

# The value and importance of ocean exploration in marine protected areas



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New England  
Aquarium

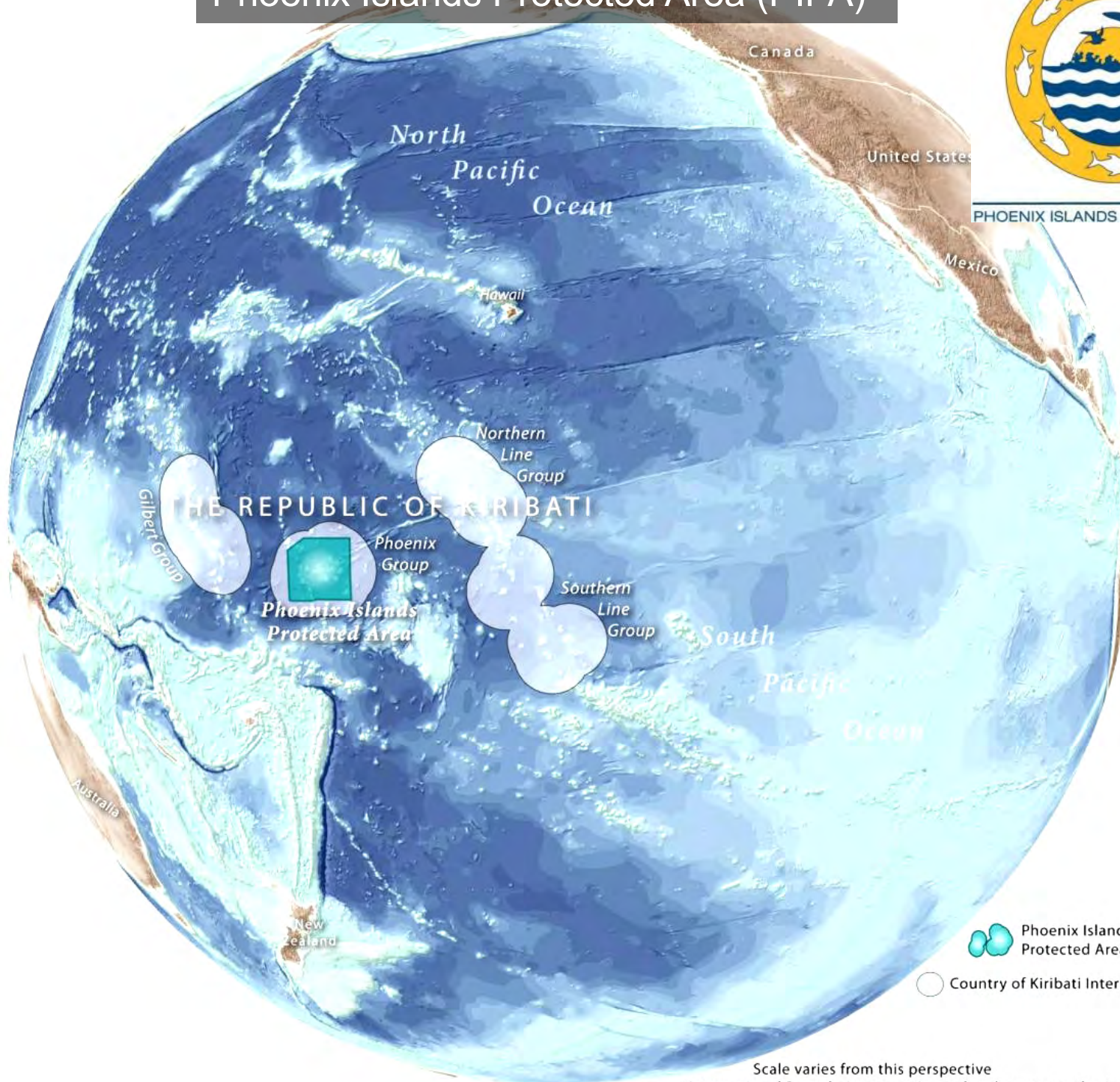


*Protecting the blue planet*

# Phoenix Islands Protected Area (PIPA)



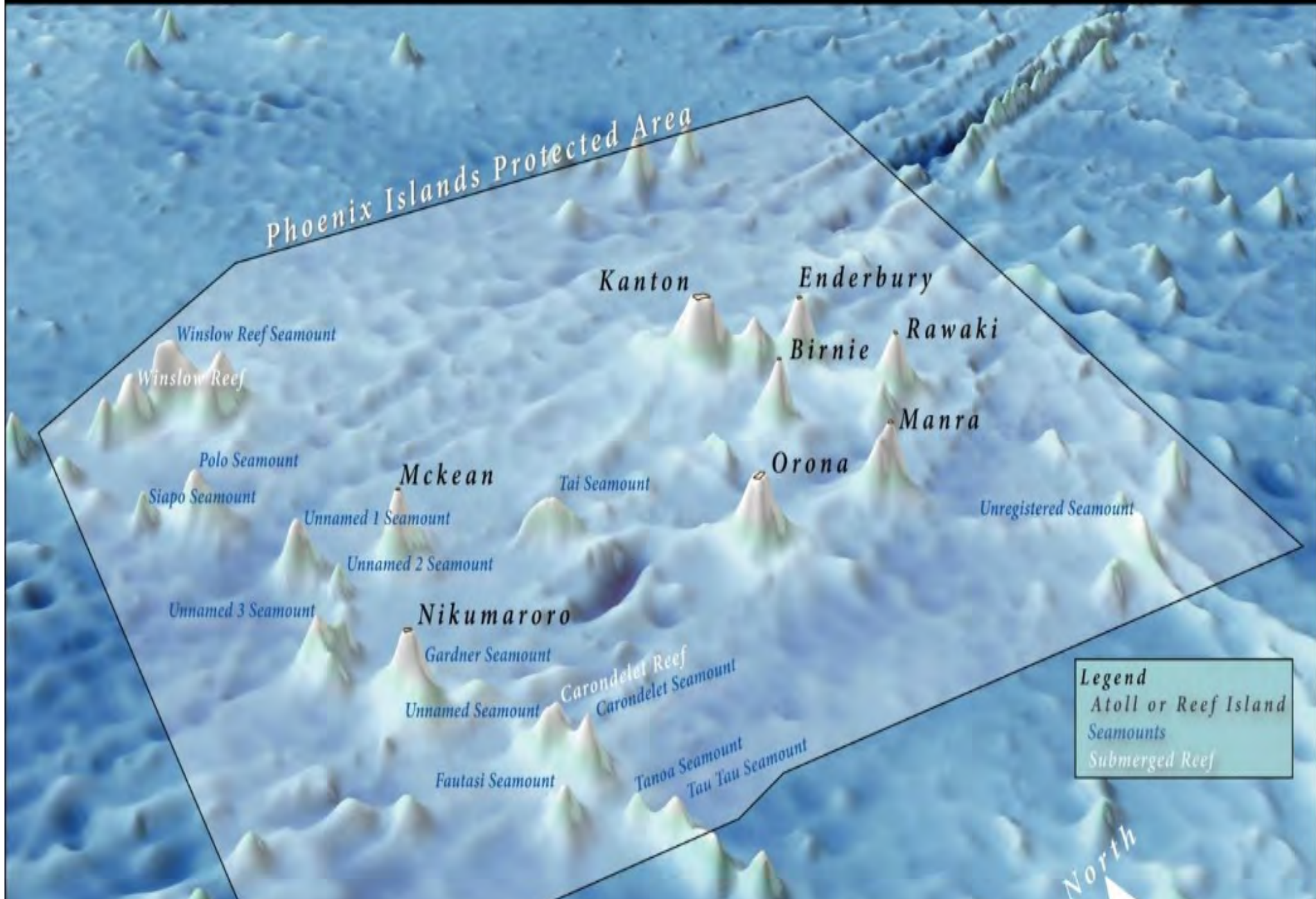
PHOENIX ISLANDS PROTECTED AREA



Scale varies from this perspective

\*International Boundaries are estimated and are not authoritative.

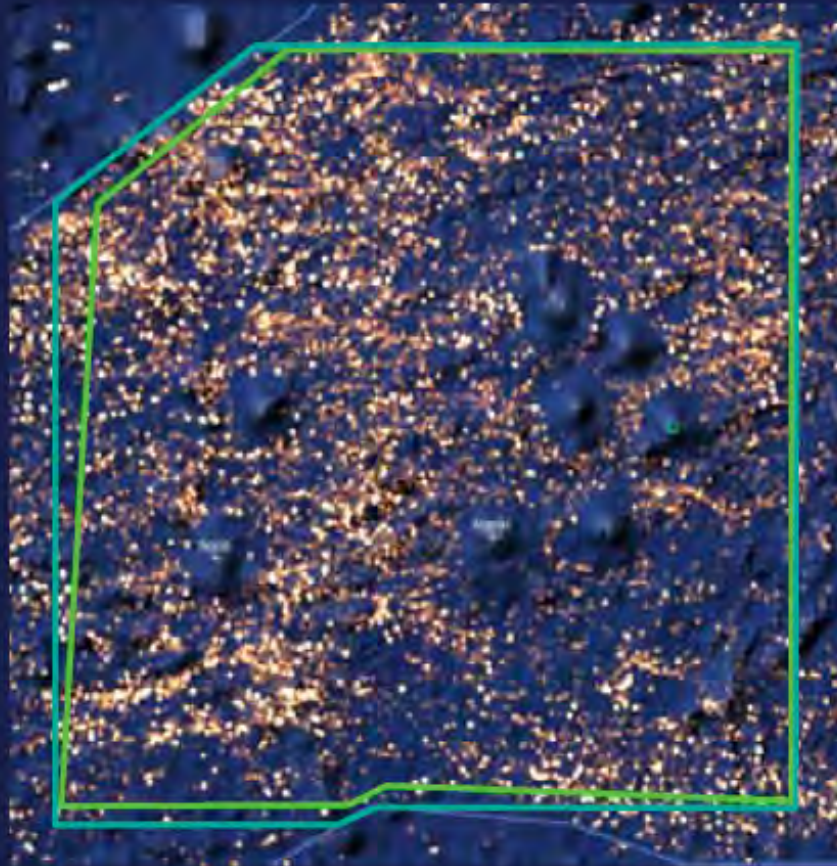
# Largest & deepest UNESCO World Heritage Site



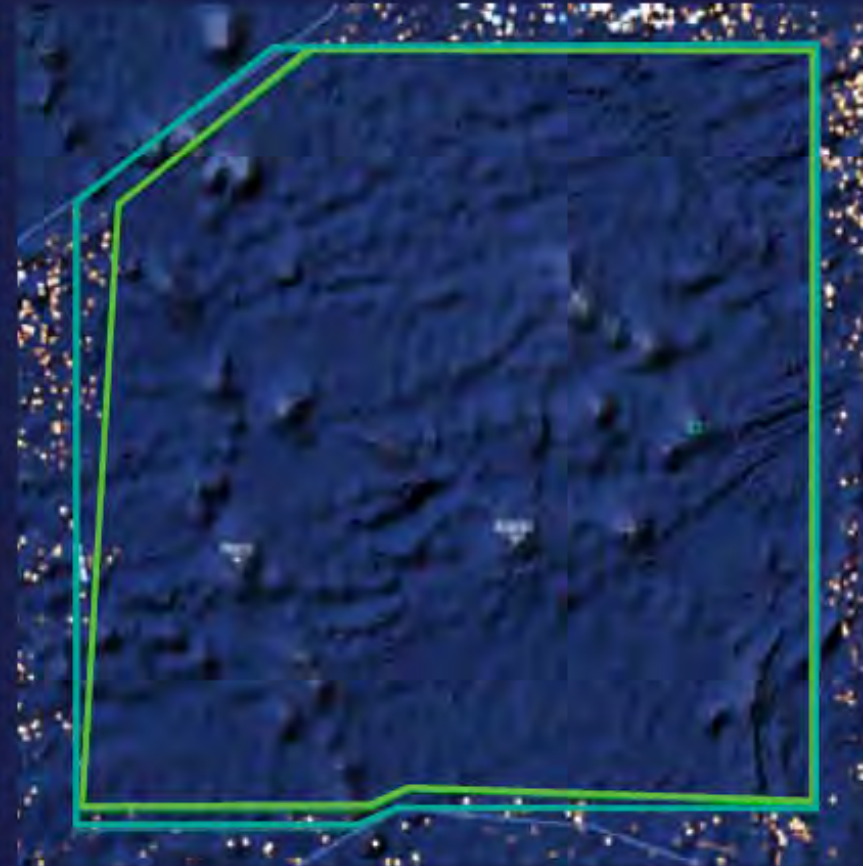
# FIGURE 6 BEFORE AND AFTER THE FISHING BAN

Heavy fishing activity was detected by Global Fishing Watch in PIPA from January to October 2014, before the ban was enacted. Fishing activity was nearly non-existent in the first 10 months following the closure of PIPA to commercial fishing. Data was collected through October 15.\*

**January - October 2014**






**January - October 2015**



Source: Global Fishing Watch

## LEGEND

-  Management Plan Boundary
-  Enforcement Boundary
-  Fishing Effort



*\*The closure boundary given to the Forum Fisheries Agency does not perfectly align with the boundary mapped out in PIPA's management plan due to shifts in EEZ delineations at the northwest edge of Kiribati's central region. A gap exists between the two boundaries, excluding Winslow Reef in the northwest corner of the EEZ. There appears to be some continued fishing in that area. Oceana understands that Kiribati and the PIPA Trust intend to resolve this issue.*

## PIPA Scientific Advisory Committee (SAC):



## PIPA Scientists and collaborators:



## PIPA Conservation Trust:



# A PIPA scientific research program is part of World Heritage Status maintenance:

Section 45(1)(f) and 48(4)(d)(for World Heritage areas) of the Environmental Act 1999, as amended, requires scientific and research studies to support protected areas.



United Nations  
Educational, Scientific and  
Cultural Organization



World  
Heritage  
Convention

## And the PIPA management plan:

SAP 1.10 – PIPA Science and Research

SAP 2 – PIPA 'Issues to Results'

SAP 3 – State of the PIPA Report 2014

as required by the PIPA Regulations



PHOENIX ISLANDS PROTECTED AREA

– SAC, PIPA Science – meetings; advisory role

# 10 Year Research Plan: 2010-2020

## Exploration

- Shallow reefs
- Mesophotic reefs
- Seamounts
- Deep sea floor

## Climate Change

- Temperature
- Sea level rise
- Resilience
- Recovery

## Connectivity

- Tuna & other large pelagics
- Mammals / Turtles
- Larval replenishment source

## Ecological Economics

- PIPA as a global resource



## Emerging priorities:

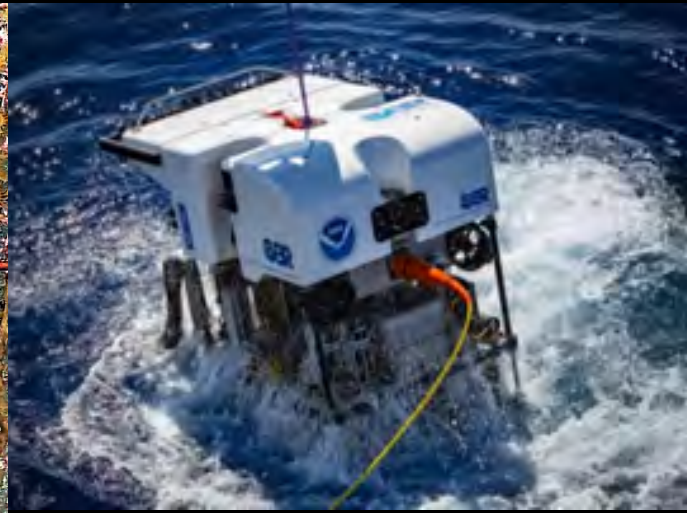
- Ecological economics
- Recovery processes
- Population genetics

# 10 Year Research Plan: 2010-2020

## Exploration

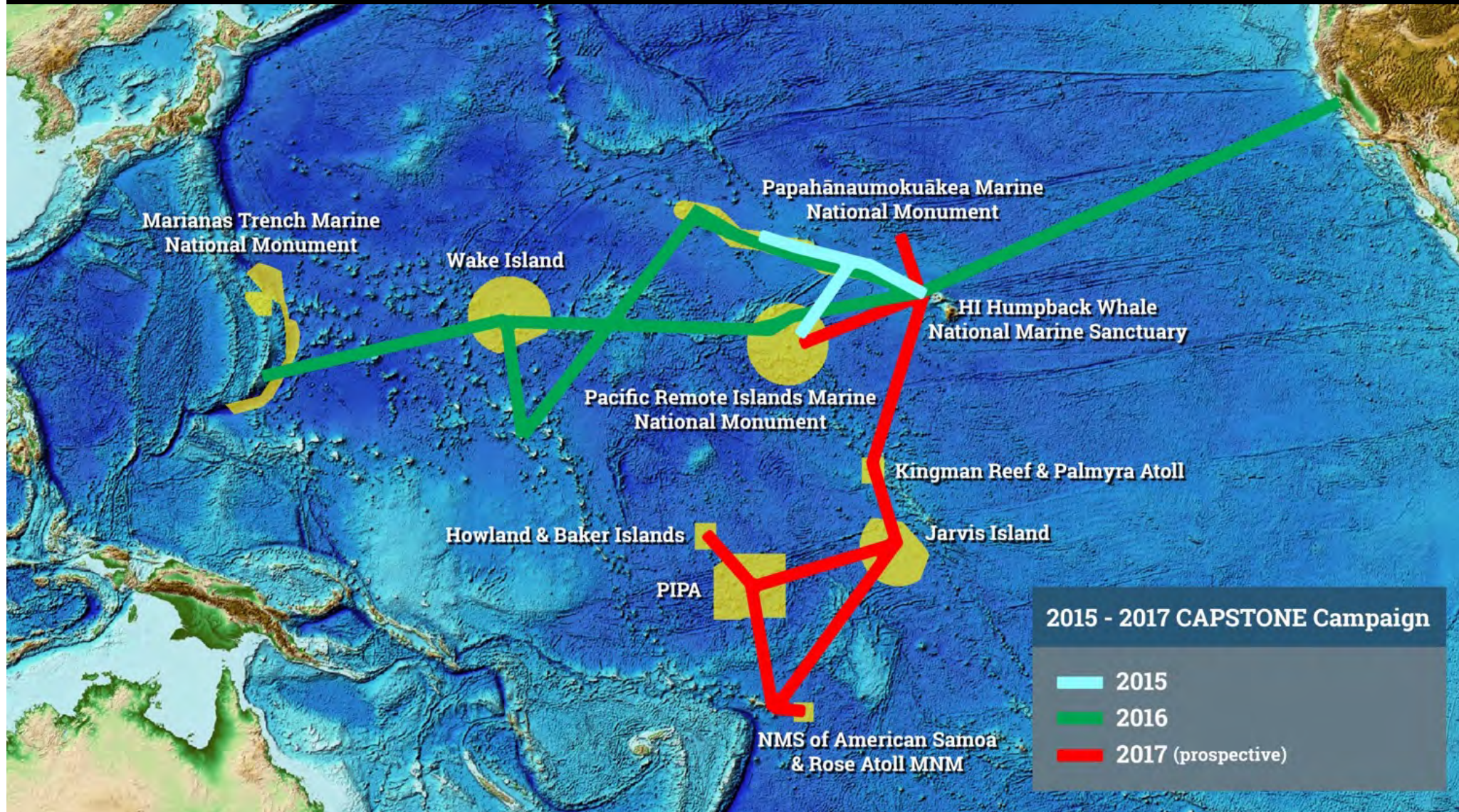
- Mesophotic reefs
- Seamounts
- Deep sea floor

1. Okeanos Explorer: Jan – March 2017
2. Falkor: October 2017 (with OER support)



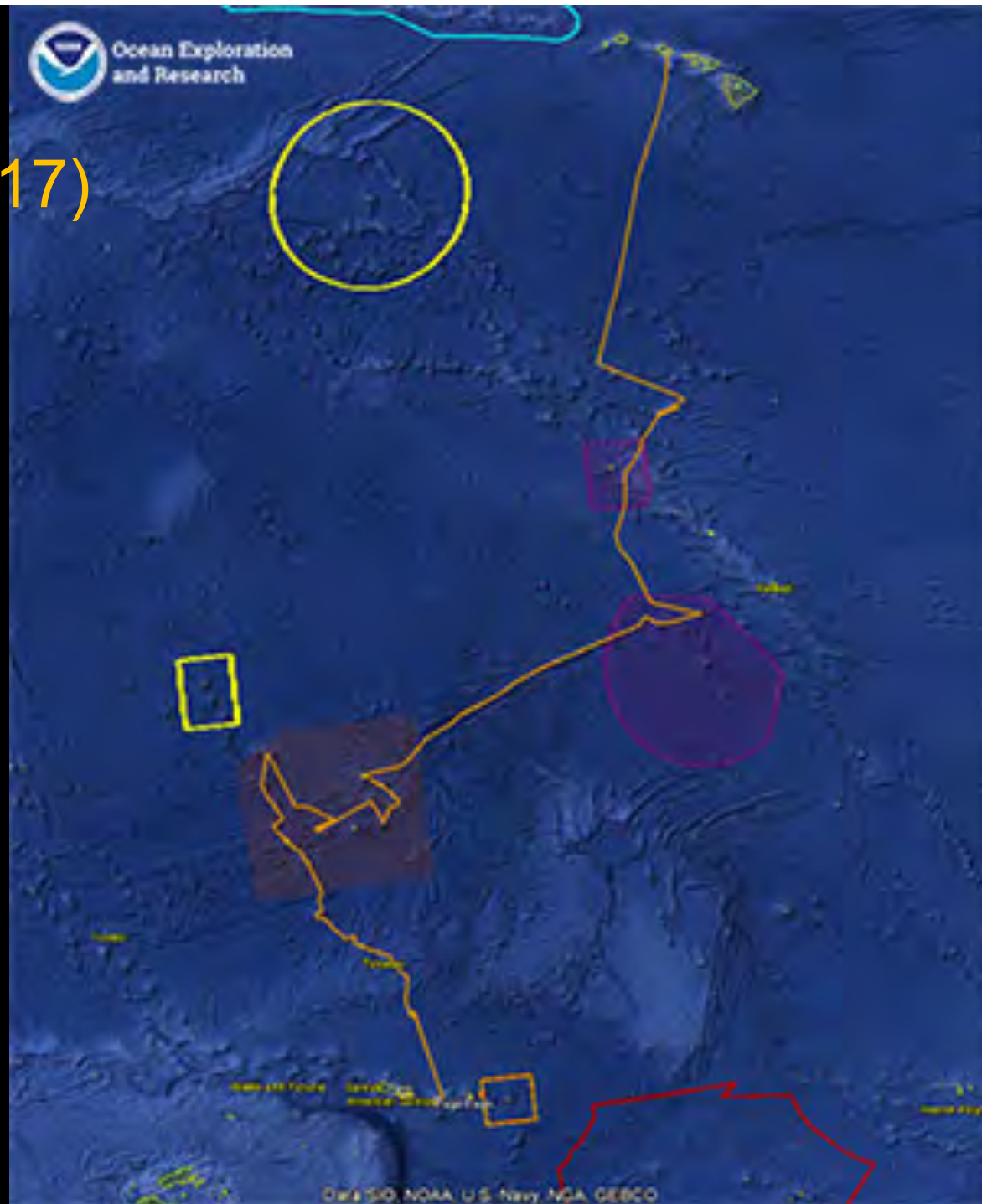


# CAPSTONE 2015-2017

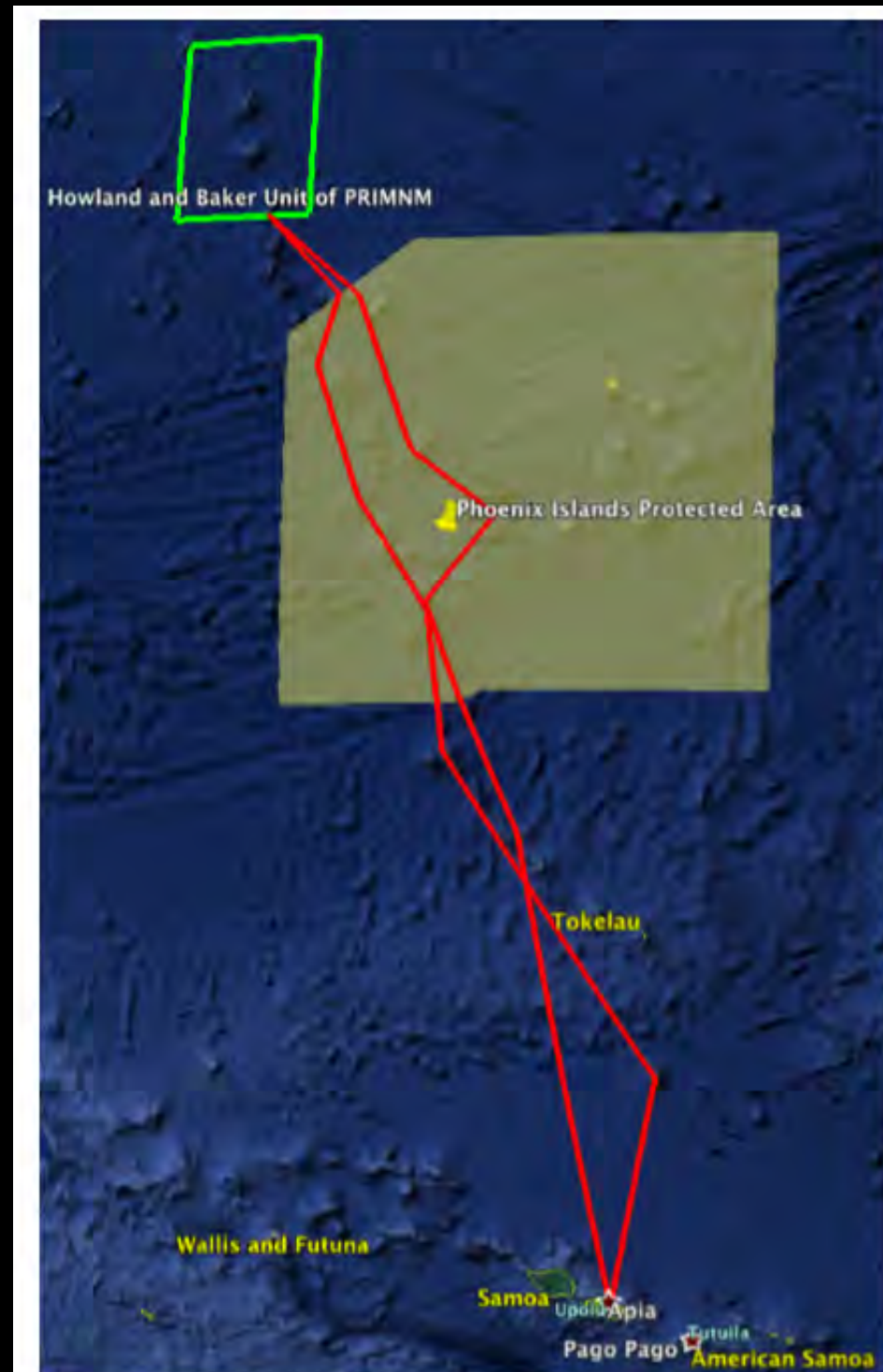


- Resource-limitation for SIDS and the role of the US in regional exploration

# Mapping (Jan / Feb 2017)



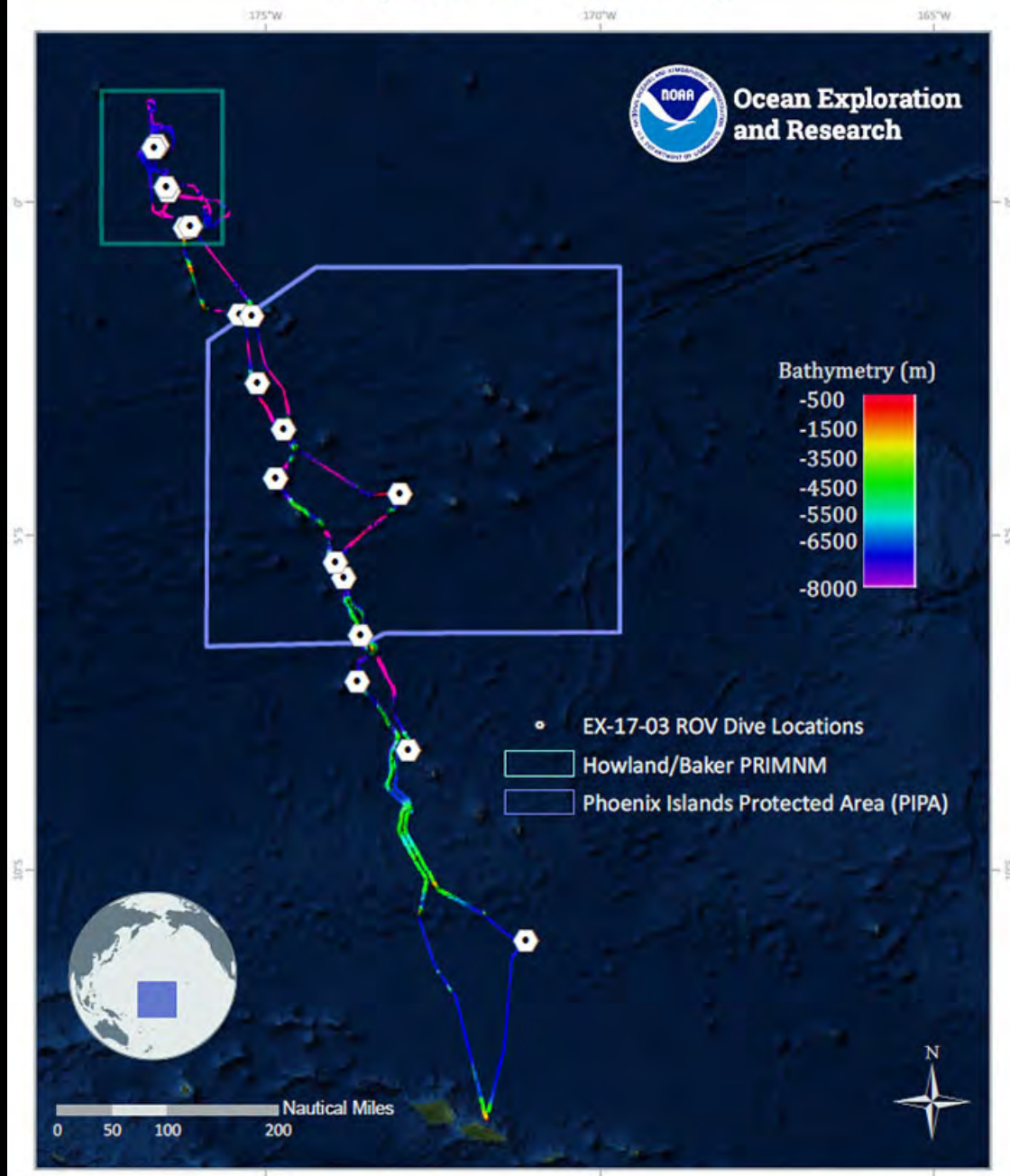
# NOAA Okeanos EX-1703 March 7-29, 2017



# NOAA Okeanos EX-1703 8 dives in PIPA

Carondelet – 3/11  
Athena – 3/12  
Polo – 3/13  
Winslow – 3/22  
Teutana / McKean - 3/23  
Kinono Hadal Trough - 3/24  
Maibua - 3/25  
Te Kaitira - 3/26

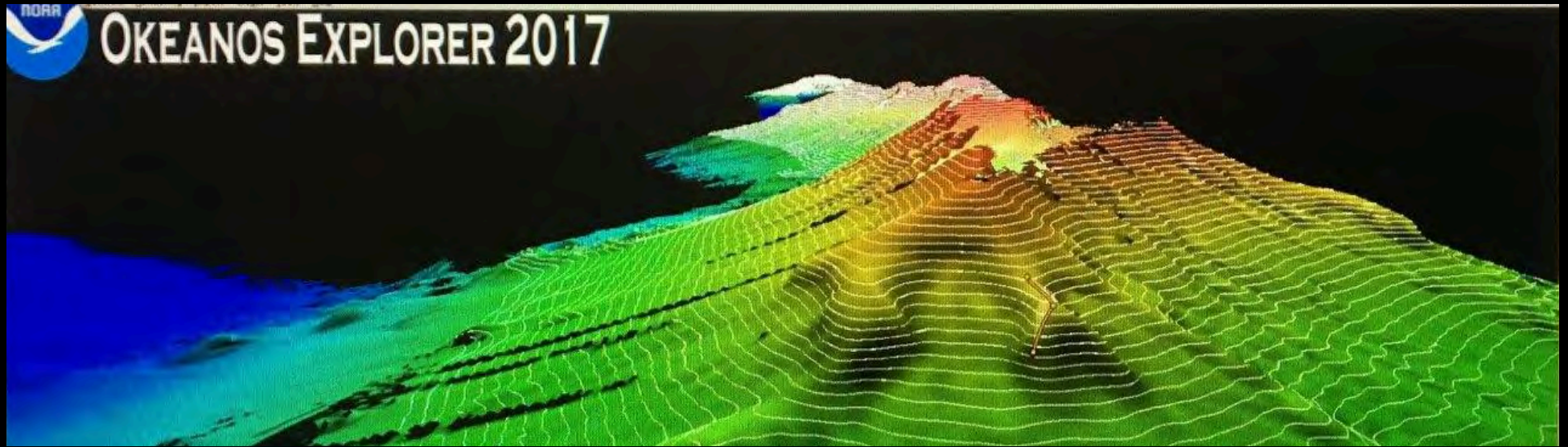
## EX-17-03 Howland/Baker PRIMNM and PIPA Expedition Overview Map



Overview map showing seafloor bathymetry and ROV dives completed during cruise EX-17-03, part of a three year NOAA Office of Ocean Exploration's Campaign to Address the Pacific monument Science, Technology, and Ocean Needs (CAPSTONE).

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS

“Hiking up one tiny trail, at night, with nothing but a flashlight” ....



“Hiking up one tiny trail, at night, with nothing but a flashlight” .... But it’s a giant leap in our understanding of never-before seen ocean areas.

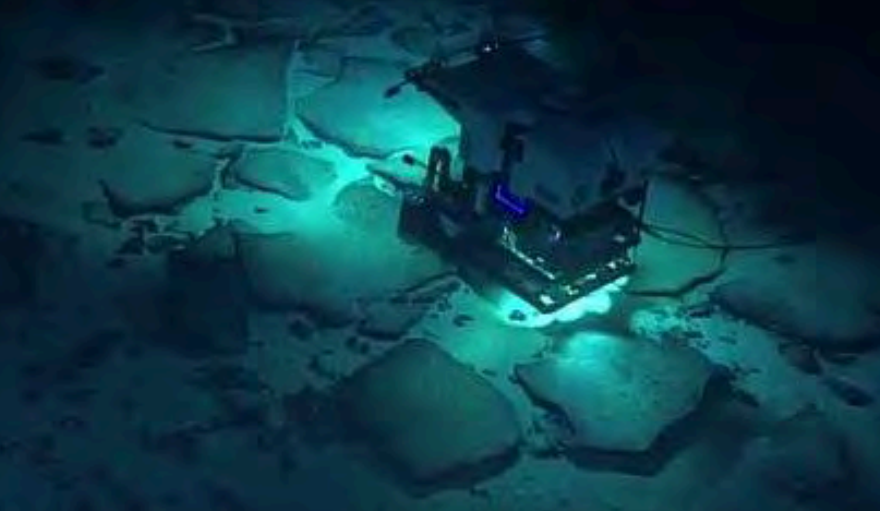
**“That’s one small step  
for man, one giant leap  
for mankind.”**

Neil Armstrong  
1930 - 2012



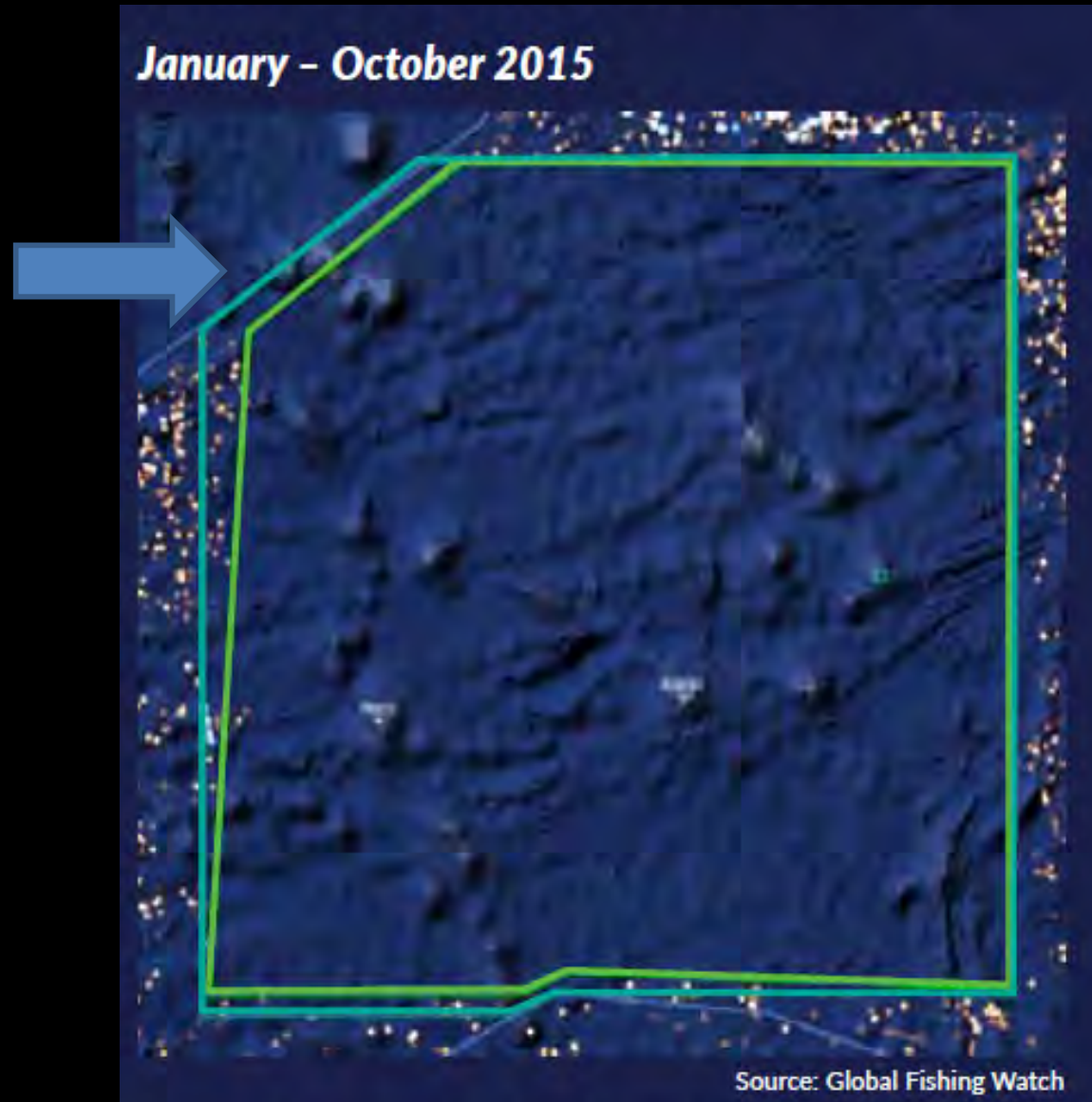
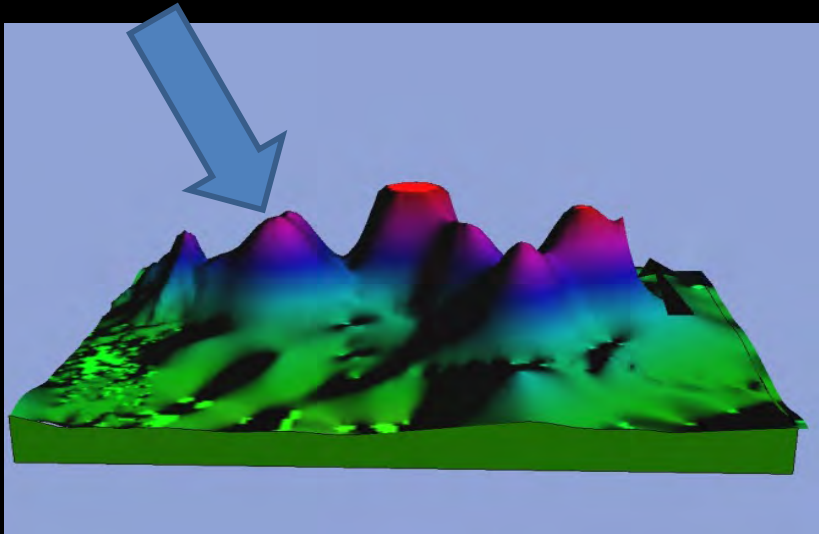
So what do we do with this initial exploration?

*How is it used?*

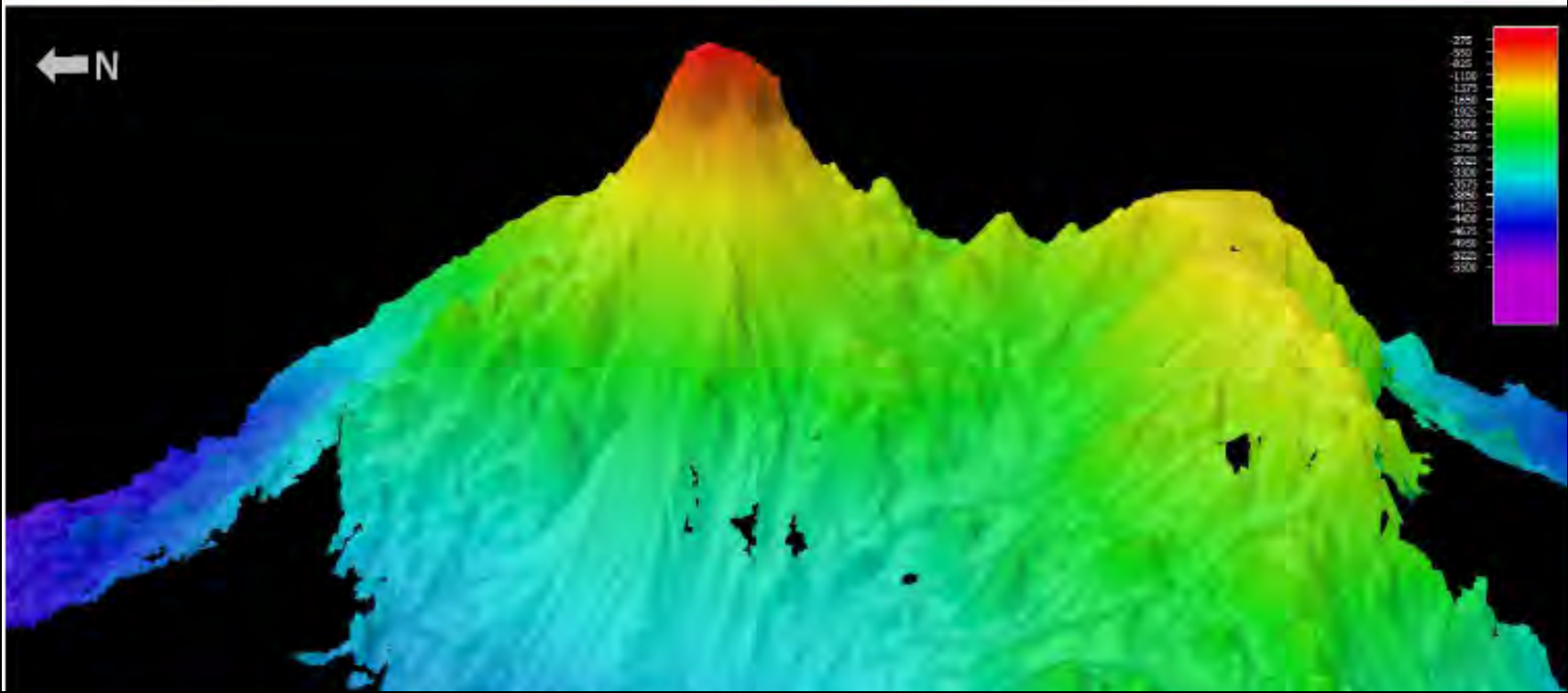
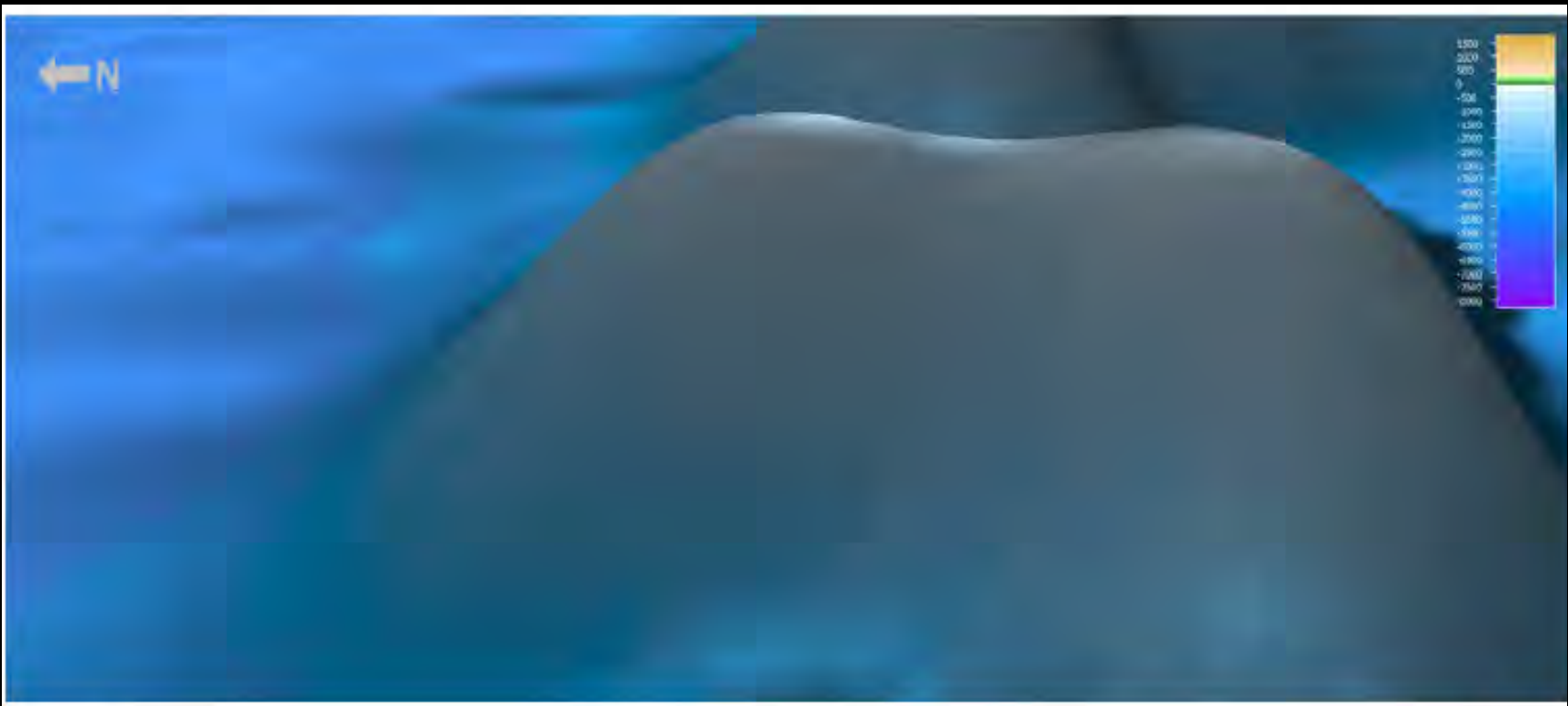


# 1) Boundary and zoning decisions

Example: Winslow Reef







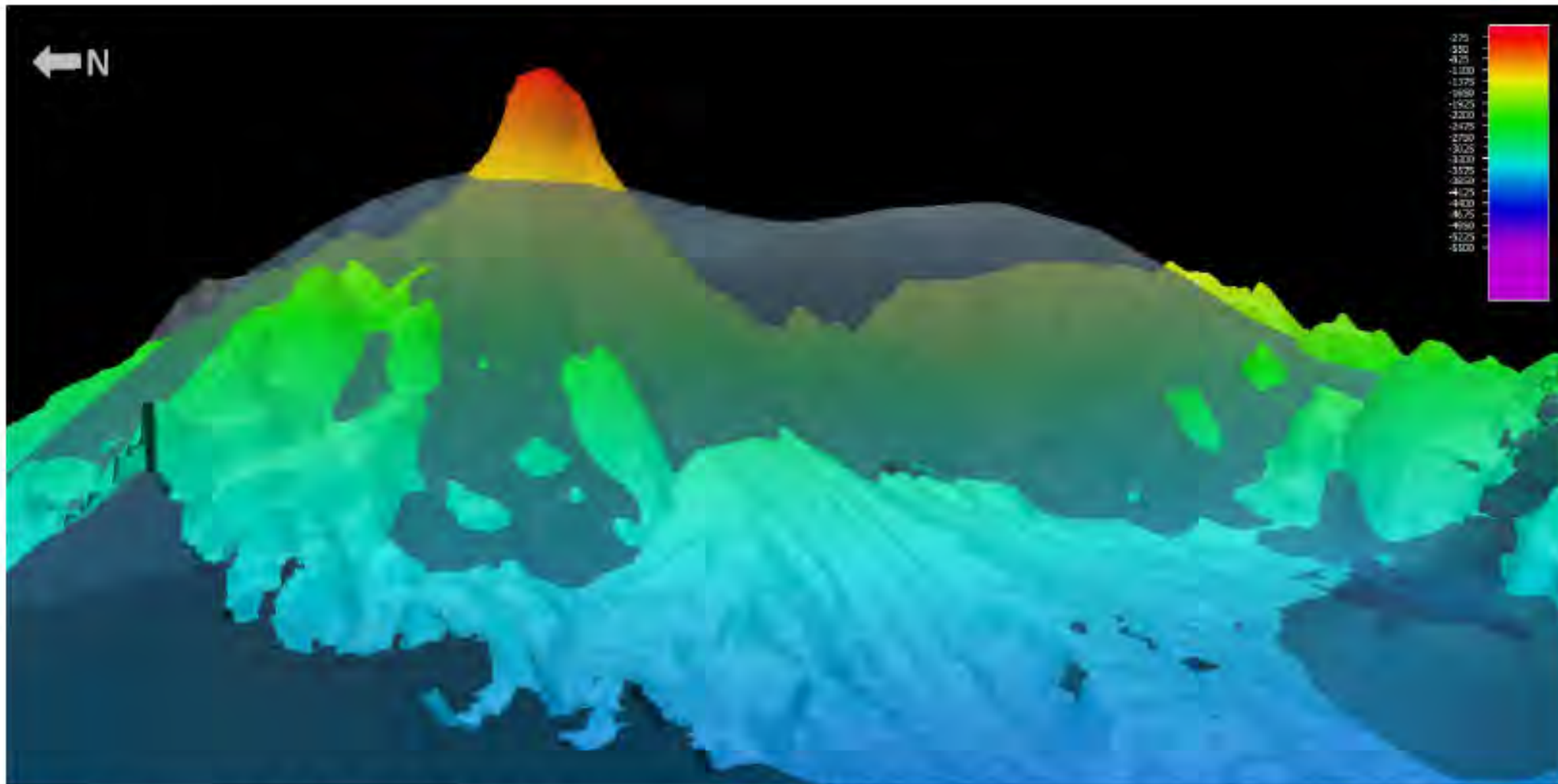
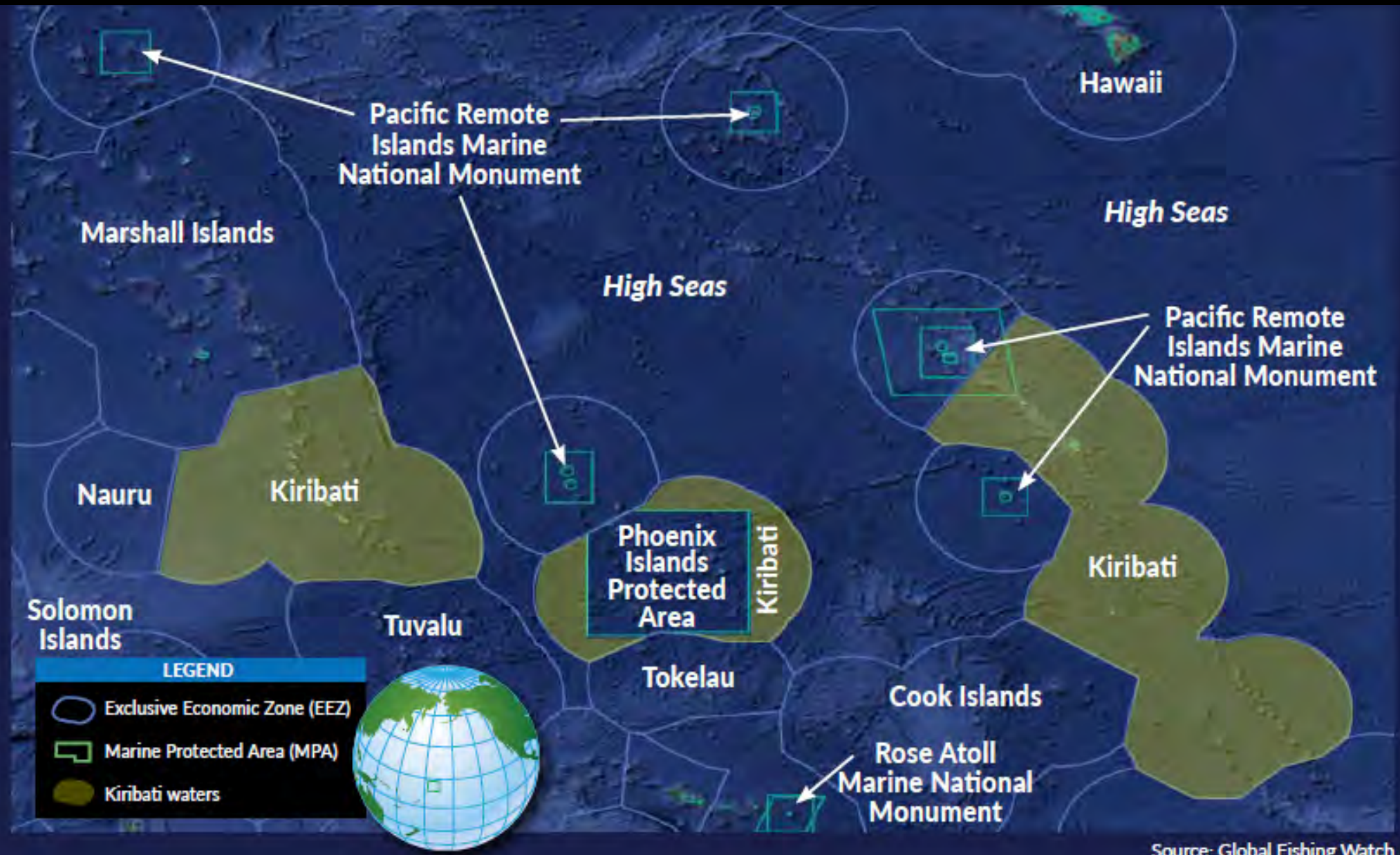
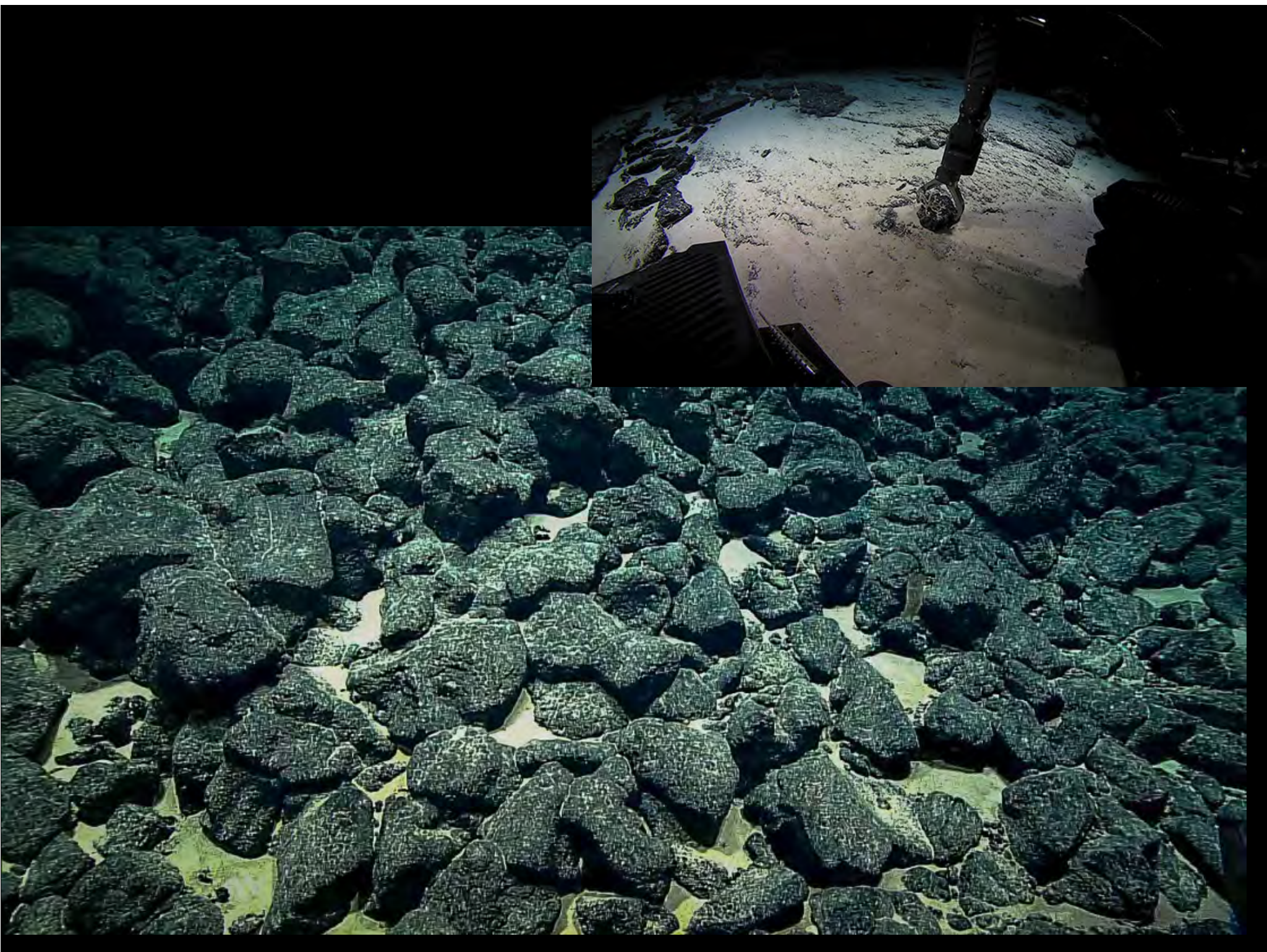


Figure 8. Comparison of the SRTM30 grid (transparent grey) and EX-17-03 bathymetry (rainbow color ramp). Note the 950m difference between the actual top of the seamount and the estimated seamount depth surface from the SRTM30 model. Previous comparisons between the *Okeanos* ship-based multibeam measurements and the SRTM30 grid have noted up to 1400m of difference in predicted depth elevations due to grid resolution constraints of the satellite/gravity models. The depth scale bar is for the EM302 multibeam data collected by the *Okeanos Explorer*. Image made in QPS Fledermaus software, 3x vertical exaggeration.

## 2) Setting baselines

Example: Kiribati EEZ





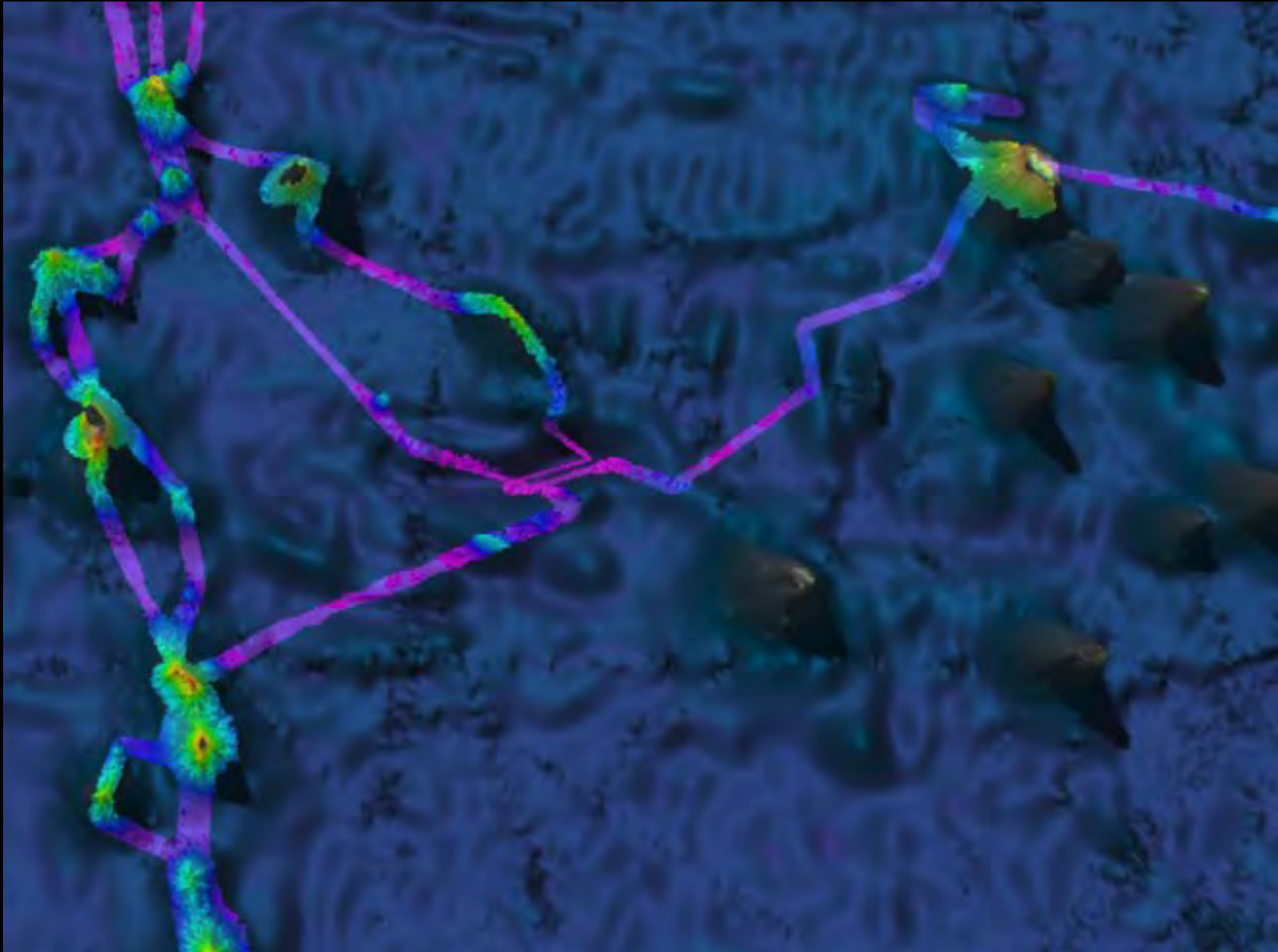
# Hemicorallium (precious coral)



# Gold coral (another precious coral) - Maibua



# Hadal Trough feature – “Kinono”





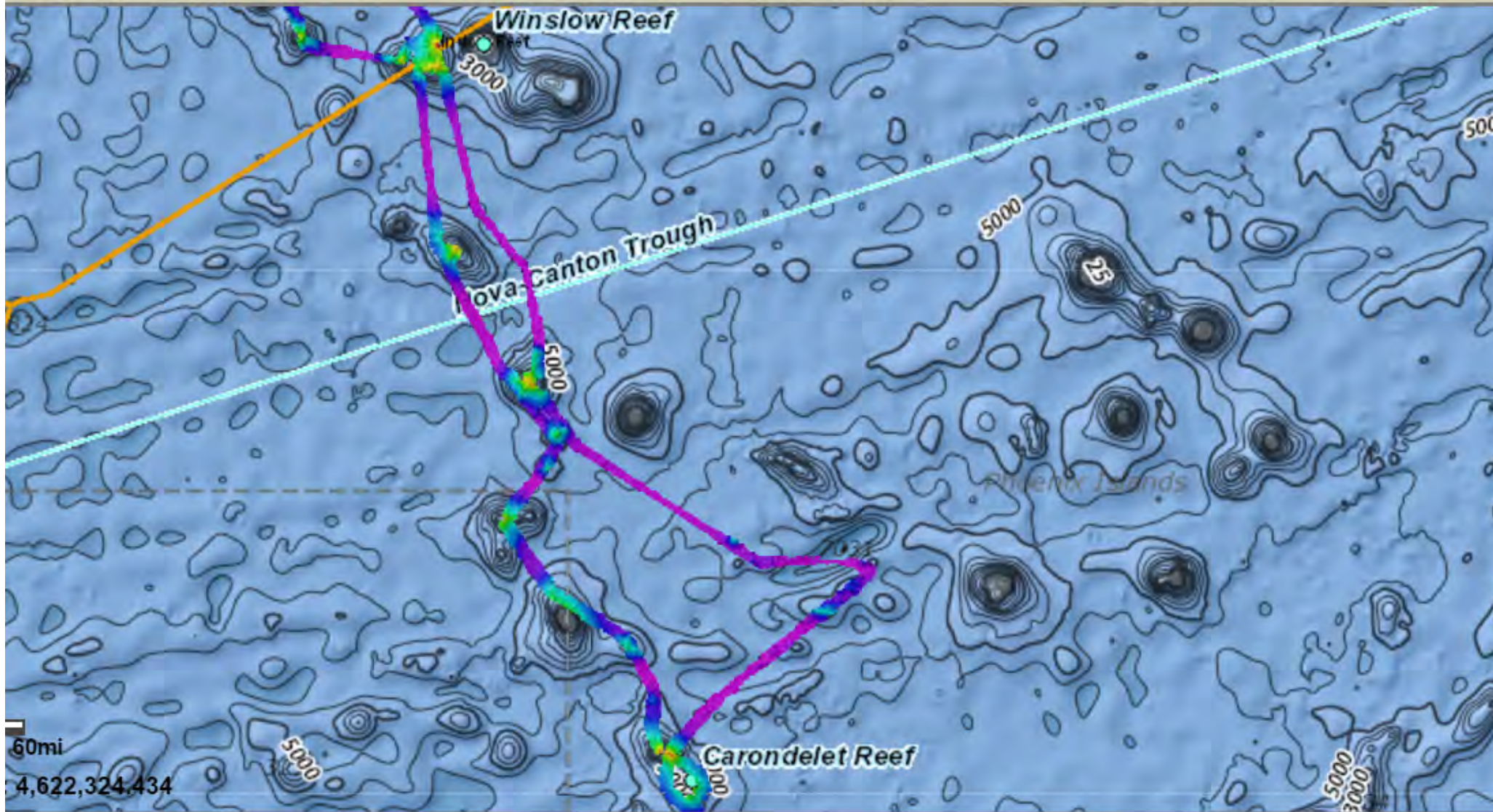


### 3) New science and continued exploration

Example: *Upcoming Falkor cruise*



# Cruise goals:





# Potential new species?



# 4) Outreach and engagement:

- Broadcast on PIPA Facebook Page
- Broadcast on PIPA Twitter
- ABC Radio – “Pacific Beat”
- Kiribati Radio
- USP campus
- PIO (Betarim) as the telepresence Observer



A screenshot of a news website layout. On the left, an ABC News article titled "Pristine condition of Kiribati deep sea w for ocean scientists" is shown, with a video player at the top. The main content area features an article titled "Kiribati carries out major survey of Phoenix Islands" with a video player and text describing the survey. On the right, a "Pacific Beat" article titled "New marine species discovered off Kiribati in ground-breaking exploration of untouched ocean floor" is displayed, also with a video player and text. The layout includes navigation menus, social media sharing buttons, and timestamps for each article.

A government research ship gives us a vivid reminder of the many amazing creatures living deep beneath our oceans

[nyti.ms/2n9UeME](https://nyti.ms/2n9UeME)

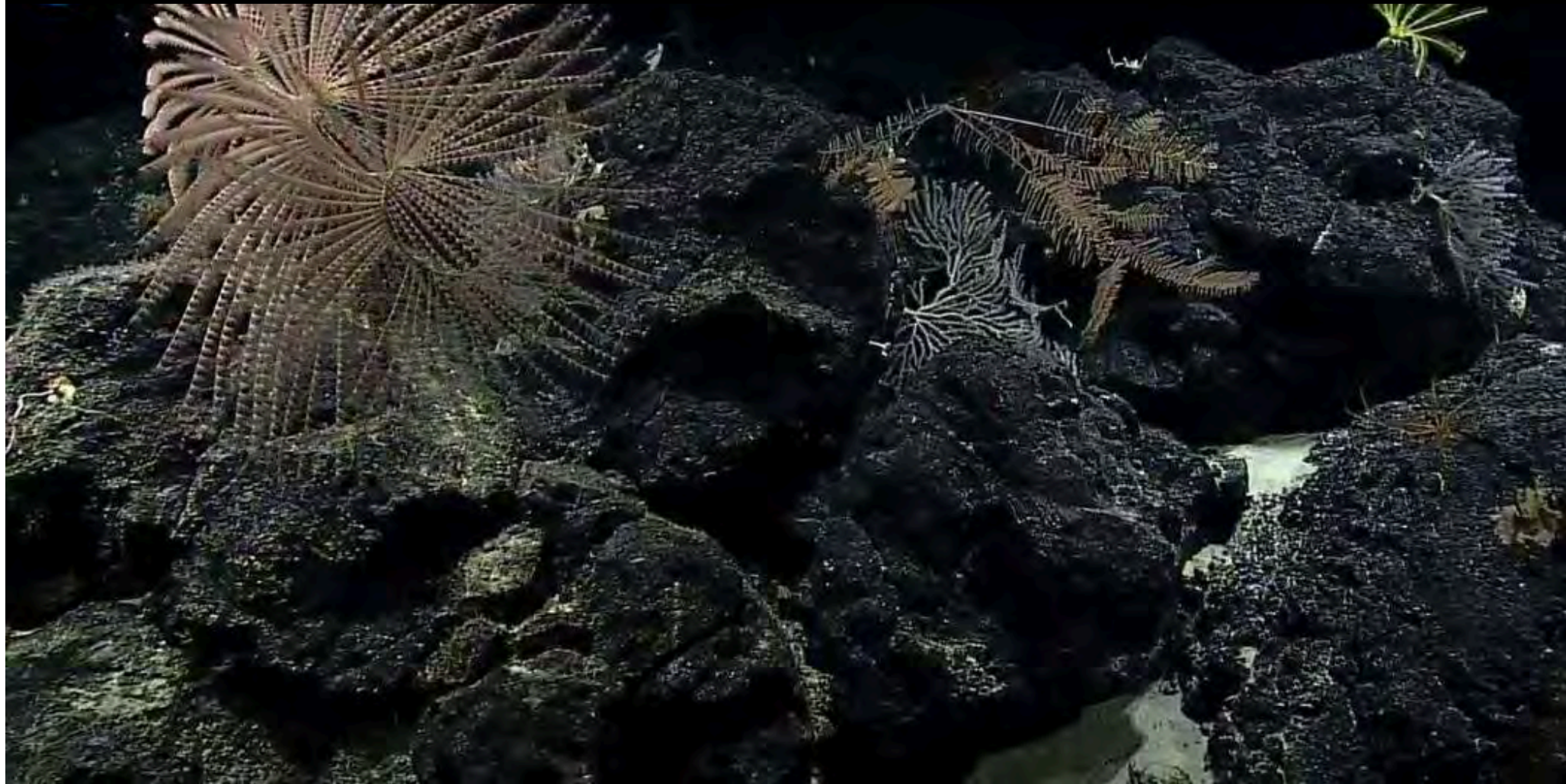


# Many possible paths



Thank you.

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New England  
Aquarium



*Protecting the blue planet*