GRID ARENDAL

A Centre Collaborating with UNEP

What's in and what's not: using the new global seafloor geomorphic map to examine the representativeness of global marine protected areas

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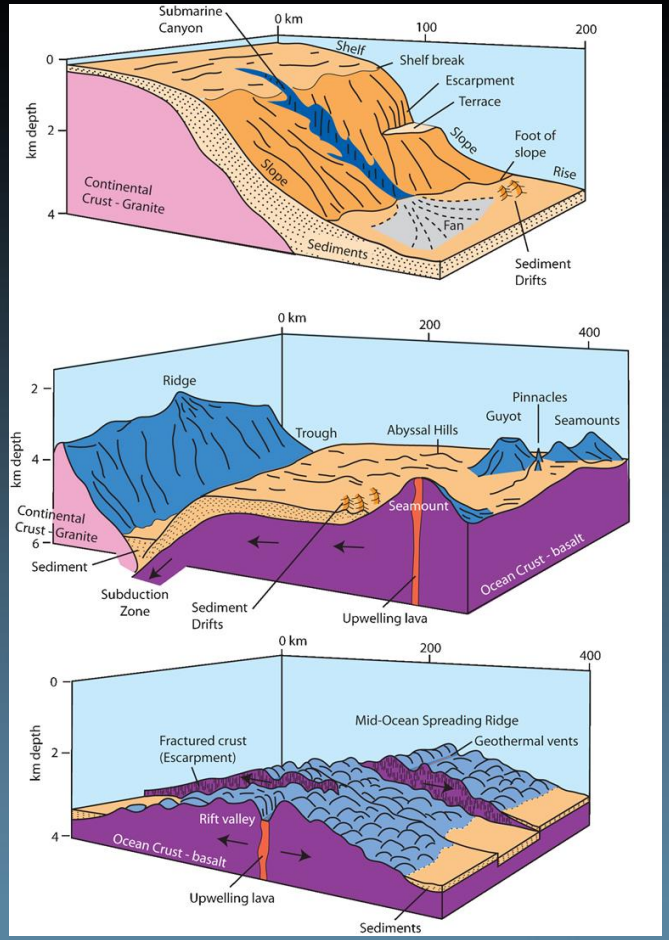
Why Seafloor Geomorphology?

- Seafloor geomorphology can be mapped at global scale using existing data
- Is a useful surrogate for biodiversity at the global scale. i.e Seamounts have a different suite of species to Abyssal Plains
- Support improved management of the marine environment (eg MSP, feature inventories)
- Can be built upon using other physical and biological data

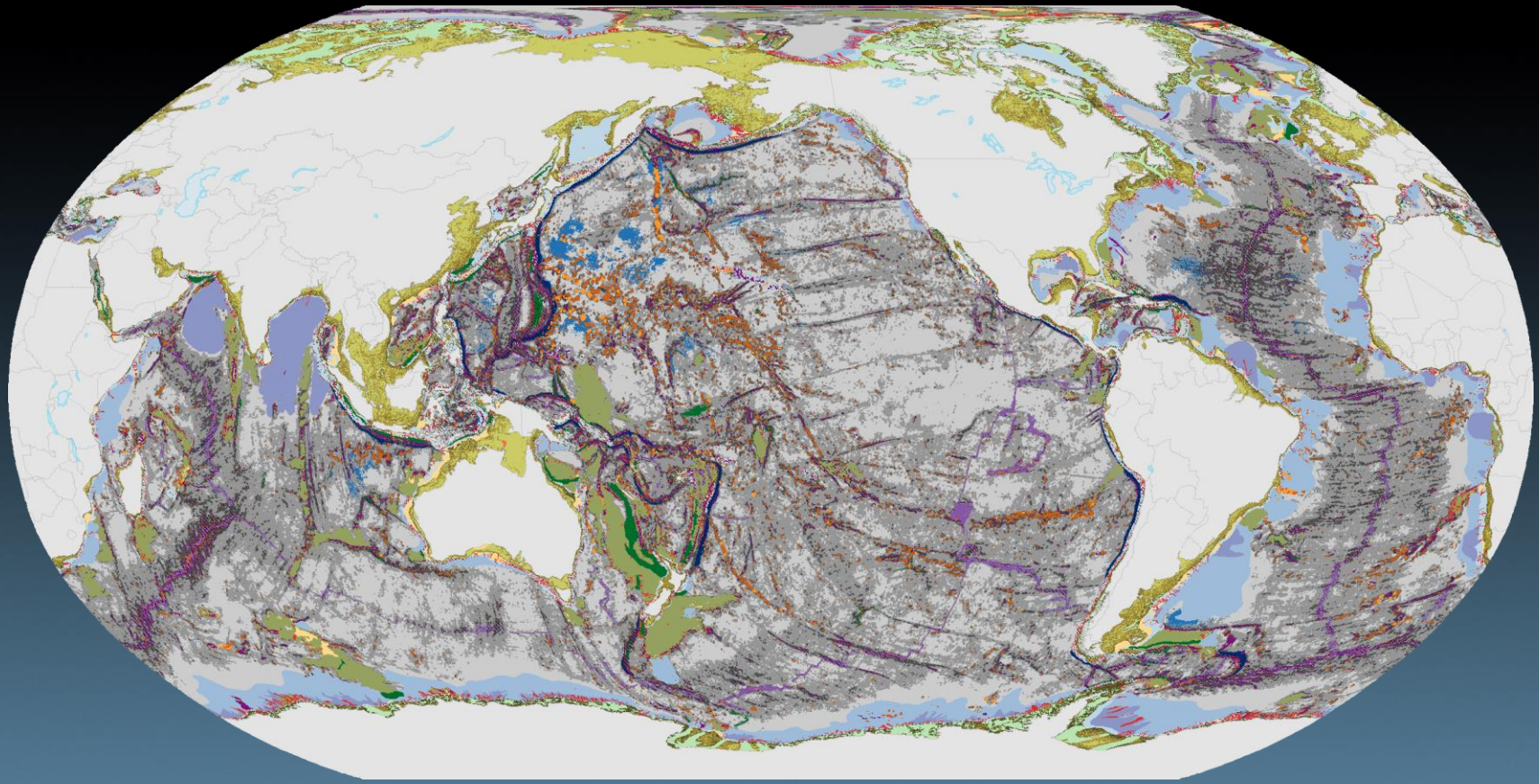
Geomorphic Feature Interpretation



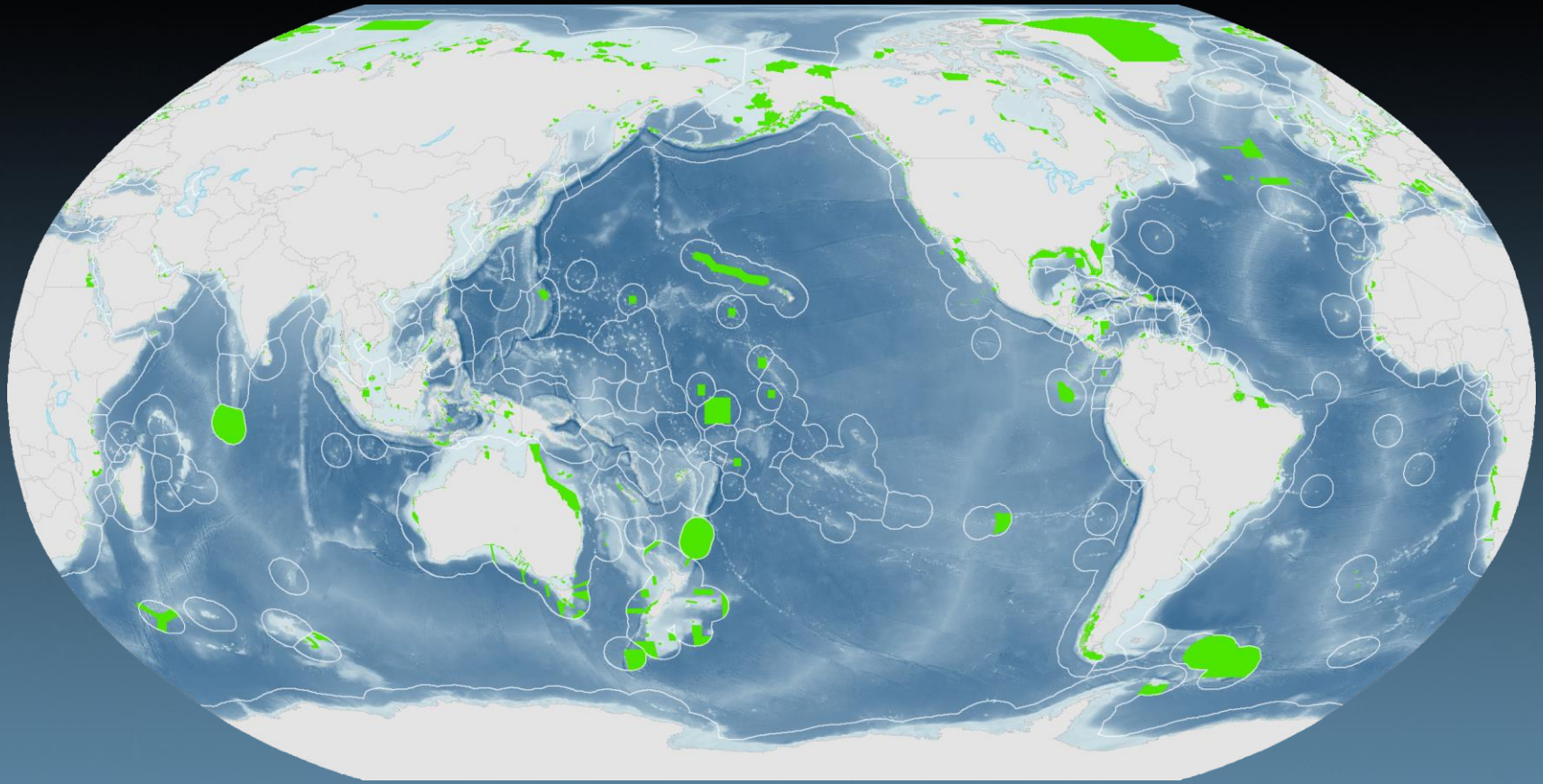
- SRTM30Plus v7 + other data
- Features defined based on shape, slope, rugosity and TPI
- Combination of automated algorithms and expert interpretation
- Minimum feature size mapped ~10 square kilometres

IHO Categories

1. Shelf	2. Slope	3. Abyssal	4. Hadal
5 Low relief (<10m)		11 Abyssal plains (0-300 m relief)	
6 Medium relief (10-50m)		12 Abyssal hills (300-1000 m relief)	
7 High relief (>50m)		13 Abyssal mountains (>1000 m relief)	
8 Shelf valleys (s, m, l)	10 Terraces	14 Rise	
9 Glacial troughs [coral reefs]*		15 Mid-ocean ridge	
		16 Rift Valley	
17 Basins (shelf perched)	17 Basins (slope perched)	17 Basins**	17 Basins**
18 Sills	18 Sills	18 Sills	18 Sills
	19 Escarpments	19 Escarpments	19 Escarpments
	20 Seamounts	20 Seamounts	20 Seamounts
	21 Guyots	21 Guyots	
	22 Canyons-shelf incising	22 Canyons-shelf incising	
	23 Canyons-blind	23 Canyons-blind	
	24 Ridges	24 Ridges	24 Ridges
	25 Troughs	25 Troughs	25 Troughs
		26 Trenchs	26 Trenchs
		27 Bridges	27 Bridges
	28 Fans	28 Fans	
	29 Plateaus	29 Plateaus	


Shelf - high profile
Shelf - medium profile
Shelf - low profile
Slope
Abyss - mountains
Abyss - hills
Abyss - plains
Hadal
canyon
guyot
seamount
bridge
sill
escarpment
shelf valley
rift valley
glacial trough
trough
ridge
spreading ridge
fan
rise
terrace
trench
plateau

Global MPAs – WDPA



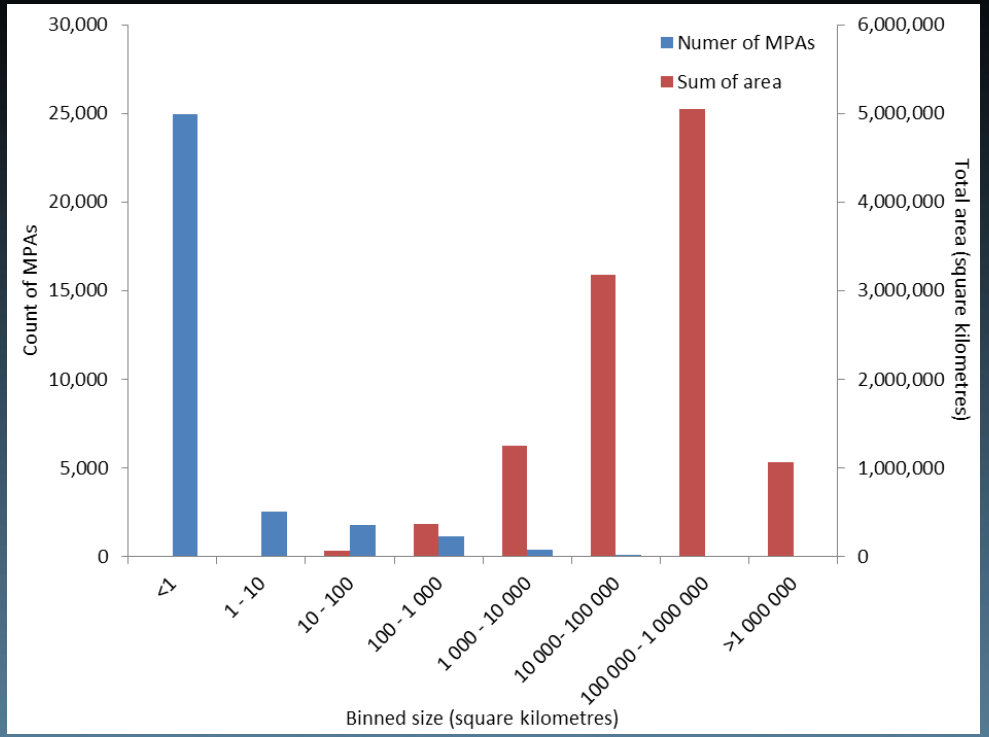
August 2013 version

CDB - Aichi Target 11

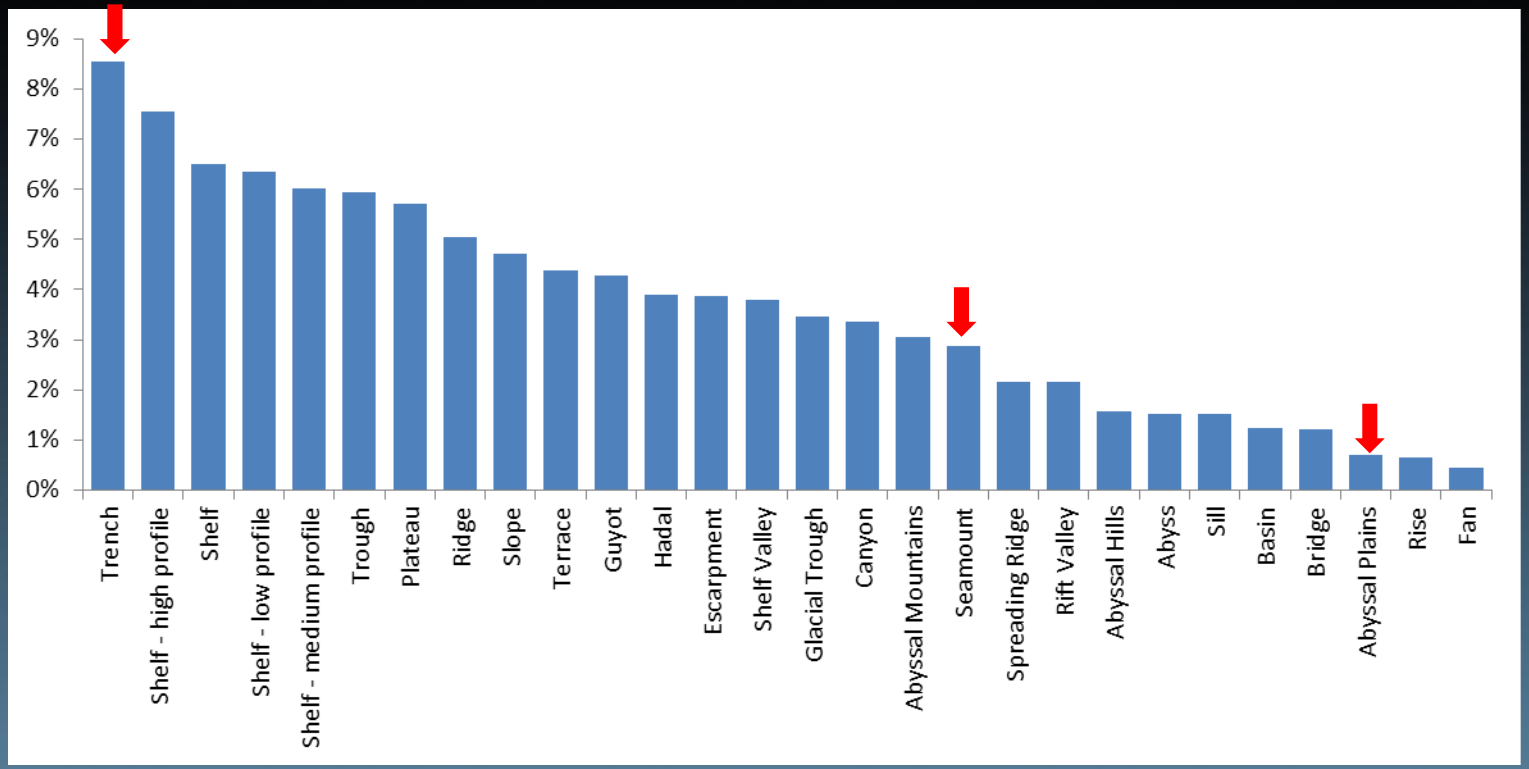
By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

Global Status of MPAs

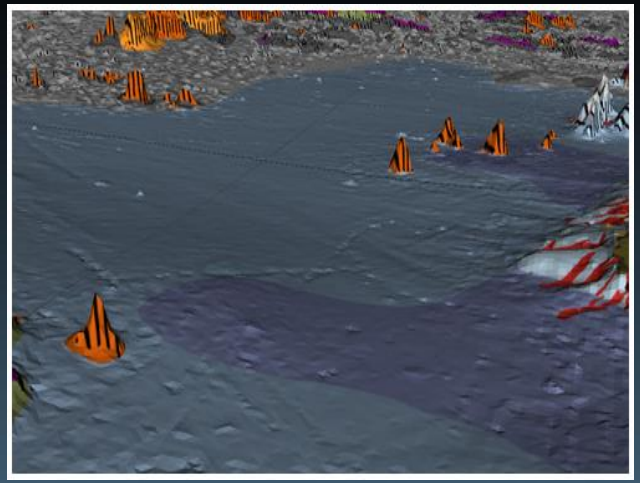
- 3% of the oceans in MPAs
- 97% of MPAs in EEZs
- Majority of MPAs small
- Majority of area from few large MPAs



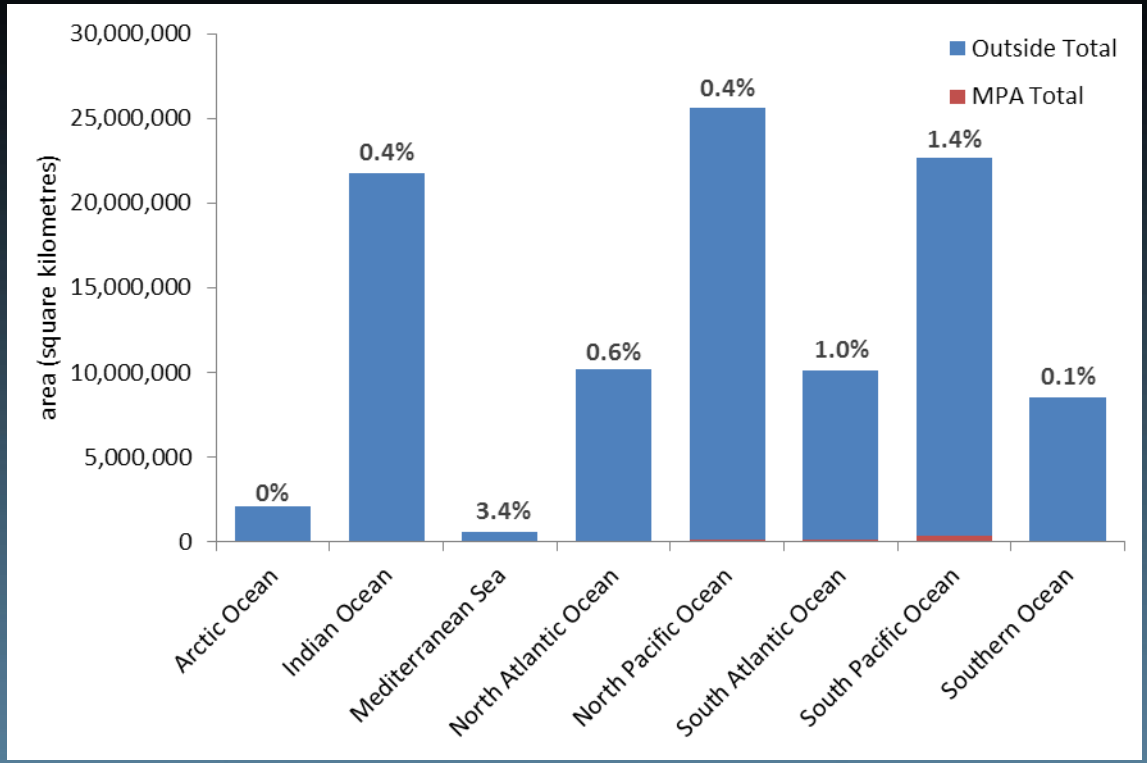
What features are represented in MPAs



Abyssal Plains – Globally 0.7 % in MPAs

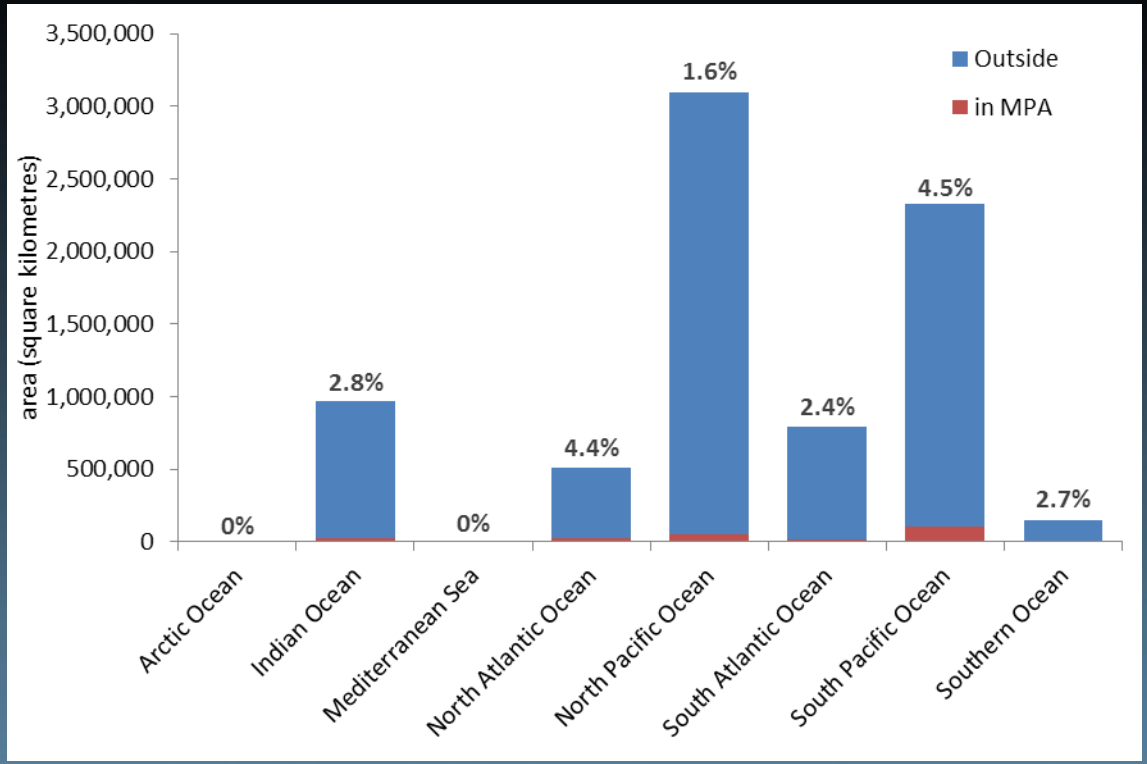


Cape Verde
Abyssal Plain

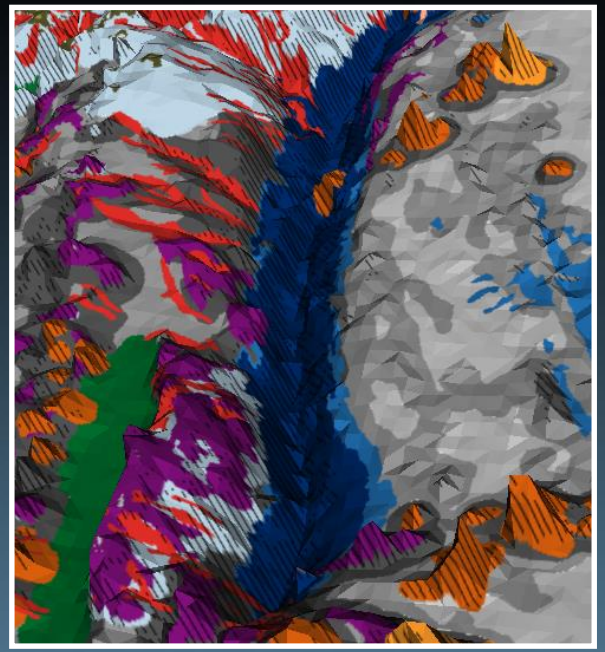


Seamounts – Globally 2.9 % in MPAs

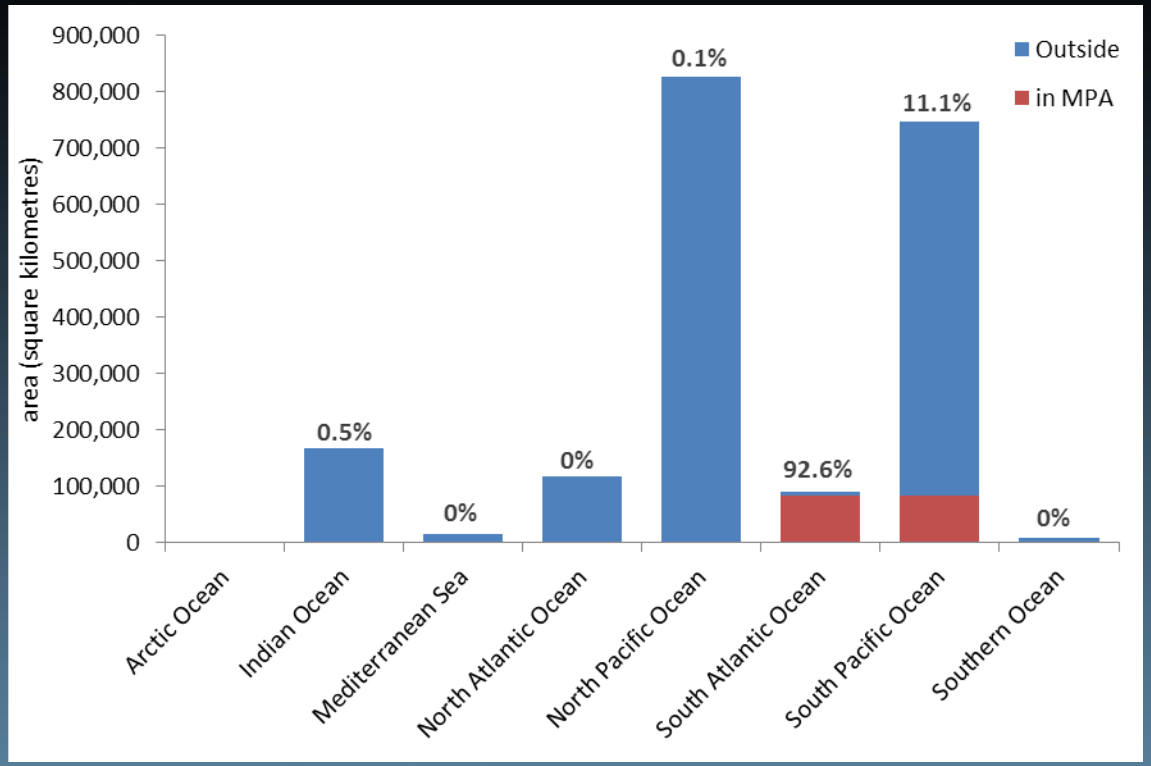
Kelvin seamount in northwest Atlantic



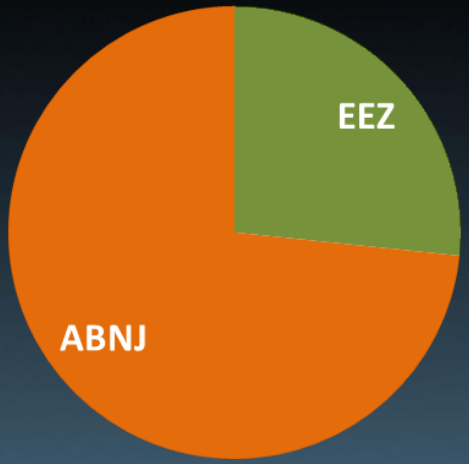
Trenches – Globally 8.5 % in MPAs



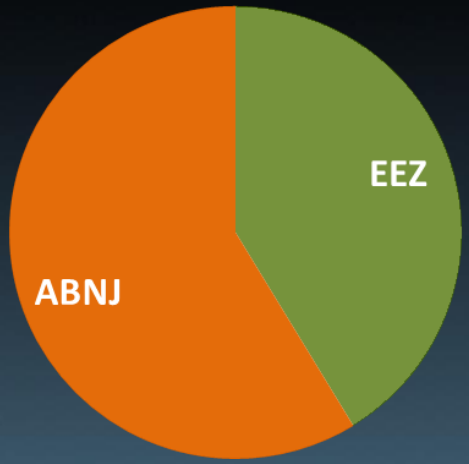
Japan Trench



Less than 3% of MPAs are in ABNJ



Abyssal Plains



Seamounts

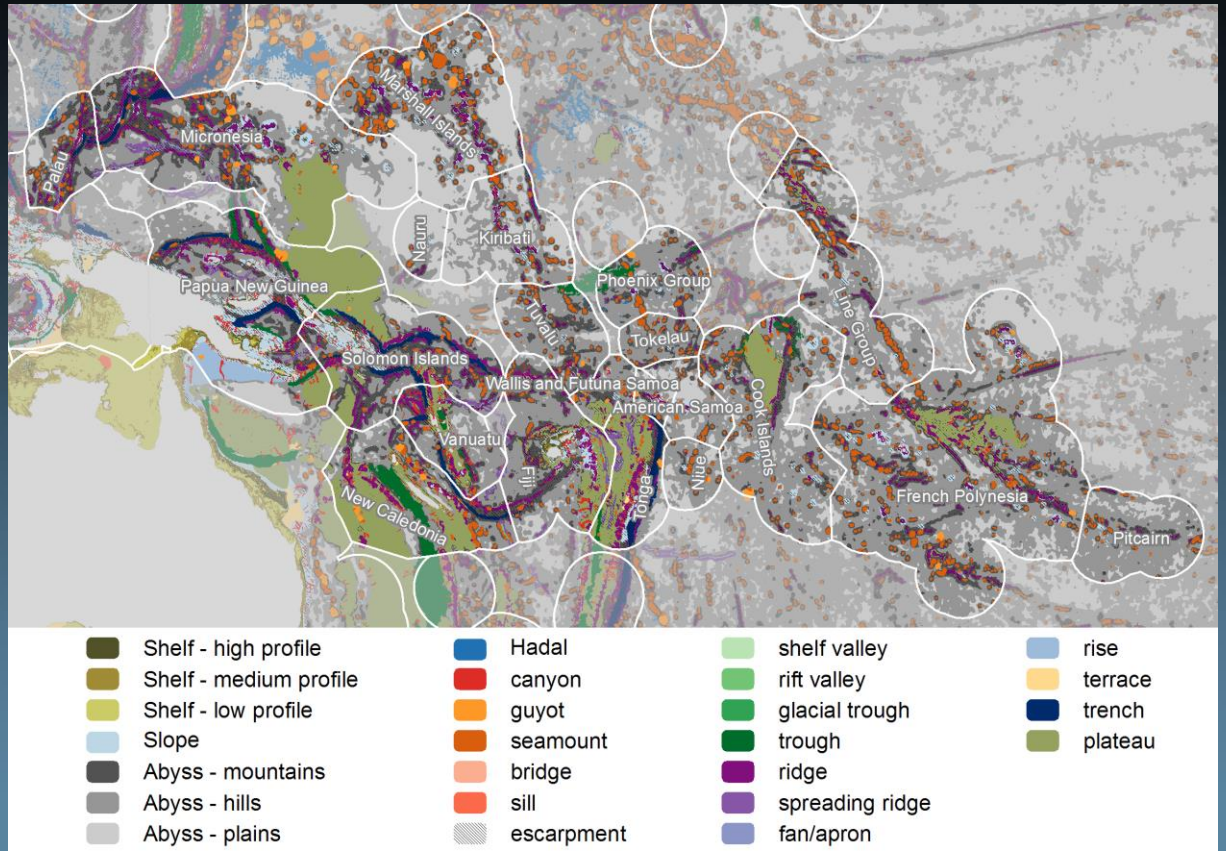
Trenches

Representation in MPAs

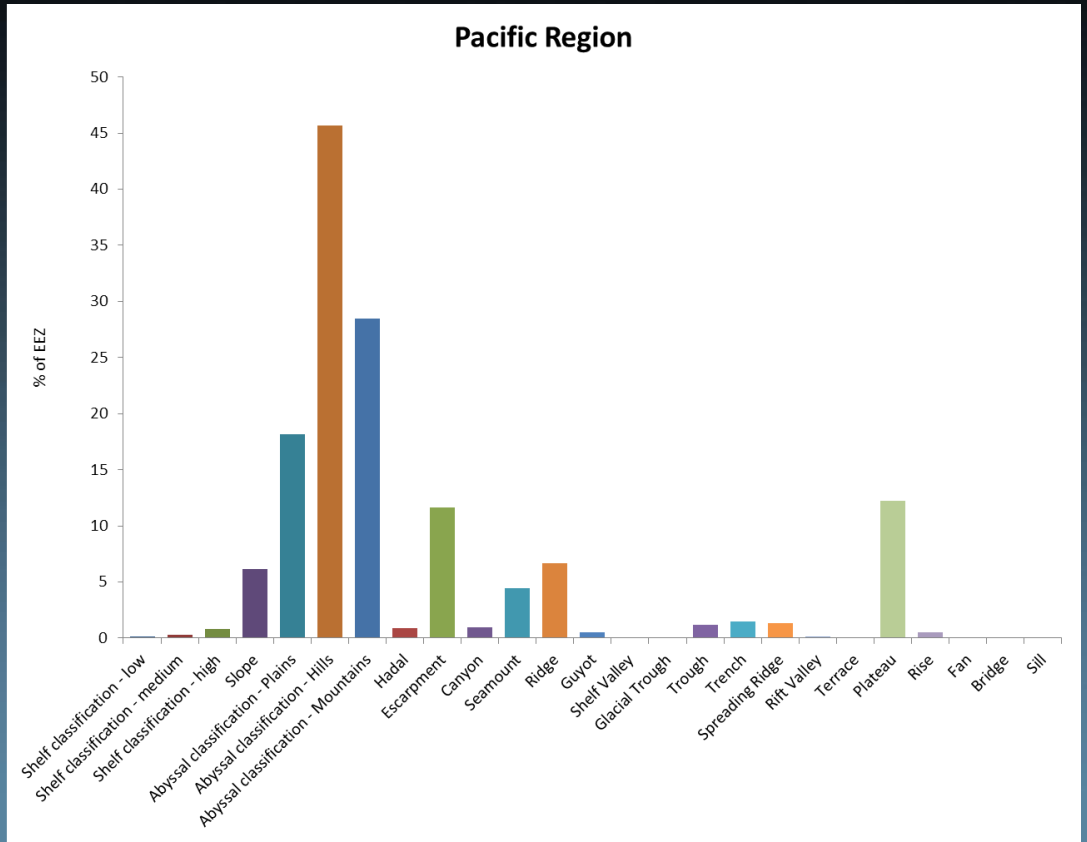
Globally what's in and what's not?

- Feature representation ranges from 0.5 and 8.5%
- Deep water features poorly represented
- Representation of features varies in the different oceans
- Features in ABNJ poorly represented

Seafloor geomorphology of the Pacific Region



Seafloor geomorphology to characterise EEZs of the Pacific Region

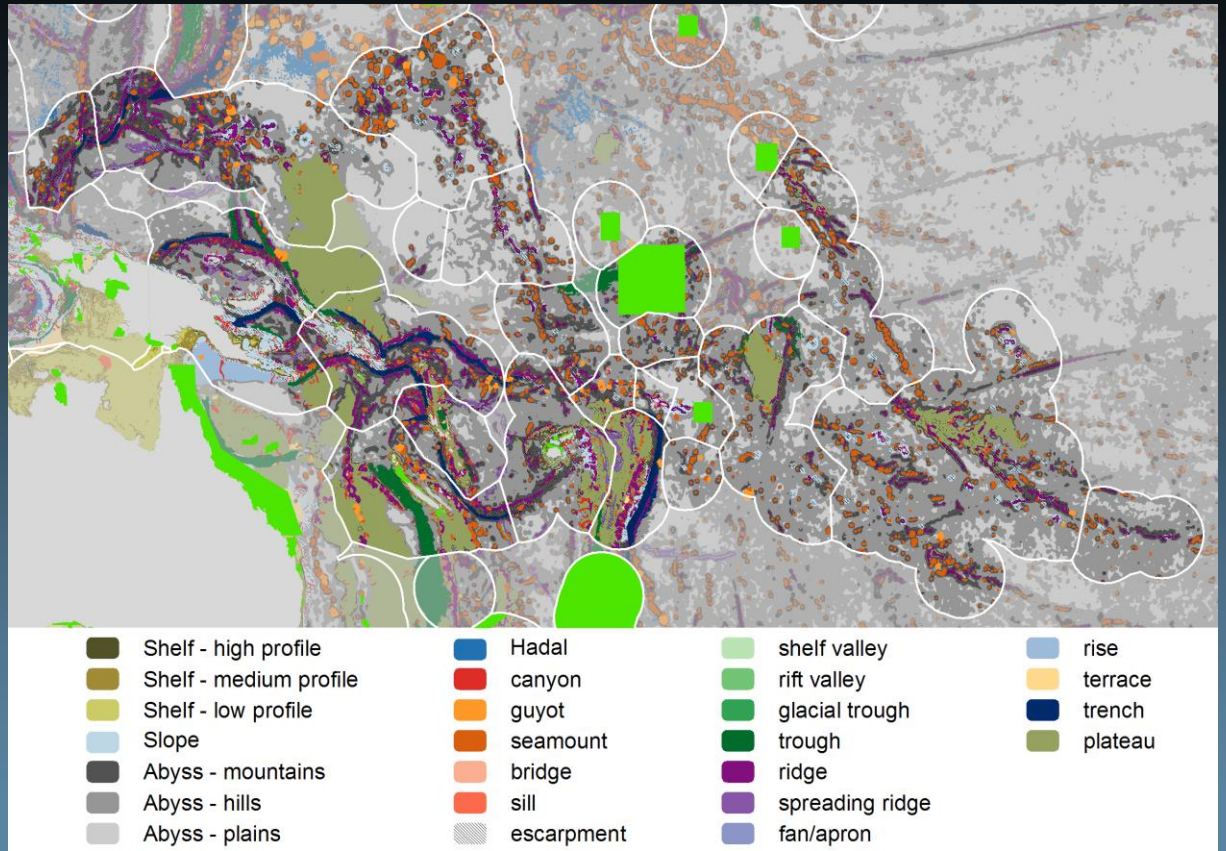


Seafloor features of Pacific Region

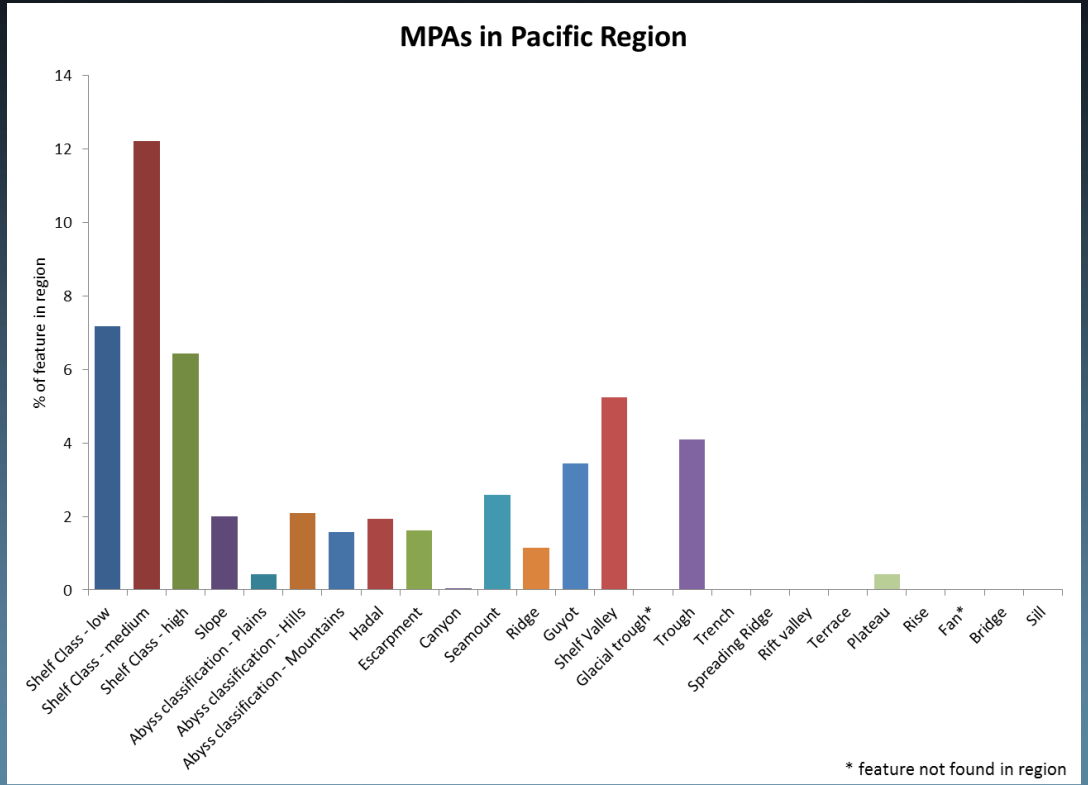
	North Pacific
Greater than global average*	Escarpment, Trench, Ridge, Plateau, Seamount, Bridge, Guyot, Abyssal mountains, Trough, Canyons
Less than global average*	Glacial Trough**, Fan**, Shelf valley, Rise, Shelf (all classes), Terrace, Sill

* compared to proportion of feature at global scale
** features not present in region

Marine Protected Areas of the Pacific Region



Features represented in MPAs in the Pacific Region

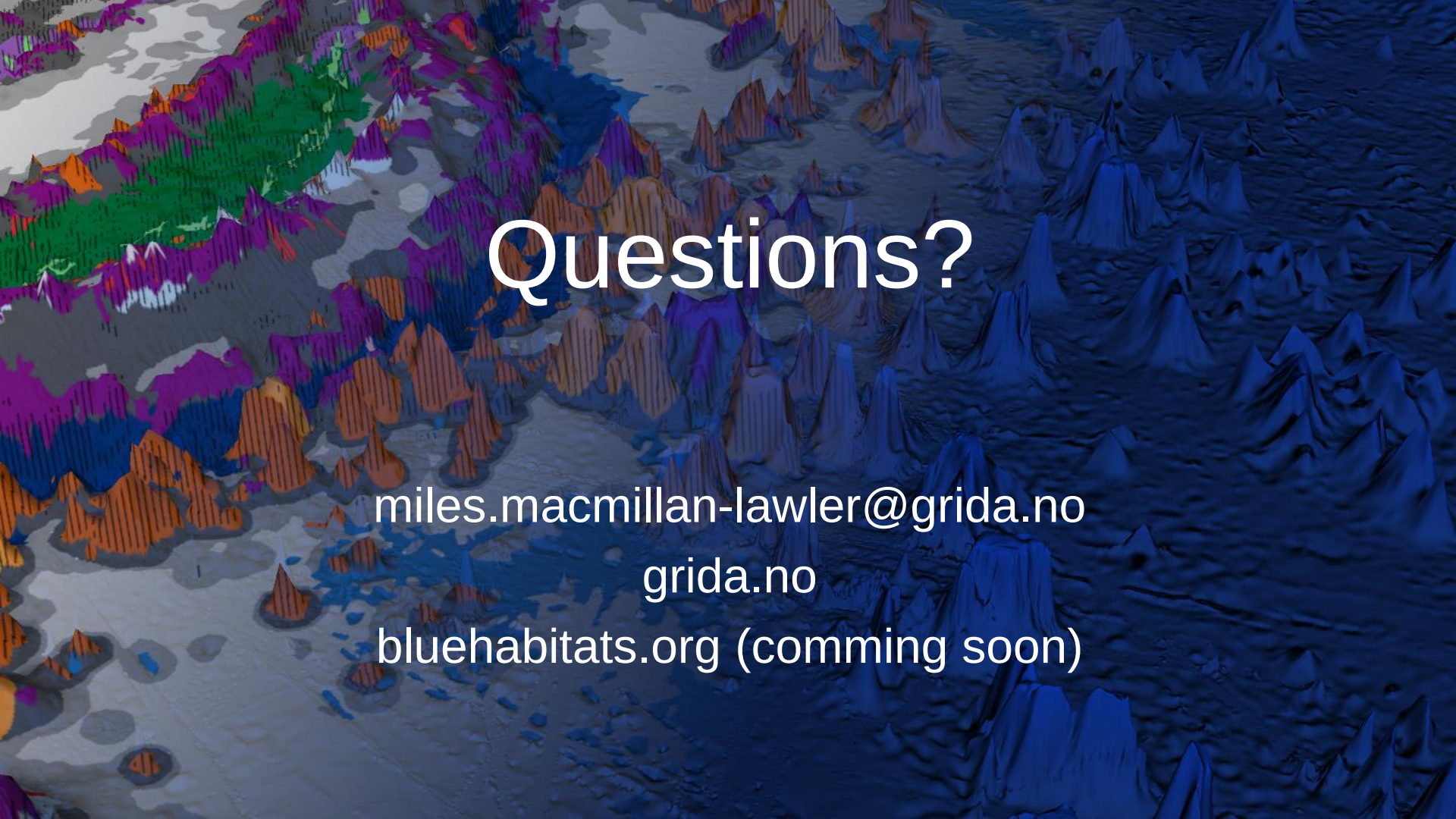


Summary of geomorphic feature representation in MPAs in the Pacific Region

- The three shelf classes are the best represented features in MPAs in the region, between 6 and 12 %.
- Most of the features that are characteristic of the region (e.g. escarpments, seamounts, abyssal mountains, ridge and guyot) are represented between 1.5 and 3.5 % of their area in MPAs
- Several ecologically significant features not represented in MPAs in the region (eg canyons, spreading ridges, rift valleys)

Summary

- Seafloor geomorphology provides an insight into how global MPAs are achieving the Aichi Target 11
- Especially useful in assessing whether global MPAs are capturing areas of particular importance for biodiversity and if they are ecologically representative
- Seafloor geomorphology can be used to identify gaps in MPA coverage



Questions?

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