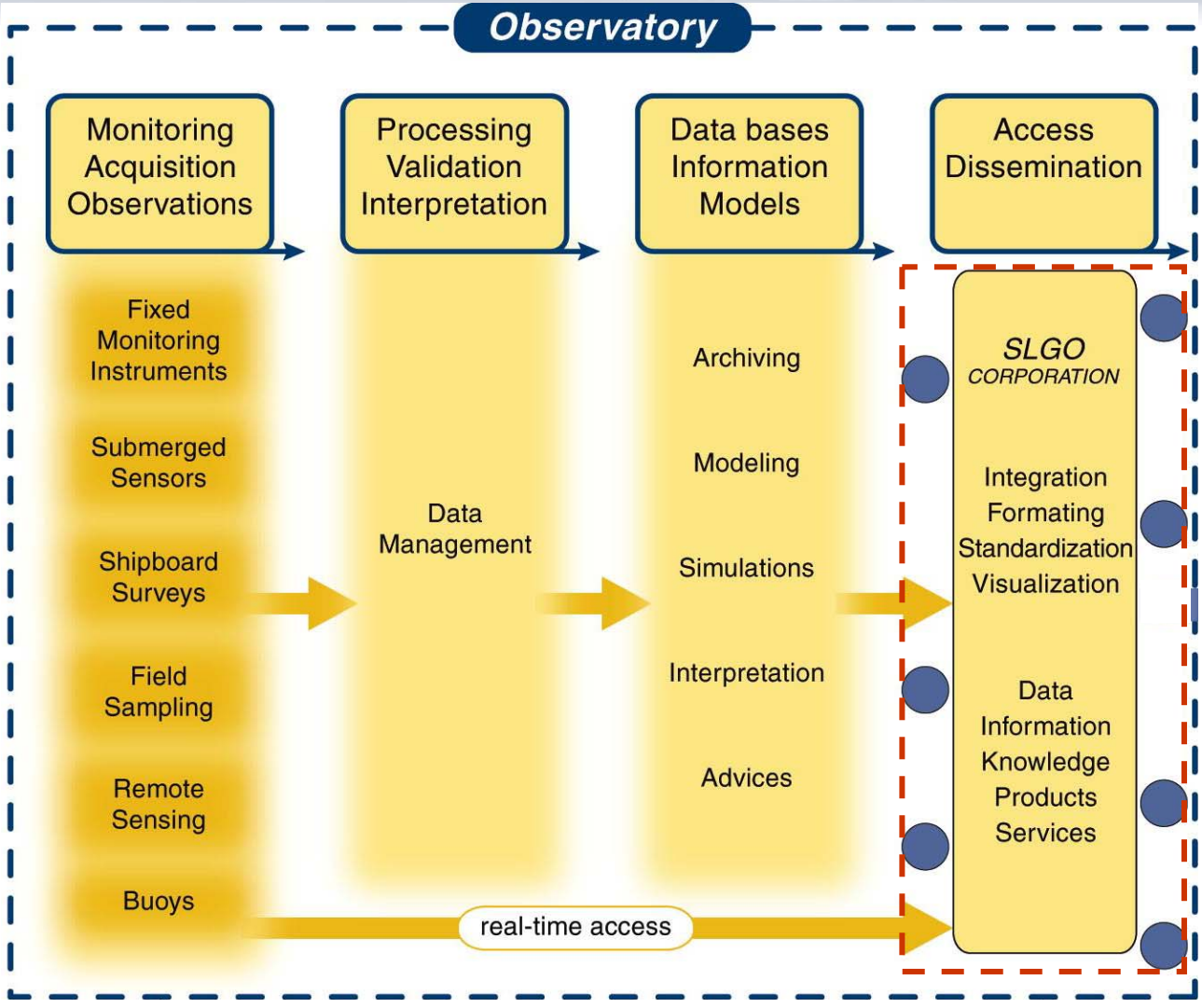
ASSOCIATE MEMBERS

- Stratégies Saint-Laurent (SSL)
- Centre Interdisciplinaire de Développement en Cartographie des Océans (CIDCO)
- Technopole maritime du Québec (TMQ)
- Centre de recherche sur les milieux insulaires et maritimes (CERMIM) — Affilié à l'UQAR

OBSERVERS

- CSA — Agence spatiale canadienne / Canadian Space Agency
- DEC — Développement économique Canada / Canada Economic Development
- MDEIE — Développement économique, Innovation et Exportation Québec

Observatory concept



collective means, infrastructures, information and expertise implemented by member organizations and the SLGO Corporation

governance structure
- non-profit organization
- Board of Directors
- business plan

member organization
- membership agreement

Integrated access ● distributed data ● network ● quality ● efficiency

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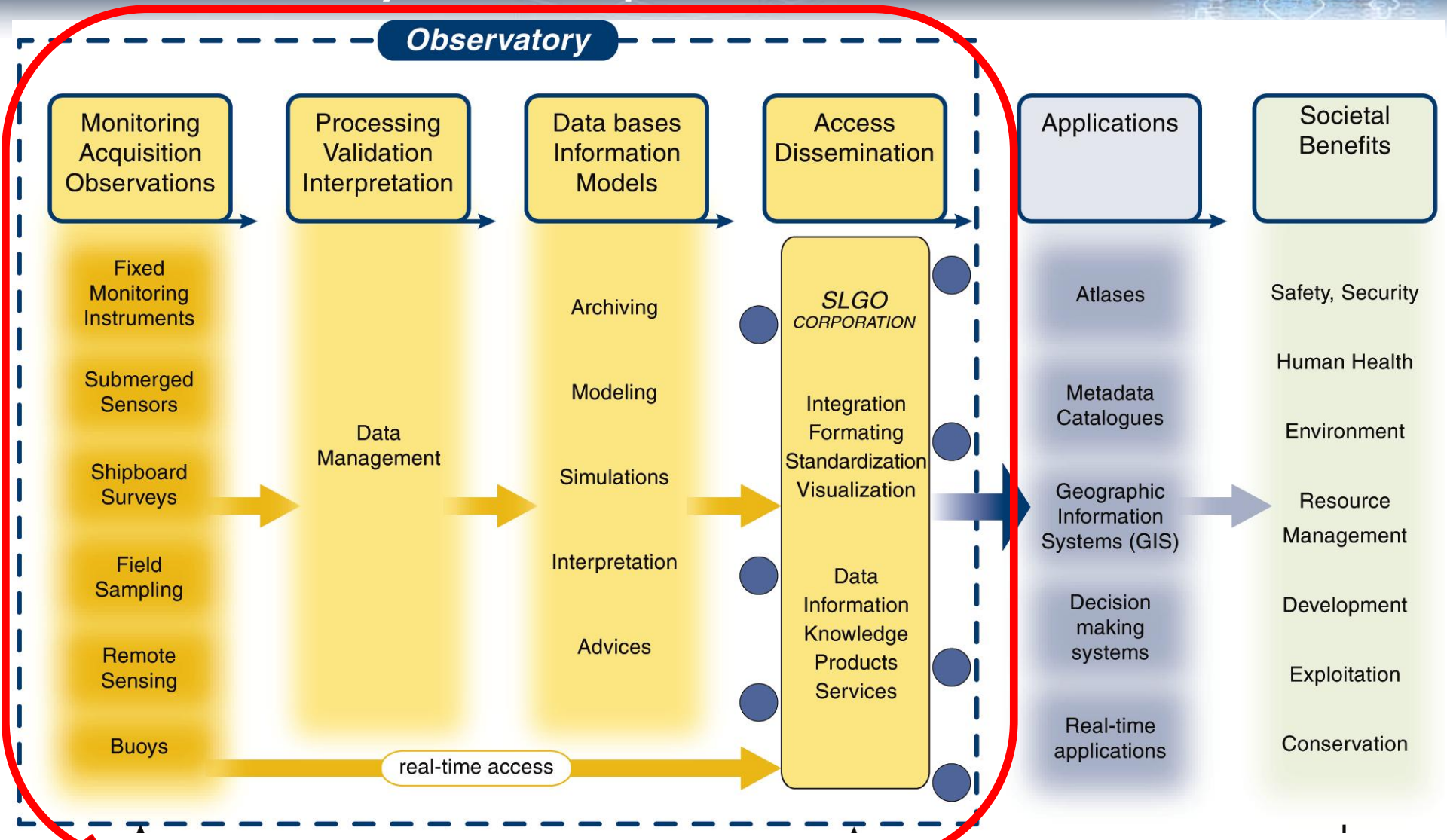
Observatory concept



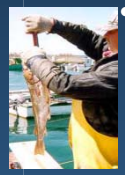
...what is already in place?

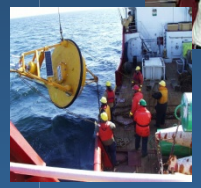
data, information, knowledge, products & services in response to user needs

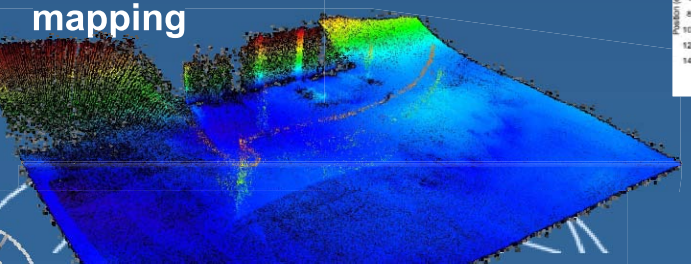
Existing capabilities

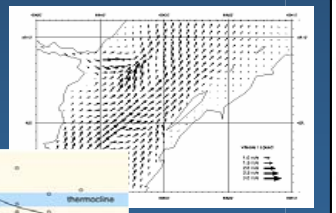
Observatory

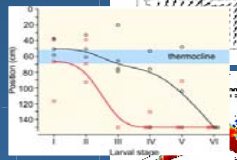
Monitoring Acquisition Observations	Processing Validation Interpretation	Data bases Information Models	Access Dissemination
• **Network of sensors**: tides, water levels, weather...	• **Network of experts**	• **Archives, time series**	• **Web development expertise**
• **Monitoring & sampling programs – ocean & freshwater**	• **Data management policies & processes**	• **Climate models**	• **On-line data, information, products**
• **Research platforms**	• **Advisory Committees**	• **Forecasts**: sea ice, currents, storm surges…	• **Web services**
• **Remote sensing**		• **Operational services**	• **On-line applications**
• **Seabed mapping**			• **Large client base**

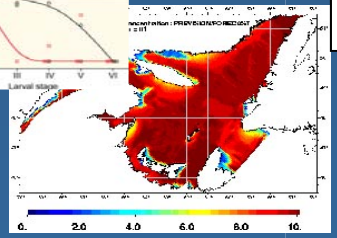


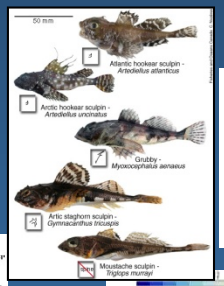


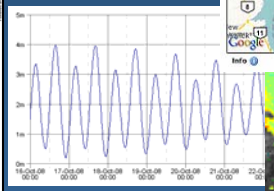


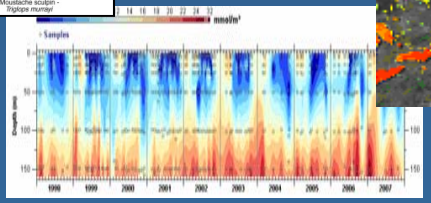


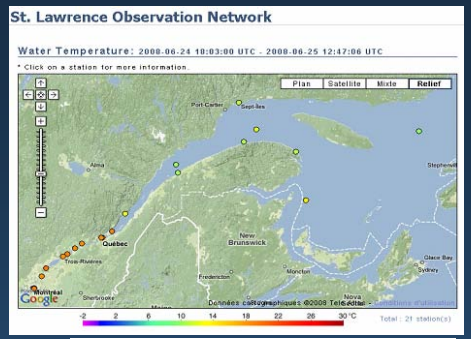


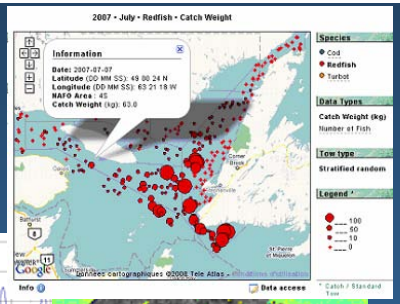


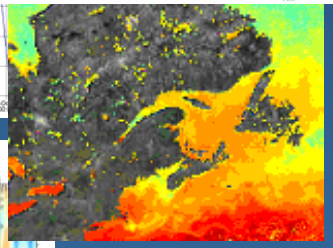












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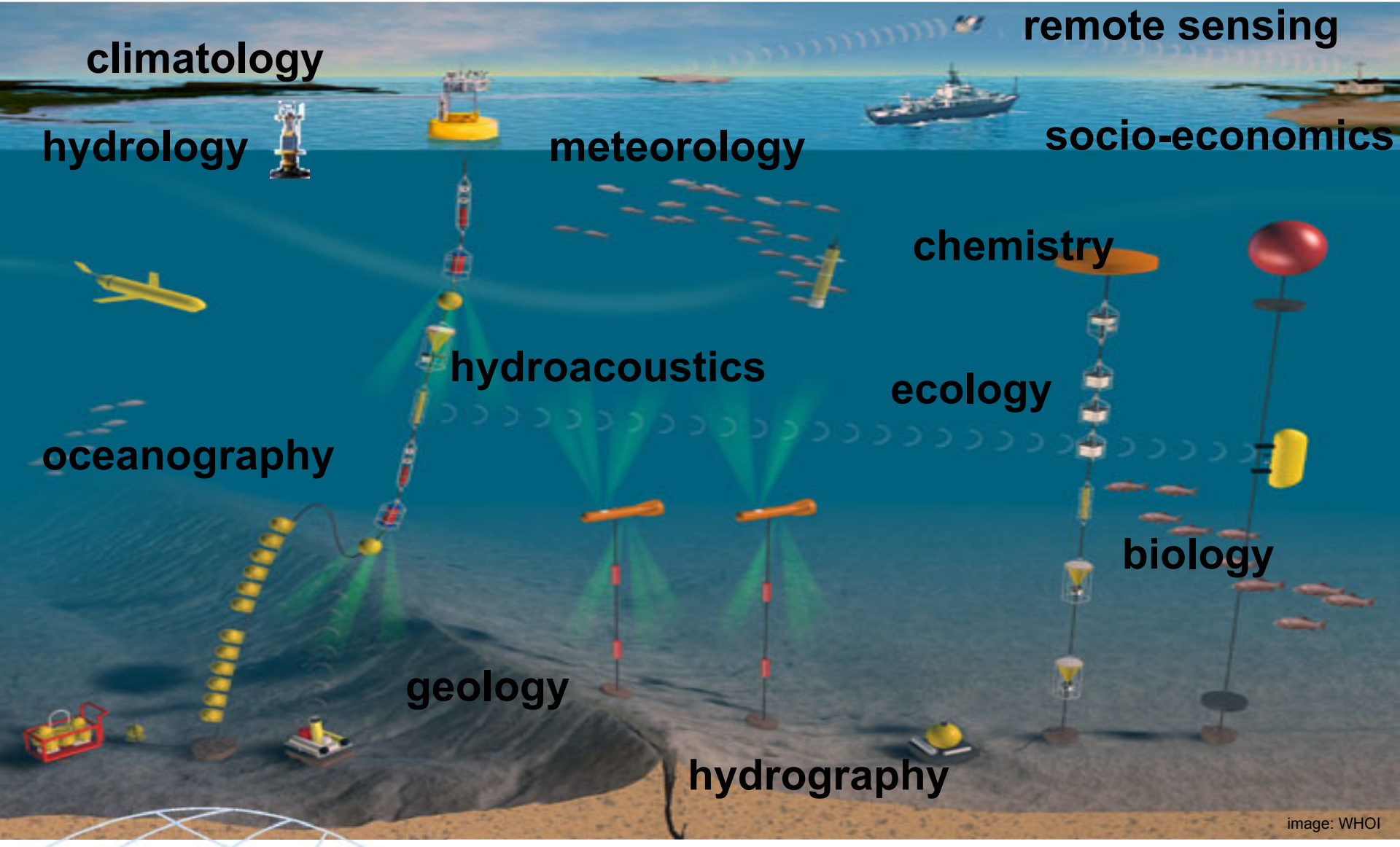
Data types

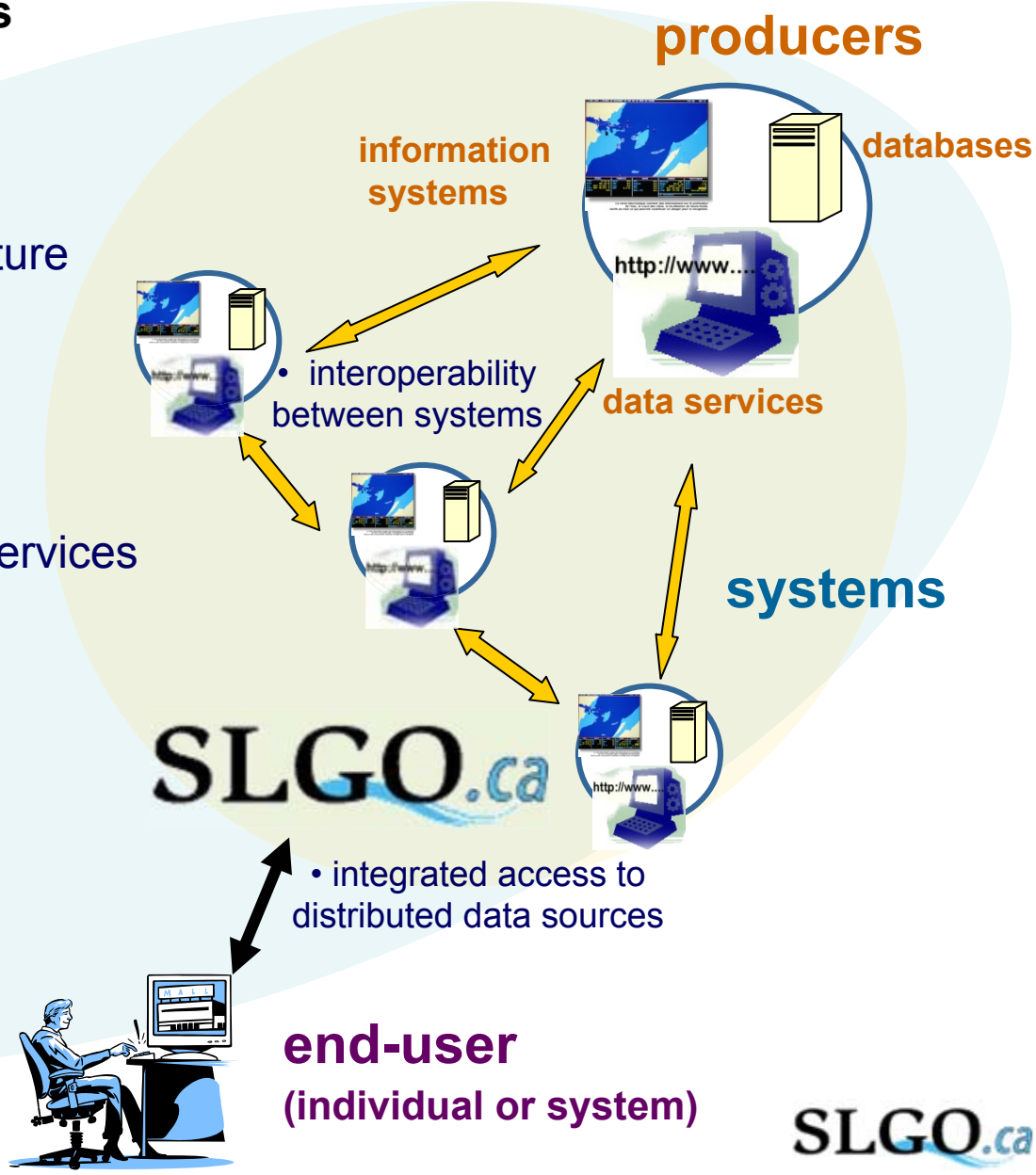

climatology
remote sensing
hydrology
meteorology
socio-economics
chemistry
hydroacoustics
ecology
oceanography
biology
geology
hydrography
image: WHOI

Interoperability: a common solution

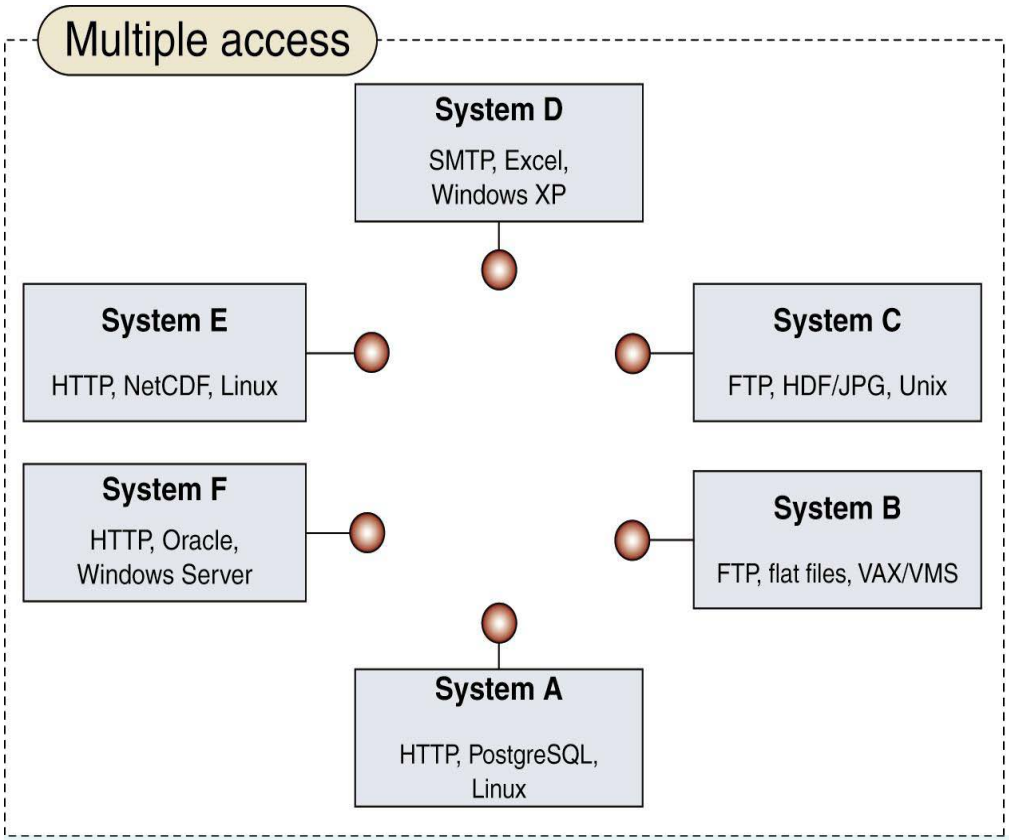
producers ◂ ▸ systems ◂ ▸ users

+ a governance structure

- secure architecture
- common standards
  (data exchange protocols, metadata, security, etc...)
- quality/timely data, products & services
- common values:
  - respect of mandates, jurisdictions & technological choices
  - collaboration
  - efficiency
- increased value & use of information assets



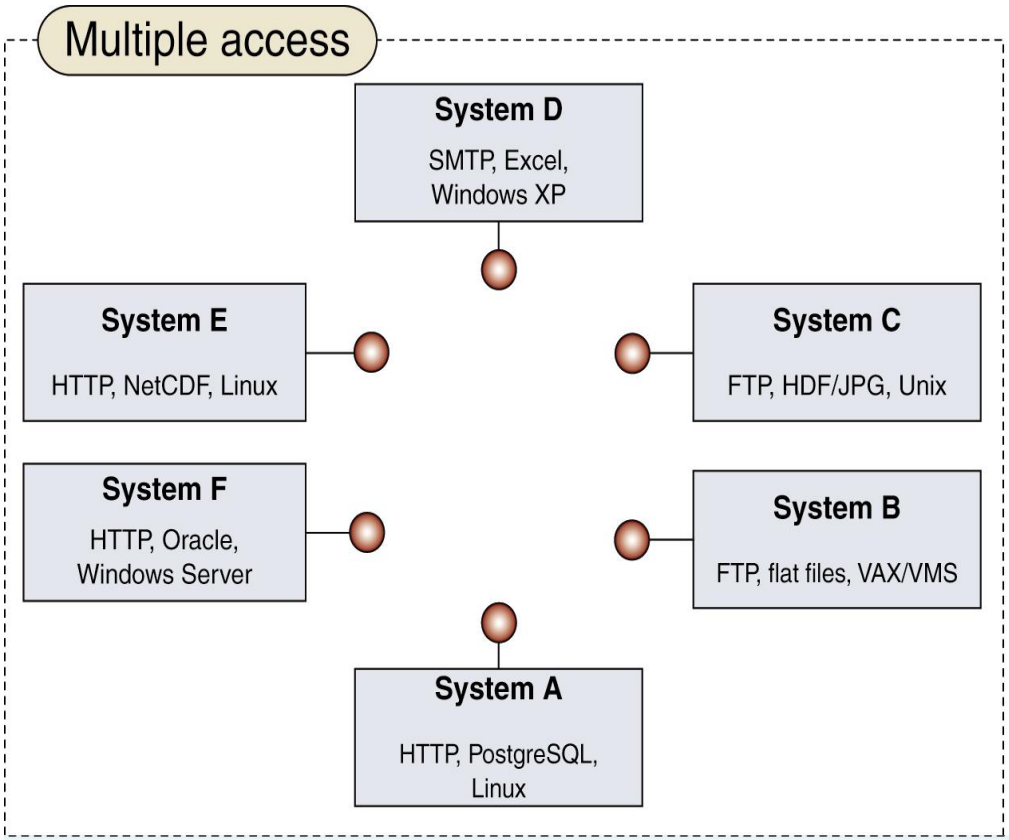
System Interoperability



Data producers with own business solutions

- Range of heterogeneous environments, technologies, protocols and formats
- Requires expertise at the end-user level

System Interoperability



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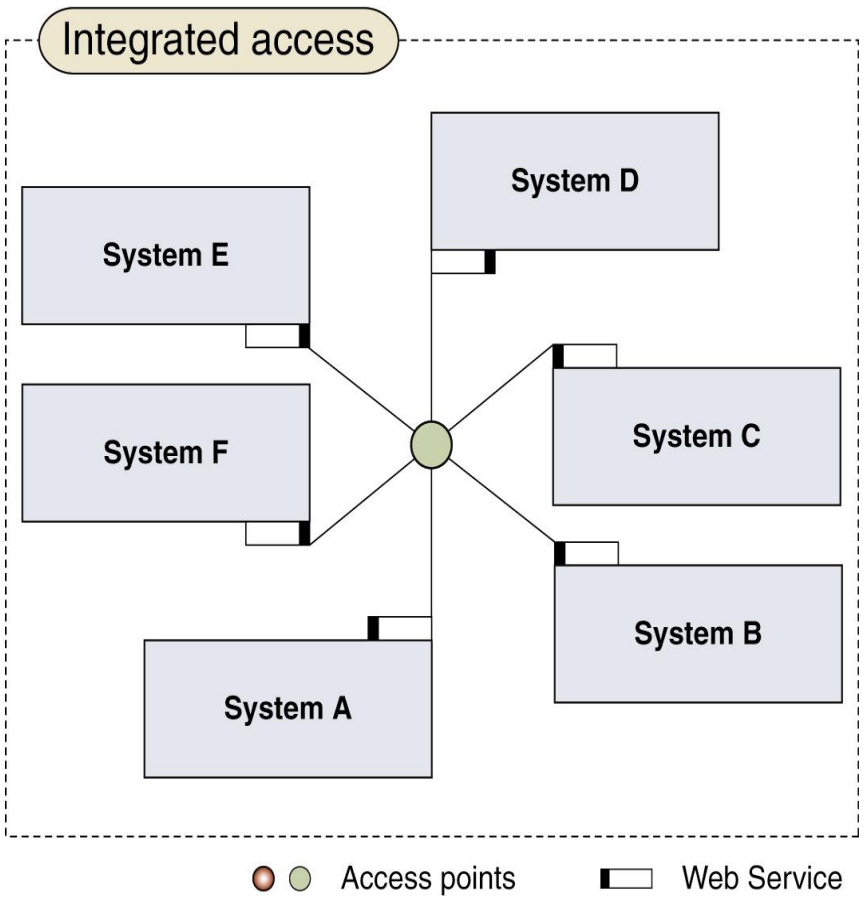

Integrated access + Web services to facilitate system queries

- Expertise remains with the system experts and no longer required at the end-user level

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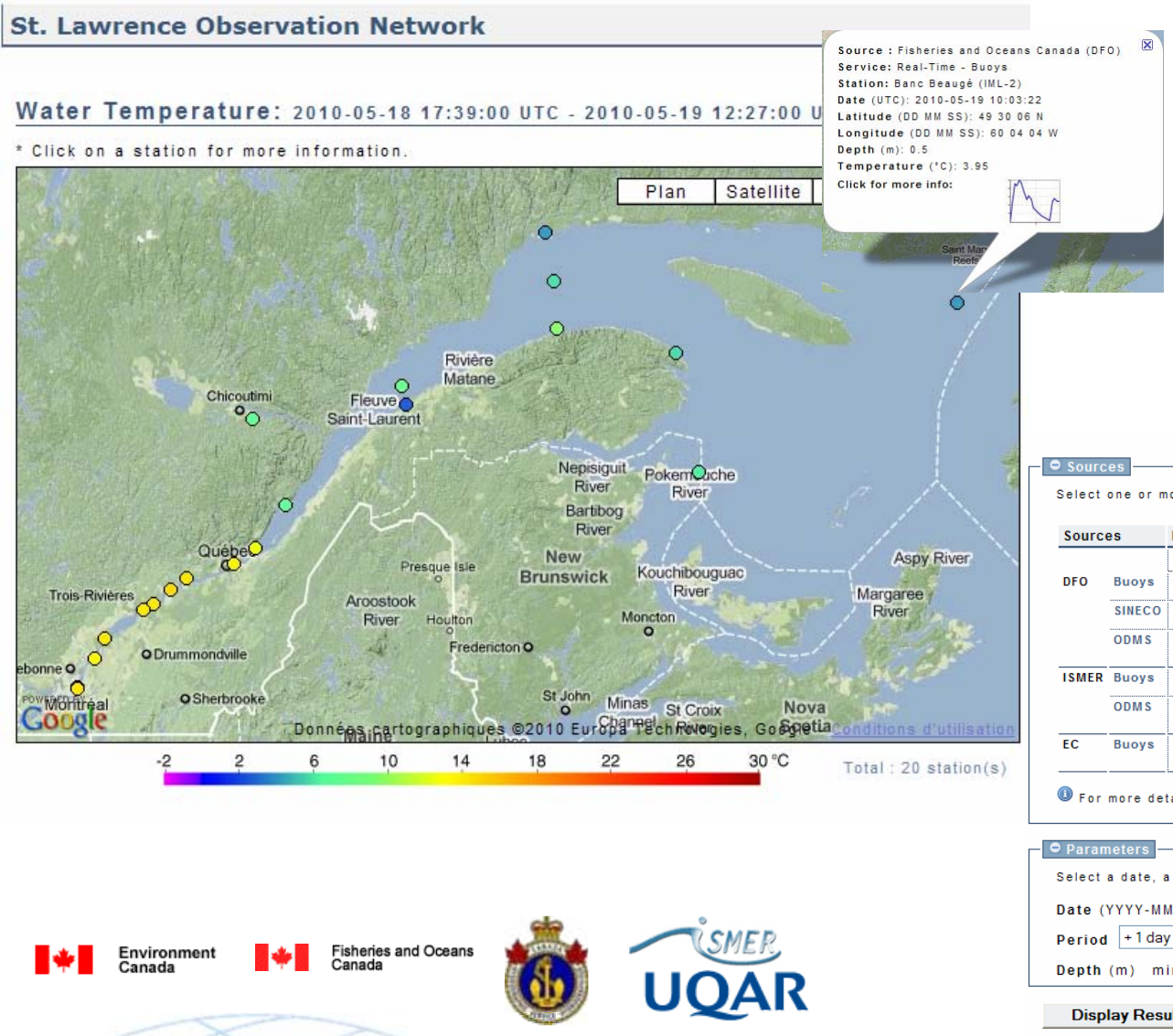
Web Data Services (WDS)

- Web services key features defined as function of operational needs & expected benefits;
- WDS developed as existing types of Web services did not offer all of the following capabilities:

- handle spatial & temporal queries along 4 dimensions (x, y, z, t)
- deliver data with their native structure and for a range of field instruments:
  - time series → ex: moored recorder (temperature, current, etc)
  - vertical profiles → ex: CTD cast, bottle sampler
  - along track measurements → ex: ship mounted ADCP
  - biological sampling → ex: trawl, plankton net
- handle data sources seamlessly whether real-time or archives
- simple development framework on both server and client sides

Web access to distributed data sources



- multi-partner collaborative project (government & academic)
- network of stations
- real-time & archived data (x,y,z,t)
- various output (map, graph, table) http://SLGO.ca

Sources

Select one or more data sources

Sources		Real Time	Archives
		Number of records - (Period)	
DFO	Buoys	☑ 2866	
	SINECO	☑ 5265924	
	ODMS		☐ 27864213 (1963-07-31 to 2009-11-05)
ISMER	Buoys	☑ 2866	
	ODMS		☐ 1490879 (2005-06-09 to 2006-11-07)
EC	Buoys	☑ 16864	☐ 2396796 (1991-05-15 to 2008-04-27)

For more details: see Contexte

Parameters

Select a date, a period and a depth interval

Date (YYYY-MM-DD hh:mm UTC) 2010-05-18 12:31

Period +1 day

Depth (m) min: 0 max: +5 m

Display Results Reset

Environment Canada

Fisheries and Oceans Canada

ISMER UQAR

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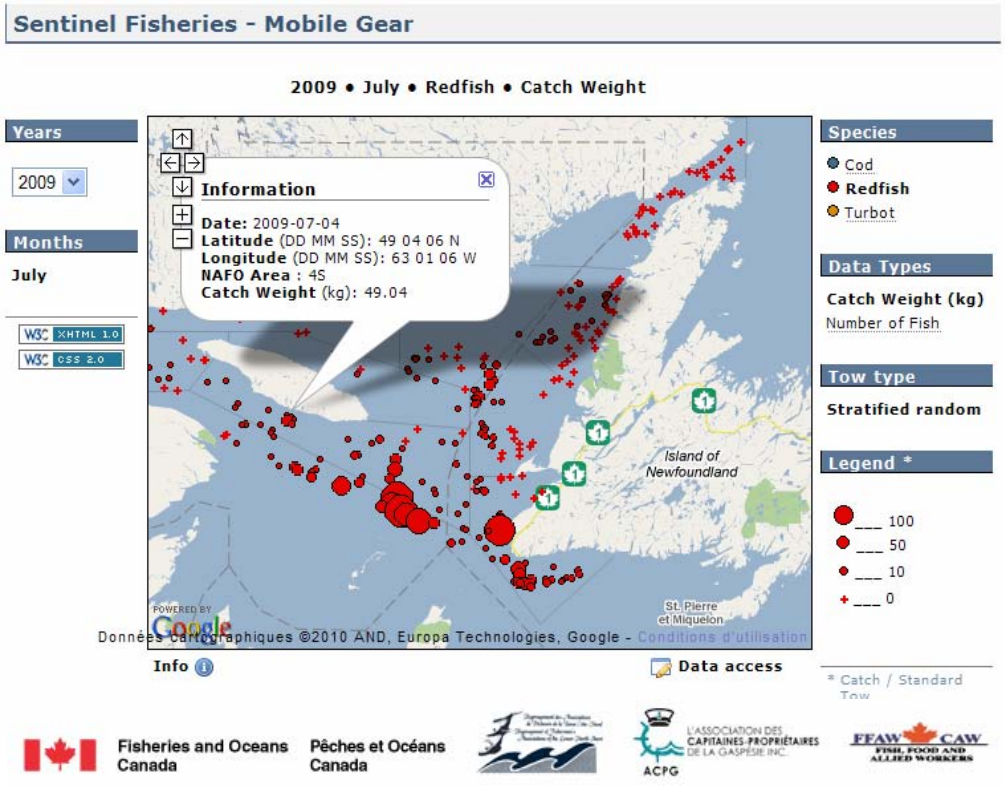
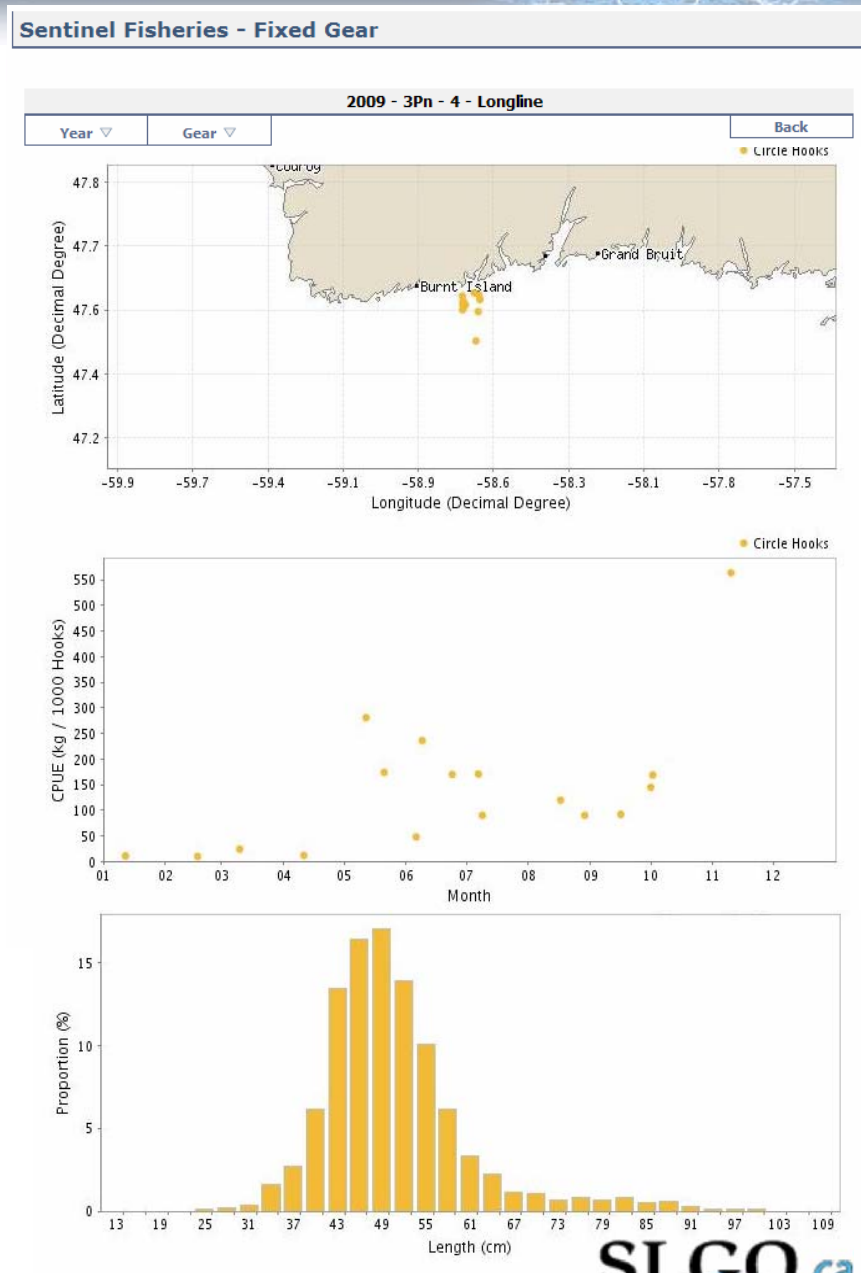
Web applications exploiting data services





- collaborative efforts (gov. & industry)
- database queries via Web Data Service (WDS)
- data visualisation & export in various formats (KML, csv, table)
- archives since 1999

  http://SLGO.ca

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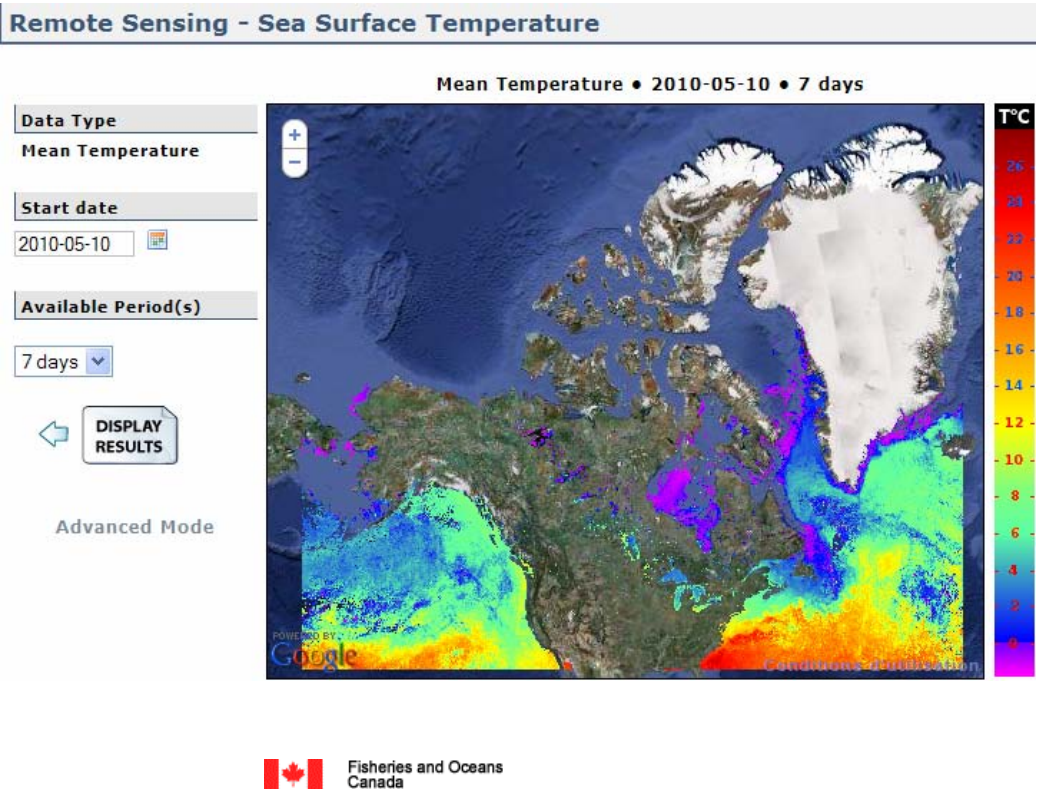
Web applications



- satellite imagery
- various output formats

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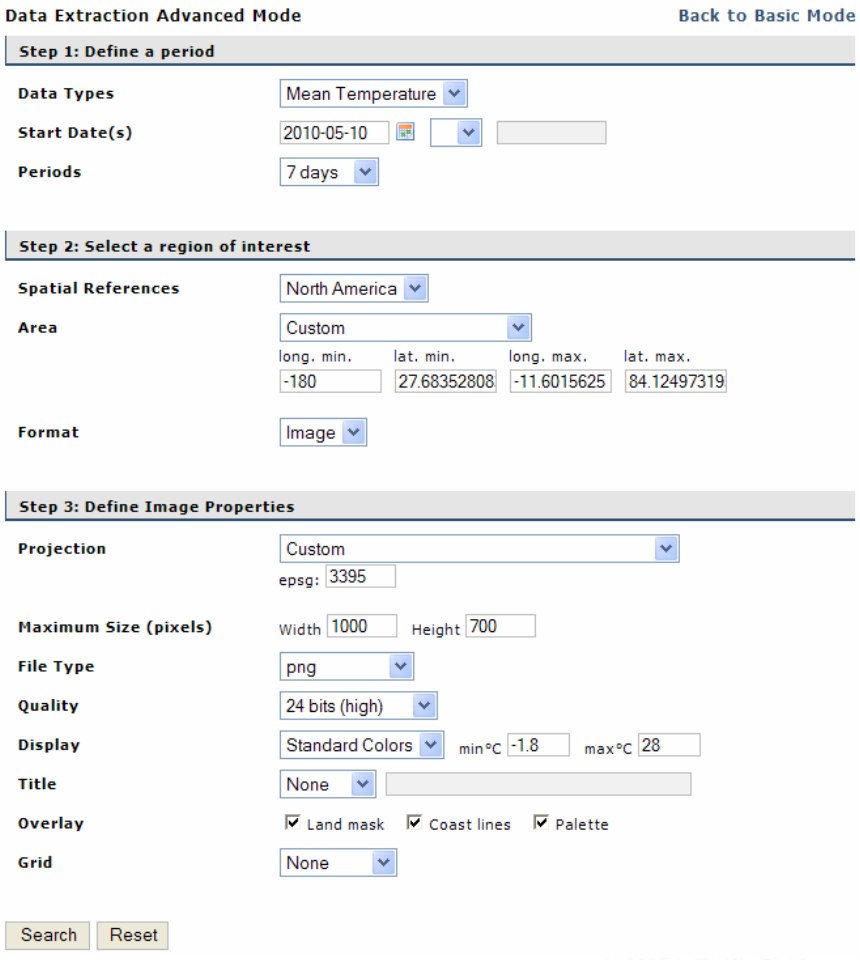

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Web applications

Ocean Forecasts

Fisheries and Oceans Canada | Pêches et Océans Canada

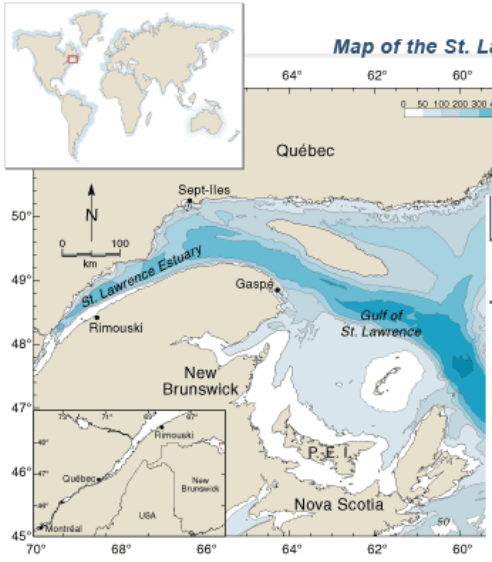
- References
- Level of service

The Ocean Forecasts for the Estuary and Gulf of St. Lawrence are issued by the Modelling and Operational Oceanography section of the Canadian Hydrographic Service (CHS), Maurice Lamontagne Institute (MLI), Fisheries and Oceans Canada (DFO).

The surface current and sea ice forecasts for the Gulf of St. Lawrence are extracted from a three-dimensional numerical model computing the oceanic circulation under the influence of tides, the St. Lawrence River fresh water runoff, the atmospheric forcing, and the sea ice drift, growth and melt. The model has been validated under a series of scientific and operational research and development programs within the Department of Fisheries and Oceans Canada. The validation process was done against a number of oceanographic observations including currents, water levels, water temperature and salinity, and sea ice drift, concentration, and thickness.

The physical data used as input to the model are:

- Tidal elevation at Cabot and Belle-Isle Straits;
- Forecasts of fresh water run-off at Quebec City;
- Meteorological forecasts issued from the GEM model of the Canadian Meteorological Centre, Meteorological Service of Canada, which includes wind, air temperature, cloud cover, and relative humidity;
- Ice observation integrated in daily charts from the Canadian Ice Service, Environment Canada.

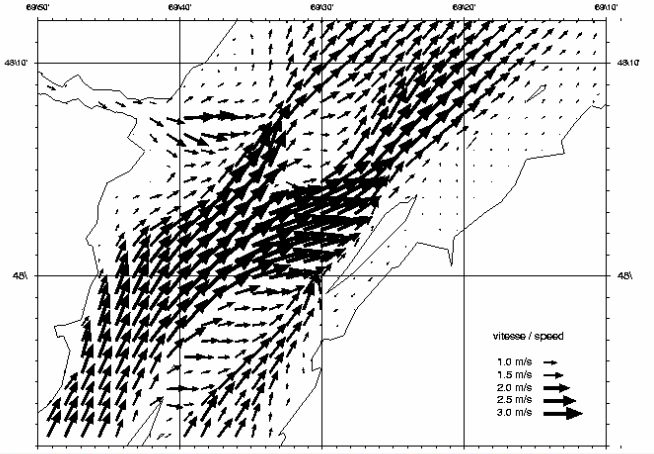


Ocean Forecasts - Surface Currents

Surface current forecast (Estuary, zone 1)

Select an hour | Back

2010-05-28 08:00 AM EST (GMT - 5)

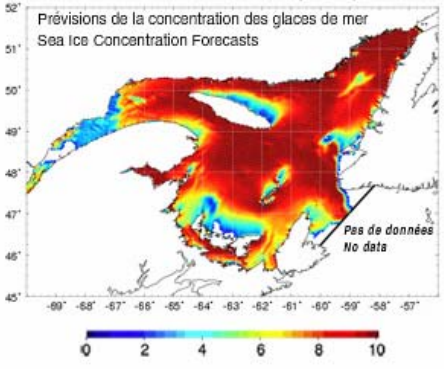


Ocean Forecasts - Animations: Interannual Comparisons

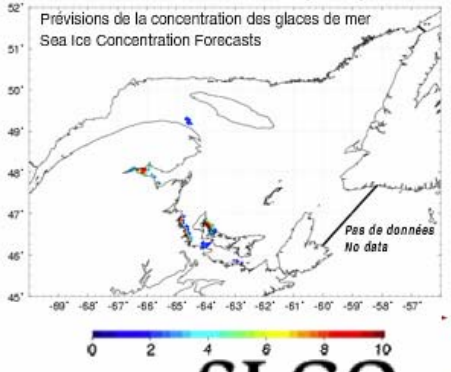
Sea Ice Concentration

Select a period

2009-02-28 12:00 (GMT)



2010-02-28 12:00 (GMT)



- operational oceanography
- hourly forecasts
- sea ice, surface currents

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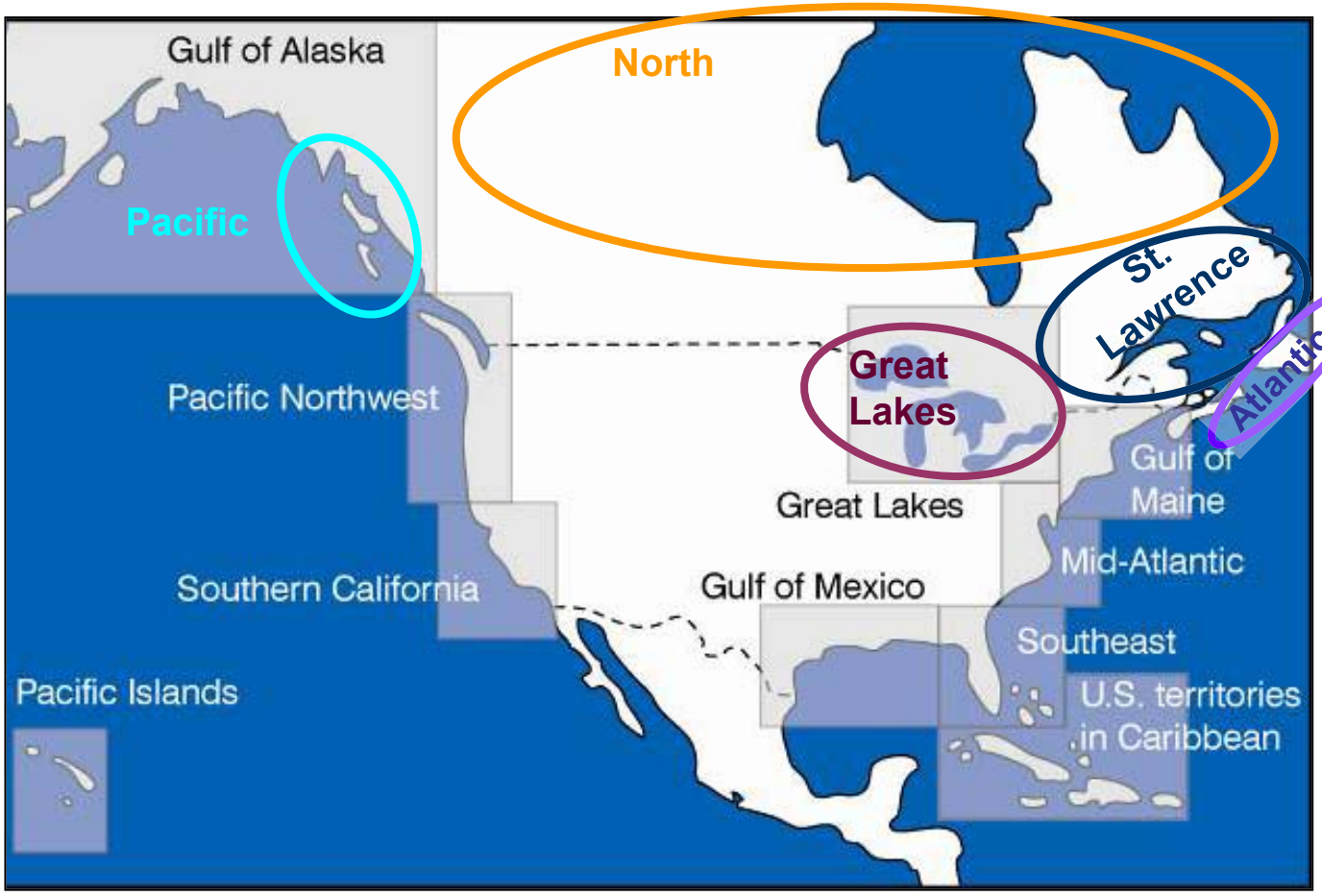
A network of observatories



range of data access initiatives:

- Government On-Line
- Canadian Geospatial Data Infrastructure (CGDI)
- Habitat atlases
- Data centers
- Ocean Science & Technology Partnership (OSTP)
- Environmental information systems
- Water management information systems
- etc.

America: St. Lawrence Global Observatory (SLGO), ocean observing systems - OOS (Neptune, Venus, etc.), Great Lakes Observing System (GLOS), Northwest Atlantic Ocean Observing System (NWAOOS), Integrated Ocean Observing System (IOOS), SmartBay, GoMOOS (Gulf of Maine), etc.

International: Global Earth Observation System of Systems (GEOSS), Mercator, Prévimer, Global Ocean Observing System (GOOS), Integrated Marine Observing System (IMOS), etc.

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Benefits for members & users

- easier **access** to collective wealth of information about the St. Lawrence ecosystem
- increased **collective capacity** to deliver mandates through collaboration, sharing & improved relations between data producers
- **savings** & better return on investment through sharing means and expertise
- identification of information **gaps** & reduction of **duplication**
- development of **joint monitoring & research** initiatives
- potential for development of a variety of **value-added** data products and services by **private & public sectors**
- global vision facilitating **integrated management** & ecosystem-based approach
- opportunities for making **academic data** available, accessible and reusable
- increased **visibility** for member community, national & international **exposure**

Summary

- SLGO inter-institutional cooperation framework
  - based on **commitment**, shared vision & values
  - built on commonly agreed upon **governance** structure
  - brings **collective benefits** to member organizations & their clients
- System interoperability
  - allows **decoupling** technology from business processes
  - **platform-independent standard-based** approach
  - **integrated access** to distributed data assets
- Looking ahead
  - issues of data integration/quality/duplication, Web service governance
  - positioning SLGO among leading initiatives
  - collaborative project with Argentina to implement an ocean observatory
  - participation in national OOS inventory (CSA-DFO-OSTP)
  - participation in research networks
    - with industry (ex: NavEcoNet on green navigation/transport)
    - with communities (ex: ARUC on climate change adaptation)

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St. Lawrence
Global Observatory
®

… collaboration, sharing, efficiency

… access to data & information

… interoperability, network of collaborators

… common vision, governance model

http://slgo.ca
info@ogsl.ca

Thank you

… Questions?