JRA1:Genomics Observatories GOs *in ASSEMPLE Plus*

Association of European Marine Biological Laboratories Expanded

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ASSEMBLE Plus Kick off meeting
19-20/10/2017, UPMC, Paris

JRA1 - Genomics Observatories GOs

GOs is a Network

of Ecosystems and/or Sites subject to long-term scientific research, including and not limited to the sustained study of genomic biodiversity from single-celled microbes to multicellular organisms

Davies et al. GigaScience 2014, 3:2

Operation of GOs

- Genomic data are taken together with high quality contextual data (e.g. spatial, temporal, environmental)
- Use and encourage development of standards for all processes: Sampling, Sample processing, Experimentation, Data & Metadata Capture, Data Management, Data Analysis

Some History

Inspirational projects

A. Micro B3 – OSD: Fill the gaps that Tara Oceans, Malaspina and everything else around, could not deliver in terms of workflows, interoperability, software development

B. Tara Oceans: most advanced endeavor: still many gaps in broadly delivering data and infrastructures

C. Genomics Standards Consortium GOs

and now:
D. GOs ASSEMPLE Plus
Sitting on an Infrastructure with secured funding can offer
T**emporal dimension &**
host international community for global capacity

Suggestion:
Whatever we develop, keep on securing OSD in the background as the simplest maintenance gymnastics

General Principles

Reconcile realism & ambitions

Technology alone does not suffice
This is an exercise for improving collaborative intelligence

Ambition to get to:

- Bring Systems Biology outside the lab into the (Eco)systems
- Get from Genes & Genomes to Phenomes and Ecosystem Functioning
- Produce knowledge from data

The operations we need to support:

- Produce Data with vigilance for methods and their global adoption
- Reduce noise in Big Complex Data, making it Accessible Manageable, Interoperable
- Build good practices and human capacity for the above

Challenges to Big Ambitions

Transparency & Repeatability is where **Big Data science fails** in human research – *extensive literature by I. Ioannidis*

Then what about **Marine Ecosystems** with **a thrilling diversity** of life, genomes, metabolic processes, habitats & ecosystems, diversity of interactions, flow of energy, matter and information.

Still a single cross generational vehicle DNA!

<u>Will it remain a black box biology for ever?</u>

The above GOs relevant Use Cases keep promise that a different marine biology is almost there

<u>A Single Species vs whole Biomes:</u>
Comparative biology may bring more information than noise

The Objectives

1. Initiate a distributed Marine Genomic Observatory (GO) community in European marine biological stations with time-series ecosystem monitoring programs and molecular expertise

2. Harmonize a **consortium strategy and guidelines for DNA barcoding** and populate **a reference DNA barcoding database** for local communities

3. Produce a common virtual-access **portal for GO data and information on protocols, tools and best practices**; **Communication & Outreach Forum**

4. Perform **pilot coordinated sampling and sample processing events** via a **«GO Ocean Sampling Day»** as an end-to-end exercise in order to identify steps in need of improvement and produce a baseline harmonized dataset for virtual access and analysis through the web services provided

The Actual Committed Partners/Stations

1. The Hebrew University of Jerusalem (HUJI), Red Sea, Israel
2. HCMR, Crete, Greece
3. National Institute of Biology (NIB), Slovenia
4. Stazione Zoologica di Napoli (SZN), Italy
5. UPMC, Villefranche-sur-Mer, France
6. UPMC, OOB, Banyuls, France
7. CCMAR, Faro, Portugal
8. University of Vigo, Spain
9. University of the Basque Country (UPV/EHU), Spain
10. UPMC, Roscoff, France
11. Flanders Marine Institute (VLIZ), Belgium
12. Max Planck Institute for Marine Biology (MPIMM), Germany
13. Institute of Oceanology Polish Academy of Sciences (IOPAN), Poland
14. University of Gdansk (UG), Poland
15. University of Helsinki (UH), Finland
16. of Gothenburg (UGOT), Sweden
17. Marine Biological Association of the United Kingdom (MBA), UK
18. Natural Environment Research Council (NERC-BAS) Antarctic, UK
19. National University of Ireland Galway (NUIG), Ireland

The Tasks

Task JRA1.1. GO standards-literate community building – M12 (HCMR)
Questionnaire & Workshop = > strategy document for GO implementation

Task JRA1.2. GO-Sampling Day M18 (HCMR)
Operation of Pilot cross-consortium: 'GO-Ocean Sampling day'
Doing the real thing in a well prepared manned, adding new elements

Task JRA1.3. DNA barcoding & metagenomics (UPMC) M24 & M45
DNA barcoding and metabarcoding water column & benthic diversity
Bring all Institutes to level for DNA barcoding and metabarcoding
Populating Reference DNA barcoding data bases

Task JRA1.4. GO virtual-access portal (MPIMM)
A multipurpose tool communication Forum,
Access to ASSEMBLE Plus and publically available relevant services,
Outreach tool - window of GOs to the community and the world

List of Deliverables

Deliverable (number)	Deliverable short name	Work package number	Short name of lead participant	Type	Dissemination level	Delivery date (in months)
D JRA1.1	**Strategy document for establishment of European GO network**	JRA1	HCMR	R	PU	M12
D JRA1.2	**Guidelines for standardization of DNA metabarcoding**	JRA1	UPMC	R	PU	M18
D JRA1.3	**GO data delivered for VA**	JRA1	HCMR	DEC	PU	M24 Update M45

List of Milestones

MS No.	MS name	Related WPs	Due M	Means of verification
3	Data Management Plan (DMP) v1	1; NA1, 2; JRA1, 3, 4, TA	6	- Publication of D **NA2.1**, with **input** from results of WSs of NA2 and **JRAs 1,** 3 and 4 - D NA2.4 online - Proposals 1st TA round selected
4	2nd GA meeting	1; NA2; JRA1, TA	12	- Minutes 2nd GA meeting with report of the 1st TA-round, selection of proposals 2nd TA - D1.4 and **D JRA1.1 delivered**
5	GO Ocean Sampling Day	1; JRA1, TA	18	- 3rd batch of TA proposals selected for TA - **D JRA1.2 delivered to allow GO sampling day**
6	3rd GA meeting	1; NA2, 3, 4; JRA1, 2, 3, 5, TA, VA	24	- Minutes of 3rd GA meeting; 4th batch of TA proposals selected; Annual TA report - **D JRA1.3 first data available for VA** - D NA2.1 v2, D NA3.1, D NA4.1, D JRA2.2, D JRA3.1, D, JRA5.1 delivered
7	Business Plan	1; NA3, 4; JRA1, 3, TA	30	5th batch of TA proposals selected for TA - D NA3.2, D NA4.2, D **JRA1.3**, D JRA3.1 delivered
9	Final JRA deliverables	NA1, 4; JRA1, 3	45	- D NA1.2, D NA4.3, D **JRA1.3**, D JRA3.3 and 3.4 delivered

Interactions between Activities in ASSEMBLE Plus

3.1.4. Graphical presentation of the components and their inter-relation

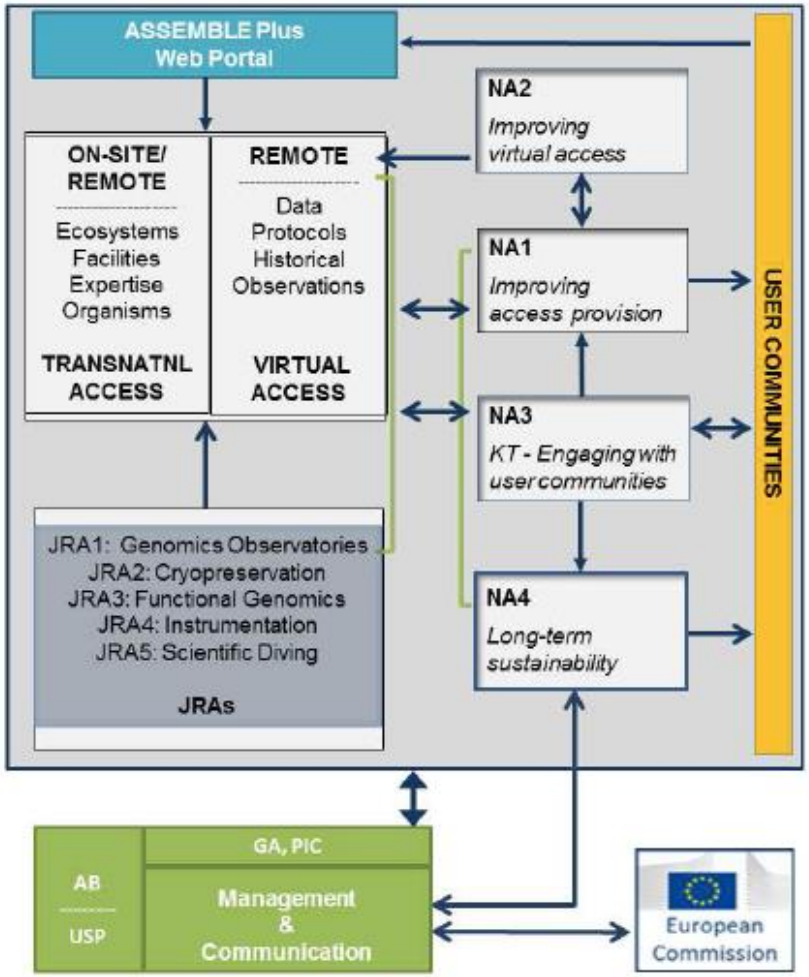


Figure 4: PERT Chart of Assemble Plus activities and their interrelationship.

Travel budget -UPMC management

Giving flexibility to workshops

UPMC management of Travel needs	Cost (€)	Event - Meeting
	6,000	Costs related to participation on regular meetings in the frame of Networking (NA3, NA4), Joint Research Activities (JRA1) and management meetings.
	15,400	Attendance to meetings organised under NA2, NA3, NA4, JRA1 and JRA5.
	6,000	Budget requested to attend coordination and workshop meetings in WP NA2, NA3, NA4, JRA1, JRA3
	10,500	Travel costs for meetings related to Networking (NA2, NA4), Joint Research Activities (JRA1, JRA4) and project review meetings.
	36,500	Travel costs for meetings related to NA1, 3, 4 and JRA1, 3,4 + project review meetings
	18,400	Travel of CCMAR staff to annual meetings and workshops; and travel of invited participants external to the consortium to 2 conferences, and training in NA3, JRA1 and JRA4.
	10,500	Costs for travel required for attendance at programmed project meetings under NA 2 and 4 and JRA1 and 2.
Total for Travel	**103,300**	

"Other costs" –UPMC management
Giving flexibility to operations

UPMC	Cost (€)	Other goods and Services - Justification
Goods and services	3000	Costs for dedicated consumables related to JRA1 activity.
	5500	Materials and supplies necessary in the frame of NA2, JRA1 and JRA5 activities.
	62422	Consumables to support genomic and equipment actions in JRA1 and JRA4 (12000) + TA actual costs (50422)
	53089	lab consumables mainly for JRA1+ JRA5 (14000)+ TA actual costs (37089) + subsidence (2000)
	198000	Consumables needed for JRA1, 3 and 4 (93000) + audit costs (25000) + NA1 workshop organisation (80000)
	173961	Expenses related to organization of conferences, training and workshops in NA3, and consumables in JRA1, JRA2 and JRA4 (66000) + TA actual costs (107961).
	5000	Minor consumables to cover JRA1 expenses and transfer of samples between partners for analysis.
Total	**500,972**	

Genomics Observatories (GOs) in ASSEMBLE Plus

19 marine stations: **16 along Europe** and one for each of **Red Sea**, **Antarctic** and **Arctic ocean**

- **Metagenomics**: bacteria - viruses
- **Metatranscriptomics**: bacteria - eukaryotes
- **Metabarcoding**: prokaryotes - eukaryotes

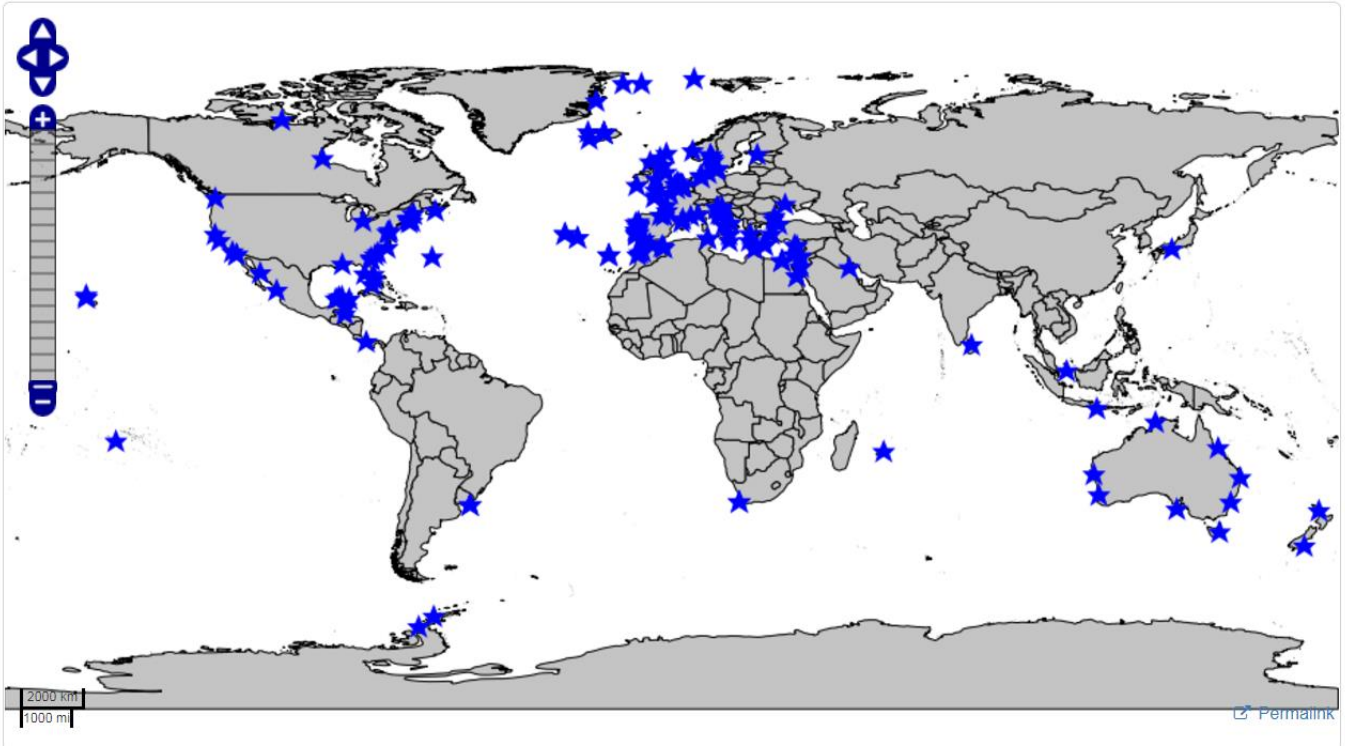
Also Supported by EMBRC, LIFEWATCH, ELIXIR

hcmr
ΕΛΚΕΘΕ

EMBRC
EUROPEAN
MARINE
BIOLOGICAL
RESOURCE
CENTRE

OSD
Ocean Sampling Day

Map of OSD Participant sites



micro B3
Biodiversity. Bioinformatics. Biotechnology.

Support of HCMR on JRA1

Thank you for your attention!

40 months employed person on JRA1
Taxonomy experts
Biodiversity Informatics
Bioinformatics
Experimental Meta-barcoding
Metagenomics
Computer cluster (640 cpus)
Close Interaction with NA2
TA