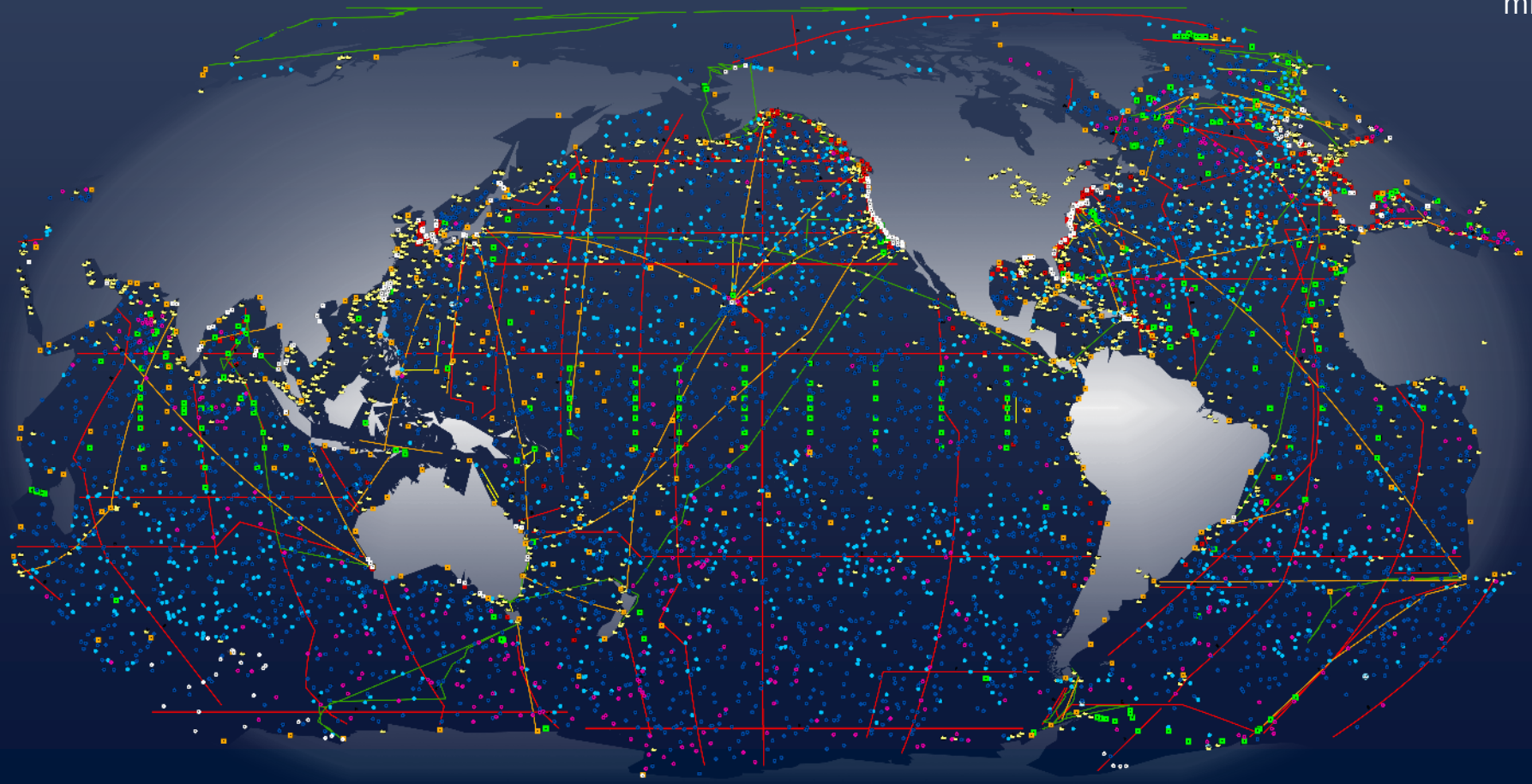
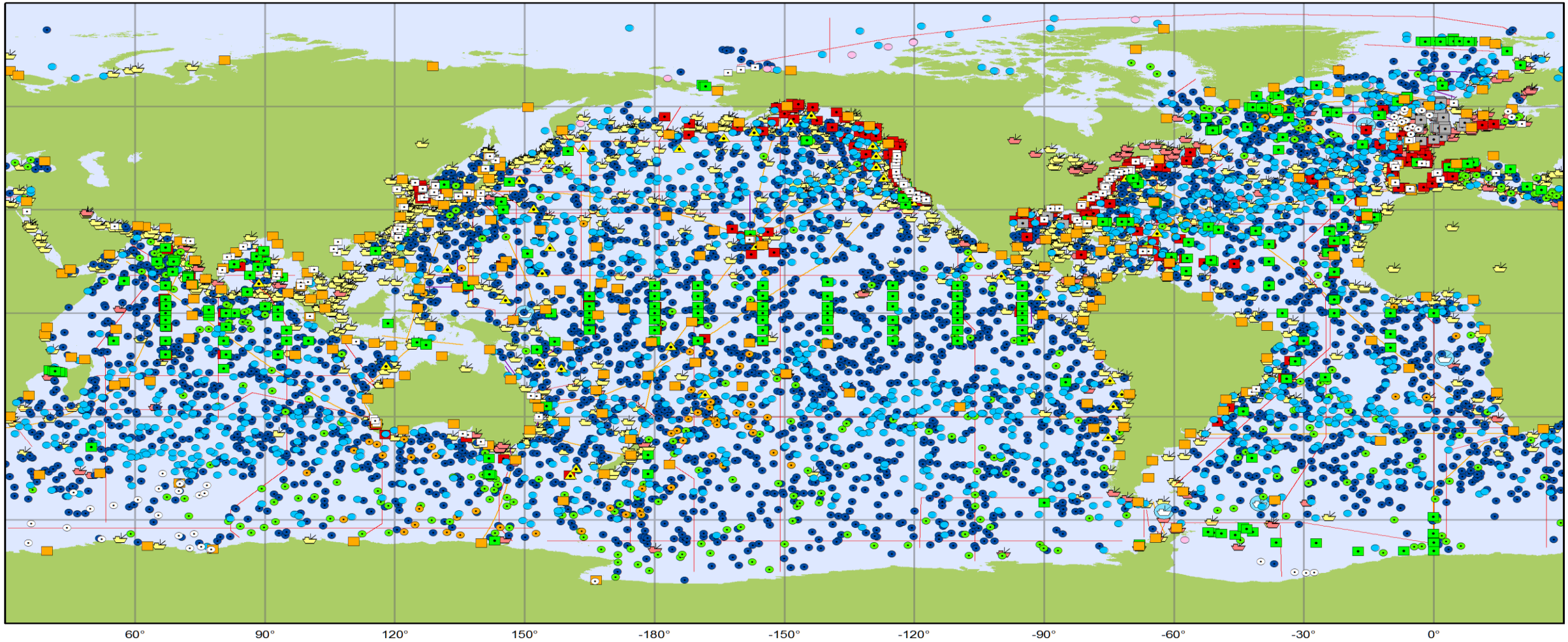
Ship Coordination as part of the Global Ocean Observing System

Martin Kramp
mkramp@jcommops.org



JCOMMOPS: JOINT WMO-IOC CENTER, HOSTED BY IFREMER IN BREST

- Mission: Support sustained or emerging in-situ Ocean Observing Networks, including
  - Argo profiling floats
  - Moored or drifting buoys (Data Buoy Cooperation Panel)
  - OceanSITES long-term deepwater reference station
  - Opportunity ships under Ship Observations Team (SOT, including VOS and SOOP)
  - GO-SHIP repeat hydrography
  - OceanGliders
  - GLOSS Tide Gauges
  - *Emerging: Marine Mammals*
  - *Emerging: HF Radar*
- Products/Tools at global scale (~10 000 operational platforms/stations):
  - Integrated Station/Platform/Cruise Metadata management
  - Monitoring (including EEZs) with regular Maps and Performance Measurement / KPIs
  - Implementation Support



Main in situ Elements of the Global Ocean Observing System

Profiling Floats (Argo)
- Core (3909)
- Deep (77)
- BioGeoChemical (344)

Data Buoys (DBCP)
- Surface Drifters (1288)
- Offshore Platforms (97)
- Ice Buoys (14)
- Moored Buoys (353)
- Tsunameters (37)

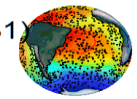
Timeseries (OceanSITES)
- Interdisciplinary Moorings (369)

Repeated Hydrography (GO-SHIP)
- Research Vessel Lines (62)

Sea Level (GLOSS)
- Tide Gauges (252)

Ship based Measurements (SOT)
- Automated Weather Stations (239)
- Manned Weather Stations (1238)
- Radiosondes (11)
- eXpendable BathyThermographs (34)

Other Networks
- HF Radars (270)
- Animal Borne Sensors (53)
- Ocean Gliders (31)



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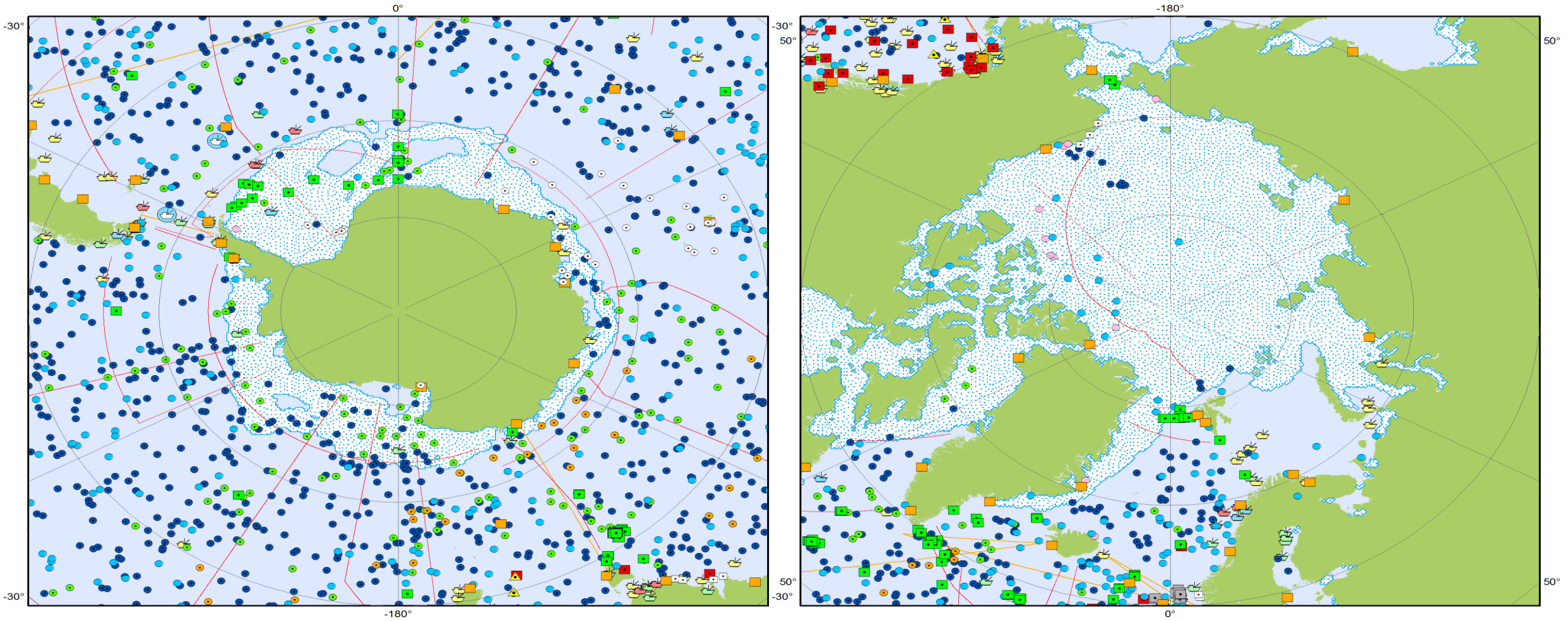


Main in-situ Elements of the Global Ocean Observing System

Argo
- Argo (863)
- Deep-Argo (25)
- BGC-Argo (135)

OceanSITES
- Platforms (84)

GLOSS
- Tide Gauges (23)

DBCP
- Surface Drifters (201)
- Ice Buoys (1)
- Moored Buoys (3)
- Tsunameter (2)

GO-SHIP
- GO-SHIP (22)

SOT
- VOSClim-Automated (6)
- VOSClim-Manned (8)
- VOS-Automated (14)
- VOS-Manned (30)
- ASAP Radiosondes (2)
- SOOP XBTs (4)

Other Networks
- HF Radars (4)
- Animal Borne Sensors (32)

Argo
- Argo (205)
- Deep-Argo (5)
- BGC-Argo (28)

OceanSITES
- Platforms (104)

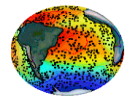
GLOSS
- Tide Gauges (25)

DBCP
- Surface Drifters (121)
- Fixed Platforms (19)
- Ice Buoys (12)
- Moored Buoys (21)
- Tsunameter (2)

GO-SHIP
- GO-SHIP (13)

SOT
- VOSClim-Automated (4)
- VOSClim-Manned (5)
- VOS-Automated (10)
- VOS-Manned (49)
- SOOP XBTs (4)

Other Networks
- HF Radars (5)
- Animal Borne Sensors (1)



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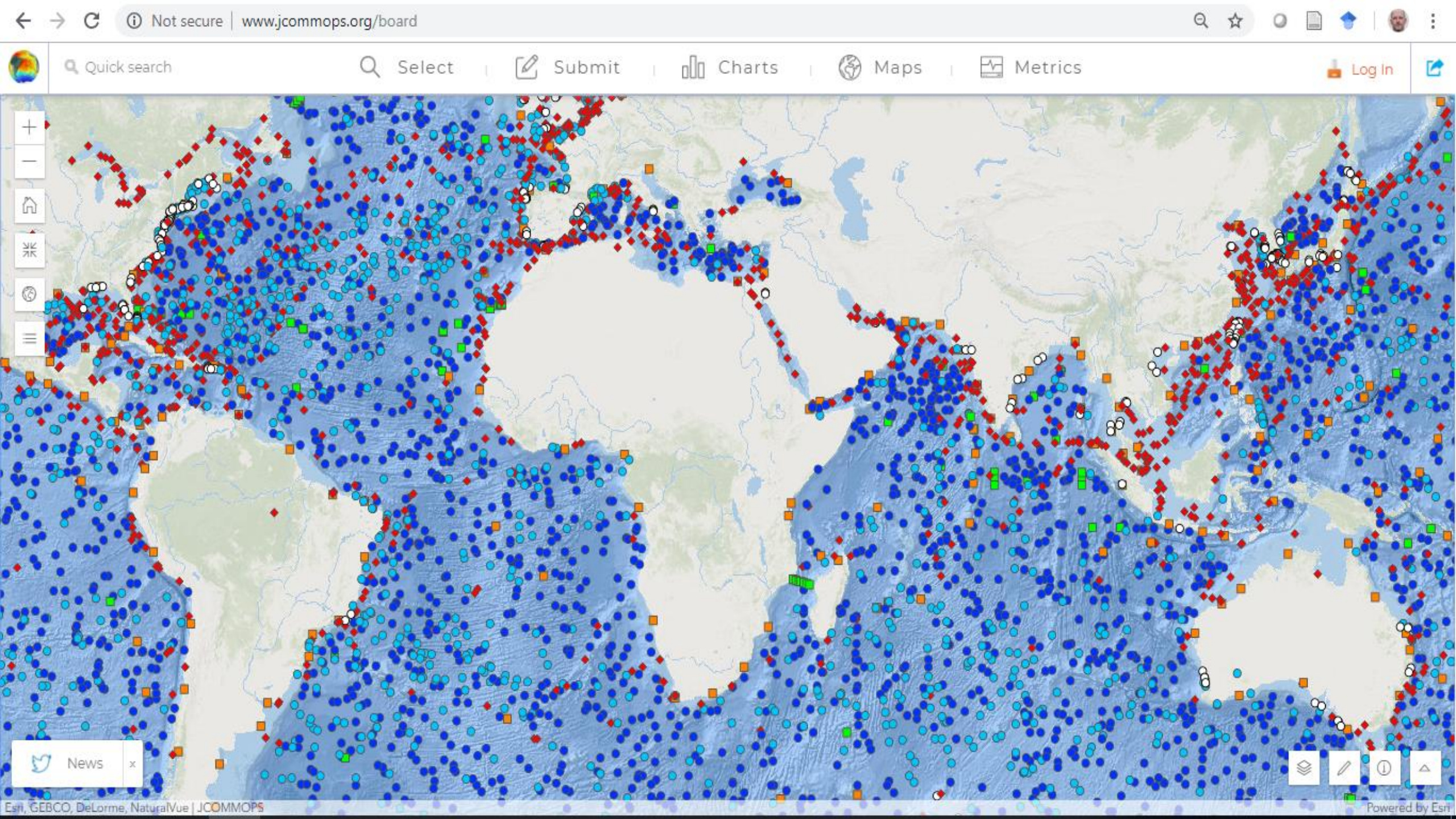
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News
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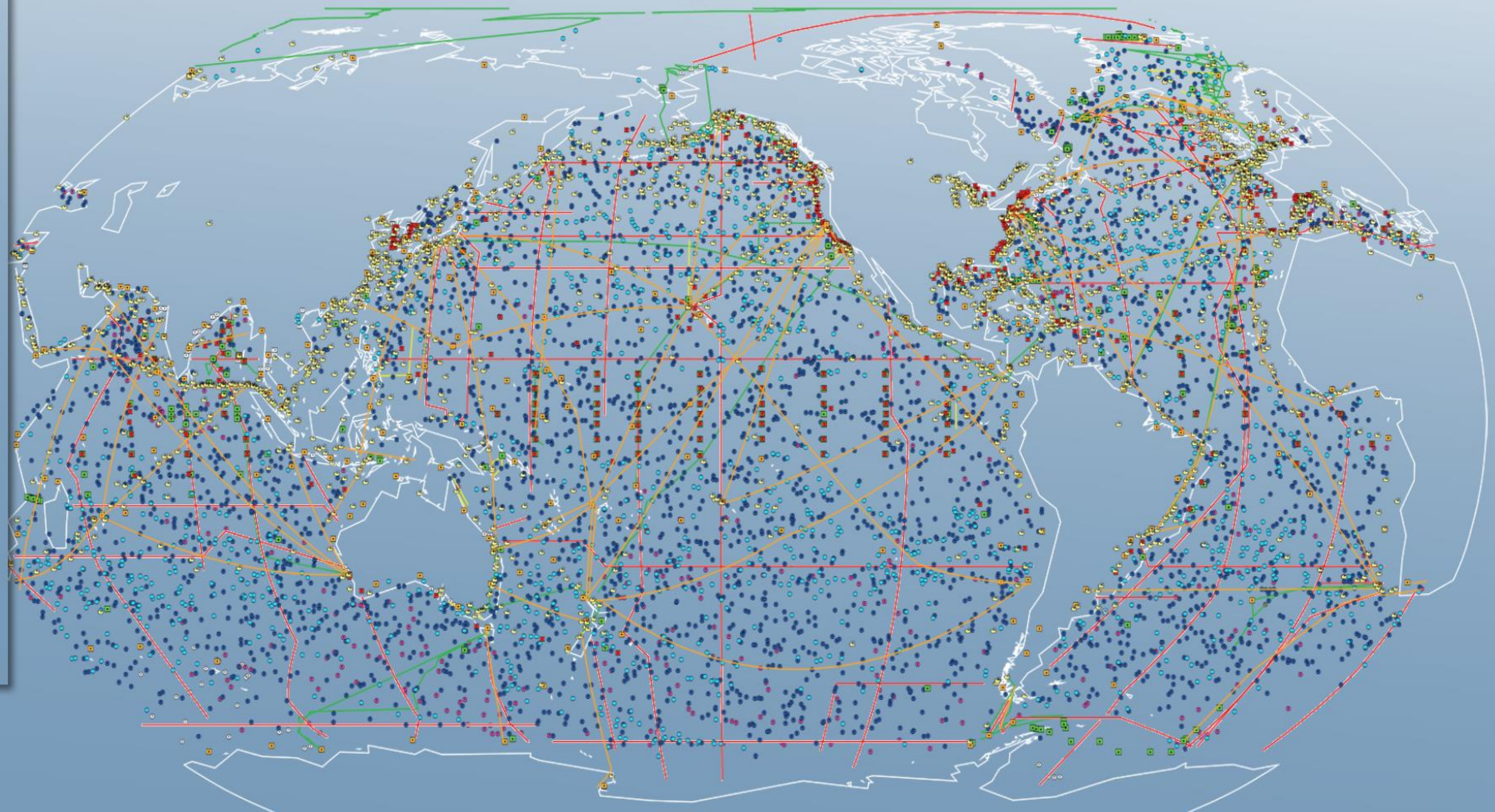
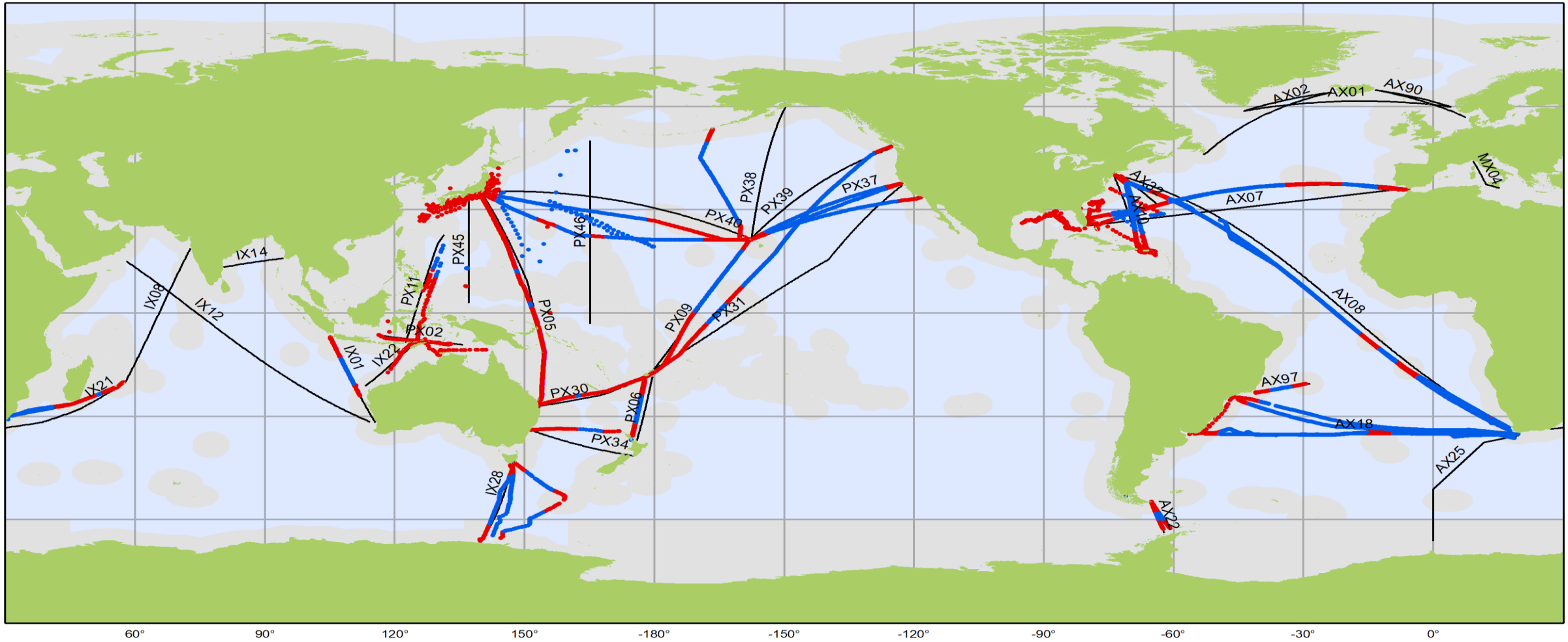
Open latest monthly map
Open near real-time interactive map

MORE DETAILS

JCOMM in situ networks

Emerging networks





Ship Observations Team

SOOP: XBT Deployments: High Seas vs other Waters

2018

Data as available on GTS on 15 January 2019

- XBT Deployment - High Seas (4830)
- XBT Deployment - Not High Seas (4306)
- XBT Reference Line
- Not High Seas

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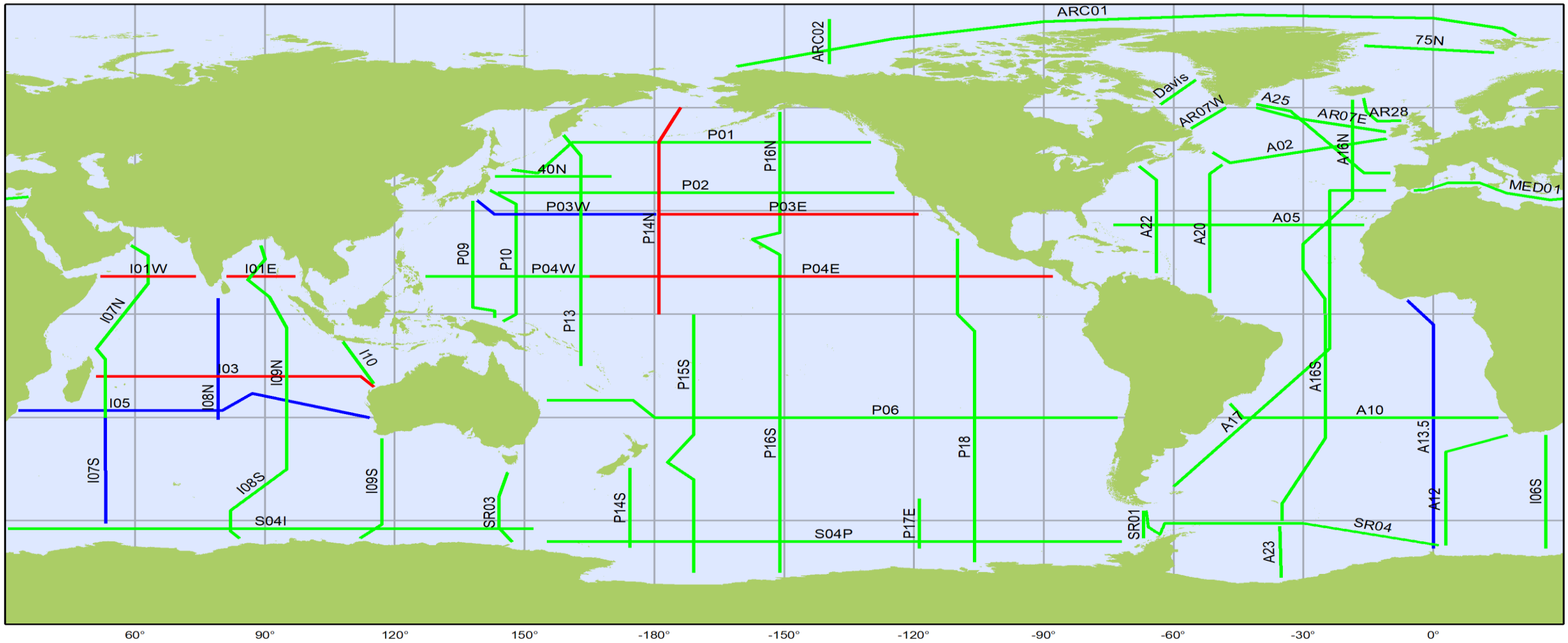

GO-SHIP

Status of 2012-2023 Survey (55 Core Lines)

August 2019

completed (80% of all core lines)
funded (9% of all core lines)
not planned yet (11% of all core lines)

Lines completed or funded: 89% (49 core lines)
Countries providing ship-time: 10
Elapsed survey time: 64% (floating 12-year survey)

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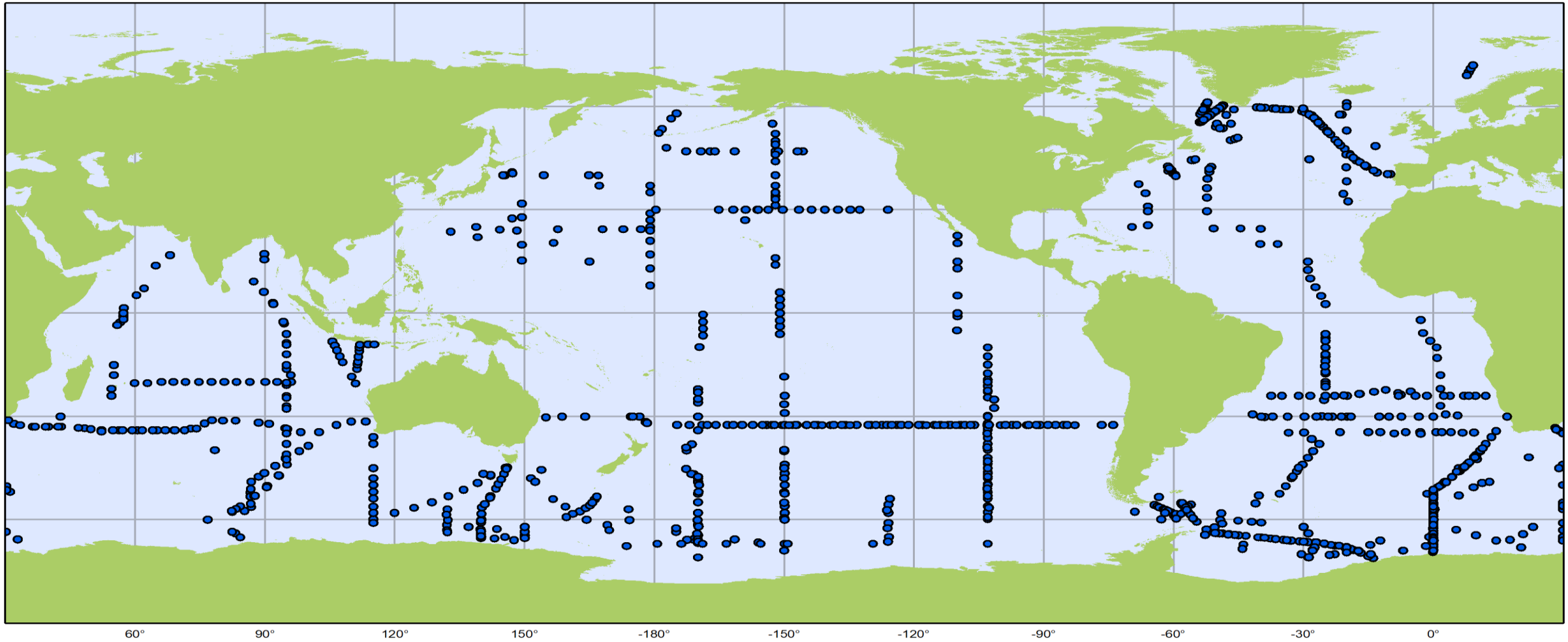

GO-SHIP and Argo

Deployment of Argo Floats from GO-SHIP Cruises

(including Transit)

June 2019

Argo Deployment

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Query Platforms

Load Query:

General

Name: Any

Reference: Any — Exact match

Status: OPERATIONAL

Country: Any

Programs: Any

Networks: Any

Exclude networks: Any

Family: Any — Type: Any

Model: Any

Age (days): Min — Max

Ending cause: Any

Site name: Any

Ship & Cruise

Ship: KAHA

KAHAROA (ICES Code: 61LY)
New Zealand (CS: ZM7552 /IMO: 8000898)
Research Vessels

Cruise line:

Line type: — Line family:

Identifiers

Telecom

Hardware

Sensors

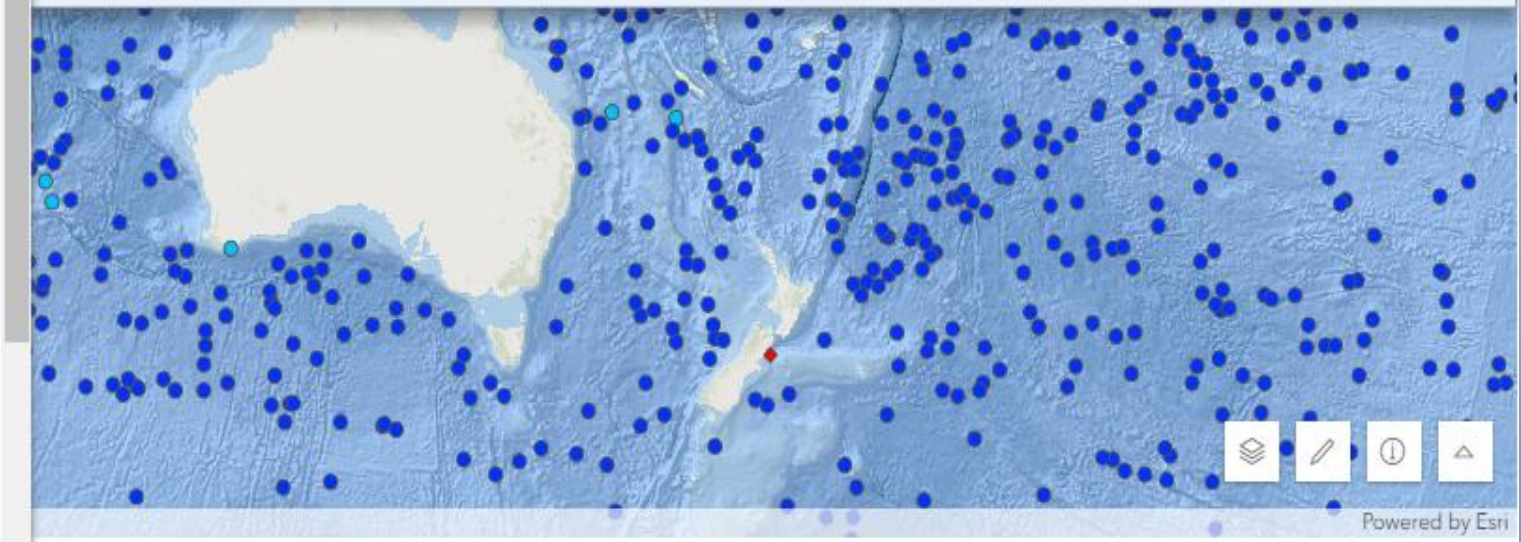
Search

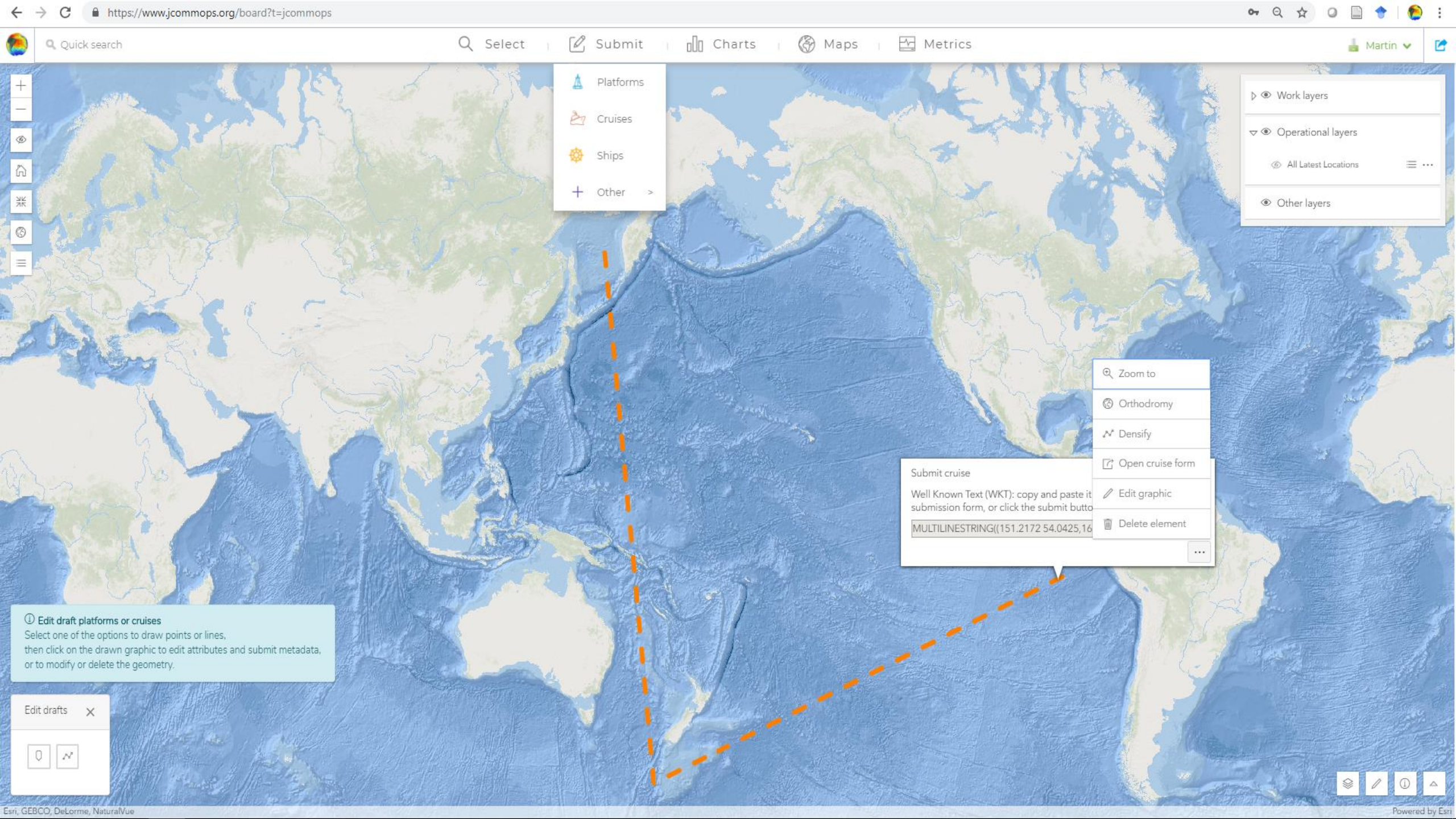
Platforms

Action | Selection | Analysis | Data

	Observing netw	Reference	Status	Model	Country	Program	Serial No.
1	SOT	5ZBW25K	OPERATIONAL	10 - Selected	New Zealand	VOS-NZ	
2	DBCP	5501505	OPERATIONAL	SVP Pacific Gyre	United States	SIO-DB	
3	DBCP	5501503	OPERATIONAL	SVP Pacific Gyre	United States	SIO-DB	
4	DBCP	5501506	OPERATIONAL	SVP Pacific Gyre	United States	SIO-DB	
5	DBCP	5501504	OPERATIONAL	SVP Pacific Gyre	United States	SIO-DB	
6	DBCP	5501507	OPERATIONAL	SVP Pacific Gyre	United States	SIO-DB	
7	Argo	5904066	OPERATIONAL	SOLO	United States	Argo SIO	3047
8	Argo	5904068	OPERATIONAL	SOLO	United States	Argo SIO	3053
9	Argo	3901121	OPERATIONAL	SOLO	United States	Argo SIO	3056
10	Argo	3901126	OPERATIONAL	SOLO	United States	Argo SIO	3061
11	Argo	5903358	OPERATIONAL	APEX	United States	Argo UW	5156

Page 1 of 35 | Platforms per page 20 | 50 | 100 | 200 | Displaying 1 - 20 of 693 Platforms

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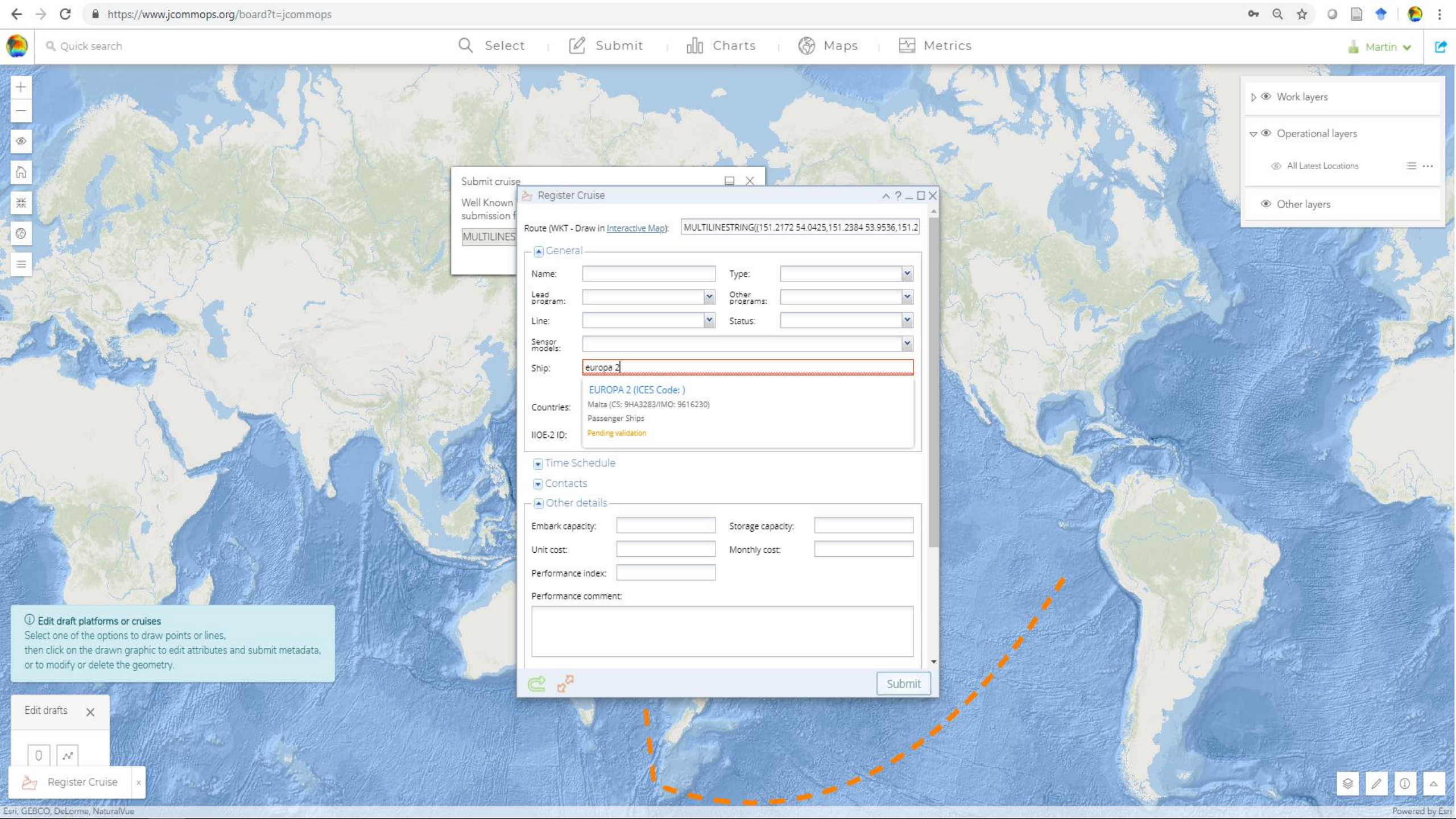
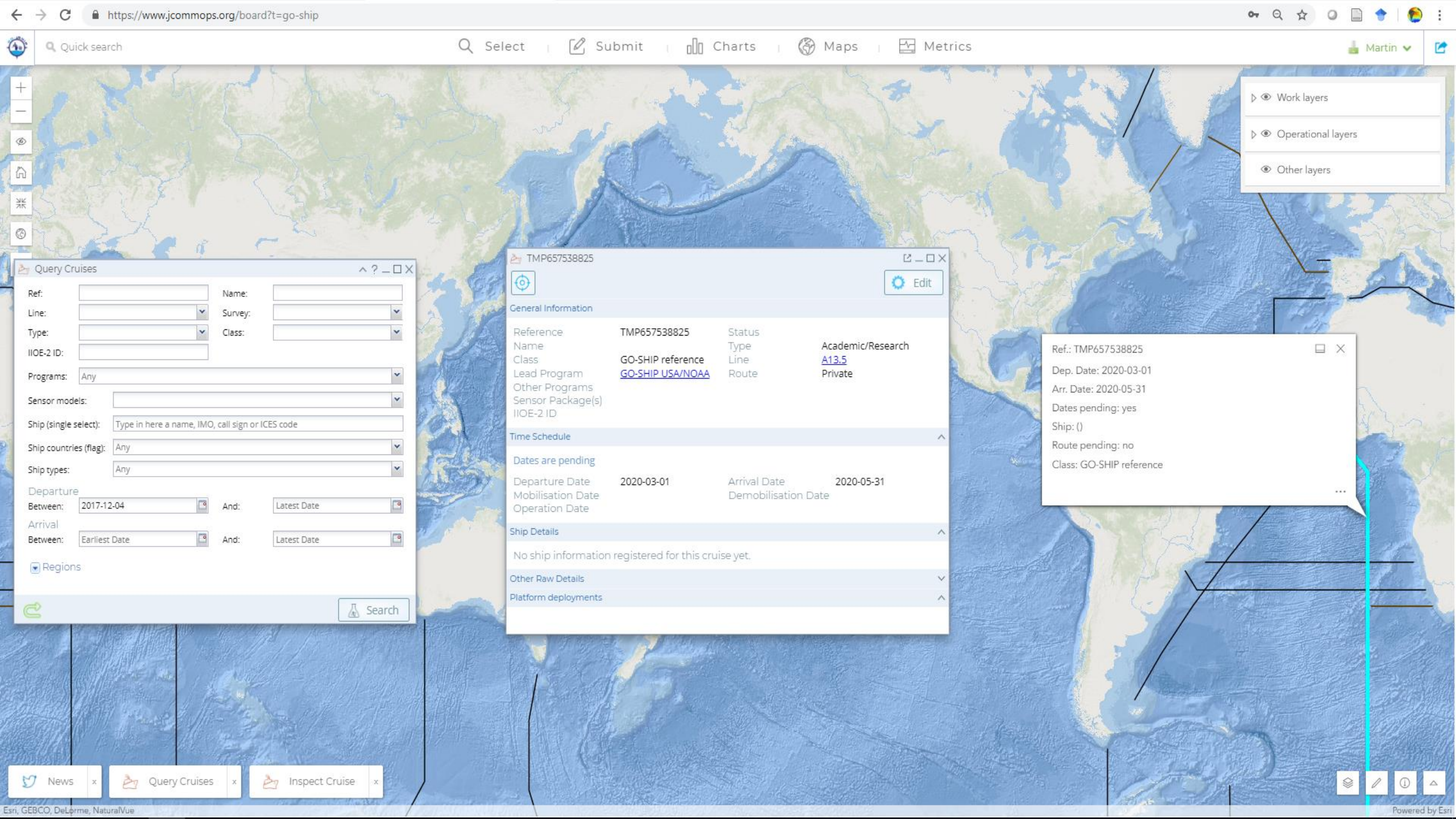
Quick search
Select
Submit
Charts
Maps
Metrics
Martin
Platforms
Cruises
Ships
Other
Work layers
Operational layers
All Latest Locations
Other layers
Zoom to
Orthodromy
Densify
Open cruise form
Edit graphic
Delete element
Submit cruise
Well Known Text (WKT): copy and paste it
submission form, or click the submit butto
MULTILINESTRING((151.2172 54.0425,16
Edit draft platforms or cruises
Select one of the options to draw points or lines,
then click on the drawn graphic to edit attributes and submit metadata,
or to modify or delete the geometry.
Edit drafts
Esri, GEBCO, DeLorme, NaturalVue
Powered by Esri


https://www.jcommops.org/board?t=jcommops
Quick search
Select
Submit
Charts
Maps
Metrics
Martin
Work layers
Operational layers
All Latest Locations
Other layers
Submit cruise
Well Known
submission f
MULTILINES
Register Cruise
Route (WKT - Draw in Interactive Map):
MULTILINESTRING((151.2172 54.0425,151.2384 53.9536,151.2
General
Name:
Type:
Lead program:
Other programs:
Line:
Status:
Sensor models:
Ship:
europa 2
EUROPA 2 (ICES Code:)
Countries:
Malta (CS: 9HA3283/IMO: 9616230)
Passenger Ships
IIOE-2 ID:
Pending validation
Time Schedule
Contacts
Other details
Embark capacity:
Storage capacity:
Unit cost:
Monthly cost:
Performance index:
Performance comment:
Submit
Edit draft platforms or cruises
Select one of the options to draw points or lines,
then click on the drawn graphic to edit attributes and submit metadata,
or to modify or delete the geometry.
Edit drafts
Register Cruise
Esri, GEBCO, DeLorme, NaturalVue
Powered by Esri


https://www.jcommops.org/board?t=go-ship
Quick search
Select
Submit
Charts
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Metrics
Martin
Work layers
Operational layers
Other layers
Query Cruises
Ref:
Name:
Line:
Survey:
Type:
Class:
IIOE-2 ID:
Programs:
Any
Sensor models:
Ship (single select):
Type in here a name, IMO, call sign or ICES code
Ship countries (flag):
Any
Ship types:
Any
Departure
Between:
2017-12-04
And:
Latest Date
Arrival
Between:
Earliest Date
And:
Latest Date
Regions
Search
TMP657538825
Edit
General Information
Reference
TMP657538825
Name
Class
GO-SHIP reference
Lead Program
GO-SHIP USA/NOAA
Other Programs
Sensor Package(s)
IIOE-2 ID
Status
Type
Academic/Research
Line
A13.5
Route
Private
Time Schedule
Dates are pending
Departure Date
2020-03-01
Mobilisation Date
Operation Date
Arrival Date
2020-05-31
Demobilisation Date
Ship Details
No ship information registered for this cruise yet.
Other Raw Details
Platform deployments
Ref.: TMP657538825
Dep. Date: 2020-03-01
Arr. Date: 2020-05-31
Dates pending: yes
Ship: ()
Route pending: no
Class: GO-SHIP reference
News
Query Cruises
Inspect Cruise
Esri, GEBCO, DeLorme, NaturalVue
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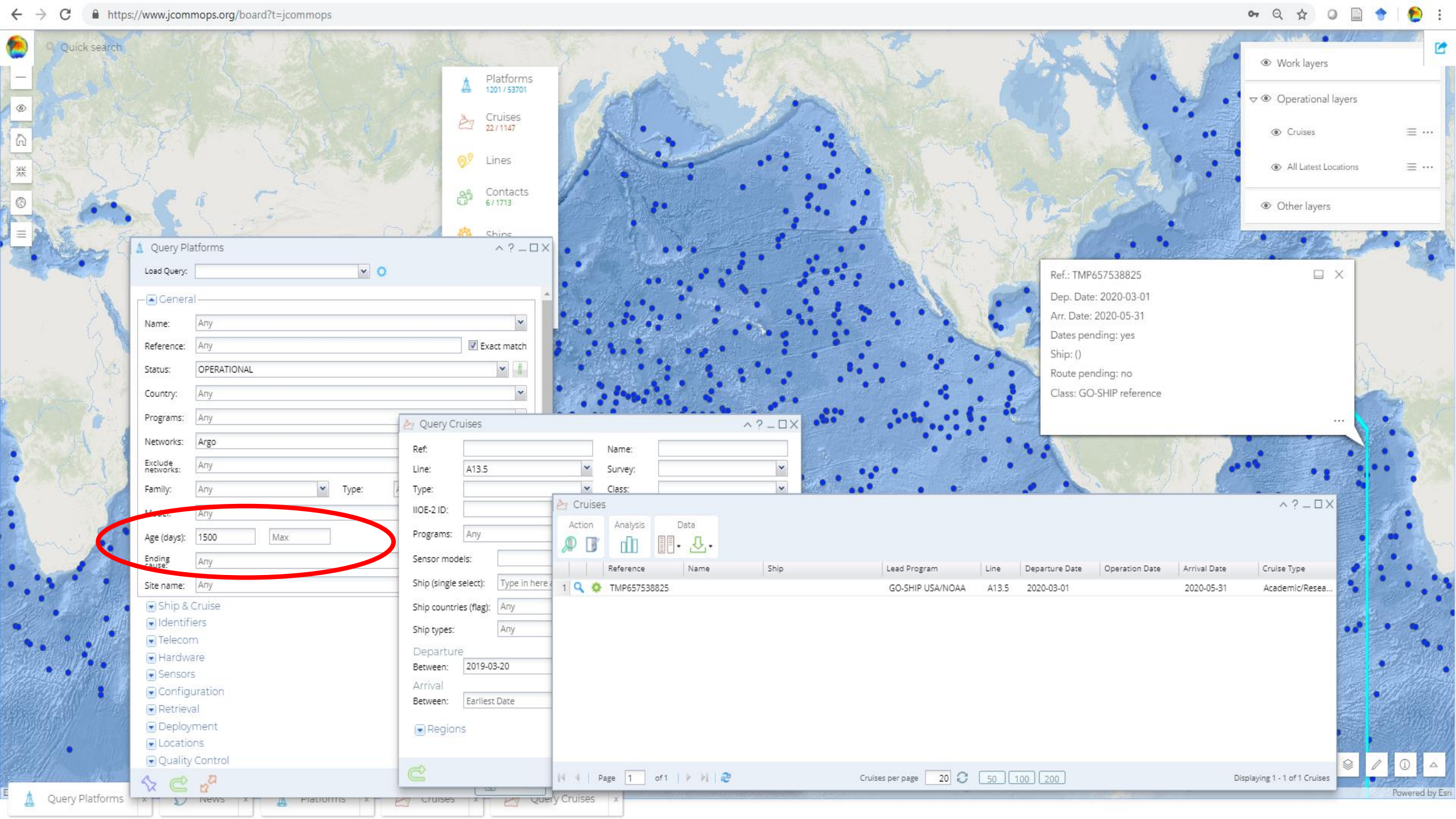
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Quick search
Platforms
1201 / 53701
Cruises
22 / 1147
Lines
Contacts
6 / 1713
Work layers
Operational layers
Cruises
All Latest Locations
Other layers
Query Platforms
Load Query:
General
Name:
Any
Reference:
Any
Exact match
Status:
OPERATIONAL
Country:
Any
Programs:
Any
Networks:
Argo
Exclude networks:
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Family:
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Type:
Age (days):
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Max
Ending cause:
Any
Site name:
Any
Ship & Cruise
Identifiers
Telecom
Hardware
Sensors
Configuration
Retrieval
Deployment
Locations
Quality Control
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Ref:
Name:
Line:
A13.5
Survey:
Type:
Class:
IIOE-2 ID:
Programs:
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Sensor models:
Ship (single select):
Type in here
Ship countries (flag):
Any
Ship types:
Any
Departure
Between:
2019-03-20
Arrival
Between:
Earliest Date
Regions
Ref.: TMP657538825
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Arr. Date: 2020-05-31
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Route pending: no
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Operation Date
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2020-05-31
Academic/Resea...
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of 1
Cruises per page
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200
Displaying 1 - 1 of 1 Cruises
Query Platforms
News
Platforms
Cruises
Query Cruises
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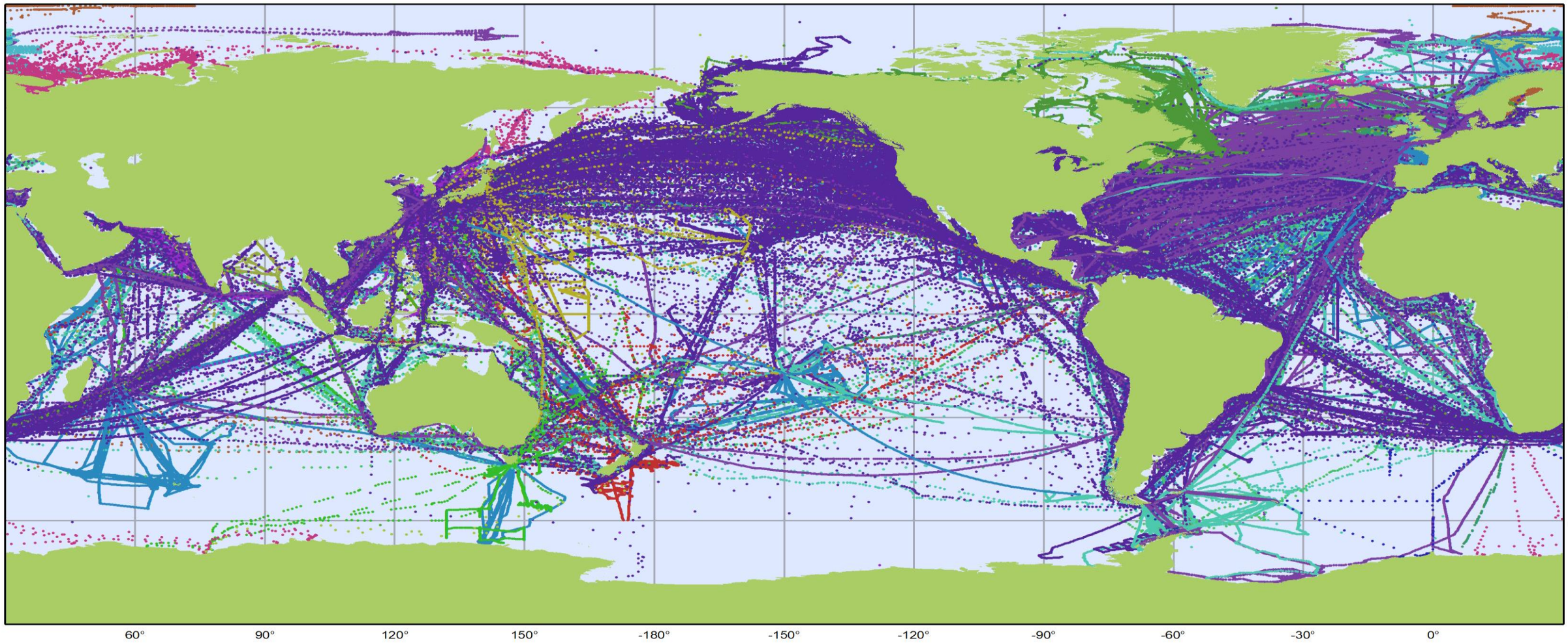
GLOBAL DATABASE FOR UPCOMING CRUISES (ALL SHIPS) – WHY, HOW?

- Deep and BGC-Argo deployments ideally go along with a reference CTD profile
- Interest in Deep and BGC-Argo recoveries is high, beyond environmental aspects
- Long-term strategy with expendable instruments (XBTs, drifter, floats): Where is the line?
- Piggyback operations: Where is the line?

- Deployment and recovery operations require
  - Network status information (coverage, instrument age): Available JCOMMOPS layers
  - More detailed cruise and route information: Available for GO-SHIP, but presently big manual effort for all others
    - Individual Websites of operators or ships
    - "POGO" database: only gridded route information
    - UNOLS
    - MFP, and similar tools: M2M synchronization (with user restrictions)



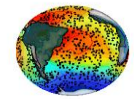
Ship Observations Team

Reports by national Programs of the VOS Scheme

2018

Data as available on GTS on 15 January 2019

- VOS-AU (29 690)
- VOS-CA (320 203)
- VOS-CL (509)
- VOS-CN (1 117)
- VOS-DE (337 671)
- VOS-ES (7 238)
- VOS-EU (54 311)
- VOS-FR (291 669)
- VOS-GB (401 683)
- VOS-GR (41)
- VOS-HK (18 951)
- VOS-IE (316)
- VOS-IL (639)
- VOS-IN (12 083)
- VOS-IS (758)
- VOS-JP (13 990)
- VOS-KR (4 442)
- VOS-NL (20 503)
- VOS-NO (43 861)
- VOS-NZ (21 306)
- VOS-RU (7 631)
- VOS-SE (38 864)
- VOS-US (478 533)
- VOS-ZA (320)



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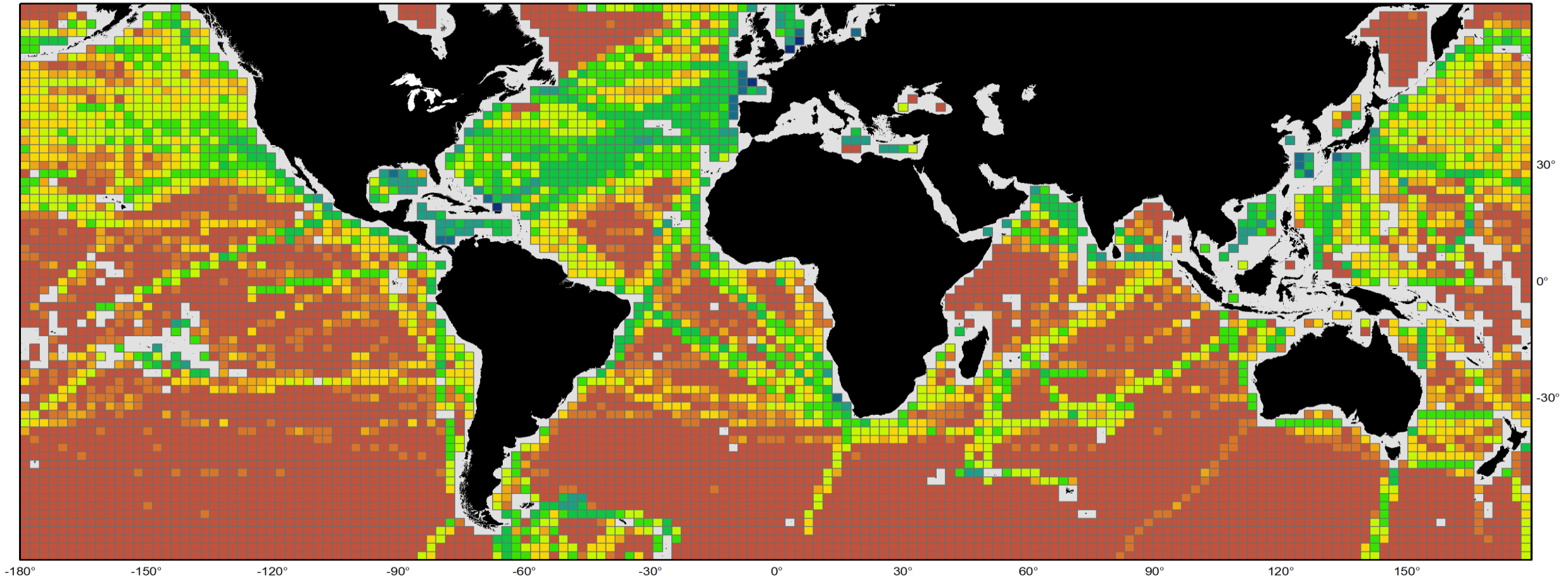
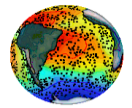


Ship Observations Team **VOS Data Coverage between 60° North and 60° South**

Number of projected (webmercator) 250 km^2 fields per number of monthly observations in TDC. Fields in total: 6811

0 (3 468)	2 (335)	6 - 10 (668)	21 - 50 (372)	101 - 200 (17)
1 (627)	3 - 5 (651)	11 - 20 (591)	51 - 100 (78)	201 - 510 (4)

Extrapolated, projected (webmercator) 500 km^2 fields that fullfil OSCAR requirement #251 (treshold): 16%



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VOS SCHEME: MORE SHIPS REQUIRED

- 2000 Voluntary Observing Ships, mostly Commercial Shipping, with declining number
- Most of the "big" RVs are part of the scheme, but not all; smaller ships mostly not, but more coastal data are also required in many areas

How to address this:

- National Weather Service
- Recruiting as "3rd party ship", using ship-owned equipment
- New technologies (AIS or Ship Management Tools)
- NSF call: AccelNet (Accelerating Research through International Network-to-Network Collaborations)
  - Driver: Shawn Smith (COAPS, SAMOS, SOT Vice-Chair)

Спасибо

Thank you

Gracias

Merci

谢谢

شُكْرًا

Let's collaborate!

support@jcommops.org