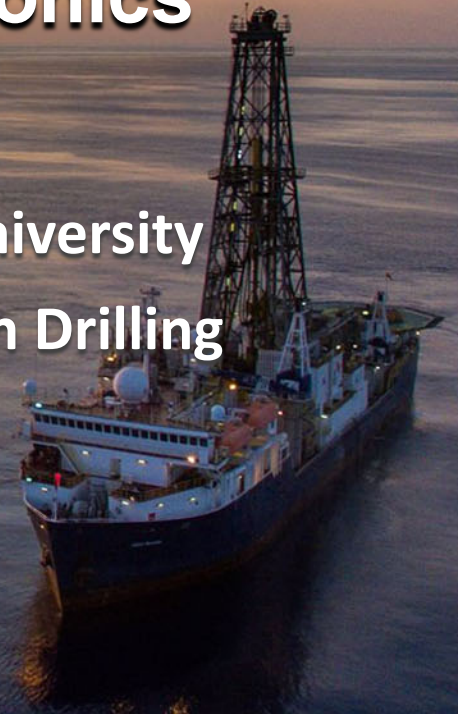


International Ocean Discovery Program (IODP) - research goals in plate tectonics

Susan DeBari, Western Washington University
US Advisory Council for Scientific Ocean Drilling

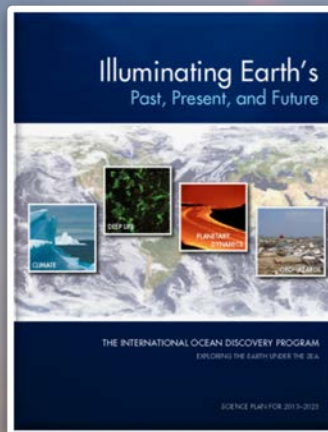


IODP is at an exciting juncture:

- the current science plan is expiring in 2023 - time is ripe for visioning
- the JOIDES Resolution (the IODP workhorse ship) is in need of replacement and progress is being made on identifying a successor

Goal is to share with you where IODP is headed and show *how you can provide critical input in this transition.*

First, need to provide some background on the program, how it is structured and how the Science Plan drives IODP science.



IODP Science Plan
2013=2023



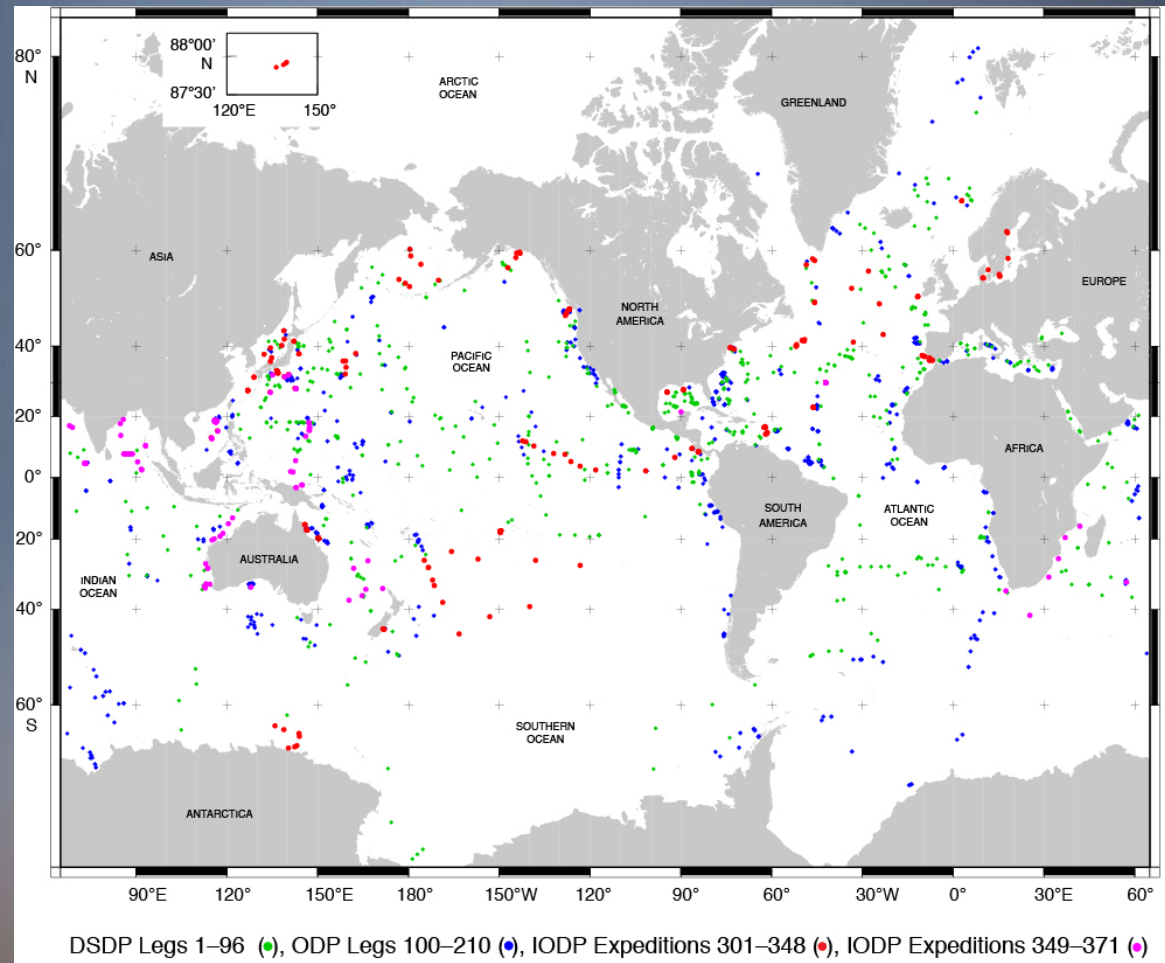
IODP is a stunningly impressive program

"... arguably the most successful international research collaboration ever." – Witze, Nature, 25 September, 2013

Scientific drilling since 1968:

Discoveries in last 50 years critical to shaping our understanding of how our planet works from plate tectonics to climate history to the limits of life

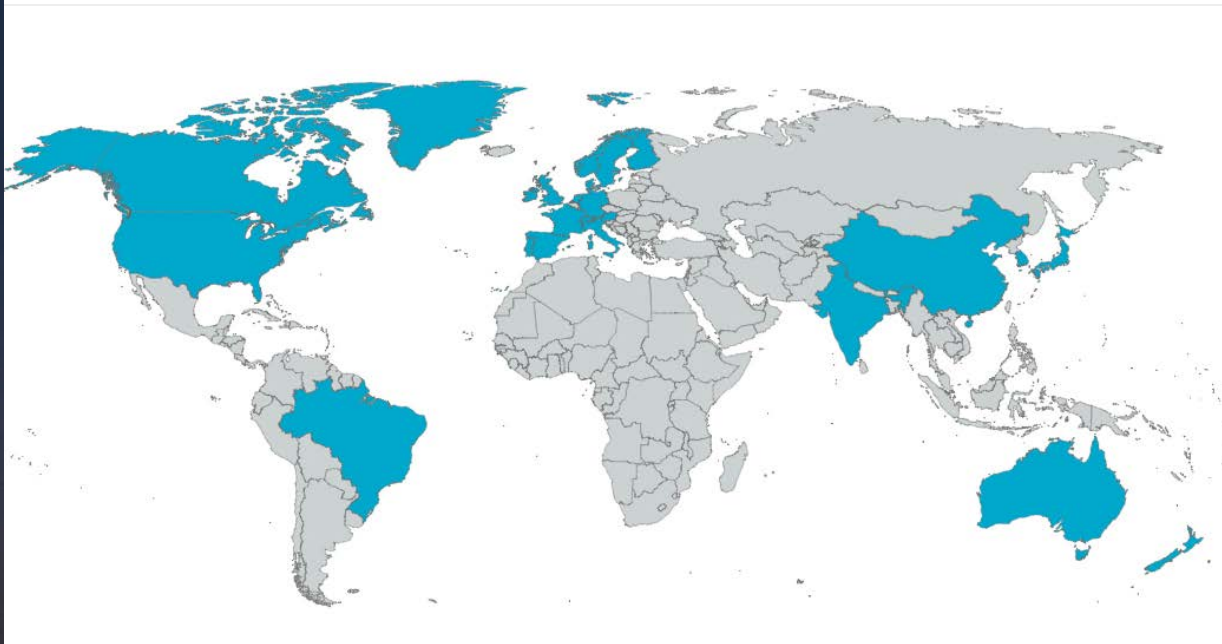
- >490 km of core! (from seafloor surface to as deep as 3 km mbsf)
- More than 5000 researchers worldwide have gone to sea.
- >11000 peer-reviewed articles
- >500 in Nature and Science



IODP is a global program - provides a unique mechanism to do truly international collaborative research

- 8 member offices representing 23 countries

Countries Participating in IODP



- USA
- Europe & Canada (ECORD)
- Japan (J-DESC)
- China (IODP China)
- Australia, New Zealand (ANZIC)
- Korea (K-IODP)
- India (IODP India)
- Brazil (CAPES)



IODP through the years:

- Project Mohole (1958-1966)
- Deep Sea Drilling Program (1968-1983) – transition from US to international funding
- Ocean Drilling Program (1985-2003)
- Integrated Ocean Drilling Program (2003-2013)
- **International Ocean Discovery Program (2013-2023)**

Current platforms:



JOIDES Resolution (U.S. operated - 165 expeditions since 1985)



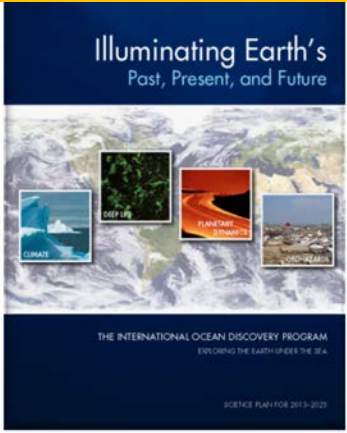
Chikyu (Japan operated - 17 expeditions since 2007)

Mission Specific Platforms (operated by European consortium, 8 expeditions since 2004)



Complicated Program: but ultimate driver of what gets drilled is the Science Plan

Science Community



Science Support Office and Site Survey Data Bank

Science Evaluation Panel (SEP)

Environmental Protection and Safety Panel (EPSP)

JR Facility Board

Chikyu IODP Board

JOIDES Resolution partners
ECORD
Australia
Brazil
China
India
Korea

NSF

ECORD Facility Board

ECORD

MEXT

Chikyu partners
ECORD
ANZIC

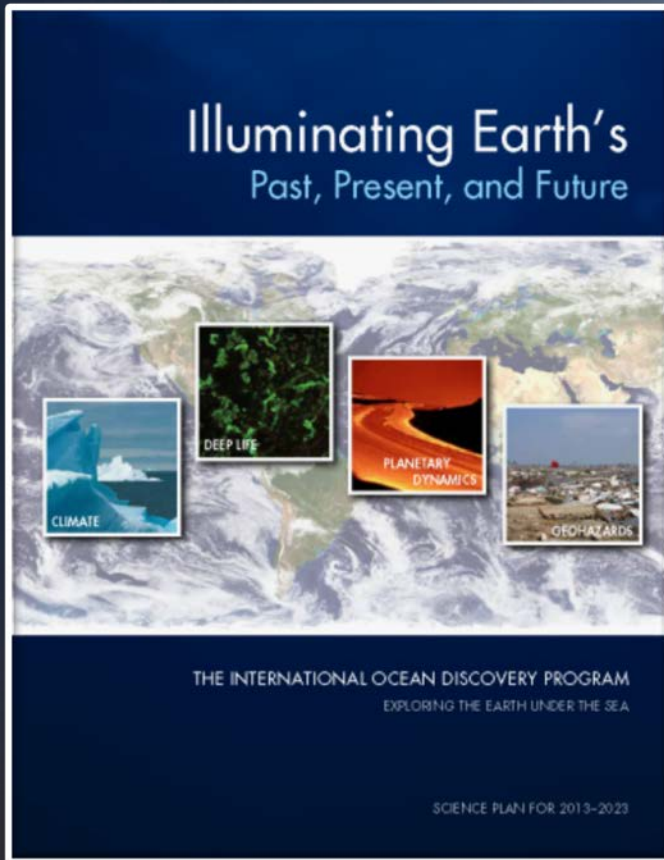


F
O
R
U
M

→ Annual funding
→ Flow of proposals

The driver of IODP Science

- The IODP Science Plan, 2013-2023



- Collaboration of ~600 international scientists
- Four major themes:
 - Climate and Ocean (reading the past, informing the future)
 - Biosphere Frontiers (Deep life and environmental forcing of evolution)
 - Earth Connections (Deep processes and their impact on surface environment)
 - Earth in Motion (processes and hazards on human time scales)
- Fourteen challenges within these themes
- All IODP proposals must address one or more theme/challenge



IODP Science plan Themes & Challenges *related to plate tectonics*: (iodp.org)

Earth Connections: Deep Processes and their Impact on Earth's Surface Environment

8. What are the composition, structure, and dynamics of earth's upper mantle?
9. How are seafloor spreading and mantle melting linked to ocean crustal architecture?
10. What are the mechanisms, magnitude, and history of chemical exchanges between the oceanic crust and seawater?
11. How do subduction zones initiate, cycle volatiles, and generate continental crust?

Earth in motion: processes and hazards on human time scales

12. What mechanisms control the occurrence of destructive earthquakes, landslides, and tsunamis?
14. How do fluids link subseafloor tectonic, thermal, and biogeochemical processes?

IODP Science plan Themes & Challenges *related to plate tectonics: (iodp.org)*

Earth Connections: Deep Processes and their Impact on Earth's Surface Environment

8. What are the composition, structure, and dynamics of earth's upper mantle?

- *Planned: Exp 391 (Walvis Ridge hotspot)*
- *Proposed: Indian Ridge Moho (SWIR), Mohole to the Mantle, Reykjanes Ridge*

9. How are seafloor spreading and mantle melting linked to ocean crustal architecture?

- *Past: Exps 349 and 367/368 (South China Sea), Exp 360 (SWIR), Exp. 381 (Gulf of Corinth)*
- *Planned: Exp 385T (Panama Basin)*
- *Proposed: Indian Ridge Moho (SWIR), Mohole to the Mantle*

10. What are the mechanisms, magnitude, and history of chemical exchanges between the oceanic crust and seawater?

- *Past: Exp 376 (Brothers arc flux)*

11. How do subduction zones initiate, cycle volatiles, and generate continental crust?

- *Past: Exp 366 (Mariana forearc), Exps 350-352 (Izu Bonin arc), Exps 371 (Tasman Sea subduction initiation)*
- *Proposed: IBM4 (Izu mid crust), Hellenic arc*

Earth in motion: processes and hazards on human time scales

12. What mechanisms control the occurrence of destructive earthquakes, landslides, and tsunami?

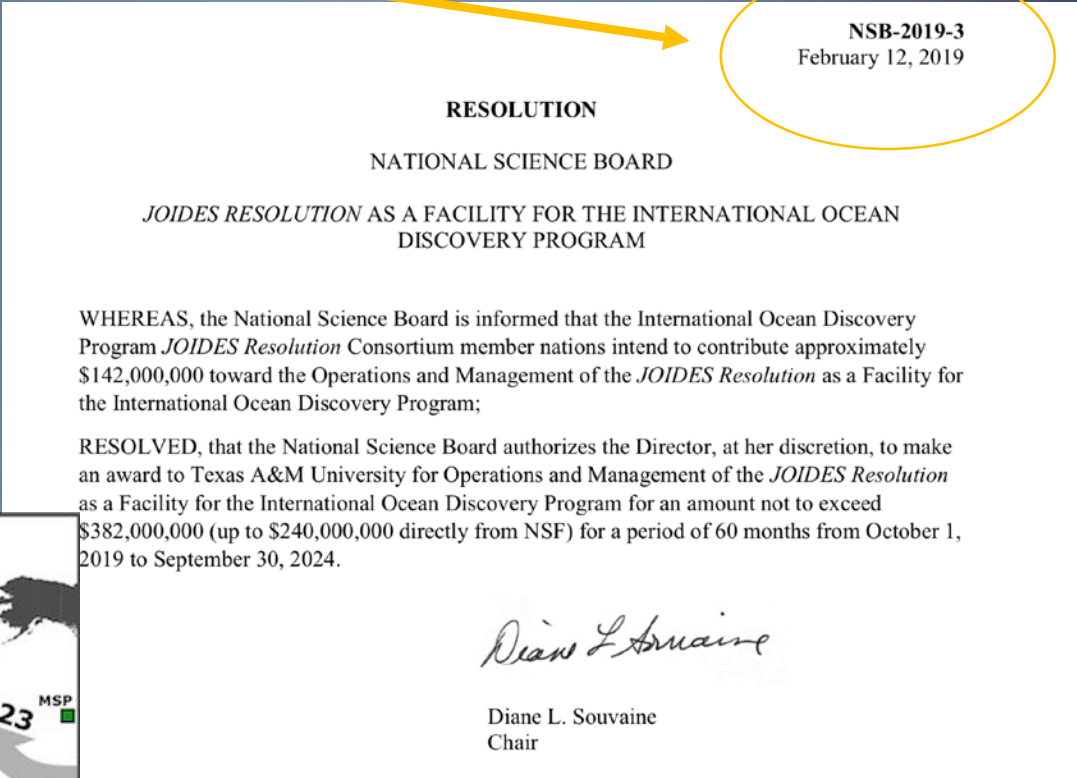
- *Past: Exp 362 (Sumatra seismogenic zone), all NanTroSEIZE expeditions, Exp. 375 (Hikurangi margin)*
- *Planned: Exp 386 (Japan Trench)*
- *Proposed: Kanto asperity, Hikurangi, Japan Trench, Costa Rica, Cascadia*

13. How do fluids link subseafloor tectonic, thermal, and biogeochemical processes?

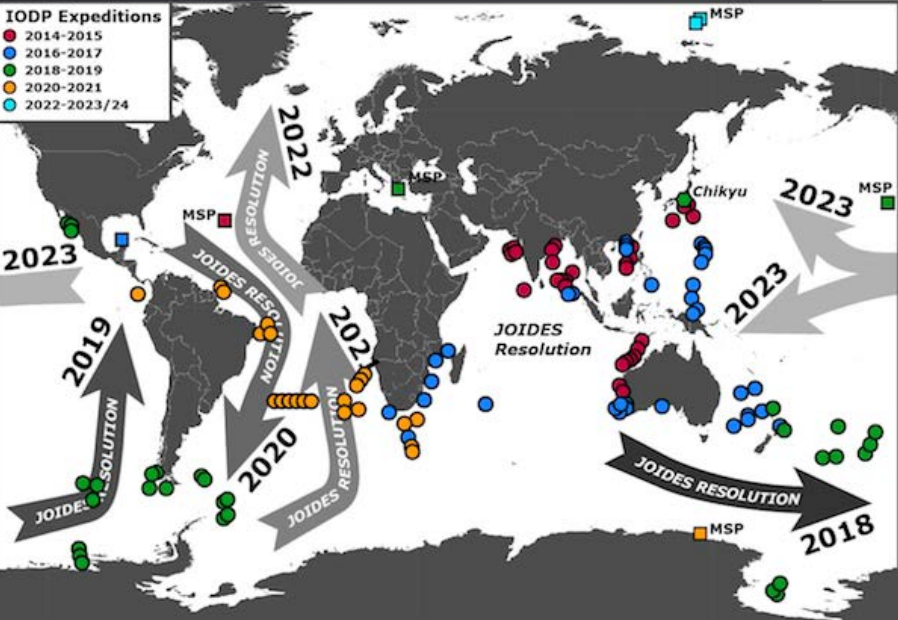
The Future of the US drilling platform

- U.S. National Science Board approves funding for JOIDES Resolution through 2024!
- Post 2024: progress on plans for a modernized non-riser drilling vessel

NSB-2019-3
February 12, 2019



JOIDES Resolution ship track:



What will the post-2023 science plan look like?

Discussions are imminent:

- ANZIC – *Ocean Planet* meeting at ANU April 14-16 2019
- ECORD – *PROCEED* workshop in Vienna April 6-7, 2019
- J-DESC – *Scientific Ocean Drilling beyond 2023* April 2-3, 2019
- United States – *NEXT: Scientific Ocean Drilling Beyond 2023*, Denver May 6-7, 2019

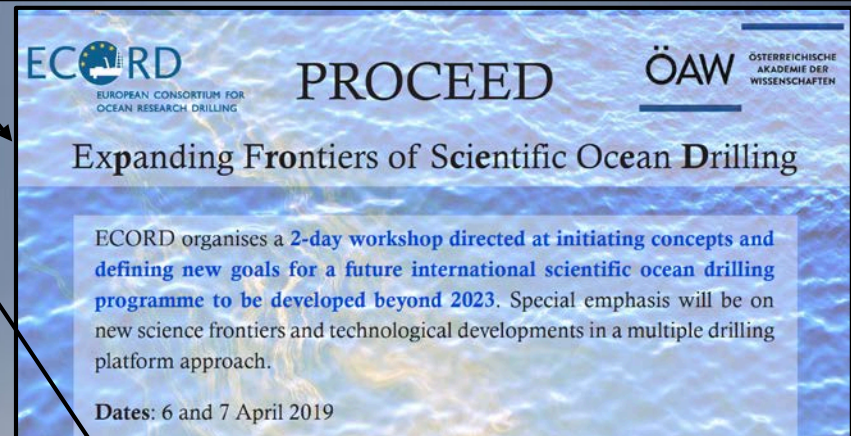
All will result in documents to be shared with other members



OCEAN PLANET:
Developing the new IODP Strategic Plan 2024 – 2034

14th - 16th April 2019
ANU Canberra, Australia.

 Australian and New Zealand IODP Consortium



ECORD EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING

PROCEED

ÖAW ÖSTERREICHISCHE AKADEMIE DER WISSENSCHAFTEN

Expanding Frontiers of Scientific Ocean Drilling

ECORD organises a 2-day workshop directed at initiating concepts and defining new goals for a future international scientific ocean drilling programme to be developed beyond 2023. Special emphasis will be on new science frontiers and technological developments in a multiple drilling platform approach.

Dates: 6 and 7 April 2019



NEXT: Scientific Ocean Drilling Beyond 2023

Time: May 6-7, 2019

Location: Denver, Colorado

Workshop Co-Chairs: Anthony Koppers (Oregon State University) and Jim Wright (Rutgers University)

Get Involved in NEXt: The deadline to apply for an invitation to the NEXt workshop has passed. But community input to the workshop is still welcome – the application form will remain open through 15 April 2019 to allow community members who are not able to attend to submit statements on their priorities for the future of ocean drilling. See [Workshop Participation](#), below, for more information.



J-DESC Workshop

“Scientific Ocean Drilling beyond 2023”

「科学掘削の未来：2023年からその先へ」

地球科学における巨大プロジェクト“科学掘削”。

若手・中堅研究者が、その未来を描くためのワークショップを開催する。

日本発の科学プランを創っていきましょう！

2019年

4月2日火 ~ 3日水

場所：海洋研究開発機構 横浜研究所 三好記念講堂 (JAMSTEC Yokohama Institute)

使用言語：英語 / 日本語

The U.S. visioning (NEXT workshop – May 6-7)

Goals:

- 1) *update existing scientific challenges and identify new challenges*
- 2) *identify and prioritize the required technologies and platform needs*

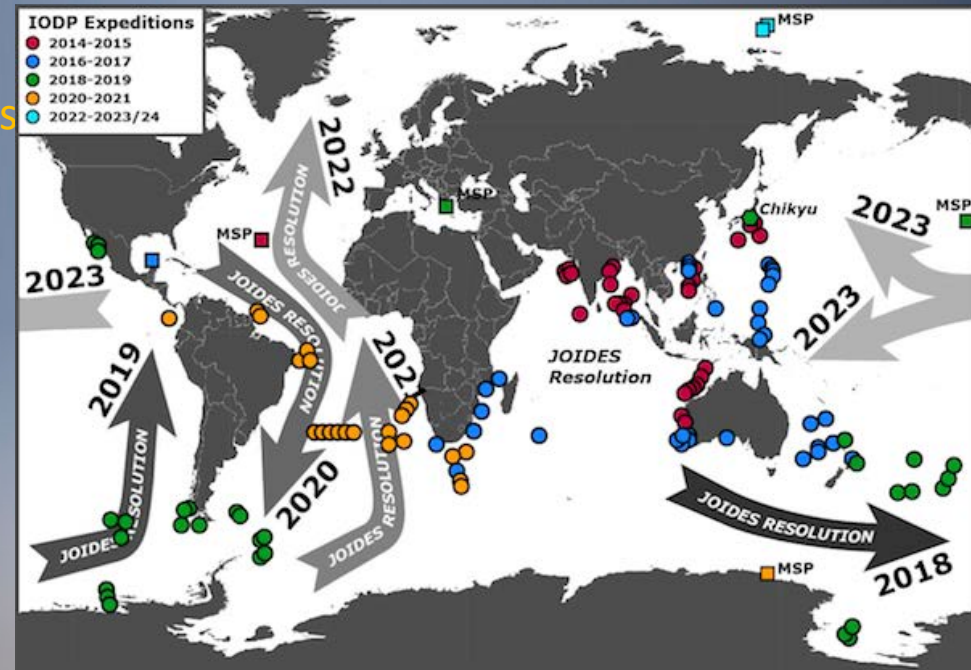
You can provide input even if you aren't going to the workshop:

Go to http://usoceandiscovery.org/next_workshop and follow instructions to answer these questions:

- *Looking beyond 2023, what current [IODP Science Plan](#) challenges need to be modified or expanded? How and why?*
- *What new scientific challenges should be formulated in the next IODP science plan?*
- *What is needed in a new U.S. riserless drilling vessel (from coring to shipboard analysis) to answer these new or updated challenges?*

Opportunities to help direct future of IODP Science

- Provide input to NEXT workshop
- Get involved in writing proposals! (note the ship track, keep proposal pressure high)
- Serve on U.S. IODP committees (USAC, SEP)
- Graduate student opportunities:
 - Apply to sail
 - Schlanger Ocean Drilling Fellowships
 - Assist in post-cruise research

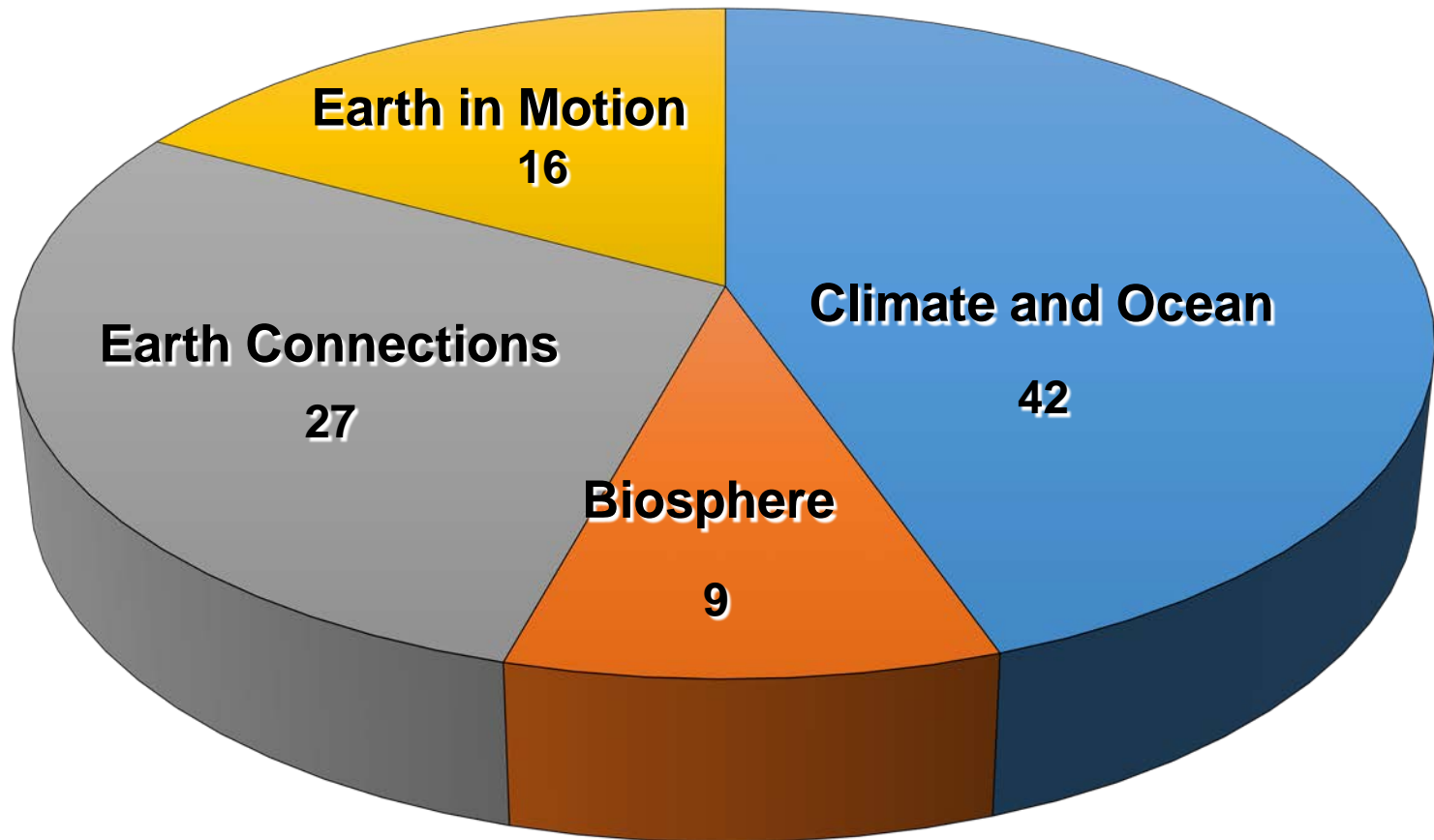


For info on US IODP activities: <http://usoceandiscovery.org>
Electronic mailing list: <http://usoceandiscovery.org/mailling-list/>



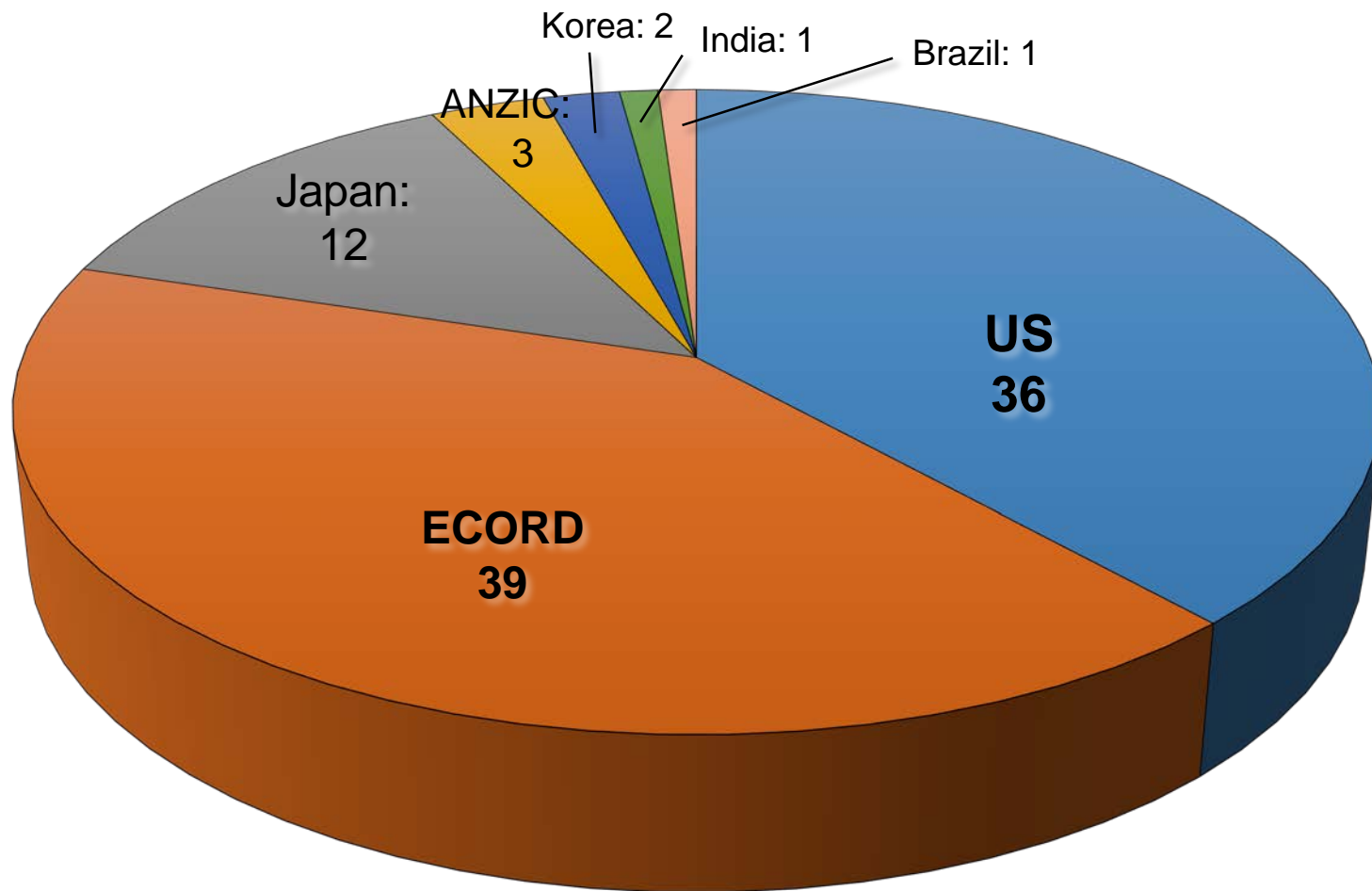
Extra slides (not used)

Active proposals: 94 by science plan themes



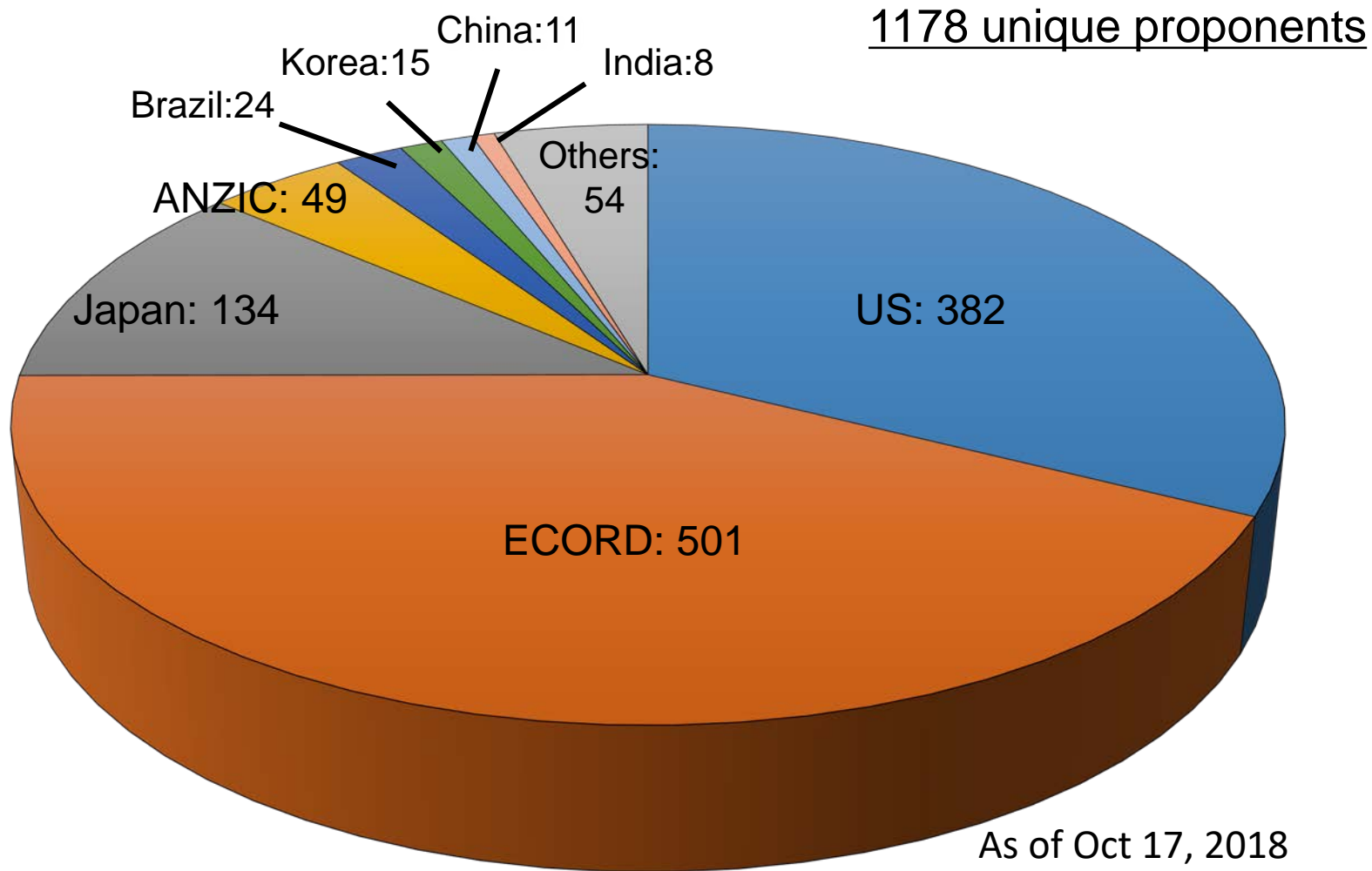
As of Oct 17, 2018

Active proposals: 94 by lead proponent's member affiliation



As of Oct 17, 2018

Active proponent distribution





Expedition Scientific Staffing - Procedure

