

# **E.O.S.S.A.**



Open-source software to simplify DCLDE workflows

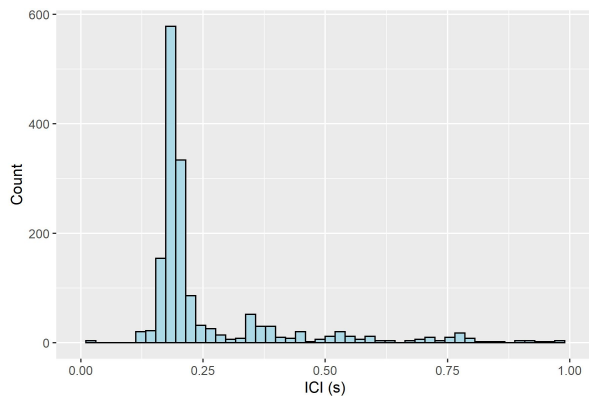
## **F.O.S.S.A.**

- **F**ree **O**pen-**S**ource **S**oftware for **A**coustics
- Series of R packages developed at SWFSC
- Streamline and standardize processing workflow for acoustics

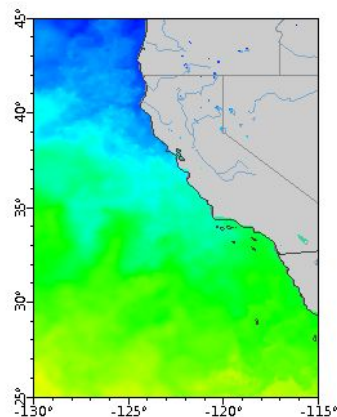
## **PAMpal**

- R package created to work with PAMGuard data
  - Created standard data structure for acoustic data
  - Keeps track of metadata
  - Makes it easier to work with acoustic data and do common tasks
-

# PAMpal One Liners

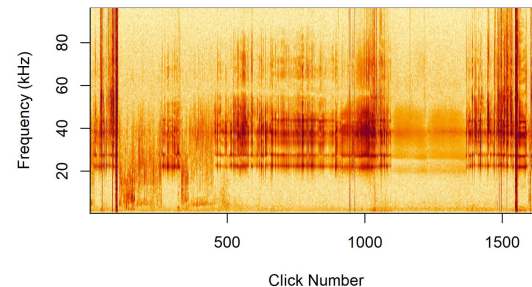


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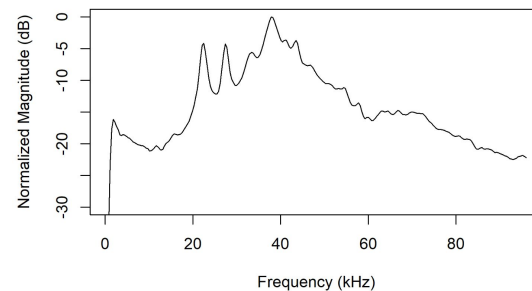


**Analysed Sea Surface Temperature (degree\_C)**  
Multi-scale Ultra-high Resolution (MUR) SST Analysis v04.1,  
Global, 0.01°, 2002-present, Daily  
(2022-02-22T09:00:00Z)  
Data courtesy of NASA JPL

Concatenated Click Spectrogram

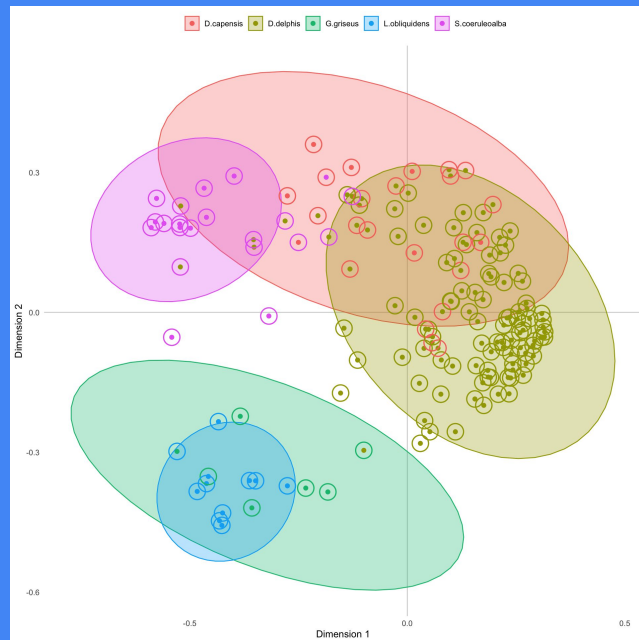


Average Spectrum



# BANTER

- R package developed by Eric Archer
- Hierarchical random forest classifier
- Event-level and detection-level information
- Multiple people presenting results at DCLDE



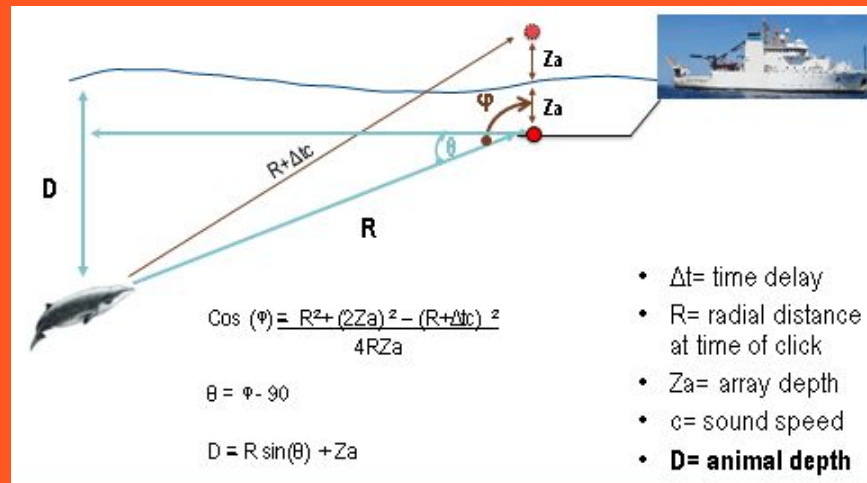
# FOSSA's Role

- Event + detector structure is not straightforward
- PAMpal makes this a single line of code
- Checks for potential errors
- Ease of use -> increased adoption -> better product
- We want to make this happen for **more** models in the future



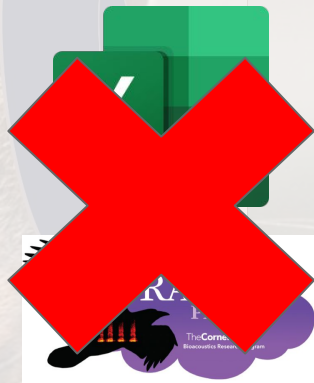
# Dive Depth Estimation

- Project with Annamaria DeAngelis & Annabel Westell
- Estimate dive depth of beaked whale + sperm whale using echoes



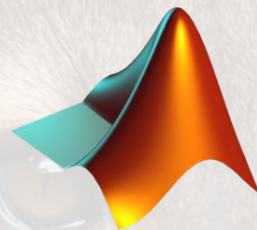
*Credit: Annamaria DeAngelis*

# FOSSa's Role



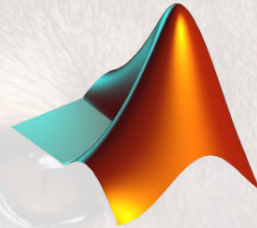
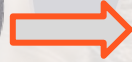
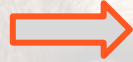
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Manual Labor





## FOSSa's Role



- Replaced many hours of manual labor
- PAMpal data structure makes it easier to track metadata
- Removing extra steps means it easier to reproduce
- Eventually hope to replace MATLAB portion with R, but PAMpal can still be useful to streamline part of a workflow creating intermediate data products (wav files, CSVs)



# ***Ziphius* Abundance Estimation**

- Project with Jay Barlow and Jeff Moore
- Estimate the density and abundance of *Ziphius* using received angles of clicks



# FOSSa's Role

- Goal is to reproduce for future surveys
- Currently...difficult
- Half of the steps already done by PAMpal
- Needs soundspeed profile, easy to accomplish with existing FOSSA tools

SpotLocationDataByDrift	2/10/2022 10:59 AM	File folder
AllEventClicks wRC	3/2/2021 2:51 PM	CSV File
AllEventClicks	3/2/2021 11:02 AM	CSV File
AllSpotData wUTC	3/2/2021 9:05 AM	CSV File
AvgSnapshotAngles	3/2/2021 3:01 PM	CSV File
DeplRetrDateTimes	3/2/2021 8:34 AM	CSV File
MeanLocationsByDrift	2/27/2019 4:19 PM	CSV File
PASCAL SoundFileList	3/2/2021 3:30 PM	CSV File
RefractedAngleCorrections	3/4/2019 8:56 AM	CSV File
SnapshotTallyByDrift	3/2/2021 3:58 PM	CSV File
EstAngleRefraction_ByRayTrace_PASCAL_byDrift.m	4/29/2021 10:38 AM	M File
raytrace.m	11/7/2017 7:05 AM	M File
PASCAL Analysis Flowchart RoboJay.pptx	12/21/2021 2:55 PM	PPTX File
PASCAL Analysis Flowchart.pptx	4/29/2021 10:46 AM	PPTX File
AngleRefractionCorrection v3.R	3/2/2021 2:58 PM	R File
CleanupSpotData.r	3/2/2021 3:10 PM	R File
CreateDetectionHistory v3.R	3/2/2021 7:14 AM	R File
EstAvgSnapshotAngles v3.r	3/2/2021 3:10 PM	R File
EstimateDetectionFunction from BWangles v9.R	4/29/2021 10:46 AM	R File
EstimateMeanSoundSpeedProfileByDrift.R	4/29/2021 10:40 AM	R File
Merge DBs _ Binaries _ Loc v4.r	3/2/2021 10:44 AM	R File
MergeEventClickFiles.r	3/2/2021 3:04 PM	R File

# Acknowledgements

- Eric Archer & Shannon Rankin
- Annamaria DeAngelis & Annabel Westell
- Jay Barlow & Jeff Moore
- Simone Baumann-Pickering, Emily Griffiths, Julie Oswald, Michael Oswald
- Doug Gillespie & Jamie Macaulay
- NOAA's Advanced Sampling Technology Working Group
- Bureau of Ocean Energy Management through Interagency Agreement M20PG00013



# What can FOSSA do for you?

- Email me! [taiki.sakai@noaa.gov](mailto:taiki.sakai@noaa.gov)
- Tutorial website: <https://taikisan21.github.io/PAMpal/>
- Channel in PAMGuard Slack:  
[https://join.slack.com/t/pamguard/shared\\_invite/zt-14d8kwgvp-QBzqPn\\_u8qOpK9gQfjejc1w](https://join.slack.com/t/pamguard/shared_invite/zt-14d8kwgvp-QBzqPn_u8qOpK9gQfjejc1w) (or e-mail me for a link)

