

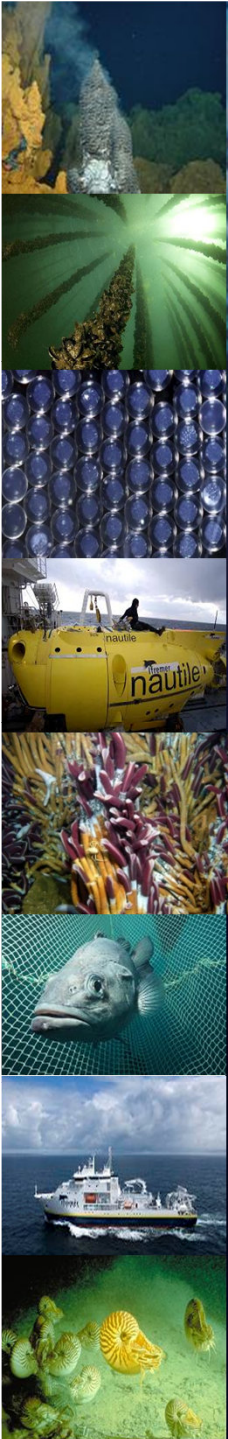
Management of events, samples, videos and data generated by deep-sea submersibles

Catherine Borremans

Ifremer – SISMER

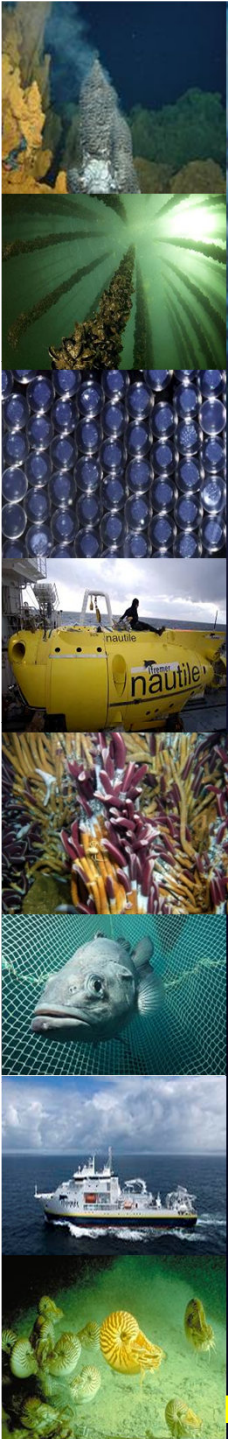
Centre Bretagne - ZI de la Pointe du Diable - CS 10070 - 29280 Plouzané, France

IMDIS 2013 - International Conference on Marine Data and Information Systems
Lucca (Italia), September 23-25, 2013



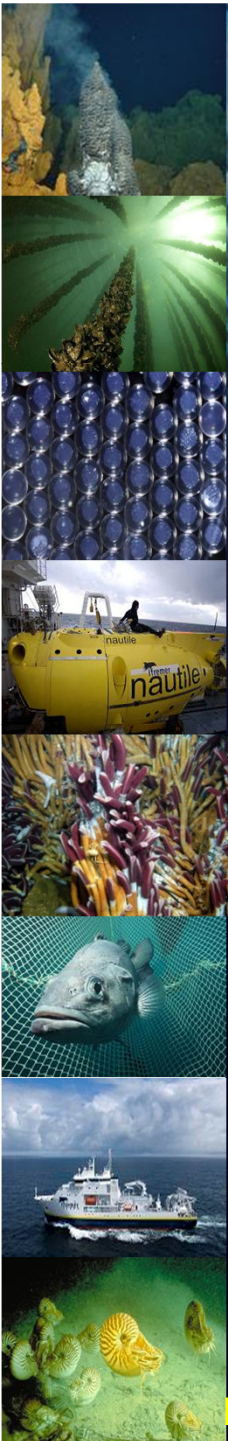
Outline Presentation

- The Submersibles
- Submersible Data & Users
- Submersible data management-Biocean
- Evolutions & New data flow
- Onboard software
- Back on land
- Focus on submersible videos
- International context



The Submersibles

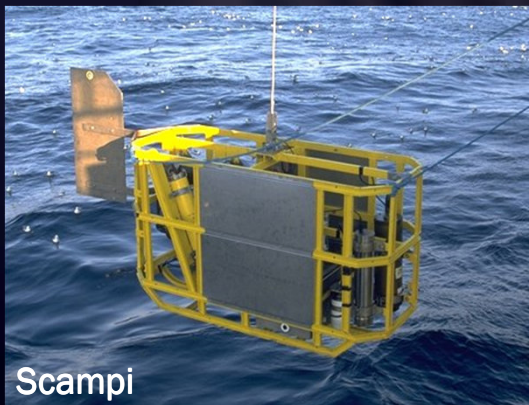
Manned/Unmanned,
Propelled/Towed/
Autonomous vehicles



Cyana



Mini ROV VideoRay



Scampi



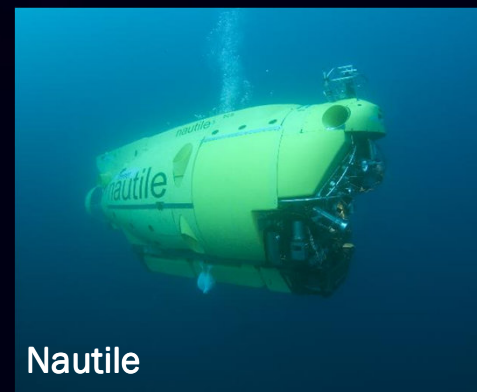
Sysif



SAR



ROV Victor 6000



Nautilie



AUV IdefX

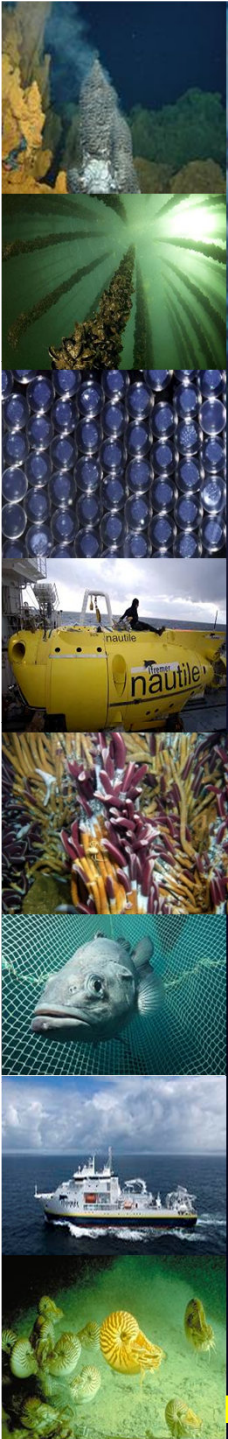
Submersible data

In situ/Raw data

- Positioning
- Micro bathymetry
- Seismic reflection
- ADCP
- CTD
- Images (video and stills)
- Measurements
- Observations
- Bio/Geo/Hydrological samples

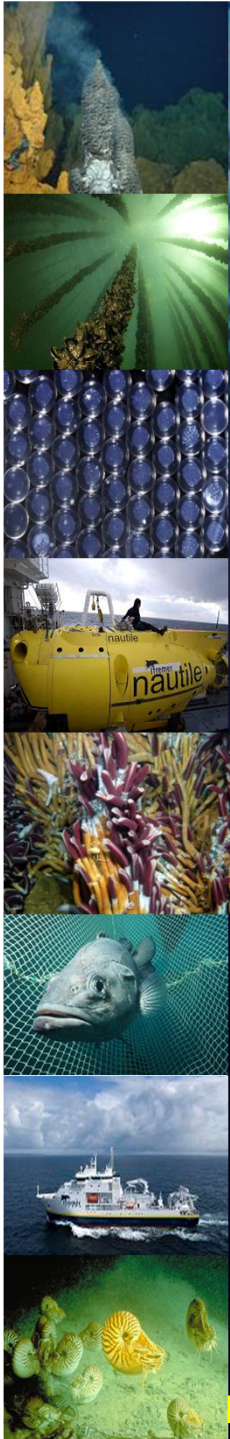
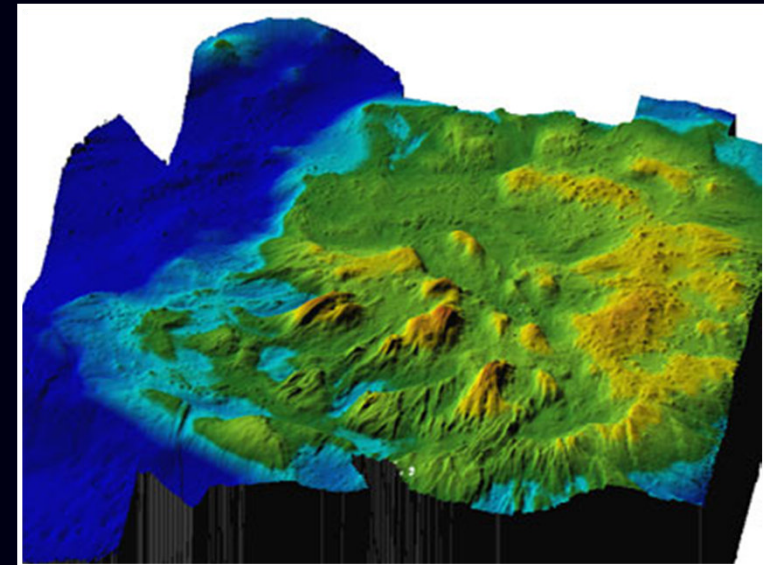
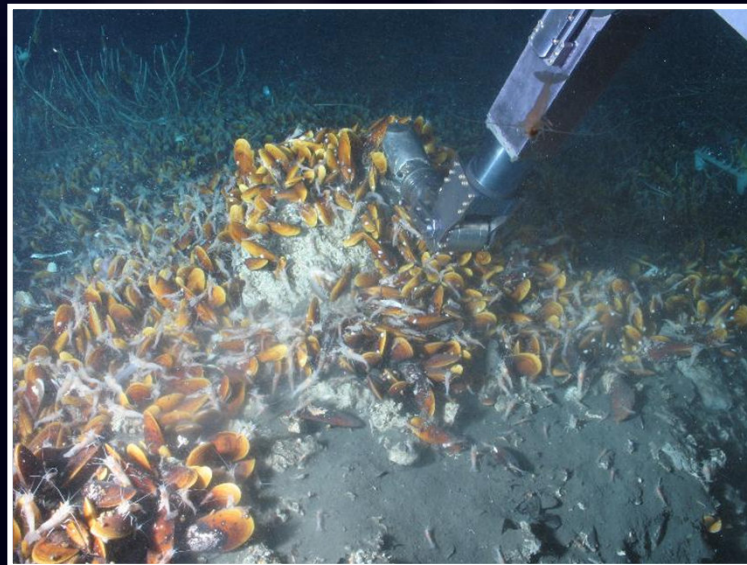
Post-processing data

- Images and related observations
- Bio/Geo/Hydrological sample analyses



Submersible users

- Biologists/Ecologists
 - Geologists
- from Ifremer and from the international scientific community

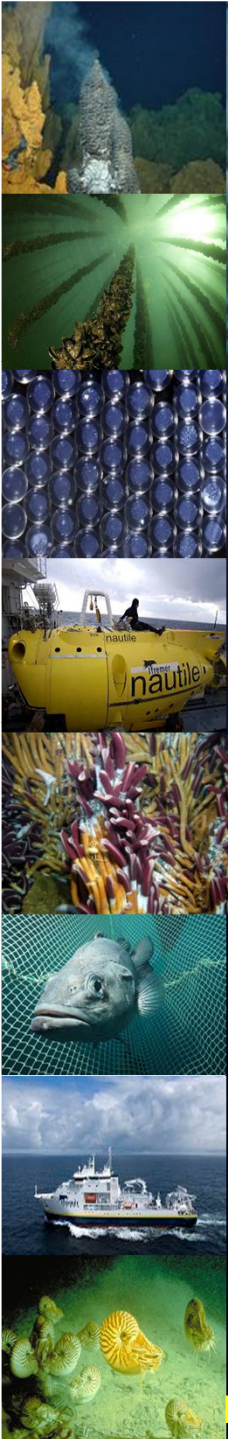


Submersible data management

Biocean

The data management system for deep-sea benthic ecological data from:

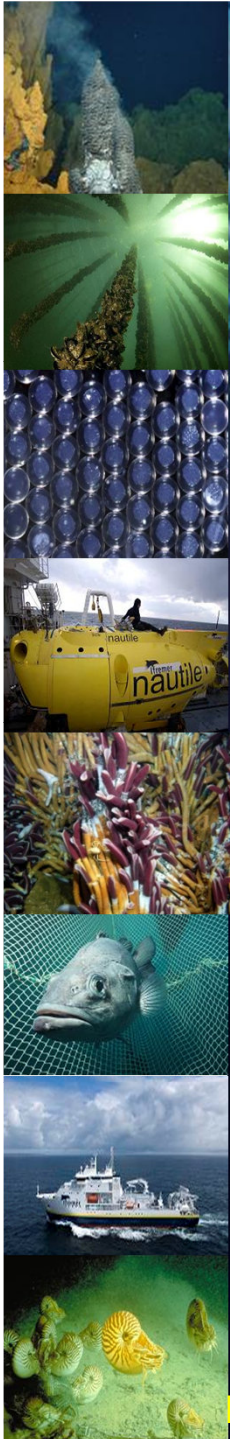
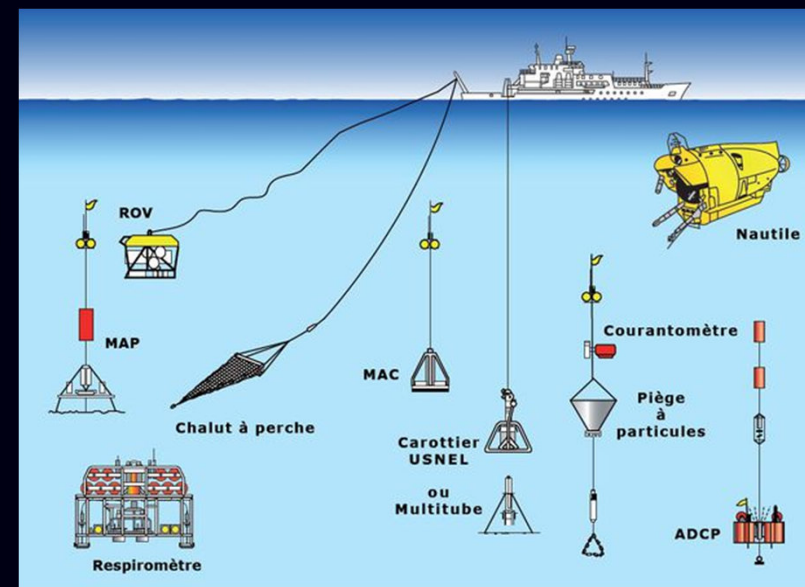
- Benthic sedimentary ecosystems
- Hot-vent ecosystems
- Cold-seep ecosystems
- Deep coral reef ecosystems
- Canyons



Biocean

Different data types mainly collected by research submersibles and multiple gear:

- Samples (biology, water, sediment) and analyses: specimens identification and definition of their living conditions
- Measurements (physics, chemistry)
- Images (stills)



Biocean

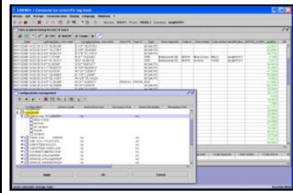
REAL-TIME

POST-PROCESSING

On board ships

Back on Land

CASINO Acquisition of surface operations



ADELIE Acquisition of submarine operations



Alamer Cruise Log

Date	Time	Commentary	Positions
2008-01-15	08:00	Departure from port	47° 15' N, 12° 30' W
2008-01-15	09:00	Start of cruise	47° 15' N, 12° 30' W
2008-01-15	10:00	First station	47° 15' N, 12° 30' W
2008-01-15	11:00	Second station	47° 15' N, 12° 30' W
2008-01-15	12:00	Lunch	47° 15' N, 12° 30' W
2008-01-15	13:00	Third station	47° 15' N, 12° 30' W
2008-01-15	14:00	Fourth station	47° 15' N, 12° 30' W
2008-01-15	15:00	Fifth station	47° 15' N, 12° 30' W
2008-01-15	16:00	Sixth station	47° 15' N, 12° 30' W
2008-01-15	17:00	Seventh station	47° 15' N, 12° 30' W
2008-01-15	18:00	Eighth station	47° 15' N, 12° 30' W
2008-01-15	19:00	Ninth station	47° 15' N, 12° 30' W
2008-01-15	20:00	Tenth station	47° 15' N, 12° 30' W
2008-01-15	21:00	Eleventh station	47° 15' N, 12° 30' W
2008-01-15	22:00	Twelfth station	47° 15' N, 12° 30' W
2008-01-15	23:00	End of cruise	47° 15' N, 12° 30' W

Alamer Dive Log

Date	Time	Commentary	Positions
2008-01-15	08:00	Start of dive	47° 15' N, 12° 30' W
2008-01-15	09:00	First station	47° 15' N, 12° 30' W
2008-01-15	10:00	Second station	47° 15' N, 12° 30' W
2008-01-15	11:00	Third station	47° 15' N, 12° 30' W
2008-01-15	12:00	Fourth station	47° 15' N, 12° 30' W
2008-01-15	13:00	Fifth station	47° 15' N, 12° 30' W
2008-01-15	14:00	Sixth station	47° 15' N, 12° 30' W
2008-01-15	15:00	Seventh station	47° 15' N, 12° 30' W
2008-01-15	16:00	Eighth station	47° 15' N, 12° 30' W
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2008-01-15	21:00	Thirteenth station	47° 15' N, 12° 30' W
2008-01-15	22:00	Fourteenth station	47° 15' N, 12° 30' W
2008-01-15	23:00	Fifteenth station	47° 15' N, 12° 30' W
2008-01-15	00:00	Sixteenth station	47° 15' N, 12° 30' W
2008-01-15	01:00	Seventeenth station	47° 15' N, 12° 30' W
2008-01-15	02:00	Eighteenth station	47° 15' N, 12° 30' W
2008-01-15	03:00	Nineteenth station	47° 15' N, 12° 30' W
2008-01-15	04:00	Twentieth station	47° 15' N, 12° 30' W
2008-01-15	05:00	End of dive	47° 15' N, 12° 30' W



« Echange Terre / Mer »
Data Import/Export

Data Files

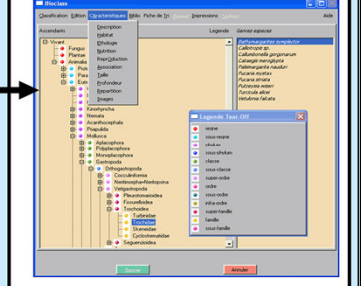
BIOCEAN Core Database
Relational Database (ORACLE)

- Metadata and Operations - Results
- Video stills
 - Samples (fauna, water, sediments)
 - Measurements
 - Moorings

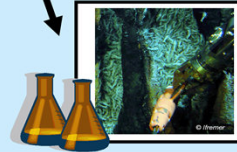
GESCOL Collection Management



BIOCLASS Taxonomic Nomenclature Management



DONENV Environmental Data Capture



Water Sampling in the shrimps ATOS 2001 (Mid Atlantic Ridge - Rainbow)

Internet Access to data

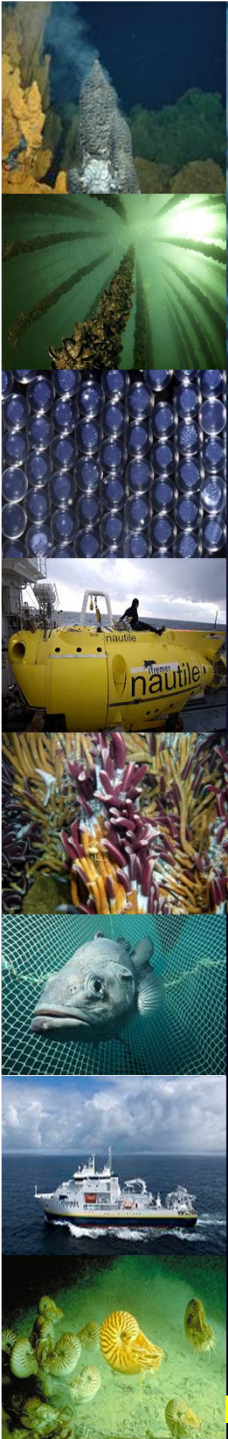


<http://www.ifremer.fr/isi/biocean>
<http://www.iobis.org>

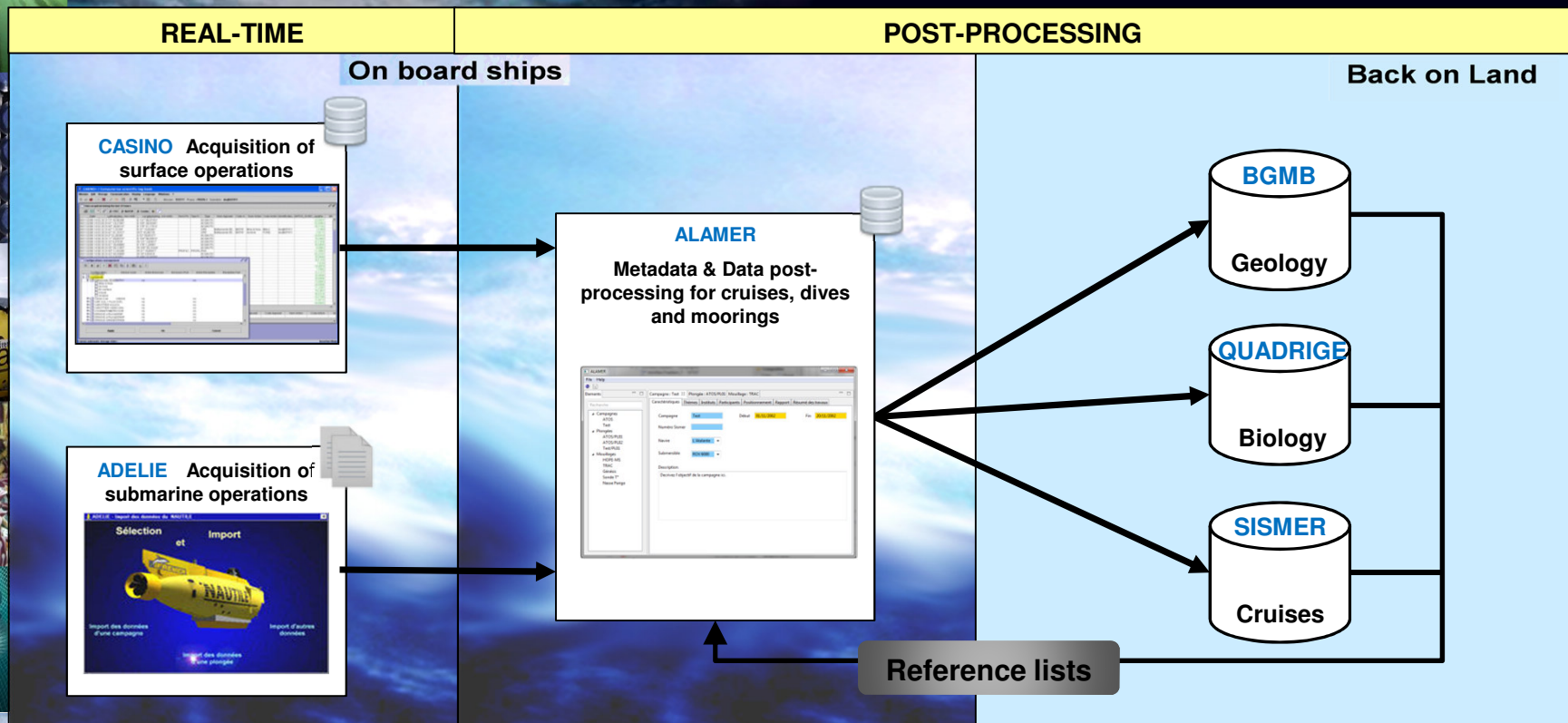
Evolutions

- New equipment and technologies: a huge increase in data volume (*e.g.*: video)
- Newcomers: geologists
- Obsolete information technologies: new functionalities needed

→ Biocean system to be renewed



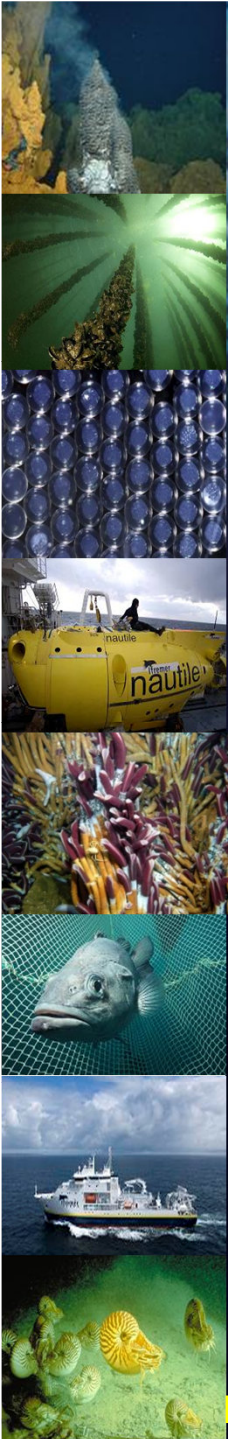
A « new » data flow



Onboard software: Alamer

Objectives

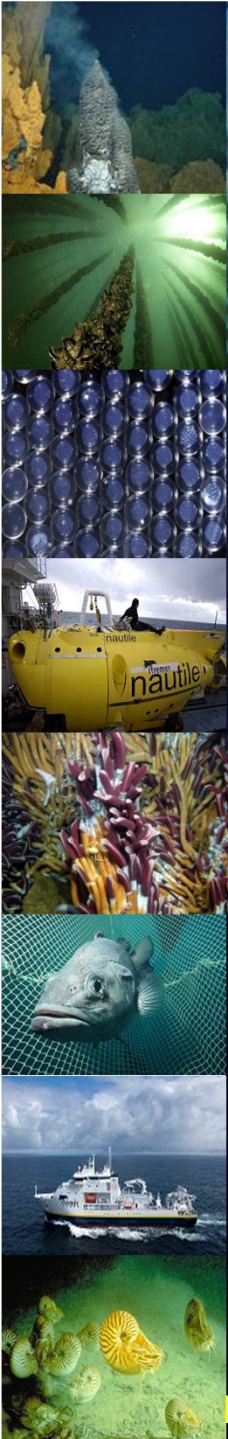
- Record and Report events (= operations)
e.g.: moorings, cores, observations...
- Track samples
from cruises, dives and moorings
operated by biologists or geologists



Onboard software: Alamer

Functionalities

- Import reference data
- Import « real-time » surface and submarine georeferenced operations
- Formatting
- Description of results, samples, measures, stills
- Safeguarding
- Export



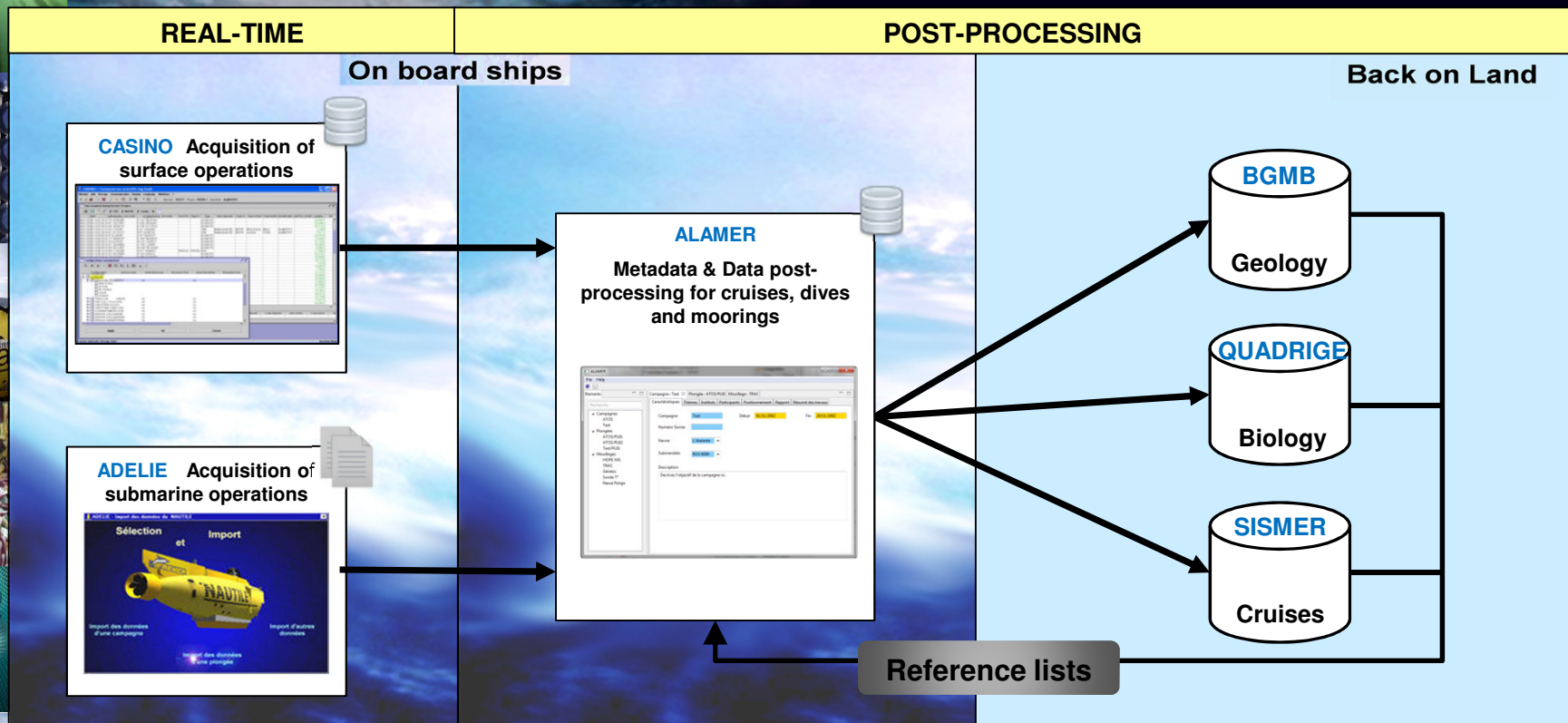
Onboard software: Alamer

Technologies

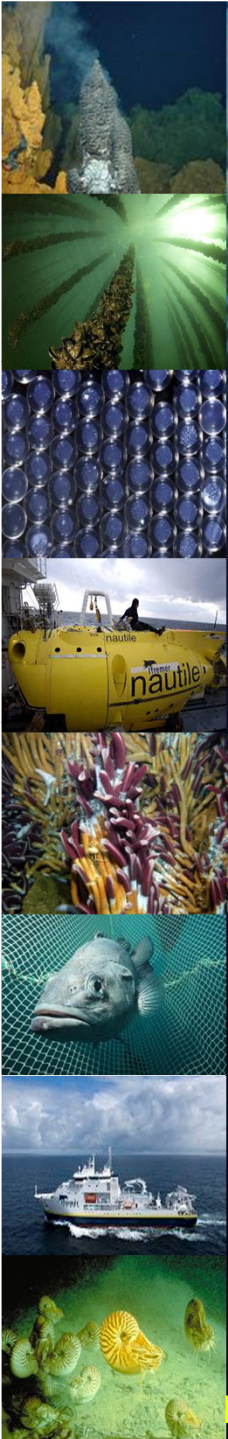
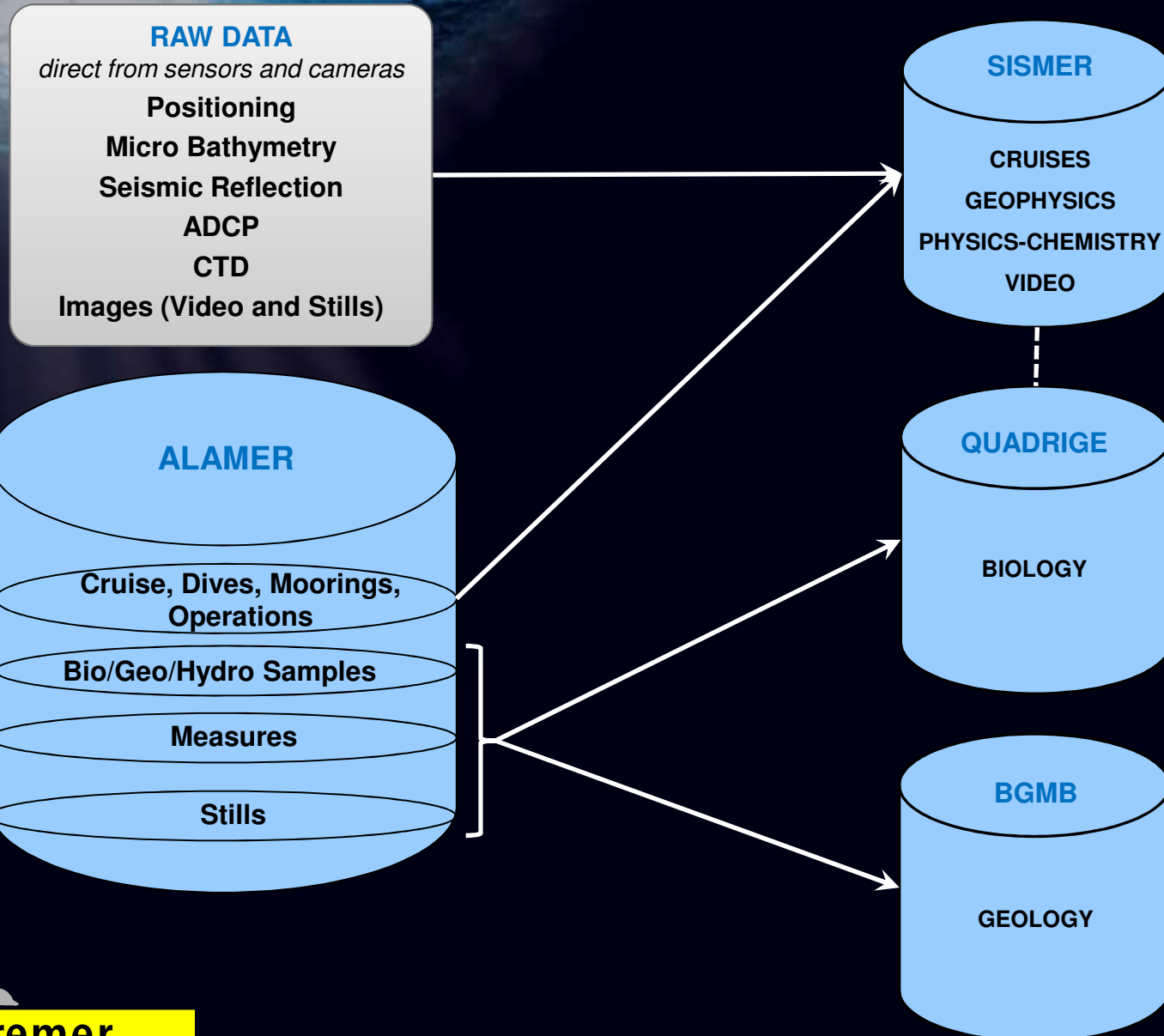
- MySQL database
- Java+Eclipse RCP
- « Stand alone » application + « Web Services » layer
- Multiplatform
- Multilingual

→ To be used onboard both French and Foreign vessels

A « new » data flow



Back on land: dedicated databases



Back on land: dedicated databases

SISMER

National data banking activity covering the fields of marine physics, chemical, underway geophysics, video and general information on French oceanographic cruises and data sets.

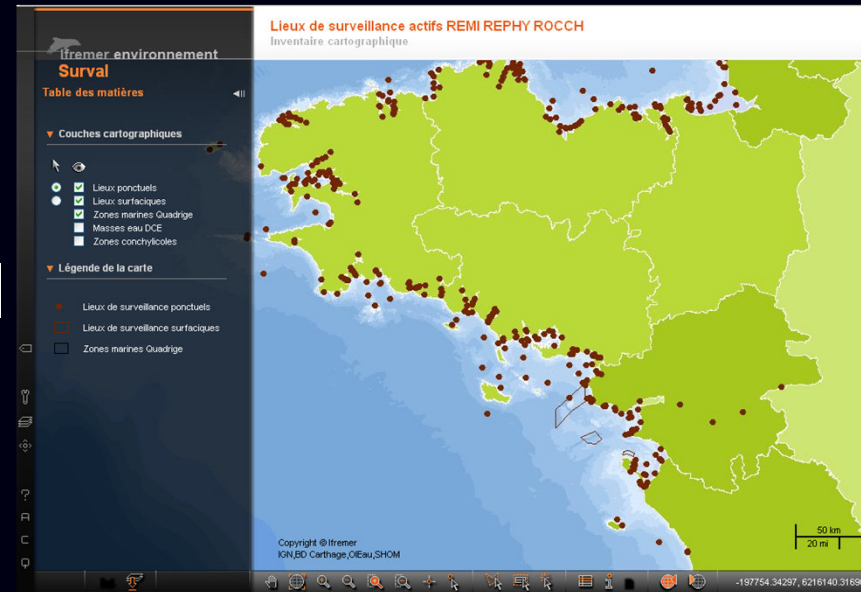


The screenshot shows the NAUTILUS Portal website. At the top, there is a navigation menu with buttons for 'Access data', 'French Databases', 'Projects', 'About SISMER', 'Quality assurance', 'Links', and 'Products'. The main content area features a large image of a research vessel at sea, with several data visualization panels (maps, charts) overlaid on it. The 'Ifremer' logo is visible in the top right corner of the page. Below the main image, there is contact information for the Centre IFREMER de Brest, including the address (BP 70, 29280 PLOUZANE, France), telephone (+33 (0)2 98 22 49 16), fax (+33 (0)2 98 22 46 44), and email (sismer@ifremer.fr). An FTP link is also provided: ftp.ifremer.fr. At the bottom of the page, there is a footer with the text 'Welcome to NAUTILUS Portal the french national oceanographic data center', a French flag, and icons for 'Copyr.', 'News', and 'Contrib'.

Back on land: dedicated databases

QUADRIGE

Initially the operational information system for French coastal monitoring, to store and give access to raw biological and ecological data. It is expanding to other subjects and is becoming a more general biodiversity information system.

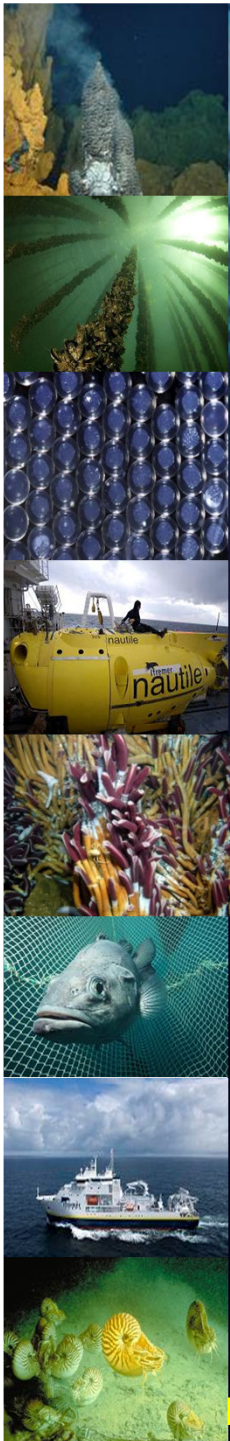


Back on land: dedicated databases

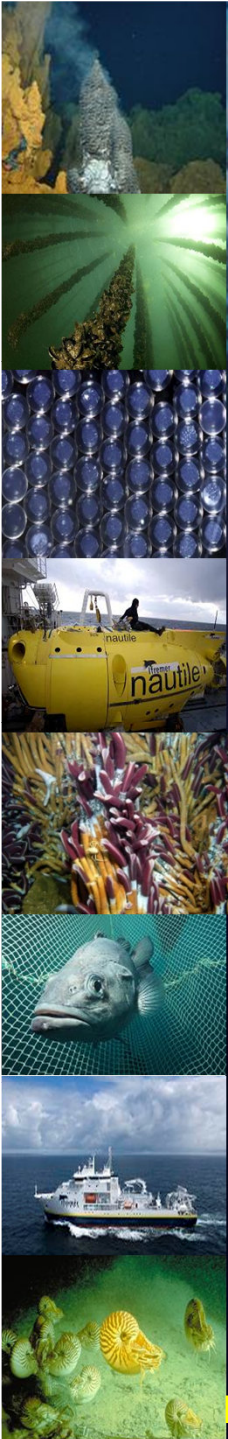
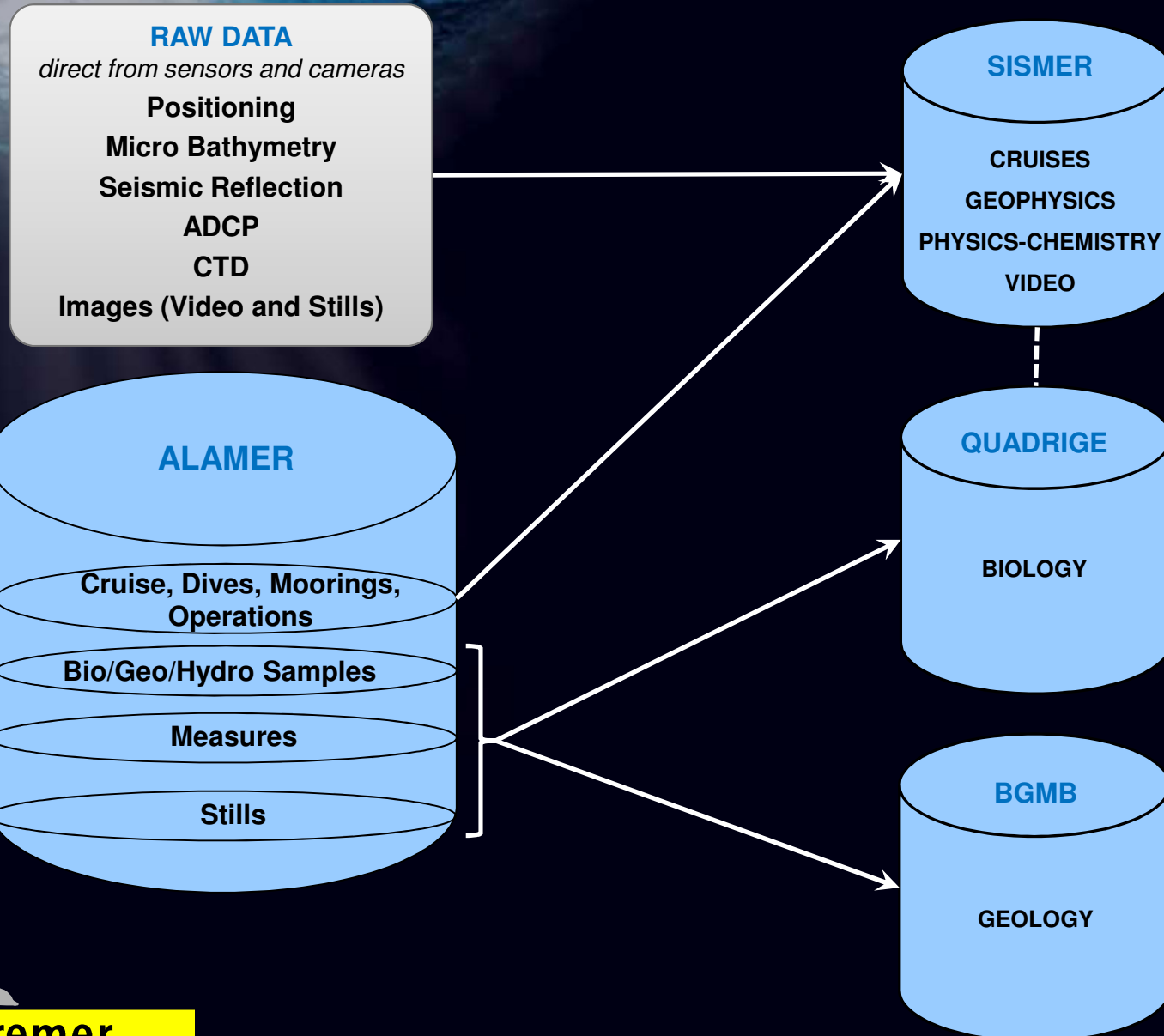
BGMB

The Marine Geological Database of Brest contains geological data related to samples and measures taken by the departments of Ifremer :

- observation and sampling stations: position, type of observation and sampling (submersible, drilling, dredging)
- descriptions of samples



Back on land: dedicated databases



Focus on video data management

Data bank

SISMER

Context

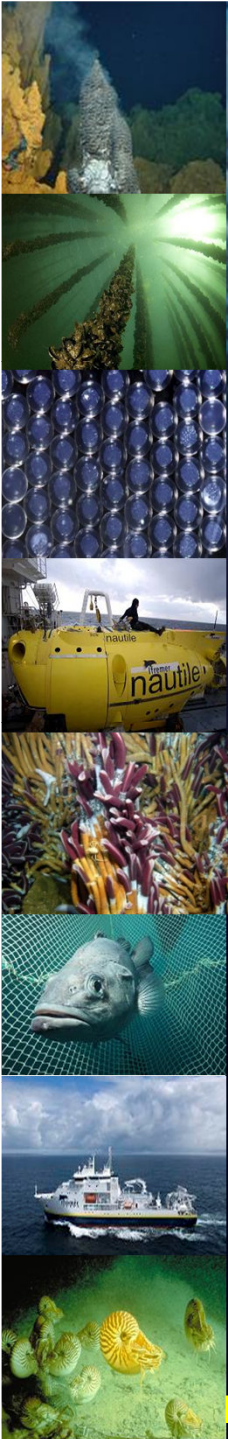
Special data: volumes, formats, diffusion,...

Objective

To provide georeferenced video online:

search tool → selection of video files extracts →

download



Focus on video data management

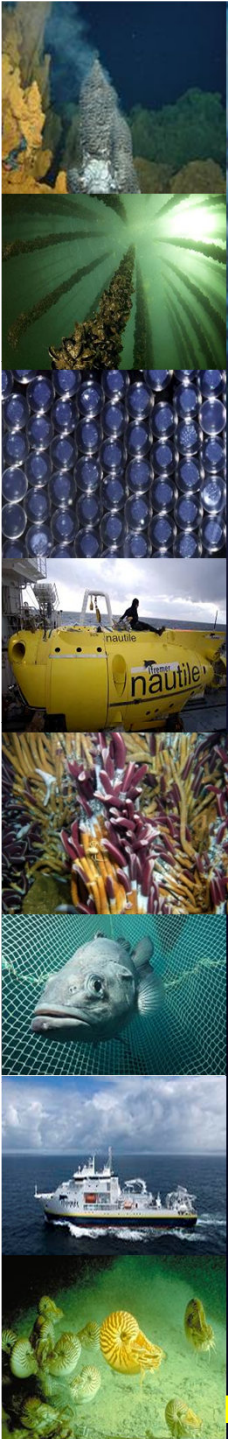
Technical needs

Management of both:

- a raw video file **format** for perennial high quality safeguarding (numerous)
- a compressed video file **format** version for web diffusion (to be defined)

Scientific oriented video **indexing**:

- metadata (cruise, location, time,...)
- inside events: observed taxa, geological features, anthropogenic impacts,...

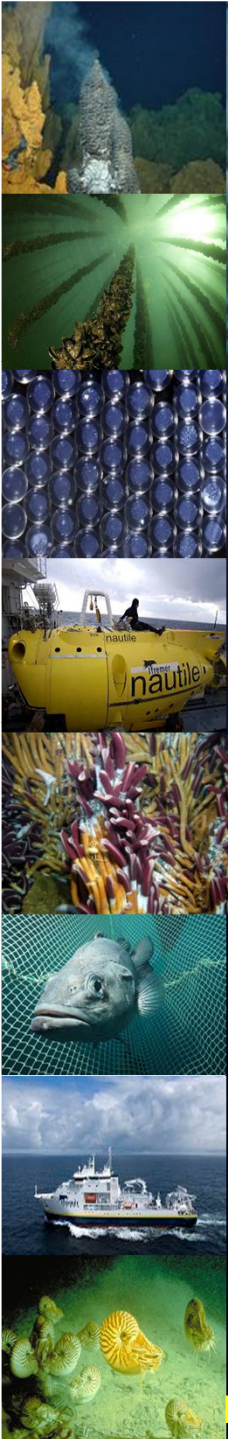


Focus on video data management

Project for the long term

To provide video related products and tools:

- automatic object detection (complex issue due to the submarine environment characteristics)
- picture enhancement (blur, light,...)
- video based automatic mosaic generation



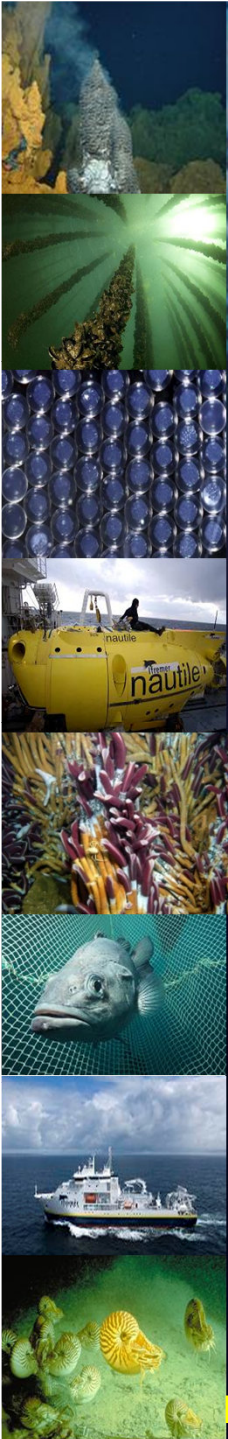
International context

... or **INTEROPERABILITY** aspects

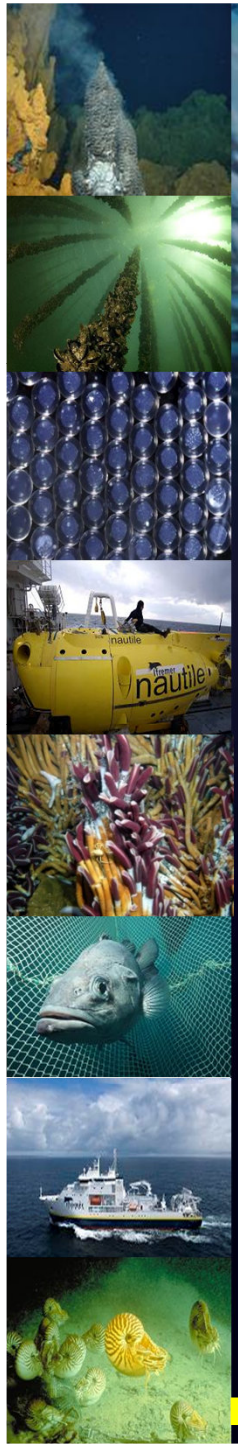
SeaDataNet and **OBIS**: use of common standards for oceanographic, environmental and taxonomic data + data connection

Eurofleets: towards a common metadata acquisition and transmission software – EARS

ODIP: input to development and implementation of standards on a global scale



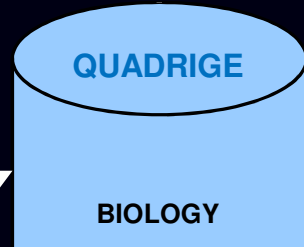
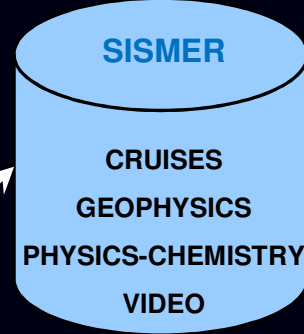
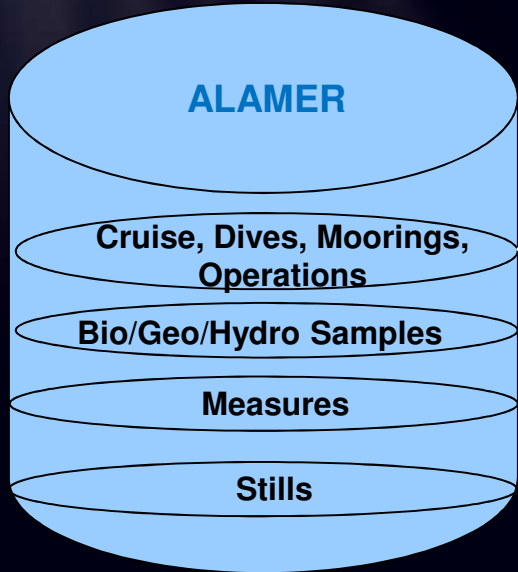
International context



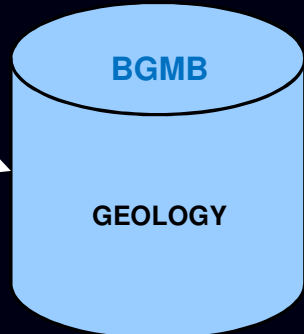
ODIP

SeaDataNet

EUROFLEETS



OBIS – WoRMS



Conclusion - perspectives

Past & Present

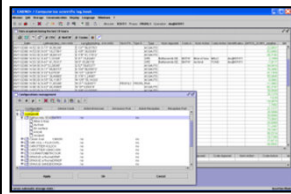
REAL-TIME

POST-PROCESSING

On board ships

Back on Land

CASINO Acquisition of surface operations



Alamer Cruise Log

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2008-08-20	23:00	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	23:30	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
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ADELIE Acquisition of submarine operations



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2008-08-20	20:00	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	20:30	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	21:00	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	21:30	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	22:00	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	22:30	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	23:00	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	23:30	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W
2008-08-20	00:00	Prise de l'eau de surface (10°C)		48° 10' N 12° 10' W

« Echange Terre / Mer »
Data Import/Export

Data Files

BIOCEAN
Core Database
Relational Database (ORACLE)

GESCOL Collection Management

BIOCLASS Taxonomic Nomenclature Management

DONENV Environmental Data Capture

Water Sampling in the shrimps
ATOS 2007
© Ifremer

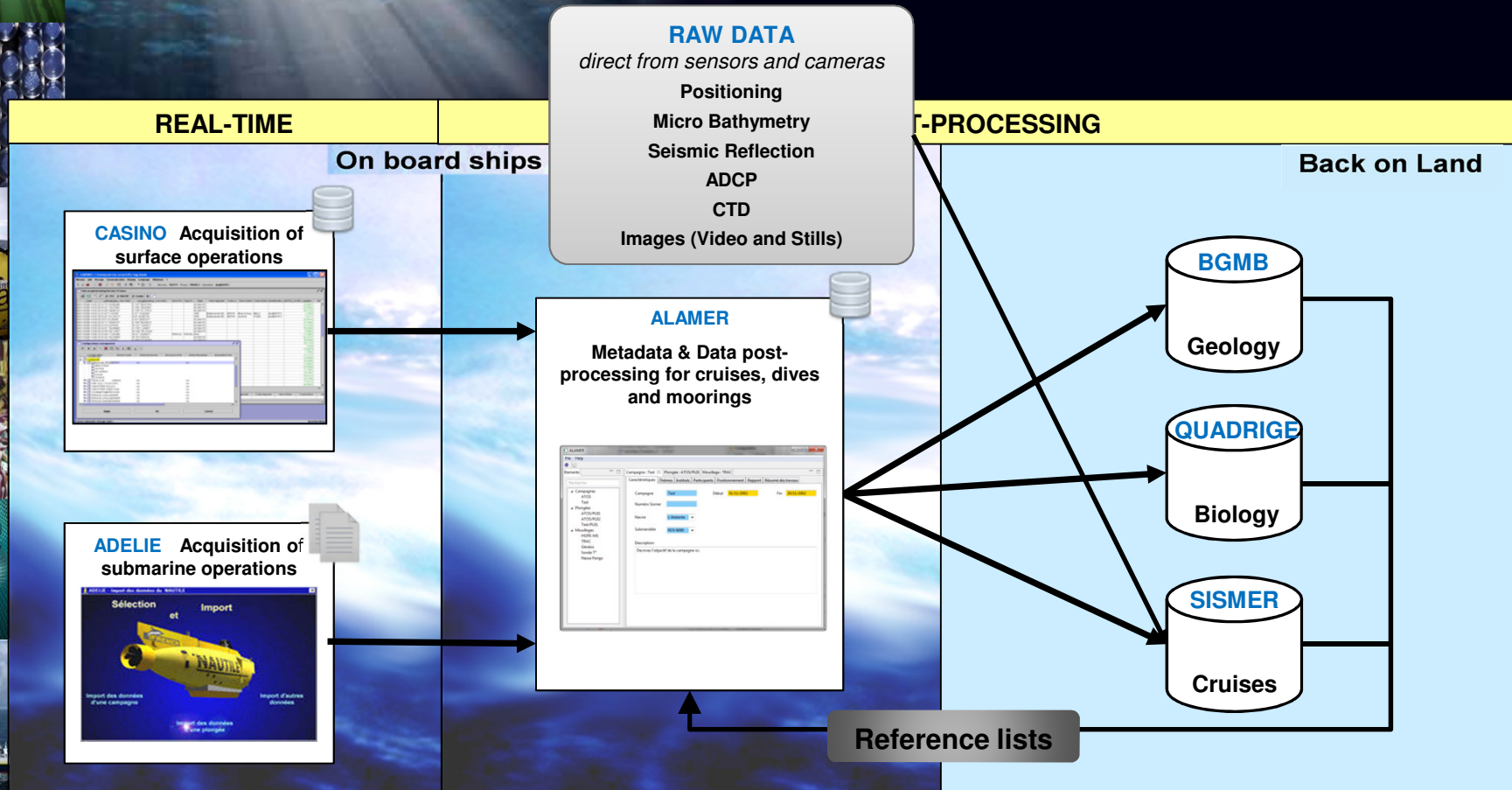
- Metadata and Operations - Results
- Video stills
 - Samples (fauna, water, sediments)
 - Measurements
 - Moorings

Internet Access to data

<http://www.ifremer.fr/isi/biocean>
<http://www.iobis.org>

Conclusion - perspectives

Present & Future



Aknowledgements

Loïc Petit de la Villeon (IDM-SISMER)

Gilbert Maudire (IDM)

Olivier Soubigou (NSE-ILE)

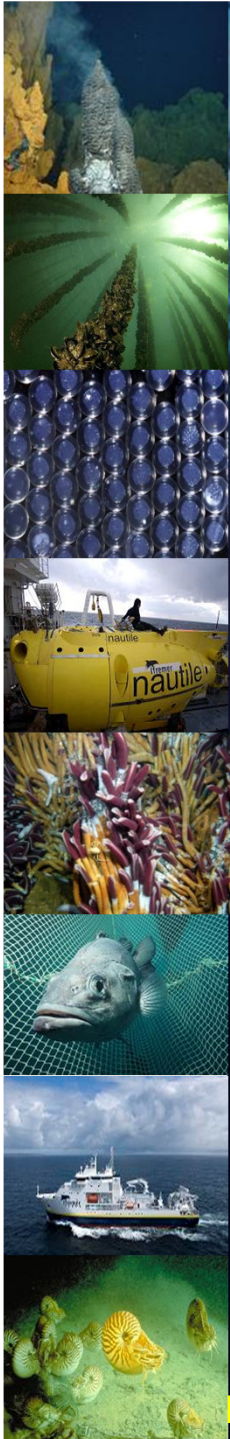
Marie-Paule Corre (NSE-ILE)

Jean-Marc Siquin (NSE-ILE)

The « biologist » team (EEP-LEP)

The « geologist » team (GM-LGM)

...





Remarks and suggestions are welcomed !

Thank you for your attention

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