



MASH-Ocean 1.0: Interactive platform for investigating microbial diversity, function, and biogeography with marine metagenomic data

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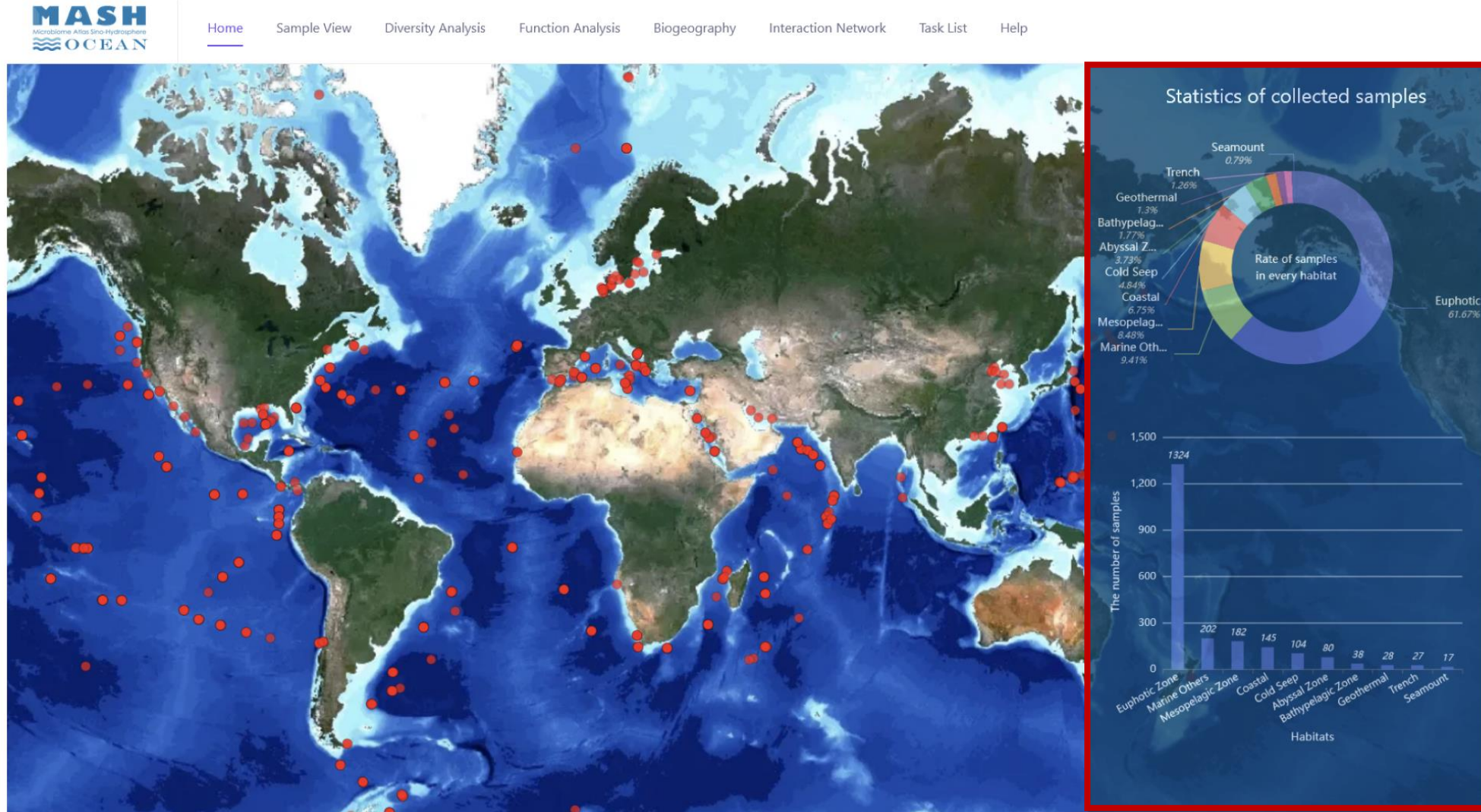


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Introduction

With the increasing severity of water environment pollution and global climate change, understanding the diversity, function, and distribution of aquatic microorganisms has become increasingly important.





Overview of MASH-Ocean

The top is the navigation bar of the web-site, and there are eight icons including Home, Sample View, Diversity Analysis, Function Analysis, Biogeography, Interaction Network, Task List and Help.

The screenshot displays the MASH-Ocean web application interface. At the top, there is a navigation bar with the MASH-Ocean logo and eight menu items: Home, Sample View, Diversity Analysis, Function Analysis, Biogeography, Interaction Network, Task List, and Help. The main content area is titled "Description" and "Overview". A "Show 20 Entries" dropdown is visible. Below this is a table with 10 columns: Run ID, Project ID, Sample ID, Habitat Source, Env Zone, Env Medium, Fractionation, Location, Longitude, and Latitude. The table contains 20 rows of data, all with "Pacific Ocean: North Pacific Gyre; Station ALOHA" as the location. To the right of the table is a "Filter" sidebar with checkboxes and dropdown menus for Search ID, Habitat Source, Env Zone, Env Medium, Fractionation, Location, Longitude, Latitude, and Depth (m). A "Search" button is located at the bottom of the filter sidebar. At the bottom of the table, there is a pagination control showing "Showing 1 to 20 of 2,147 entries" and a "Search" button.

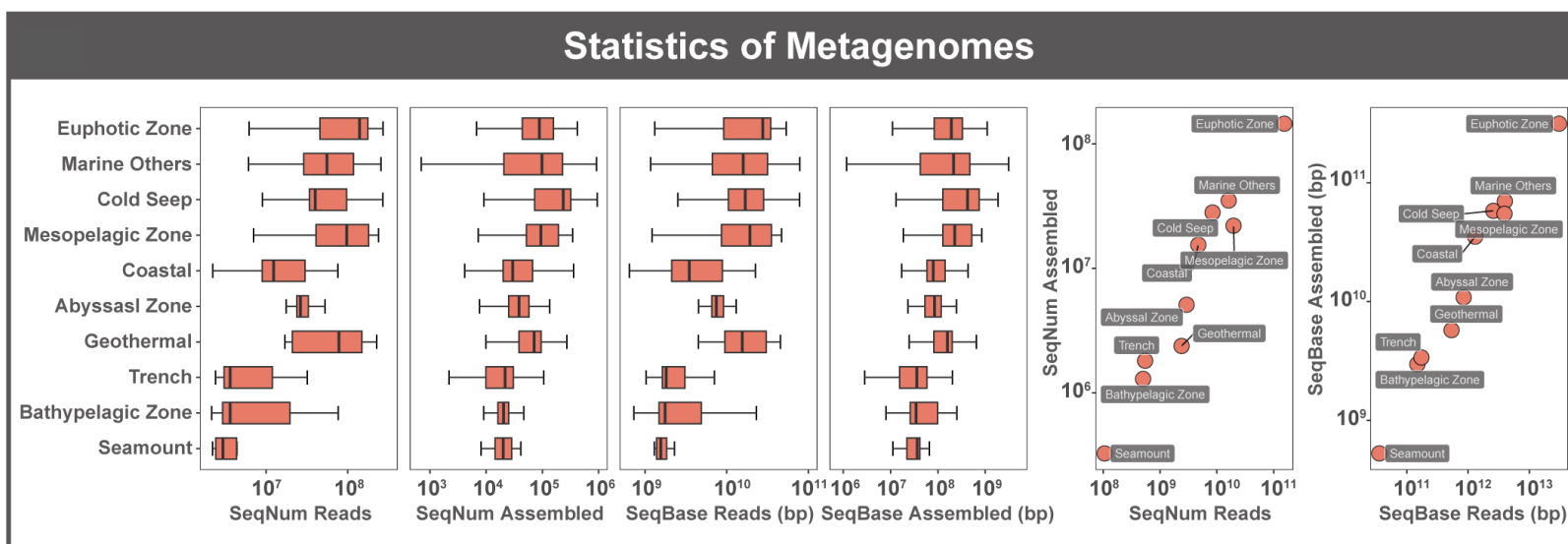
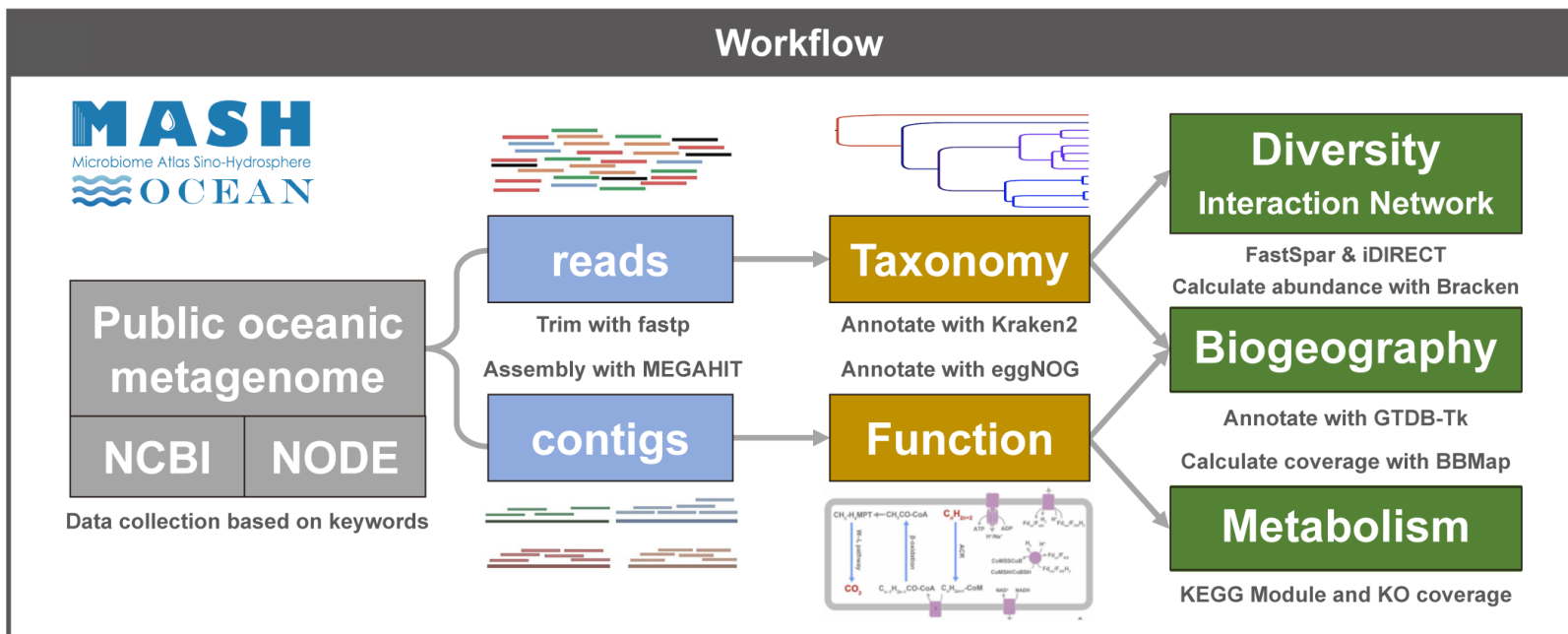
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SRR7648273	PRJNA482655	SAMN09765713	Abyssal Zone	Abyssal Zone	Seawater	Meta	Pacific Ocean: North Pacific Gyre; Station ALOHA	-158	22.75
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SRR7648294	PRJNA482655	SAMN09765709	Abyssal Zone	Abyssal Zone	Seawater	Meta	Pacific Ocean: North Pacific Gyre; Station ALOHA	-158	22.75

Showing 1 to 20 of 2,147 entries

* The meta information were standardized.

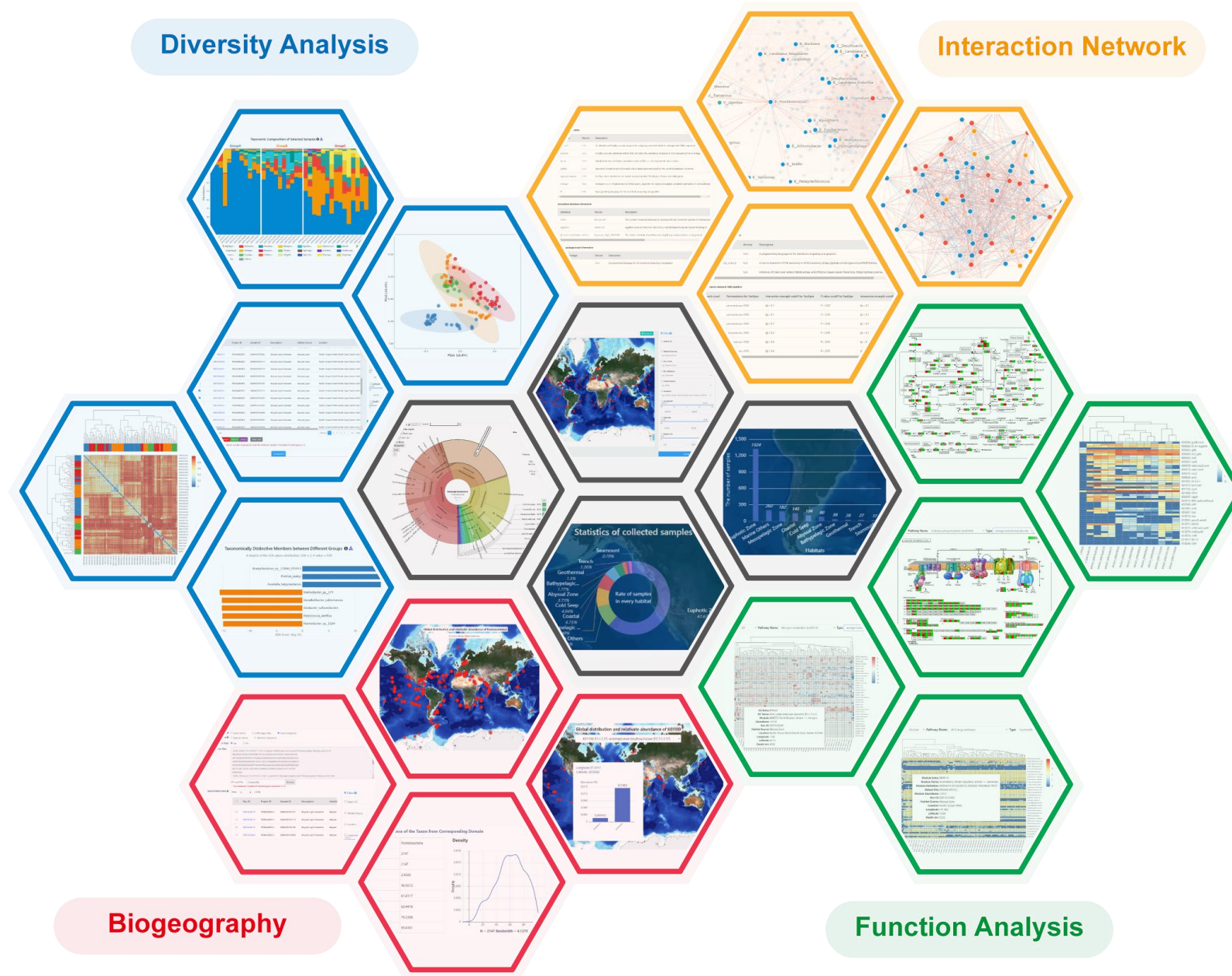


Workflows for MASH-Ocean



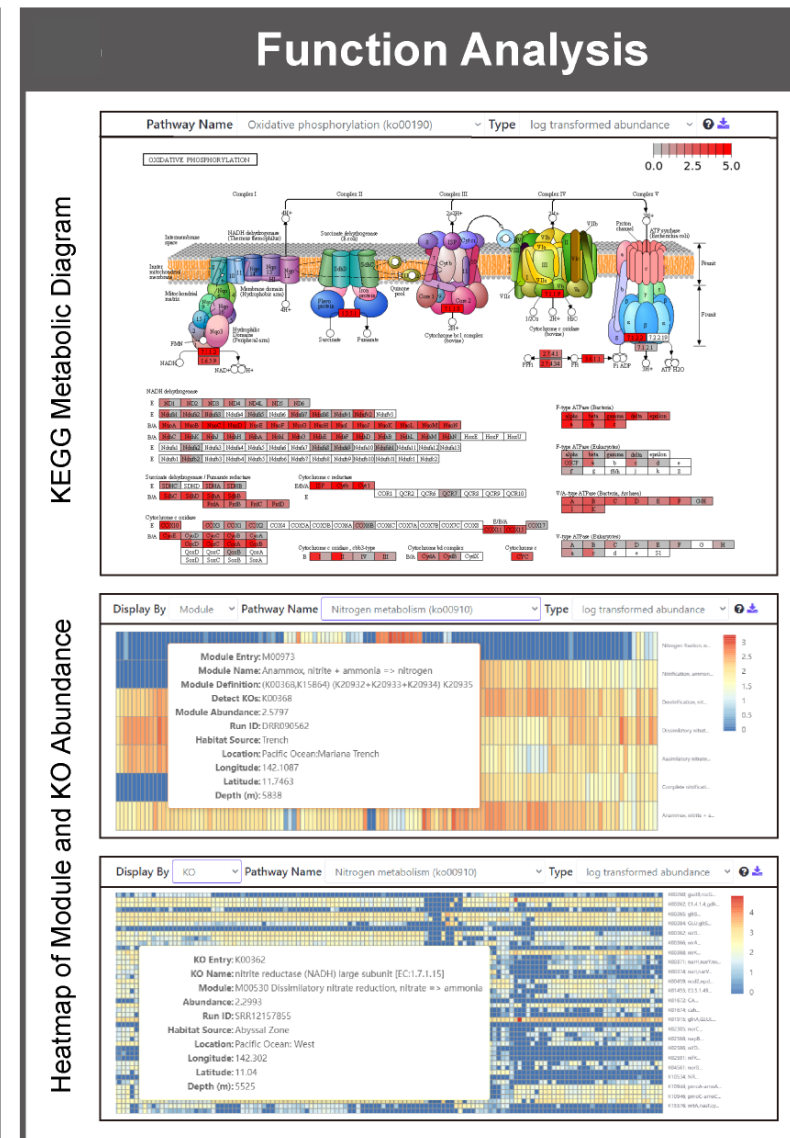
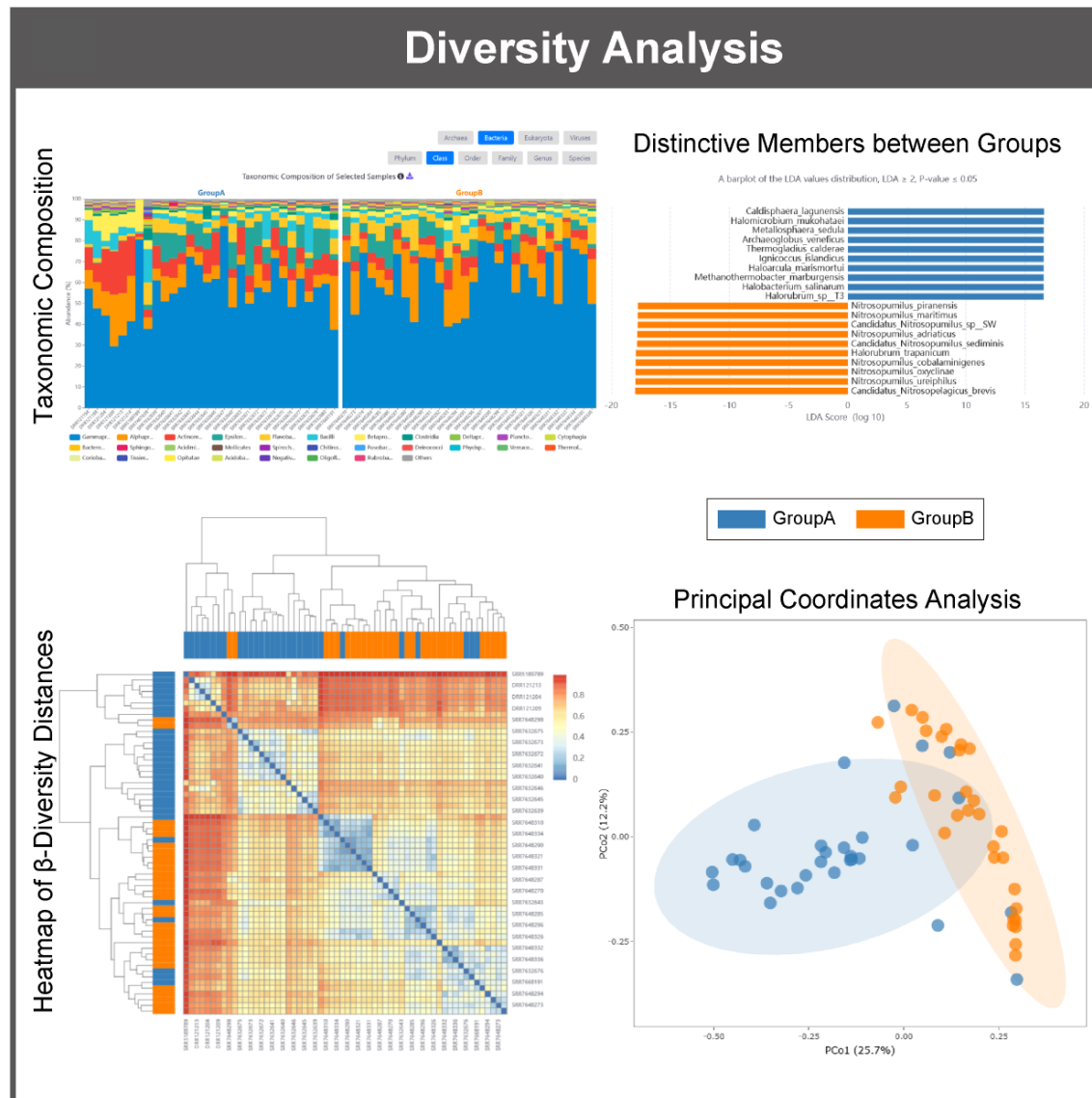


Graphical Tools for different purpose





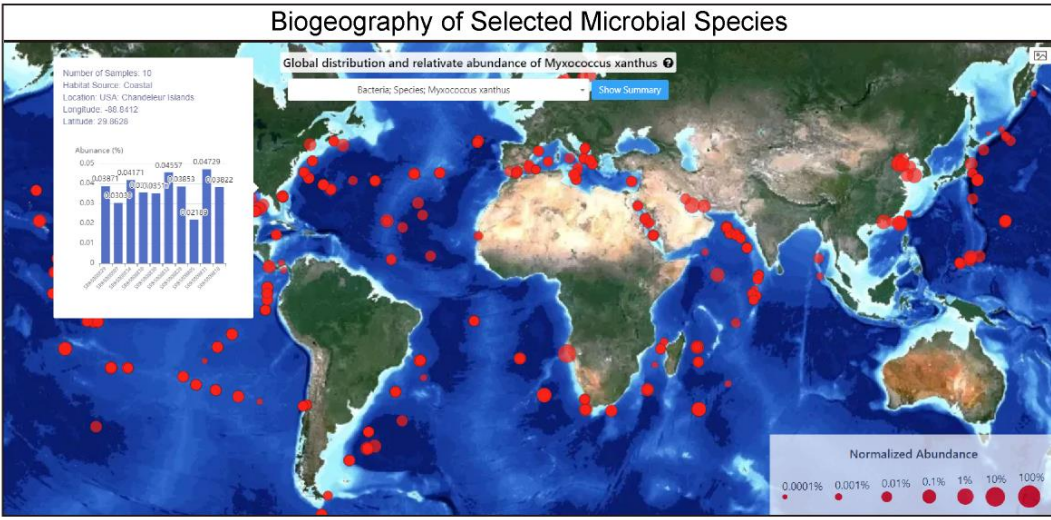
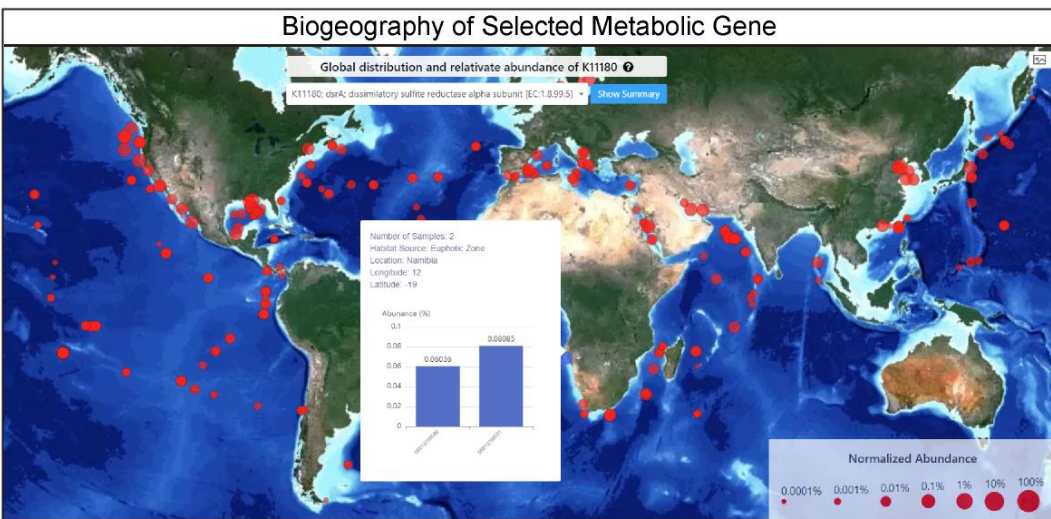
Case1: Diversity and function analysis



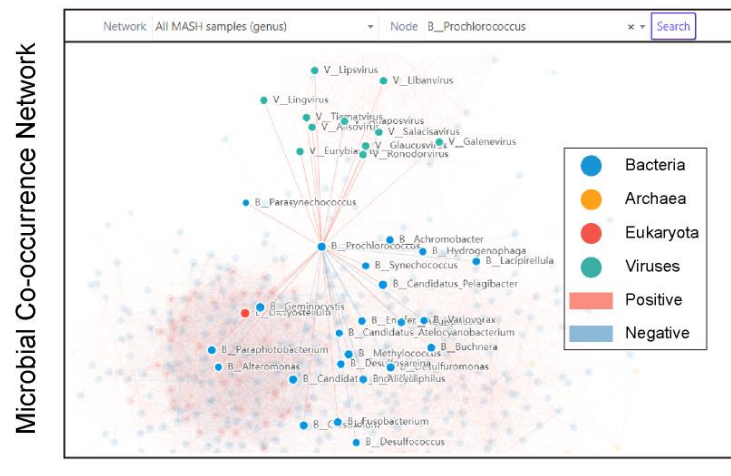


Case2: Biogeography and Interaction Networks

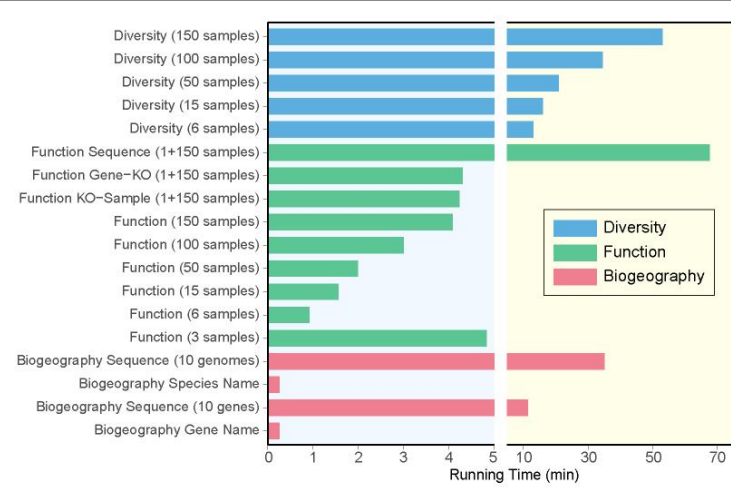
Biogeography



Interaction Network



Running Time

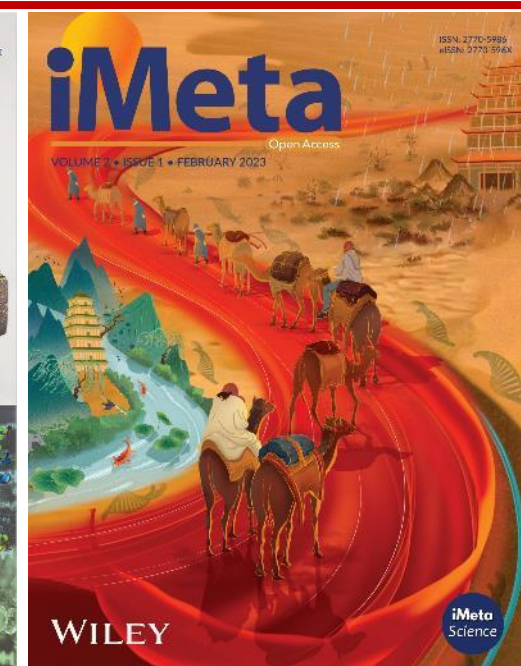
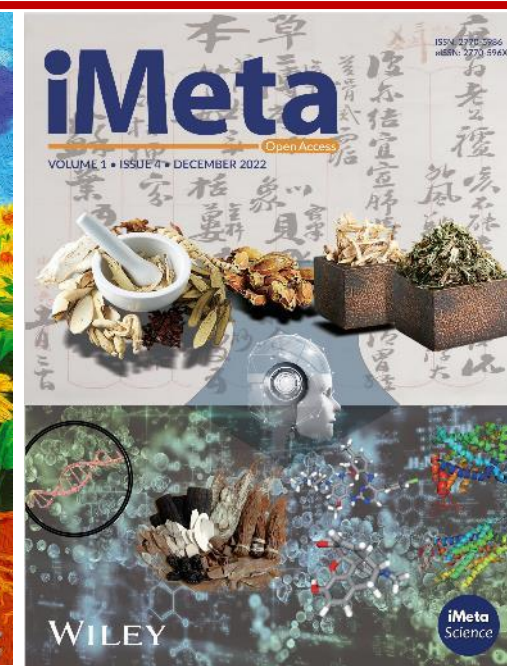




Summary

- ❑ MASH-Ocean is a website-based platform that collects, assembles, and annotates global marine metagenome data, providing users with microbial diversity analysis, metabolic feature reconstruction, and global comparison tools. Users can visualize the data without prior bioinformatics knowledge.
- ❑ The platform's workflow includes reads-level and contigs-level analyses, offering microbial taxonomy analysis using Kraken2 and Bracken, and metabolic feature analysis through MEGAHIT assembly and eggNOG annotation. Users can explore samples, conduct diversity comparisons, analyze metabolic pathways, perform biogeography analysis, and visualize interaction networks. Estimated processing times range from 10 minutes to over an hour depending on the analysis.
- ❑ MASH-Ocean's scope will extend beyond ocean ecosystems to include wetlands, lakes, rivers, etc. Suggestions and comments from users are encouraged to further improve the platform.
- ❑ Website: <https://www.biosino.org/mash-ocean/>

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