

# Measuring the Accuracy of Artisanal Fishermen's Underwater Depth Perception

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## Background

Artisanal fishermen in the Yucatán Peninsula harvest marine protein for sustenance and profit. These divers use surfaced supplied air to dive for up to 5 hours per day but often dive without standard equipment, including depth gauges. Thus they estimate depth based on general sensory perceptions. Nitrogen narcosis could also play a role in reducing accuracy in their sense of perception.

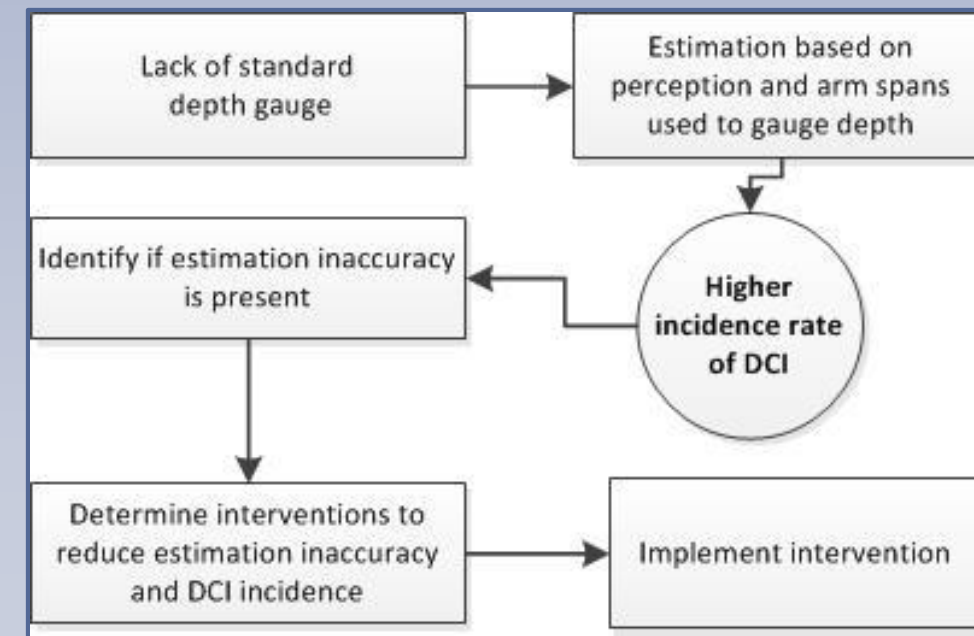


## Purpose

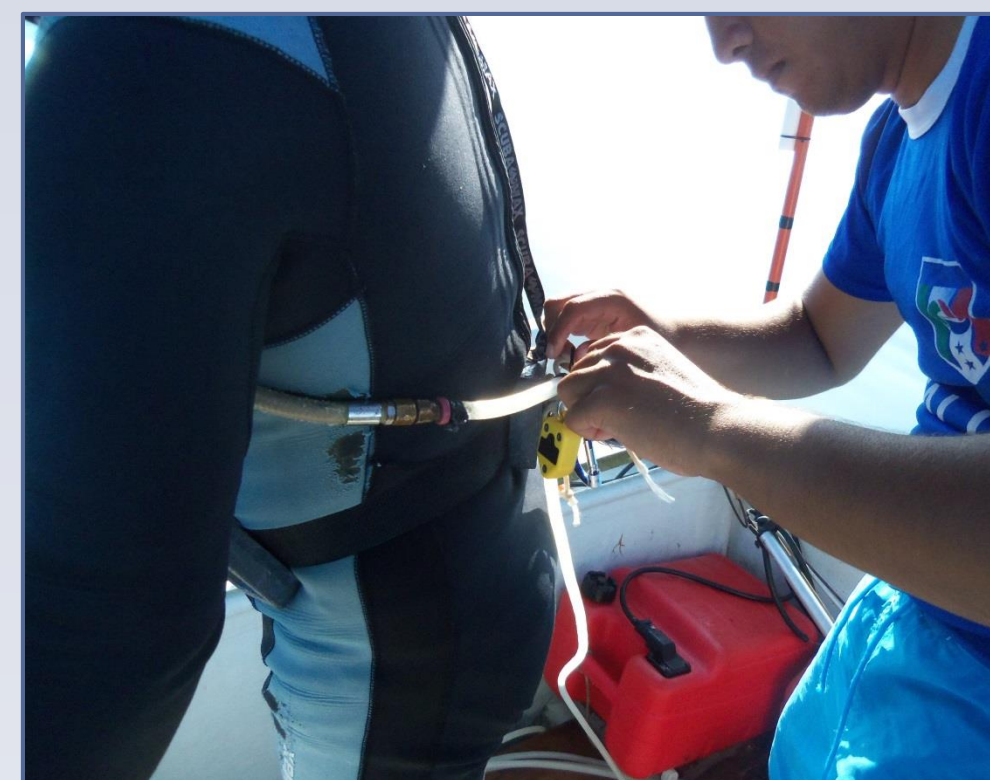
We hypothesized that the fishermen would underestimate their depths because of underwater light refraction.



## Methods

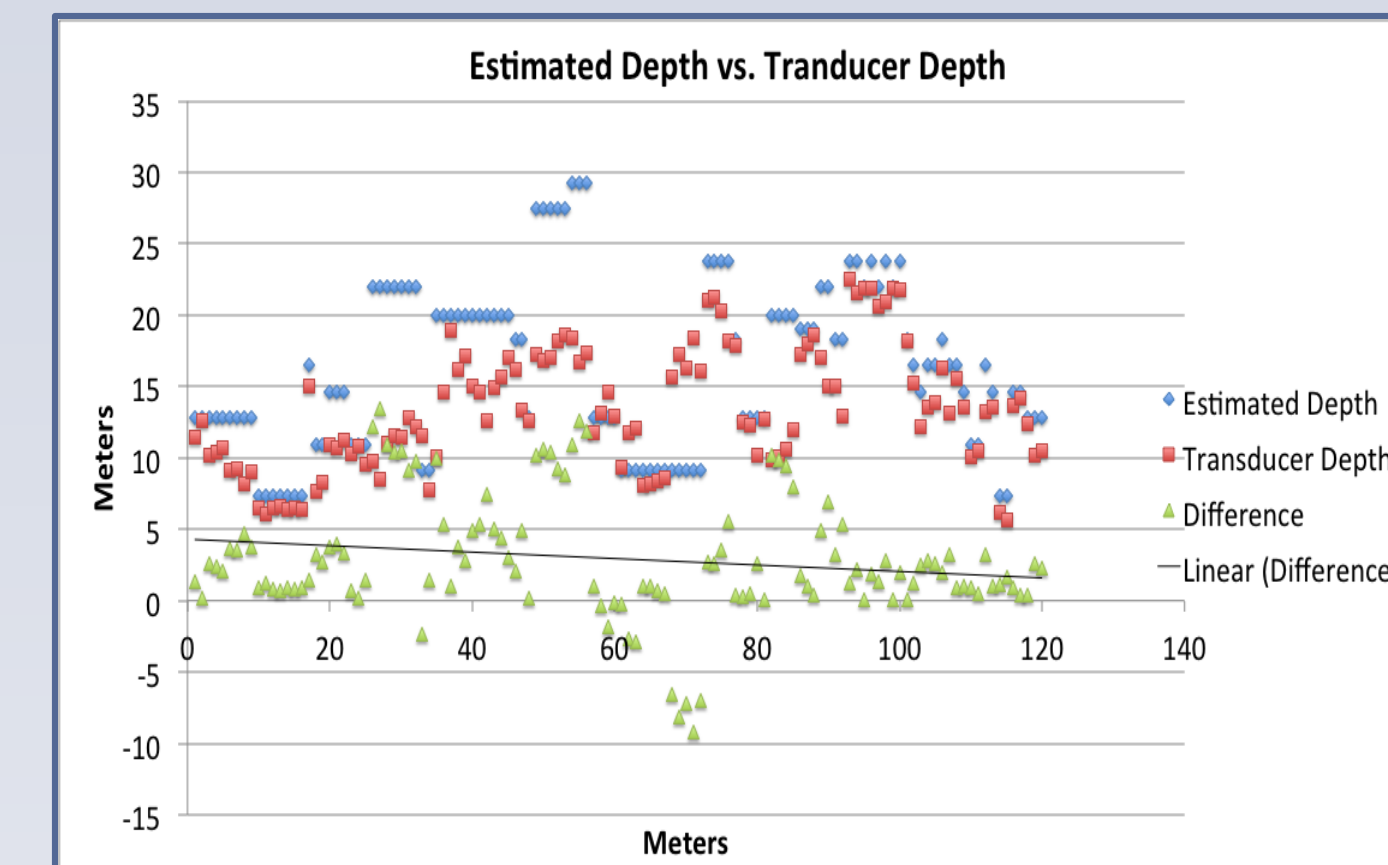
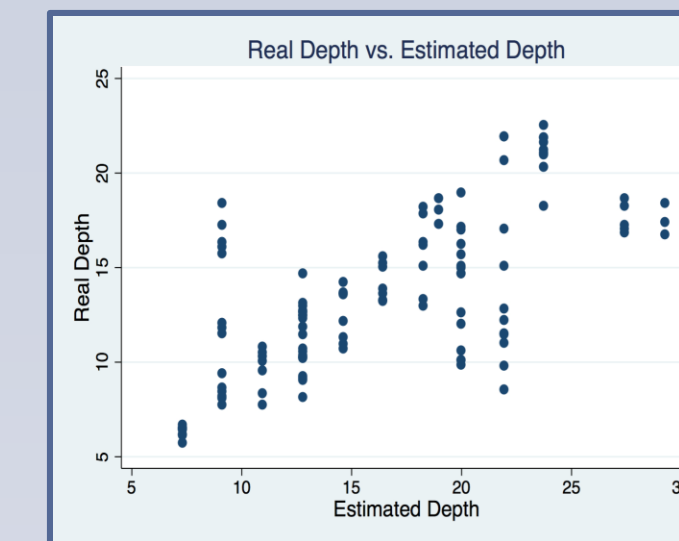
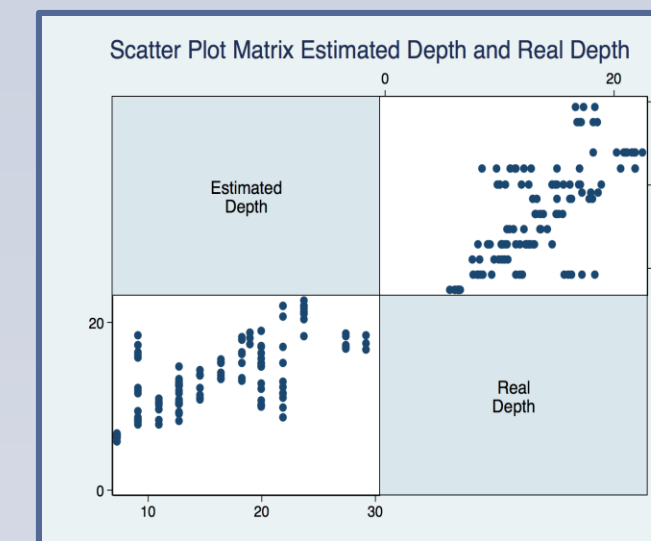
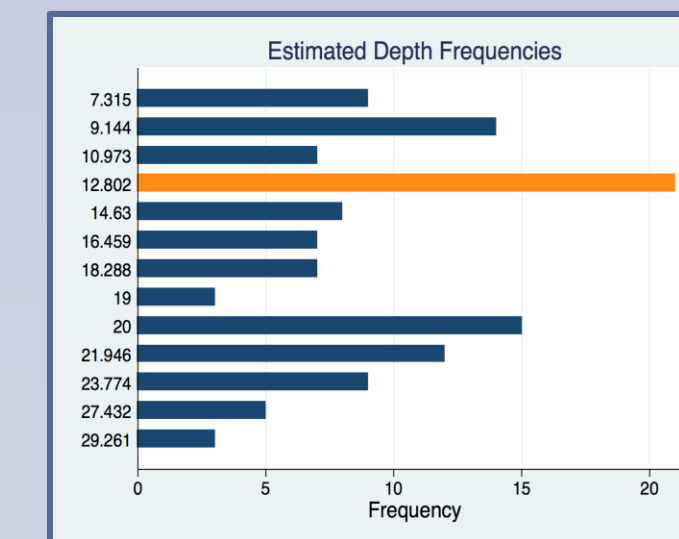
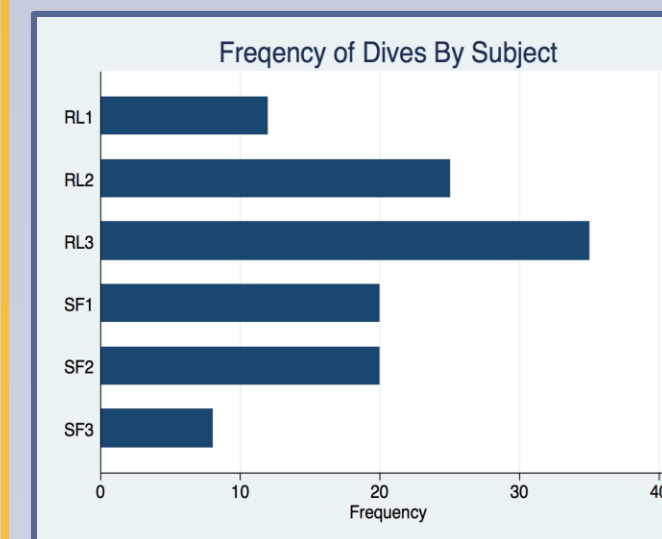


Six fishermen belonging to the cooperatives of Río Lagartos were invited to participate. Sensus Ultra Dive™ recorders with an accuracy of  $\pm 1$  Foot of Seawater (FSW) were attached to their weight belts. The recorders activated at 3 FSW and recorded data every ten to thirty seconds. The fishermen were followed throughout each observed fishing day for two months. After each dive, they were asked to recall their estimated working depths in arm strokes (1 arm stroke = 1.86 meters).



## Results

Paired samples *t*-test showed a significant difference between the means of estimated and recorded depths,  $t(119)=7.3647$ ,  $p=0.000$  and  $r=0.70$ .



## Conclusion

The survey results demonstrated that, on average, the fishermen significantly overestimated their diving depths. Experimenter bias may have caused the fishermen to report deeper depths because they may have been influenced to impress the researcher or provide values that they thought would have been more accurate. More importantly, however, even though the fishermen seemed to acknowledge the correlation between depth and bottom time and symptoms of bends, they dove long and reported diving deeper than they actually did. Such diving behavior suggests the fishermen's tendency to ignore potential risks to their health and safety in pursuit of a greater catch.

## Discussion

Understanding these fishermen's perception on depth could allow us to further understand their diving behavior and risk taking behavior. This understanding could augment future interventions among this population of fishermen divers.