

DYMAPHY's Results DataBase Input/Output Data, Structure, and Web Access



Imap
Images et Apprentissage

ULCO/ LISIC-Team

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DYMAPHY's Results DataBase Input/Output Data, Structure, and Web Access

✓ Overview

- A database: what for ?
- Data overview
- Database structure
- Database implementation
- Database Web interface



A database: what for ?

- ✓ Phytoplankton is central in DYNAMAPHY's project
 - As an **indicator** of the quality of marine waters
 - Many types of devices are available to **detect, identify, count, or predict** it
 - Necessity to **study, standardize** and **compare** those different kinds of measures
- ✓ Many campaigns have been conducted
 - In various:
 - **places, seasons, sampling frequencies, depths**
 - Either:
 - **statically** (marine station) or **dynamically** (cruises)
 - in **discrete sample** or **in-line**
 - in **fields** or **cultures**



A database: what for ?

- ✓ Necessity to **gather** those data into a database
 - High quantity
 - Many campaigns
 - High frequency measures
 - High heterogeneity
 - Various measure devices
 - Biological measures (Phytoplankton) + Physical & Chemical measures (Environmental factors)
 - Extraction by various criteria
 - Merging
- ✓ A **public** database, i.e. **not restricted** to DYNAMPHY's partners
 - To compare different ways to measure Phytoplankton
 - In order to propose efficient measure protocols
 - To improve signal processing and data analysis methods to count/identify Phytoplankton groups



Data Overview

DYMAPHY's campaigns

✓ Inter-CALibrations exercises

- Cultures

- Monocultures (CAL-1, CAL-2, CAL-3)
- Mixtures (CAL-2 & CAL-3)

- Field samples

- Jacobahaven (Versemeere, Rompot) – CAL-1
- Lowestoft (estuarine-North Sea gradient) – CAL-2
- E. Channel (coastal-offshore gradient) – CAL-3



Data Overview

DYMAPHY's campaigns

✓ Common oceanographic cruises

- **PROTOCOL/DYMAPHY** cruise

- R.V. « Endeavour » – North Sea – May 2011

- **DYPHYMA-I** cruise

- R.V. « Côtes de la Manche » – Eastern Channel – April 2012

- **« Dutch estuaries »** cruise

- R.V. « Argus » – Westerschelde, Oosterschelde and Grevelingen – September 2012



Data Overview

DYMAPHY's campaigns

✓ Local Monitoring/Observation networks

● English North Sea

- The Wash
- Smart Buoys
- Fisheries' cruise
- North Sea monitoring cruise

● Dutch North Sea and estuaries

- S.E. North Sea monitoring
- Zyrphaea cruise
- Wetern/Eastern Schelde

● French North Sea and E. Channel

- Wimereux-Slack coastal-offshore gradient (LOG)
- DYPHYMA II cruise
- REPHY/SRN IFREMER estuarine-Channel gradient (Somme Bay, Boulogne sur Mer, Dunkerque)



Data Overview - Field samples

✓ Dutch Estuaries

- CAL-1 common inter calibration
- Westerschelde/Oosterschelde monitoring
- « Dutch Estuaries » common cruise (R.V. « Argus » - RWS)

✓ English estuaries & coastal E. North Sea

- CAL-2 common inter calibration
- Wash
- Smart Buoy

✓ North Sea

- Protocol/Dymaphy common cruise (R.V. « Endeavour » - Cefas)
- North Sea monitoring cruise (Cefas)
- Zyrphaea cruise (RWS)
- SE North Sea coastal monitoring (RWS)
- Southern North Sea (Dunkerque) coastal monitoring (SRN IFREMER)

✓ Eastern Channel

- CAL-3 common inter calibration
- Wimereux-Slack coastal-offshore gradient (LOG)
- Boulogne sur Mer and Bay of Somme coastal monitoring (SRN/REPHY – IFREMER)
- DYPHYMA I common cruise across the E. Channel («R.V. « Côtes de la Manche » - INSU/CNRS)
- DYPHYMA II cruise across the E. Channel («R.V. « Côtes de la Manche » - INSU/CNRS)



Data Overview

Various measure devices

- ✓ Flow Cytometry
 - CytoSense (from Cytobuoys)
- ✓ Spectral Fluorometry
 - BBE Fluoroprobe, PhytoPAM, Algae Online Analyser (AOA)
- ✓ Pigments measures
 - HPLC
- ✓ Microscopy
- ✓ Physical & chemical measures
 - Pocket Ferry Box (Temperature, salinity, O₂, pressure...)
 - Fluorescence extraction
 - CTD sonde (YSI)
 - Technicon Alliance
 - TOC analyser (Dissolved Organic Carbon)



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Database Structure

✓ Which data ?

● Results data

- **Synthetic** data intended to biologists, like groups abundance or concentrations
- Some raw data require some **analysis processing** (FCM, Spectral Fluorescence)

● **Multiple importations** of sets of *results data* for a given water sample

- This constraint comes from the **diversity** of previous **analysis processing**
- Results data can be compared, but methods to analyse those measures too



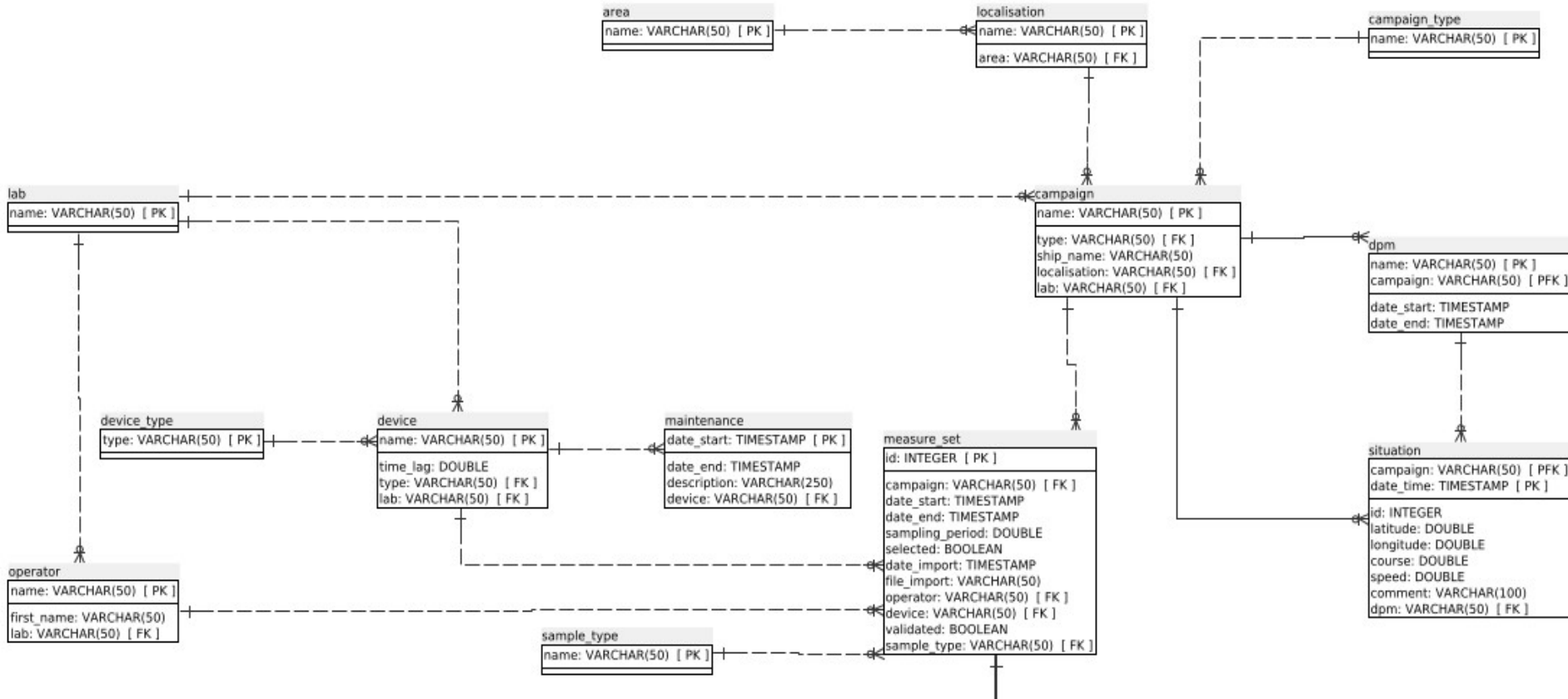
Database Structure

✓ Structured by

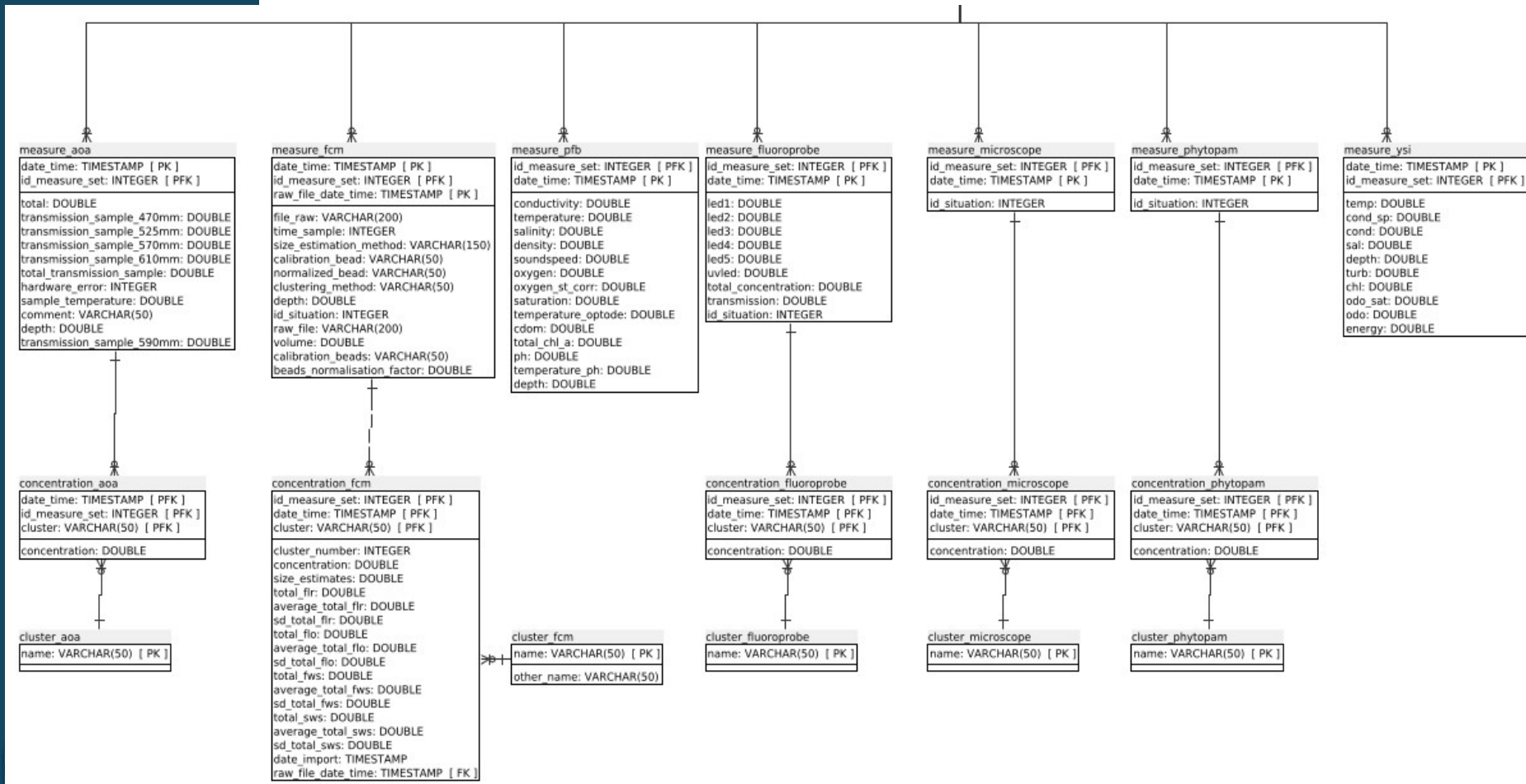
- Campaign names
- Importation sets (methods used)
- Types of devices
 - High data heterogeneity
- Time
 - **Some measures are continuous**, with distinct **sampling rates**
 - **Synchronisation** of all devices is therefore required
- Locality
 - Either places names or **GPS-coordinates**
- Depth
 - Some measures are repeated at various depths (sondes)



Database Structure Meta-data



Database Structure Results-data



Database Implementation

✓ DB system

- *Postgresql 9.1*, on a *Linux* server in ULCO university

✓ Interface: data import & export tool

- Through DYMAPHY's **website**

- At <http://www.dymaphy.eu>

- **PHP** implementation

✓ Data import/export format

- **.CSV** files (text files, structured by columns)
- A strict format is required

✓ Data description

- Units, precision indication, description
- In reference documents, on the website (**soon**)

✓ Database access

- Public, but **registration required** (**soon**)

- At present time, DB is being fulfilled
- After DYMAPHY's end will be maintained



Database Web Interface Importation

✓ Insert results data into the database

- From a .CSV *device* table file (Excel, OpenOffice)

Result Importation from a .csv data file

[Back](#)

Campaign's type: Local Monitoring/Observation Networks ▼

Campaign's name: DYPHYMA-2 ▼

Device's name: PFB_IFREMER ▼

Validated:

Operator: Lefebvre ▼

Sample type: field ▼

File: Parcourir...

Submit file



Database Web Interface Exportation

- ✓ Extract results from database into .CSV file
 - **Synchronized** data in time/locality/depth
 - **Device-Merged** data

Campaign's type: Local Monitoring/Observation Networks ▼

Campaign's name: DYPHYMA-2 ▼

Date Start: 2010-01-02

Date End: 2013-12-01

Validated:

Validate campaign common parameters

Device type: ▼

Requested fields:

[Device type] [Device name] [Method] [Fields] [Cluster Fields] [Cluster Names]
[Flow Cytometer] [FCM_ULCO] [MANUAL] [][total_flr] [Coccolith,synecho1]
[Pocket Ferry Box] [PFB_IFREMER] [] [density,depth,temperature,total_chl_a] [] []

Remove selected fields

Download Data .CSV File



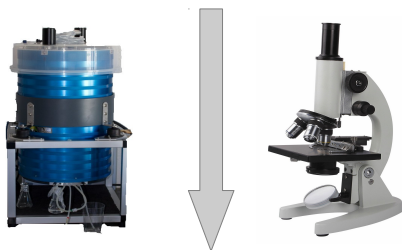
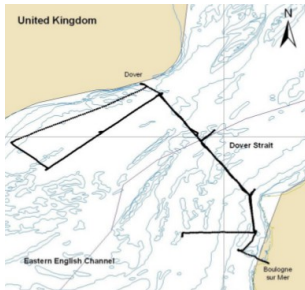
Database Web Interface Exportation

✓ Extraction from database into .CSV file

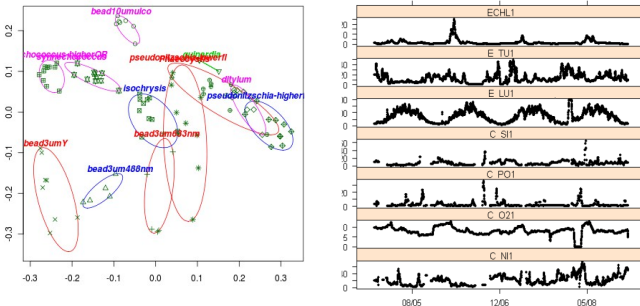
	A	B	C	D	E	F	G
	date time	FCM_ULCO.MANUAL.total flr.Coccolith	FCM_ULCO.MANUAL.total flr.synecho1	PFB_IFREMER.density	PFB_IFREMER.depth	PFB_IFREMER.temperature	PFB_IFREMER.total chl a
1	2011-05-08 09:19:00	549000	1080000				
2	2012-04-27 22:00:00			1023.846		10.093458	0
3	2012-04-27 22:01:00			1023.843083		10.094125	0
4	2012-04-27 22:02:00			1023.848583		10.099125	0
5	2012-04-27 22:03:00			1023.845708		10.110125	0
6	2012-04-27 22:04:00			1023.827292		10.110083	0
7	2012-04-27 22:05:00			1023.830167		10.102417	0
8	2012-04-27 22:06:00			1023.840625		10.105917	0
9	2012-04-27 22:07:00			1023.832708		10.116375	0
10	2012-04-27 22:08:00			1023.834875		10.113958	0
11	2012-04-27 22:09:00			1023.835875		10.113583	0
12	2012-04-27 22:10:00			1023.841042		10.111792	0
13	2012-04-27 22:11:00			1023.8165		10.114667	0
14	2012-04-27 22:12:00			1023.8185		10.112375	0
15	2012-04-27 22:13:00			1023.8235		10.112125	0
16	2012-04-27 22:14:00			1023.823042		10.115083	0
17	2012-04-27 22:15:00			1023.805958		10.120458	0
18	2012-04-27 22:16:00			1023.77475		10.126875	0
19	2012-04-27 22:17:00			1023.837292		10.126	0
20	2012-04-27 22:18:00			1023.841333		10.1235	0
21	2012-04-27 22:19:00			1023.839708		10.123833	0
22	2012-04-27 22:20:00			1023.837917		10.126292	0
23	2012-04-27 22:21:00			1023.83425		10.134458	0
24	2012-04-27 22:22:00			1023.82975		10.141833	0
25	2012-04-27 22:23:00			1023.83025		10.143292	0
26	2012-04-27 22:24:00			1023.826167		10.153792	0
27	2012-04-27 22:25:00			1023.820958		10.165167	0
28	2012-04-27 22:26:00			1023.817042		10.1735	0
29							

DYMAPHY's Results Database

Collected data during
 DYMAPHY's campaigns

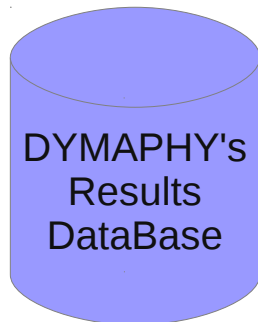


Results data:
 biological, physical, chemical



Exportation of a single
 device-merged &
 synchronised .CSV file

Public Web access



Scientists interested in
 Phytoplankton



Importation of multiple
 by-device .CSV files

Conclusion & Perspectives

✓ Conclusion

- All results data obtained in DYMAPHY's campaign are gathered in this database
- Public database intended to biologists or data analysis scientists

✓ Perspectives

- Add some more device types
- Complete data insertion
- Add more criteria in the export process
- Finally, open public internet access to DB





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Data Overview

Culture Samples

✓ FCM culture samples

- Species on **CAL-1**
- Species on **CAL-2**
- Species on **CAL-3**
- Mixture on **CAL-2**
- Mixture on **CAL-3**

✓ From different CytoSense devices

- Cefas
- RWS
- LOG-IFREMER

