Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission





Recently available dFAD tracking data in the WCPO: challenges, new research areas and potential useful tool to guide management

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2ª Reunión del Grupo de Trabajo conjunto de las OROP atuneras sobre plantados
2nd Meeting of the Joint Tuna RFMOs Working Group on FADs
San Diego, California USA, 08-10 May 2019

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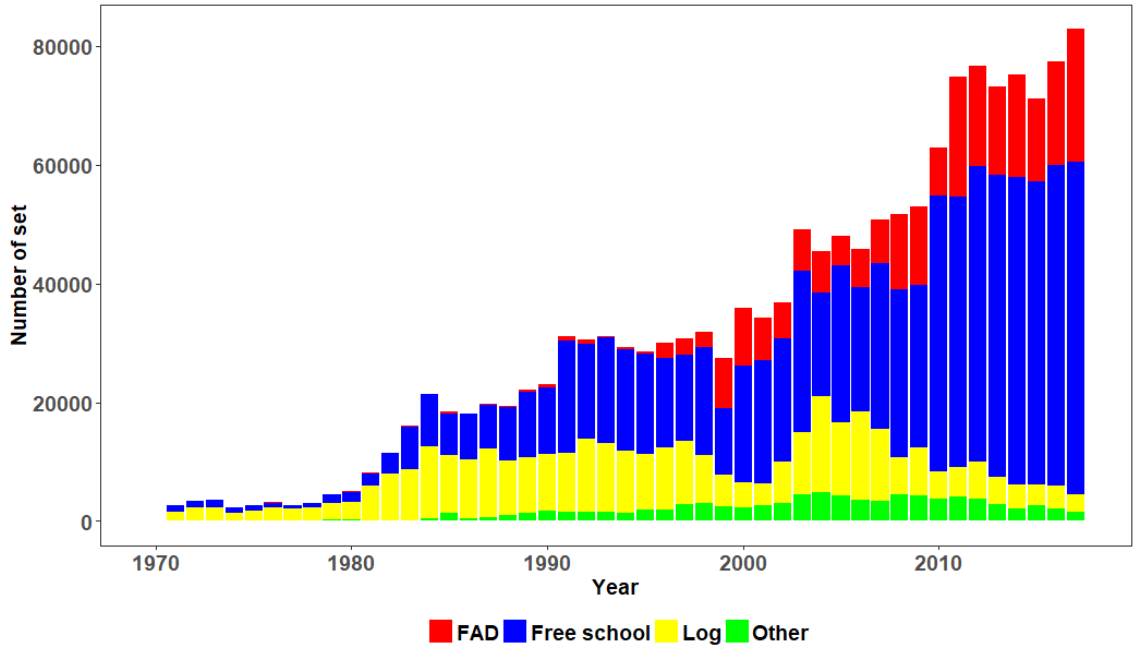
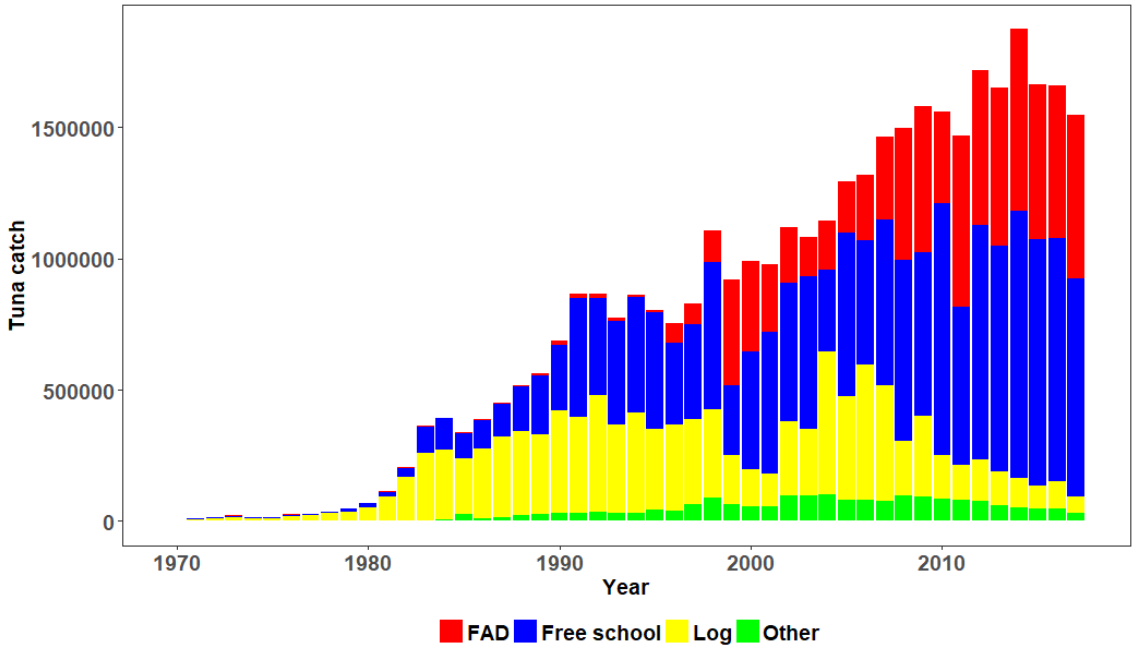
[2]Parties to the Nauru Agreement (PNA)

Overview

- **Increase use of drifting Fish Aggregating Devices (dFAD)**
- **High capture of bigeye tuna on FAD associated sets → 3 to 4 months FAD closure**
- **Potential ecosystem impacts**





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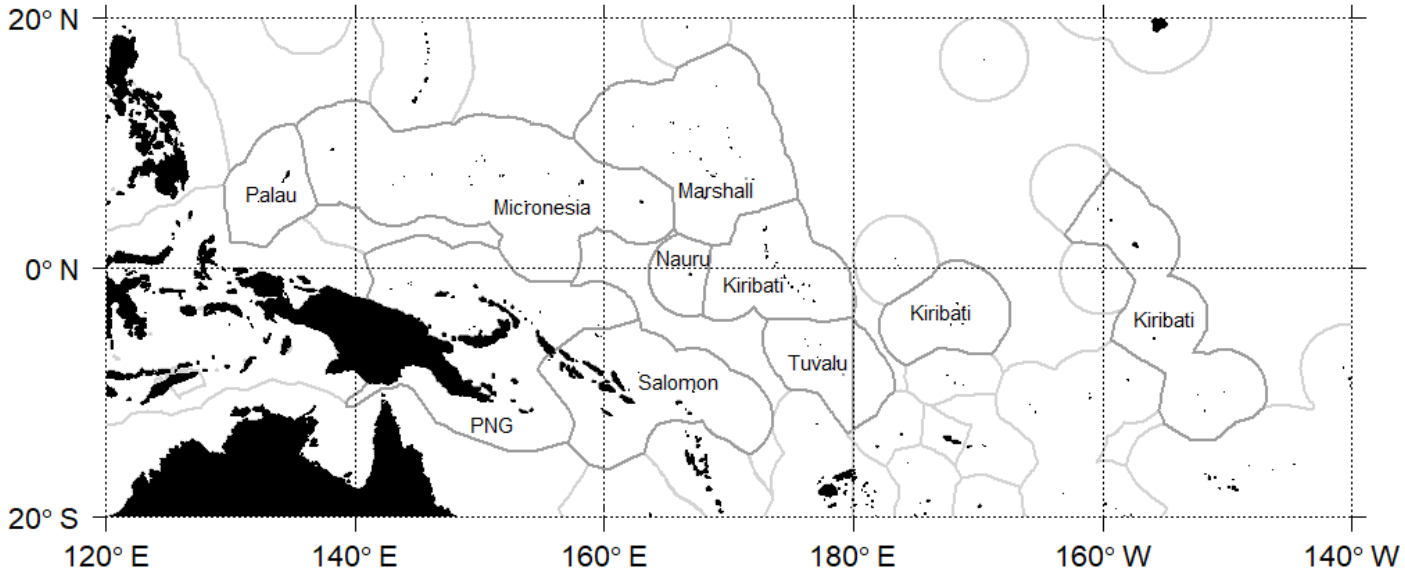
Overview

The Parties to the Nauru Agreement (PNA) initiated a FAD tracking trial in 2016

Objectives:

- Understanding of the use of FADs
- Scientific info on impacts of FADs and fishing on them
- Economics of FAD use
- Inform FAD management



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Summary of data

- **Cleaning**

	Number of transmissions	Number of buoys
Raw dataset	20,761,533	41,388
% removed during cleaning process	7.0 %	12.9 %
Corrected dataset	19,311,442	36,041

Fishing companies or vessel name (63% of the buoys) owner of each buoy

- **Data processing**

At sea portions of FAD track (Random forest); i.e. ~80% transmissions

Identification of deployments

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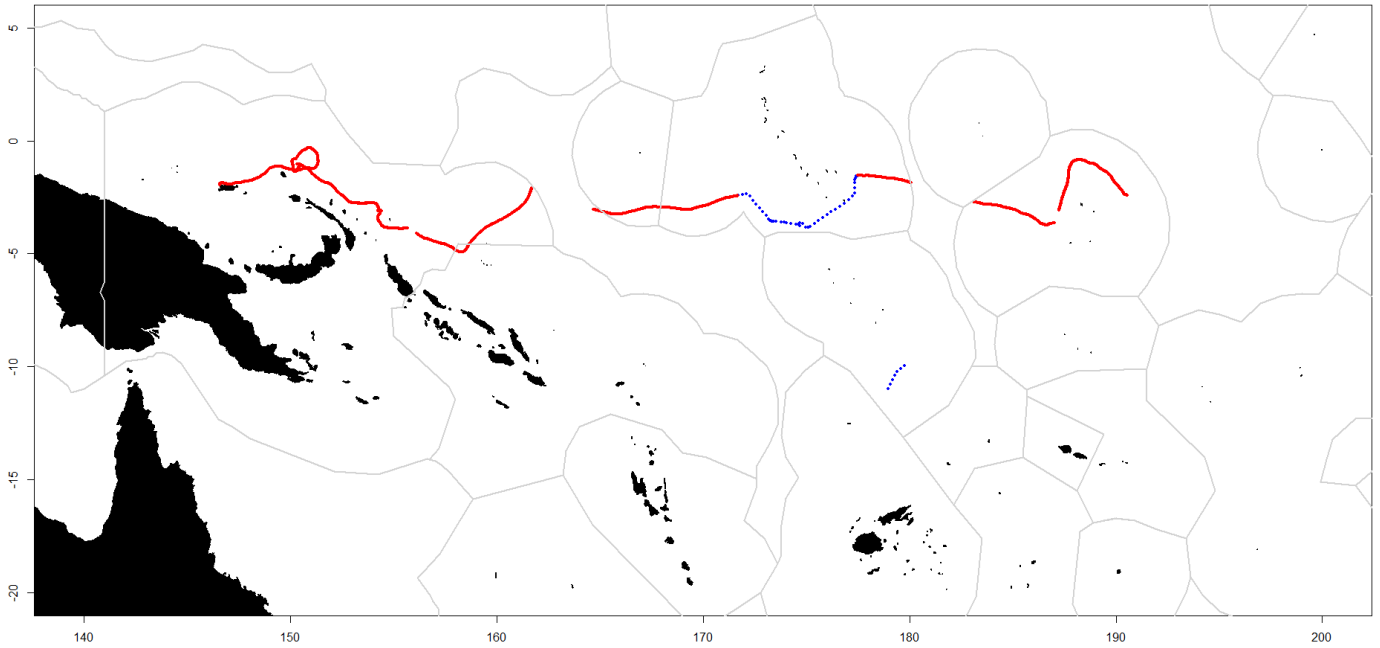
Summary of data

Challenges: - "Geo-fencing"
- Non-complete dataset, even in PNA waters
- Lack of consistent buoy identifiers in observer or logsheet data complicates the matching with trajectories



On board
A sea

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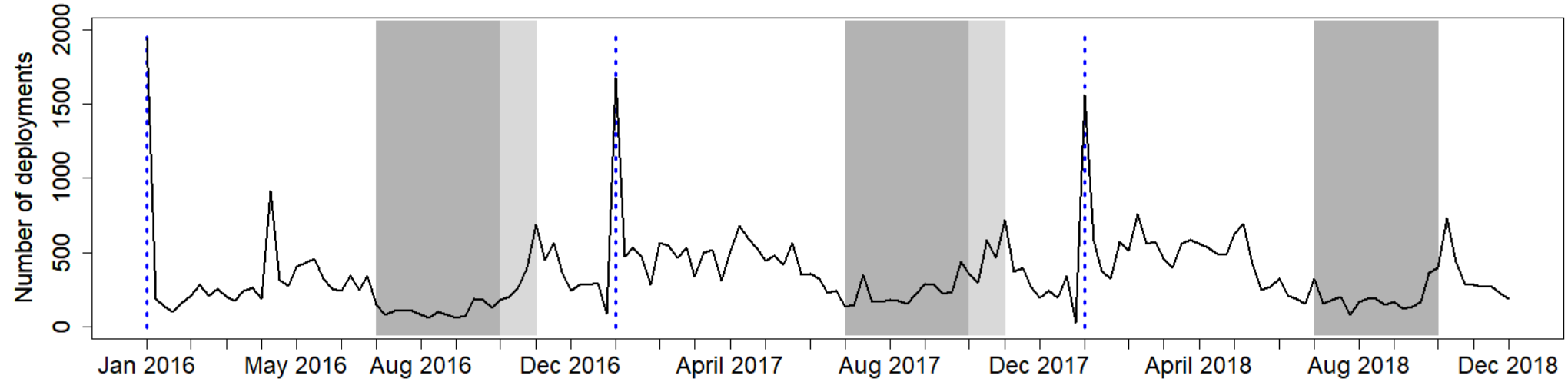
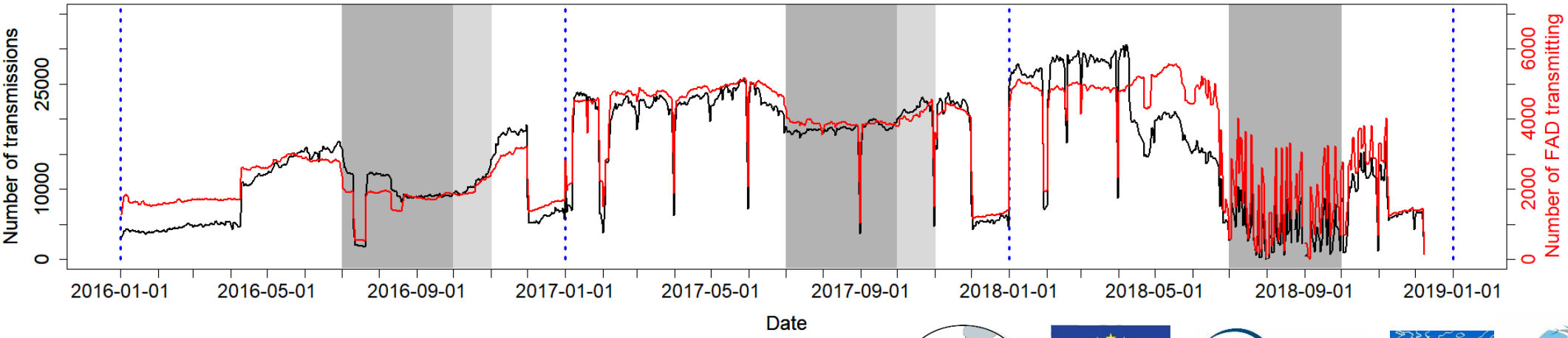
Summary of data

- **Temporal variability**



Buoy deployments per week



Transmissions per day

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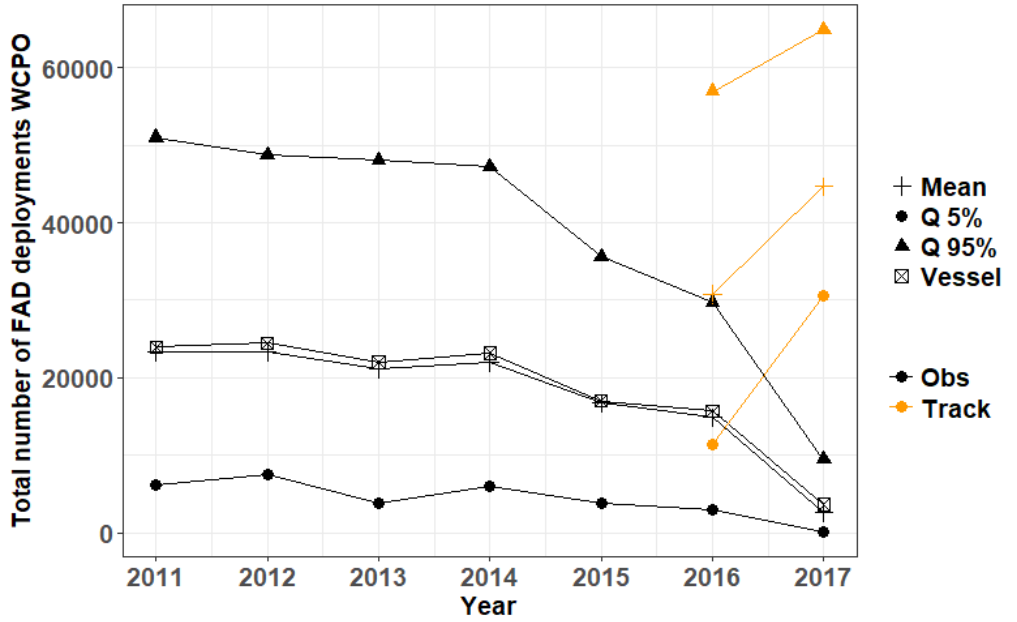
Summary of data

- **WCPFC CMM-2017-01**

Limit of 350 dFADs with activated instrumented buoys per vessel at any one time.
Buoys shall be activated exclusively on board the vessel and have a clearly marked reference number a satellite tracking system.

- **Number of buoy deployments estimated**

	Vessels with ≥350 **deployments** per year by estimation method				Vessels with ≥350 **active** FADs per year	Vessels with ≥150 **active** FADs per day
	Vessel	Mean	Quantile 95%	FAD tracking	FAD tracking	FAD tracking
2011	1.9 %	0 %	18.4 %	-	-	-
2012	0.4 %	0 %	2.7 %	-	-	-
2013	0.4 %	0 %	2.7 %	-	-	-
2014	2.5 %	0 %	2.5 %	-	-	-
2015	0 %	0 %	0 %	-	-	-
2016	0 %	0 %	0 %	10.4 %	1.1 %	0 %
2017	0 %	0 %	0 %	25.5 %	15.7 %	3.9 %



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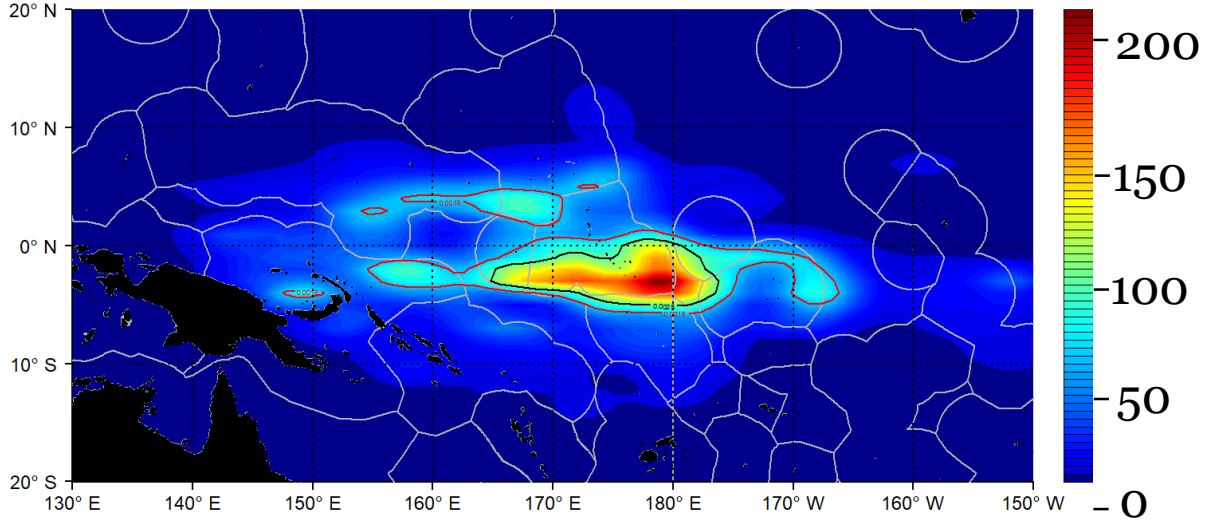
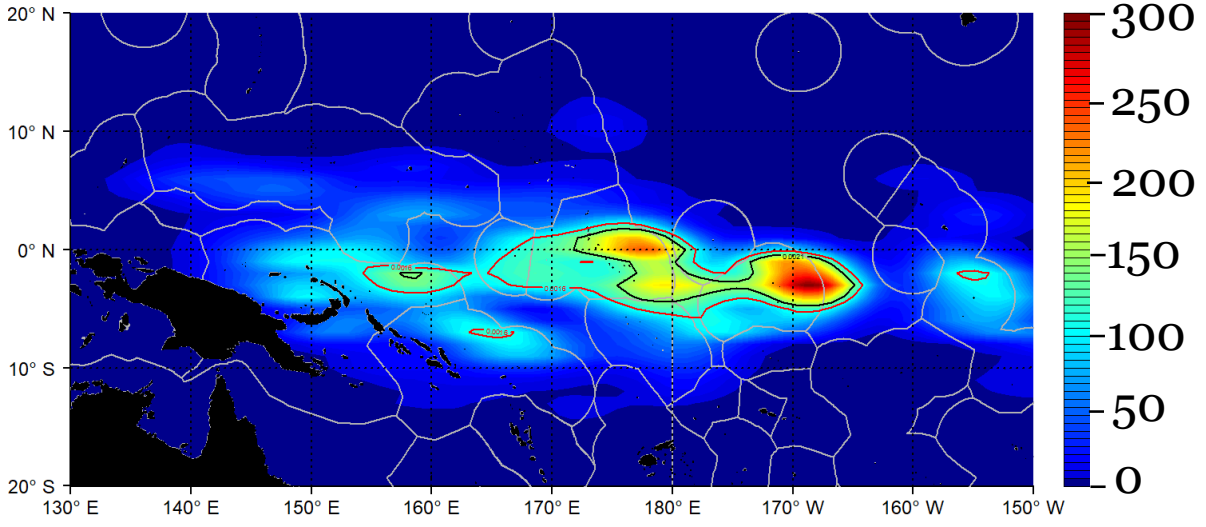
Spatial distribution

- **Buoy deployments by year**

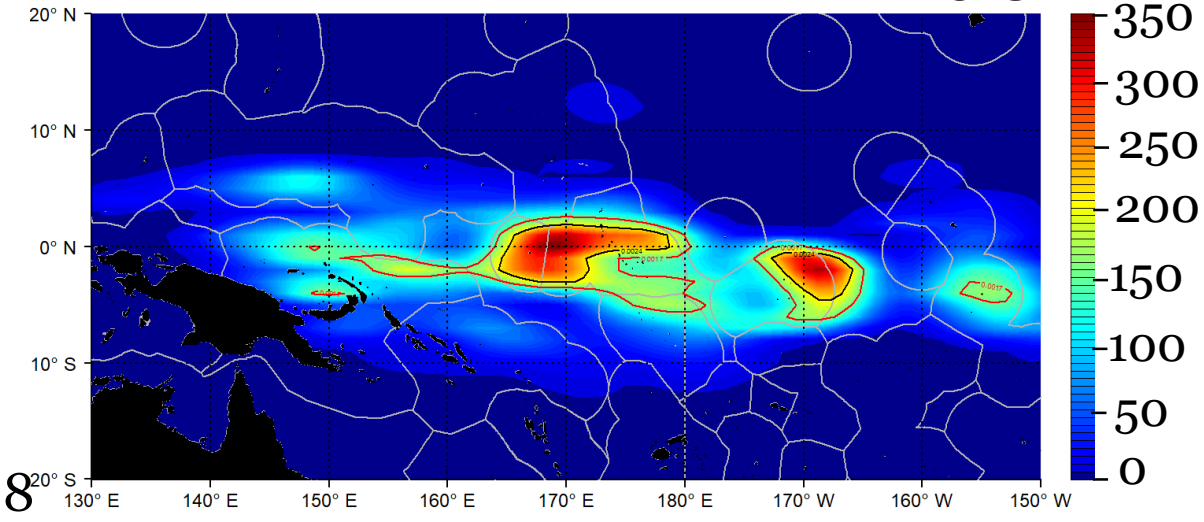
2016



2017



2018



Number of Deployments

WCPFC-SC14-2018/MI-WP-09

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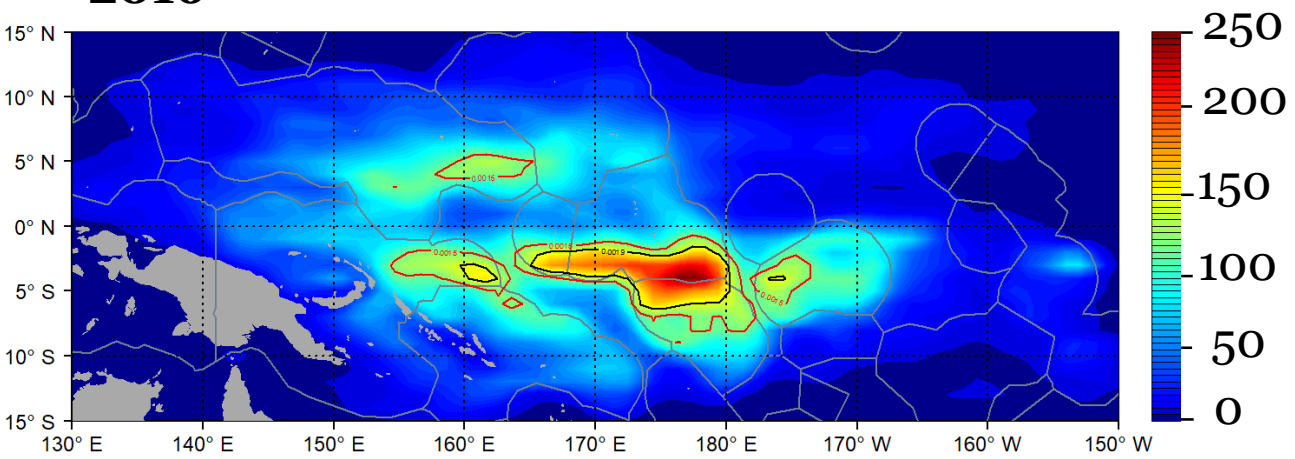
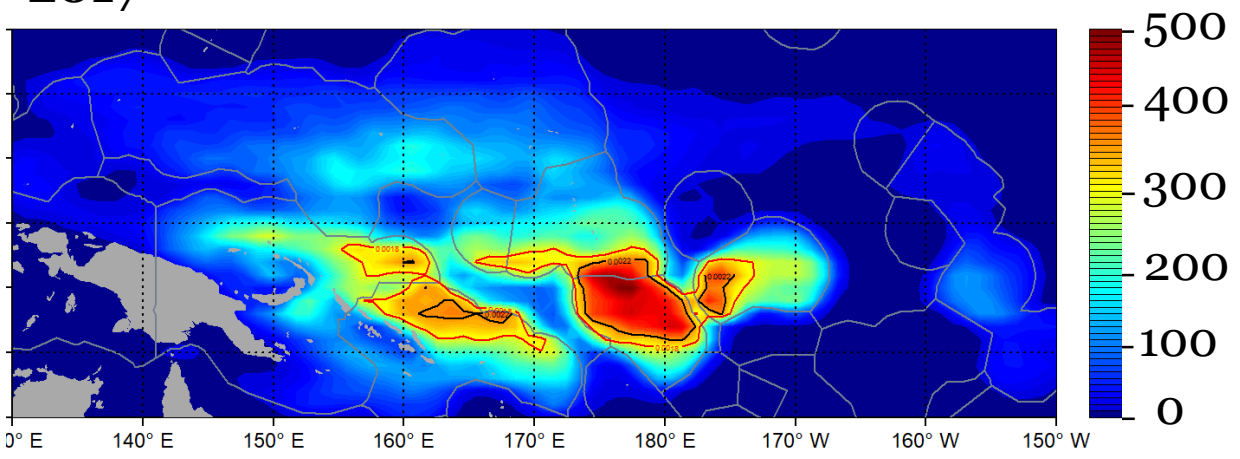
Spatial distribution

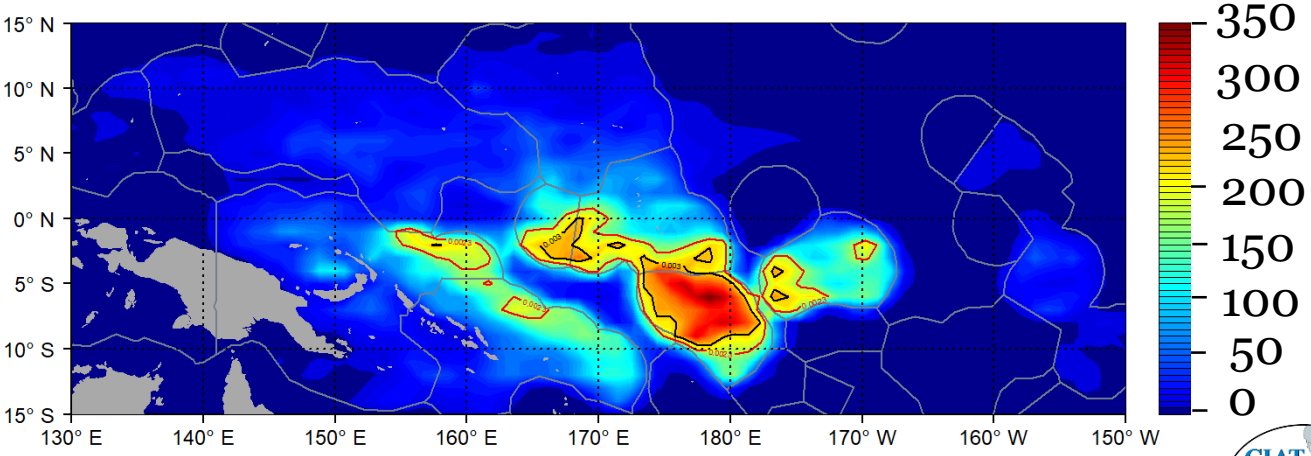
- **FAD densities**

2016



2017





Average number of dFADs per month

2018

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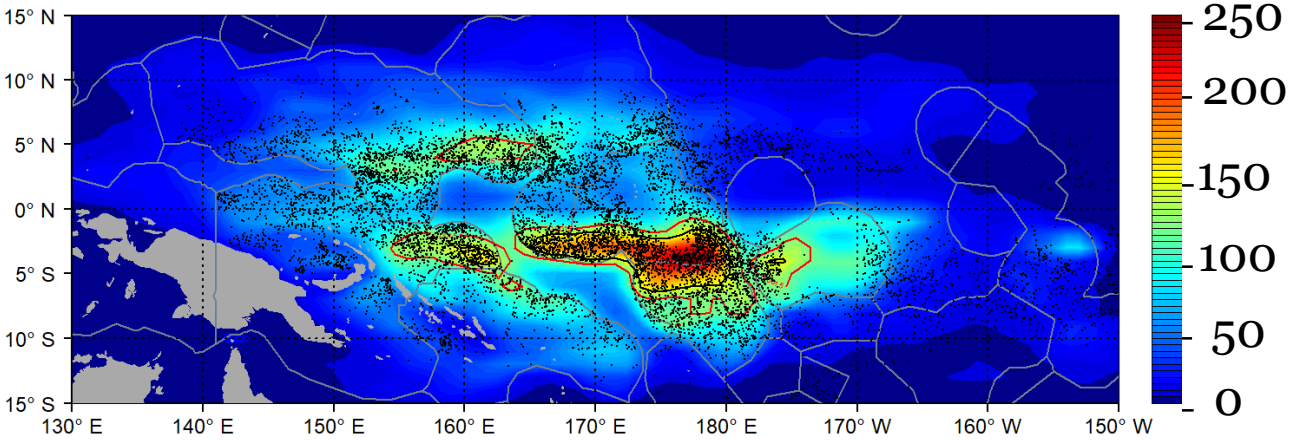
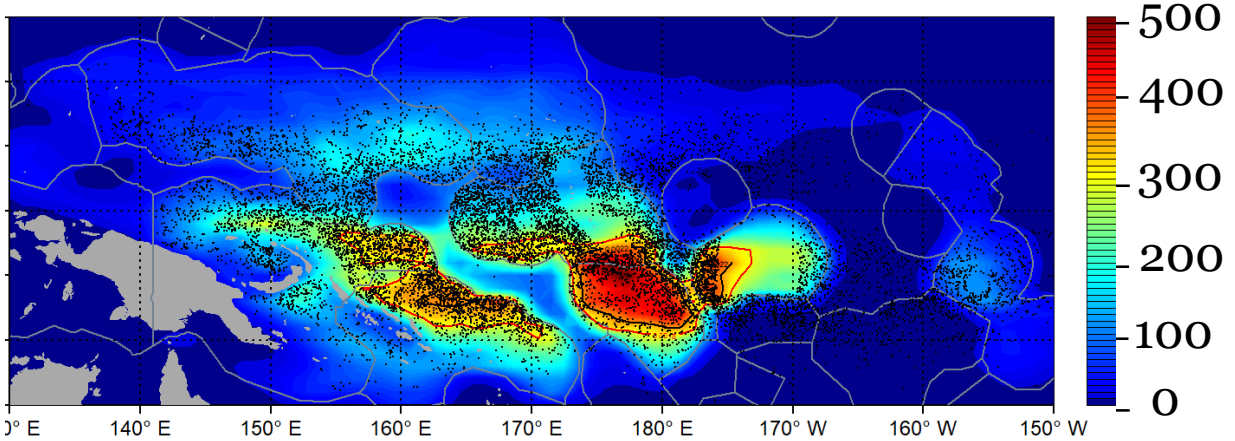
Spatial distribution

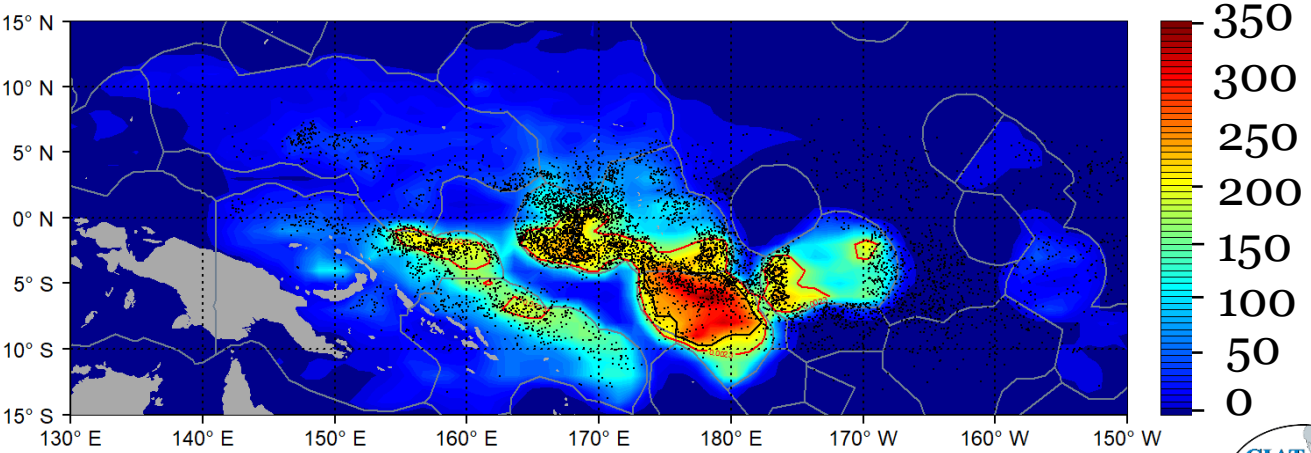
- **FAD densities + associated sets**

2016



2017





Average number of dFADs per month

2018

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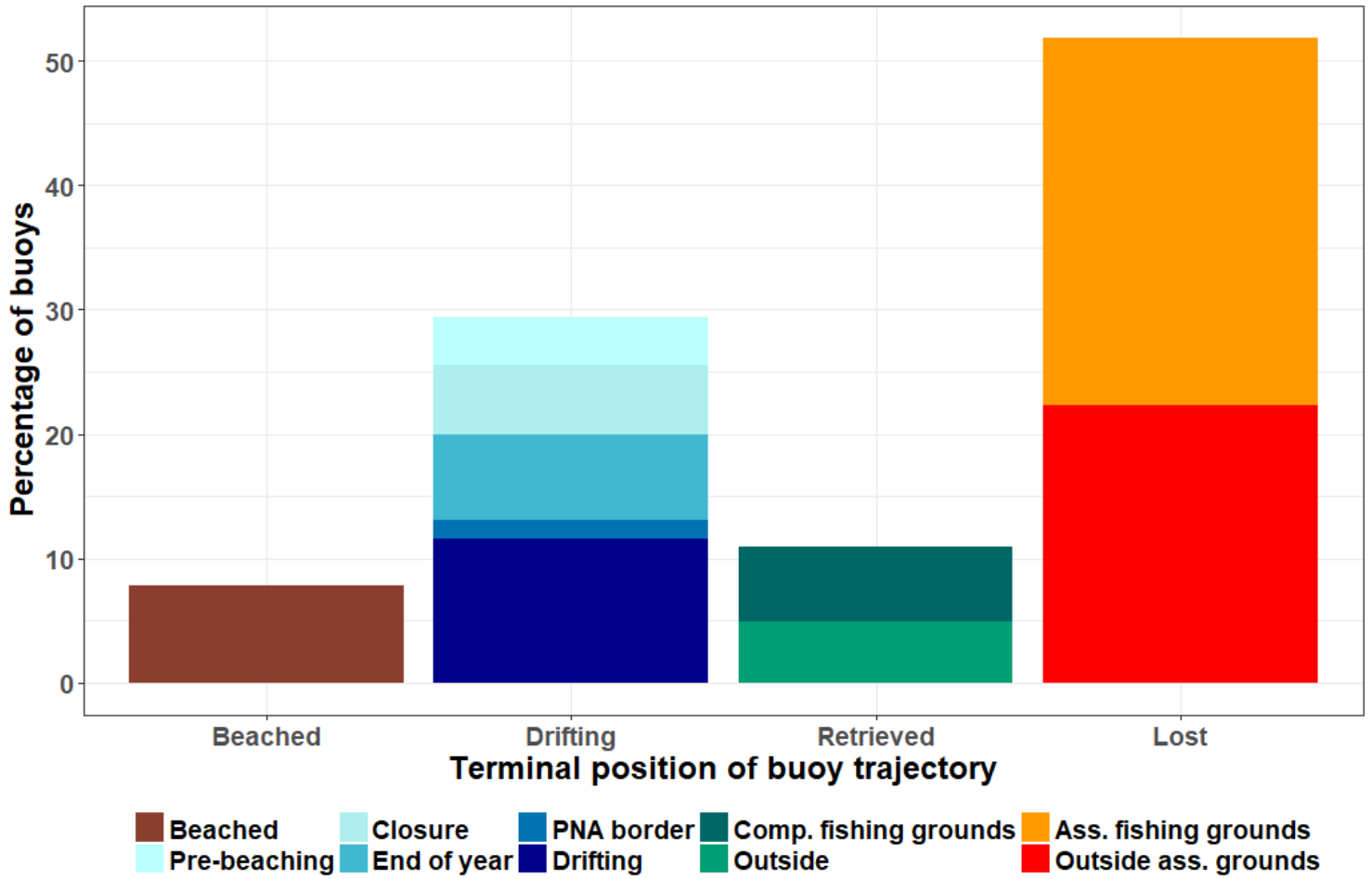
FAD lost and beaching

- **Fate of FADs**



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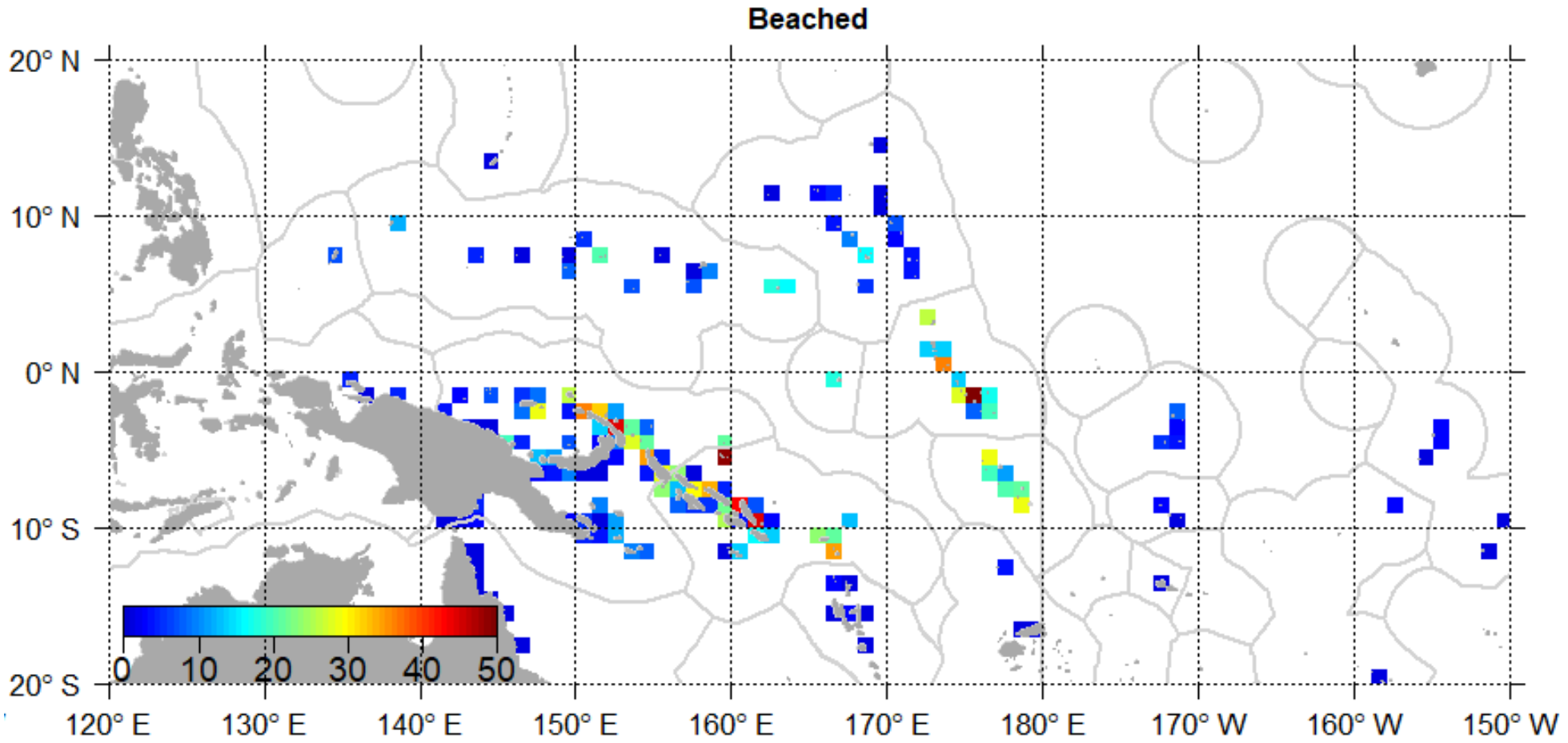
FAD lost and beaching

- **Beaching**

Total = 1300
7%



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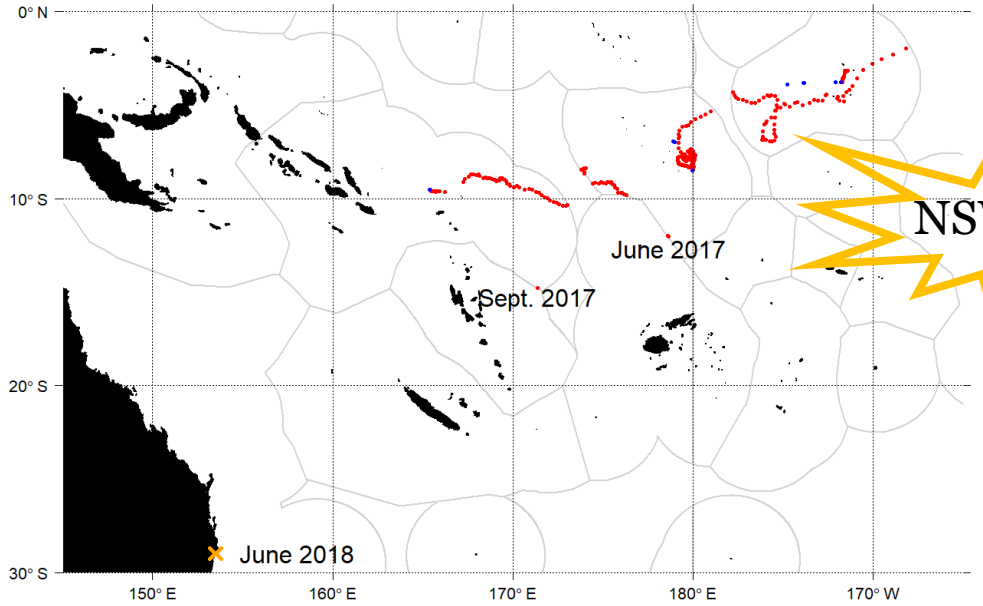
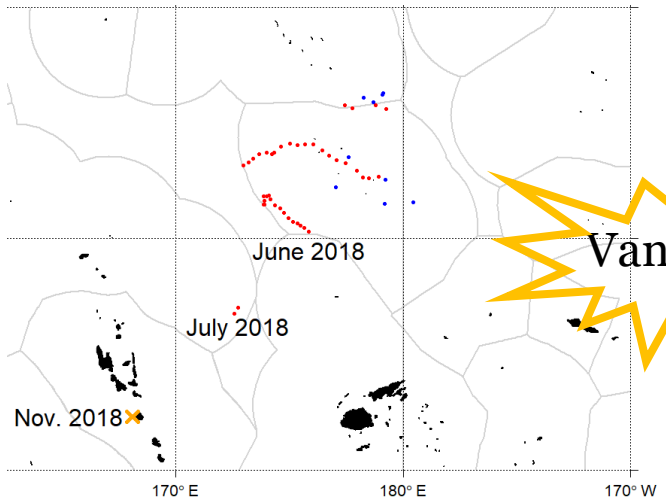
FAD lost and beaching

Unnoticed beaching ?



NSW, Australia

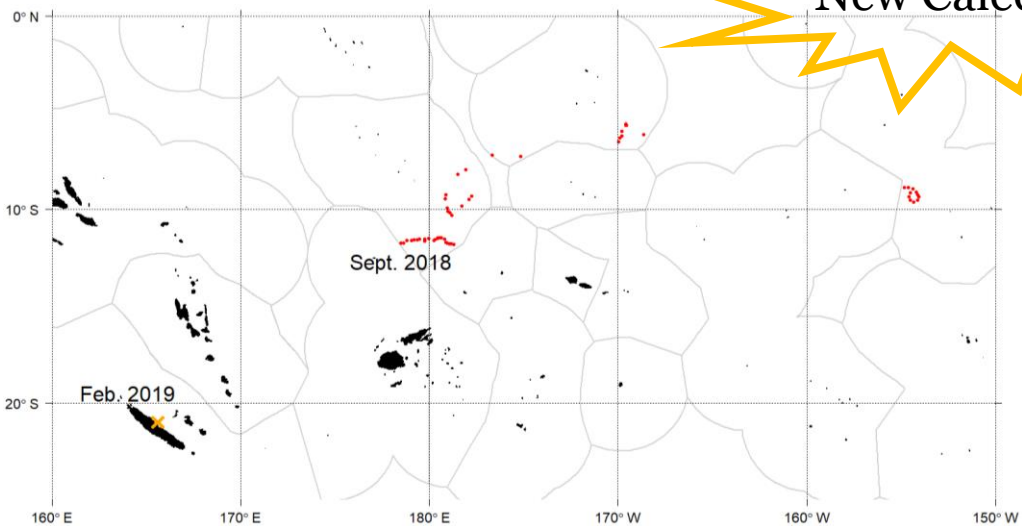


Vanuatu

EPO ??

Cook Islands

New Caledonia



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Conclusion

- **Access to a dataset of over 18,000 buoys per year**
- **Incomplete data submission and trajectory modification complicates analyses**
- **Patterns of deployments, drifting behavior and connectivity**
- **Estimation of FAD use: 30,000–65,000 buoys (re)deployed annually in 2016 and 2017**
- **FAD densities (incomplete), study of its influence on CPUE**
- **Beaching and loss of FADs**

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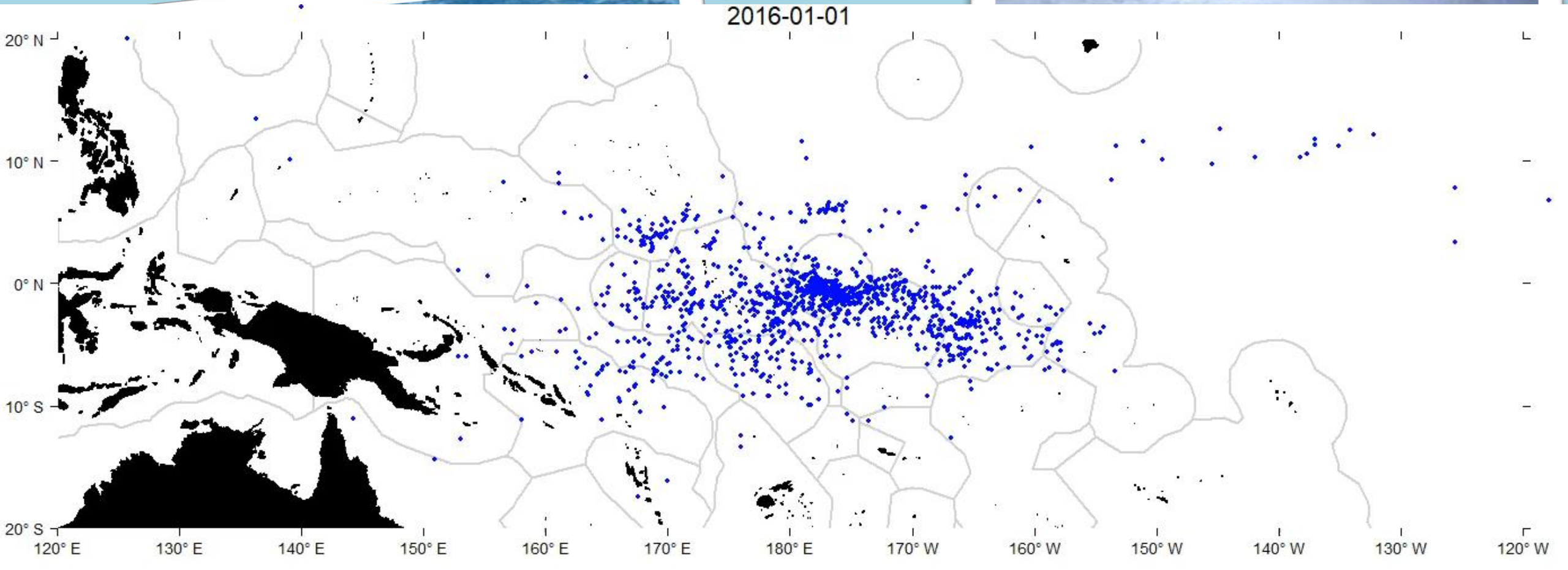
Acknowledgments We thank the members of the Parties to the Nauru Agreement for data access and the Pew Charitable Trusts for the funding provided to support these analyses



Questions

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