



Diving Behavior and Decompression Stress among Artisanal Fishermen from the Yucatan Peninsula, Mexico



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Background

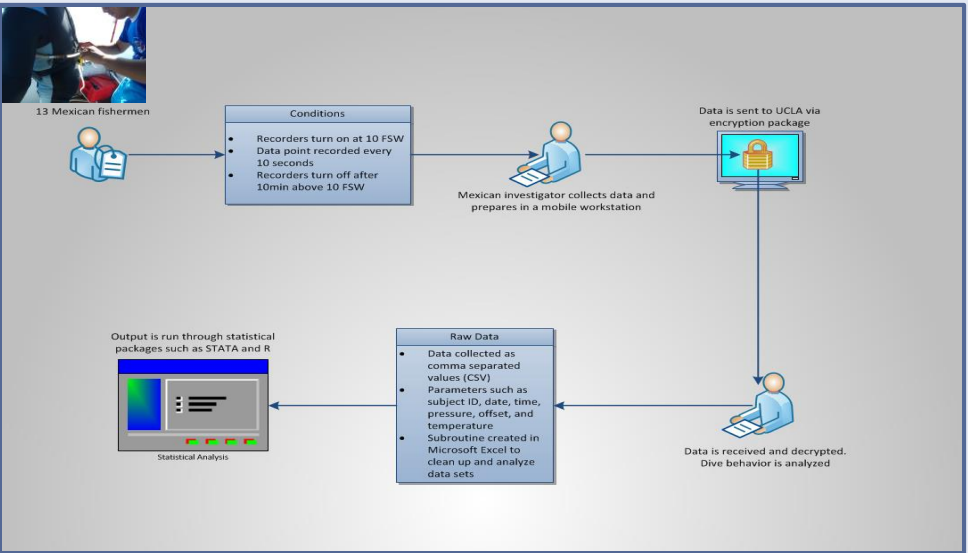
Artisanal fishermen divers (AFD) dive for sustenance. The prevalence of decompression sickness (DCS) among this population is alarmingly high.

Purpose

The aim of this study is to understand the diving behavior in ten AFD

Methods

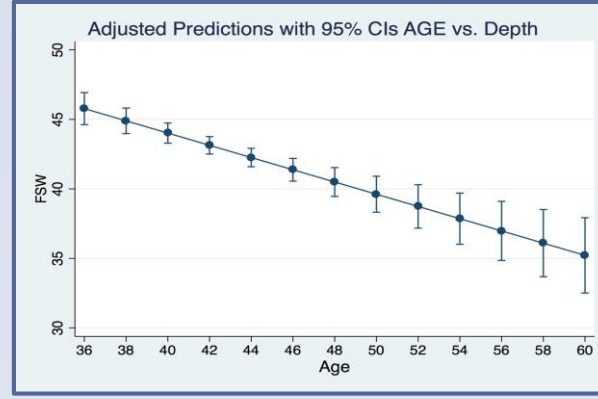
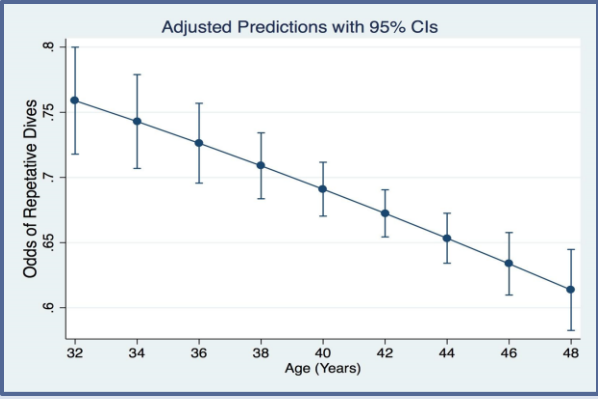
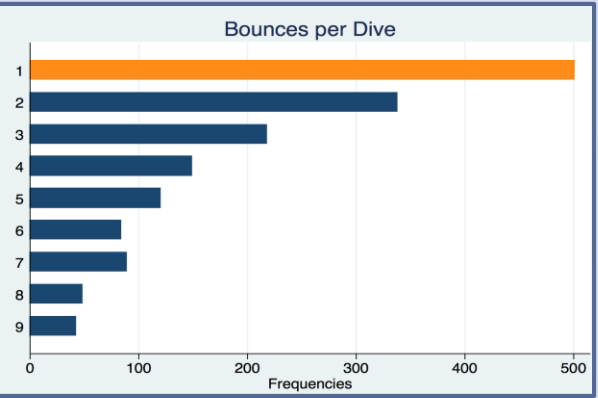
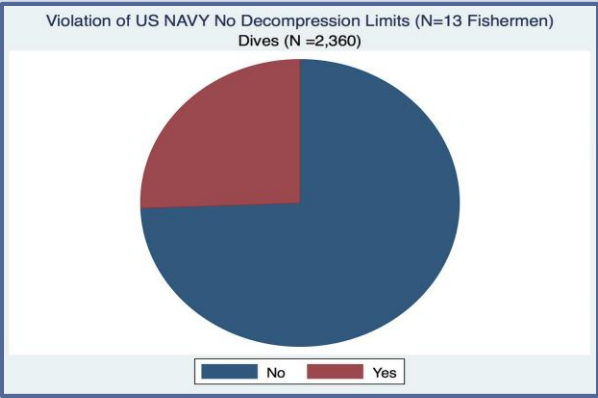
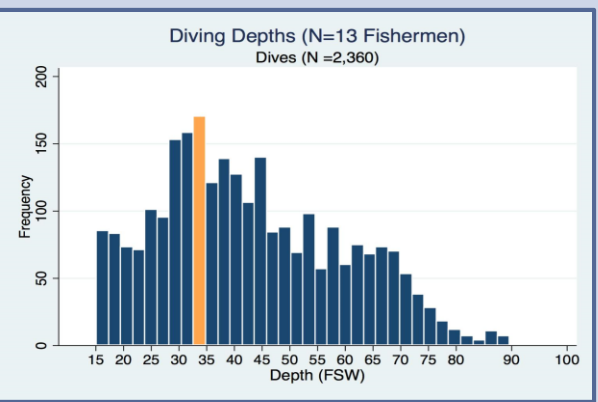
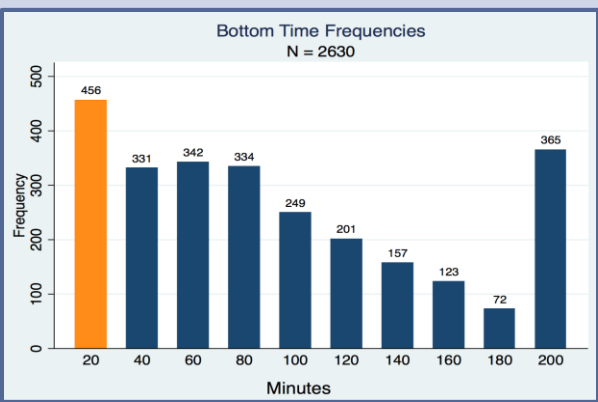
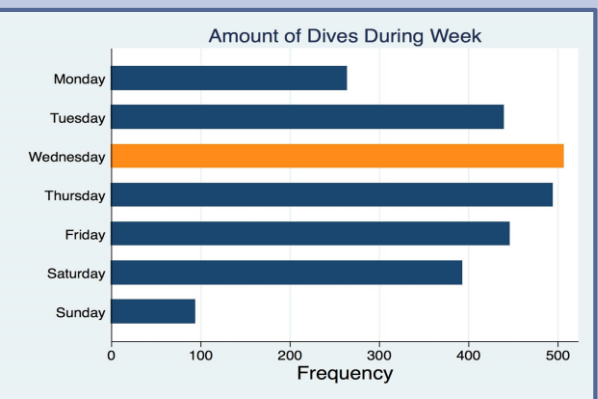
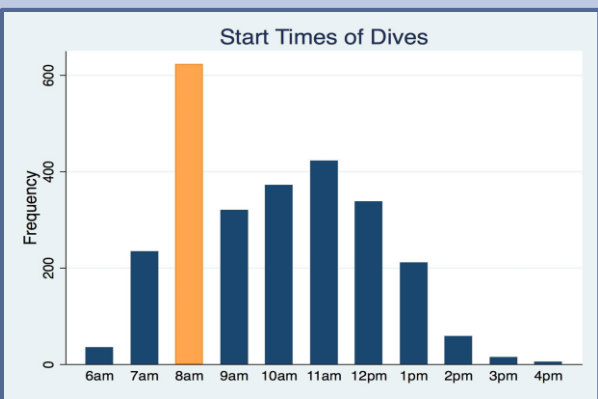
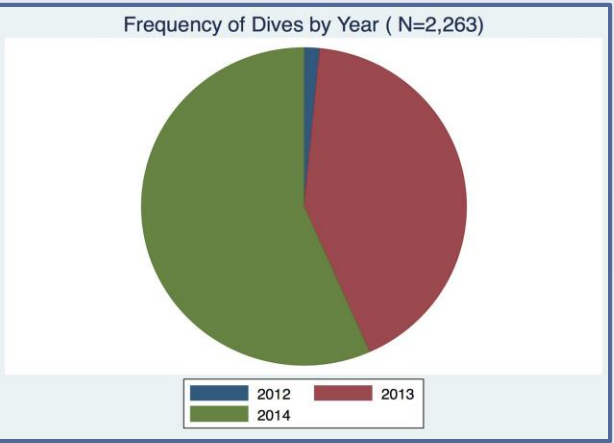
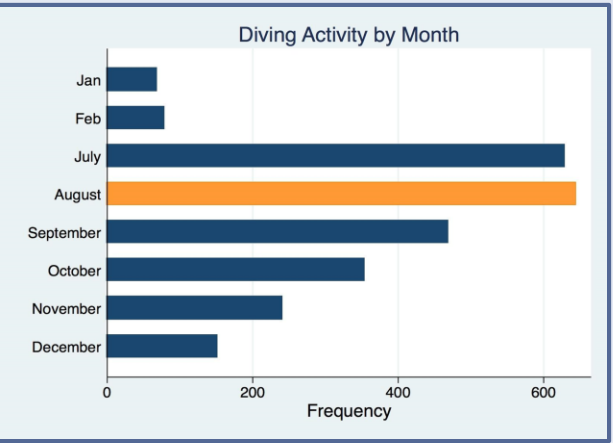
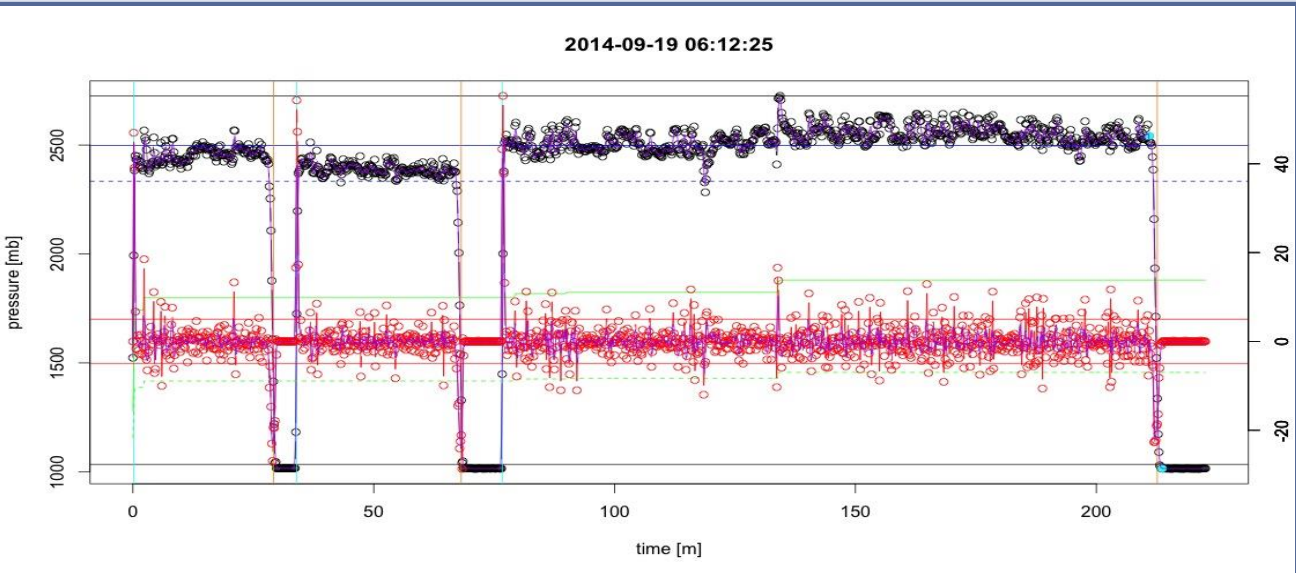
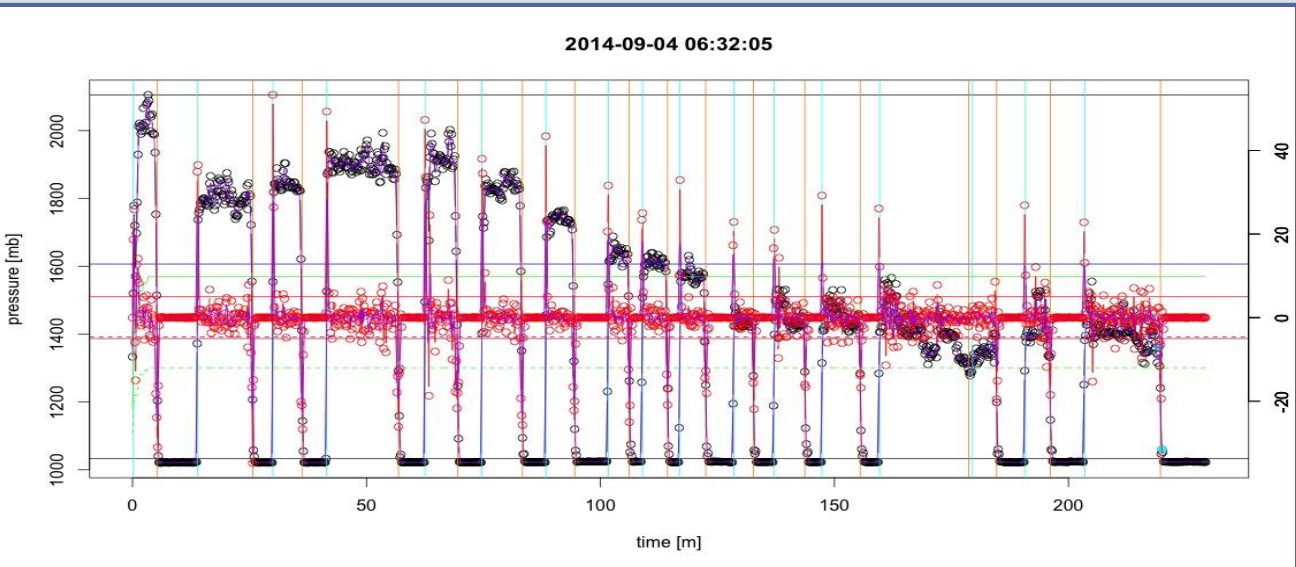
Approved by the UCLA IRB two #13-000532, this study was conducted during fishing seasons 2012 through 2015.13 consenting male fishermen, ages (41-49), were instructed to attach dive recorders to their waists during every fishing day throughout the study period. SENSUS ULTRA dive recorders (ReefNet Inc.), with an accuracy of ± 1 foot of seawater (FSW), were used to record parameters. Sampling interval was set to 10 seconds with an activation depth of 10 FSW. Data sets from recorders were downloaded onto desktop workstations and saved as comma separated values files. A subroutine in Microsoft Visual Basic© was created to extract the parameters of depth, bottom time (BT), dives, diving days (DD), and repetitive dives. Stata 13.1 was used for statistical analysis.



Results

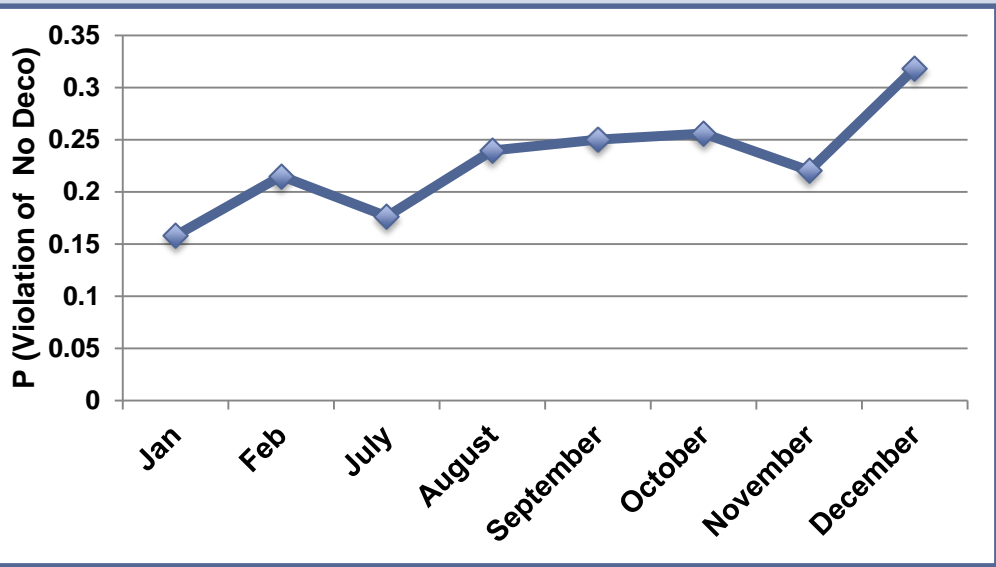
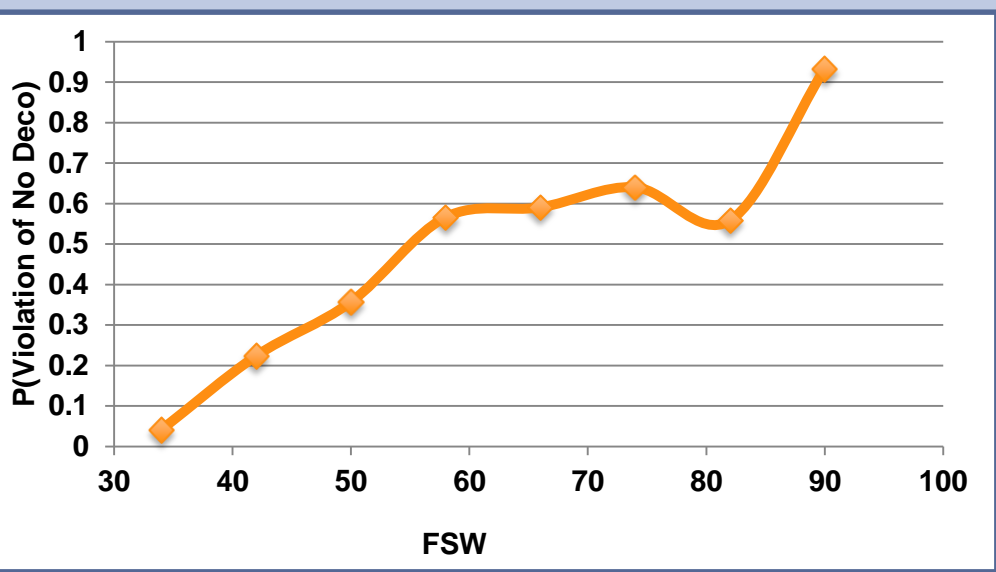
Subjects	Dives	Diving Days	Single Dives	Multiple Dives	FSW	BT	Bounces
					Mean	Mean	
SU-10527	404	141	138	266	50.04	94.69	1.83
SU-10779	116	66	60	56	34.37	195.29	3.44
SU-10782	441	153	62	379	42.58	117.98	4.88
SU-11156	46	36	35	11	34	198.77	2.02
SU-11160	339	106	9	330	42.4	110.88	2.73
SU-12511	260	90	9	251	38.41	117.92	3.40
SU-12512	186	105	186	0	29.57	183.36	3.36
SU-12514	366	88	366	0	51.77	73.73	2.32
SU-12515	353	118	353	0	40.63	106.1	3.28
SU-13241	49	15	49	0	37.78	105.67	1.62
TOTAL	2,560	918	1267	1293	42.79	114.86	2.99

R Dive Profile Plots



Mixed-effects logistic regression	Number of obs	=	2630
Group variable: sub	Number of groups	=	13
	Obs per group: min	=	1
	avg	=	202.3
	max	=	446
Integration method: mvaghermite	Integration points	=	7
	Wald chi2(9)	=	472.42
Log likelihood = -624.65734	Prob > chi2	=	0

Violation of USN No Deco	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
Depth	1.22	0.012	21	0.00	1.20	1.25
Bottom Time	1.04	0.002	20	0.00	1.04	1.04
Month						
Feb	2.70	1.575	2	0.09	0.86	8.47
July	1.39	0.686	1	0.50	0.53	3.66
August	3.76	1.765	3	0.01	1.50	9.43
September	4.32	2.076	3	0.00	1.69	11.08
October	4.64	2.212	3	0.00	1.82	11.81
November	2.81	1.416	2	0.04	1.05	7.54
December	10.46	5.830	4	0.00	3.51	31.19
_cons	0.00	0.000	-18	0.00	0.00	0.00
var(_cons)	0.83	0.419	0	2.23		
LR test vs. Logistic Regression chi2(01) 72.41 Prob>=chi2=0.00						



Conclusion

We recorded 2,560 dives. These exposures clarify the level of decompression stress these fishermen undergo. These dives, fishing yields, and diving behaviors will serve as input for a deterministic decompression table for these AFD.

Discussion

Our data indicated that the fisherman violate the no decompression limit during more than 25% of dives (based on US Navy models). There is a strong, negative, linear relationship between the age of the fisherman and the depth of the dive. Younger fisherman dove deeper than older ones and were more likely to perform repetitive dives than their older AFD.

Acknowledgements

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