

Introduction:

What have we learned from controlled exposures of free-ranging animals to navy sonar sounds?

AUTEC BRS, 3S and SOCAL BRS projects.

Perspectives and future steps in Behavioral Response Studies of cetaceans in response to anthropogenic sound, Session 2

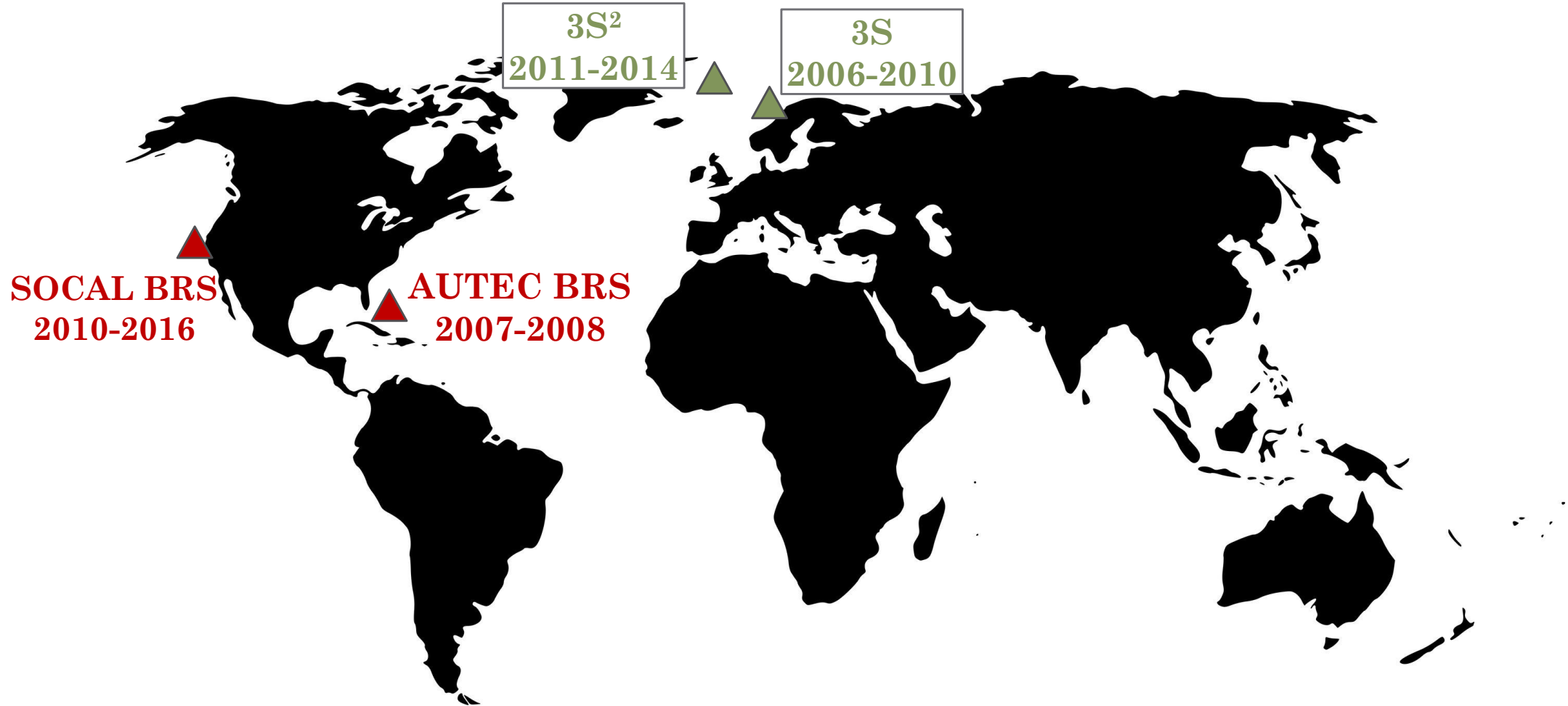
(Pre-Conference Workshop)

Society for Marine Mammalogy Biennial Conference, Dec. 2015

Agenda

- Nicola Quick – The AUTECH project
- Frans-Peter Lam – The 3S and 3S² projects
- John Calambokidis – The SOCAL project

Sonar BRS Experiments in the Field



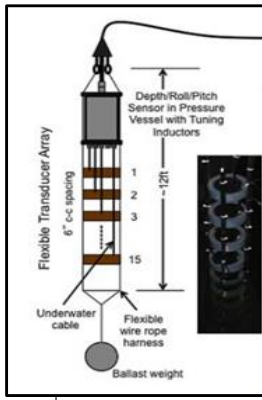
MOCHA



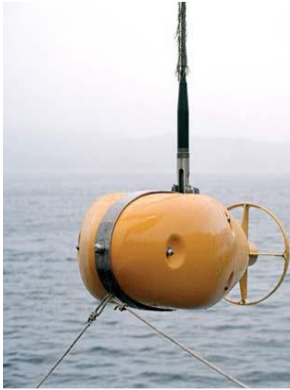
MULTI-STUDY OCEAN ACOUSTICS HUMAN EFFECTS ANALYSIS



- 2012-2015
- Develop and implement innovative methods to analyze BRS data
- Work toward common methodological frameworks and meta-analysis



Source: Scaled or Operational?



Source: Towed or Stationary?



Playbacks: One or more per animal?

AUTEC



Blainville's Beaked whale
(*Mesoplodon densirostris*)

BMMRO - bahamaswhales.org



False Killer Whales
(*Pseudorca crassidens*)

(2 groups - 2008)

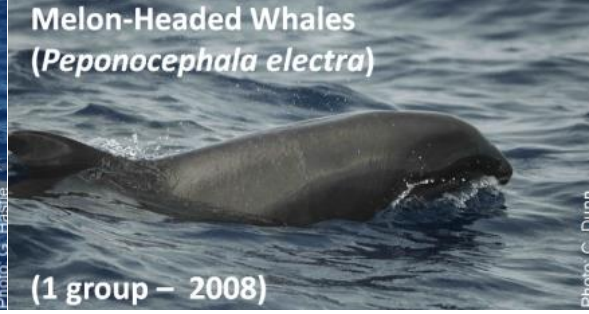
Photo: J. Winn



Short-finned Pilot Whales
(*Globicephala macrorhynchus*)

(2 groups - 2007 & 2008)

Photo: G. Hastie



Melon-Headed Whales
(*Peponocephala electra*)

(1 group - 2008)

Photo: C. Dunn

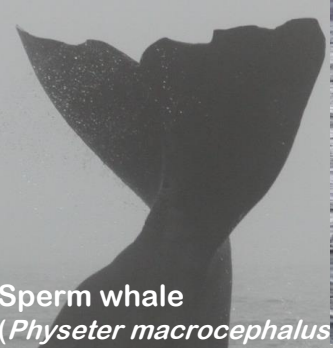
3S/3S2



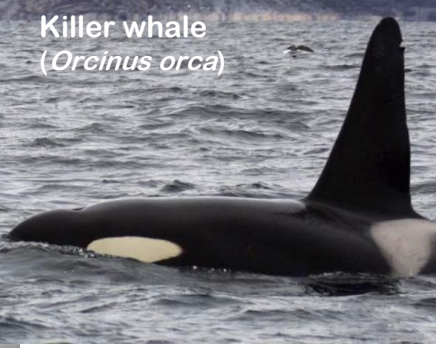
Northern bottlenose whale
(*Hyperoodon ampullatus*)



Long-finned pilot whale
(*Globicephala melas*)



Sperm whale
(*Physeter macrocephalus*)



Killer whale
(*Orcinus orca*)

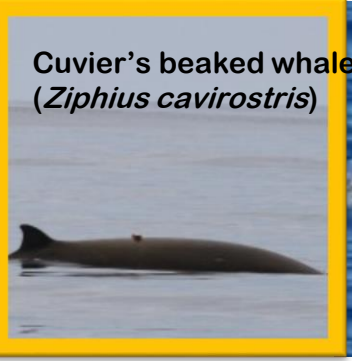


Minke whale
(*Balaenoptera acutorostrata*)



Humpback whale
(*Megaptera novaeangliae*)

SOCAL



Cuvier's beaked whale
(*Ziphius cavirostris*)



Minke whale
(*Balaenoptera acutorostrata*)



Sperm whale
(*Physeter macrocephalus*)



Humpback whale
(*Megaptera novaeangliae*)



Fin whale
(*Balaenoptera physalus*)



Blue whale
(*Balaenoptera musculus*)



Risso's dolphin
(*Grampus griseus*)

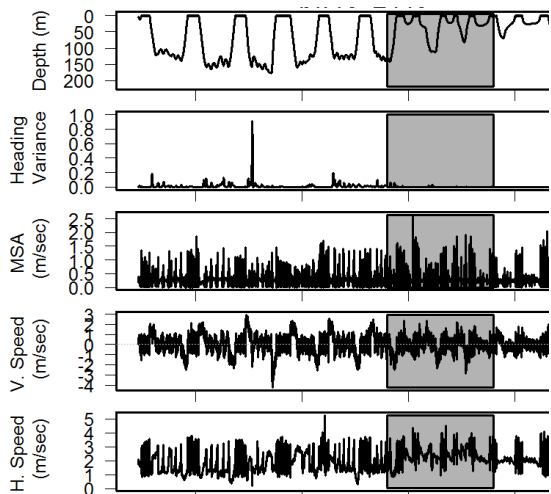


Baird's beaked whale
(*Berardius bairdii*)

SPECIES AND CONTEXTS

Photos: AUTEC, BMMRO, J. Winn, G. Hastie, C. Dunn. 3S: E. Grønningsæter, Renaud de Stephanis, A. Friedlaender, https://en.wikipedia.org/wiki/Killer_whale#/media/File:Tysfjord_orca_1.jpg, NMFS Southwest Fisheries Science Center, Duncan Murrell/Steve Bloom Images/Barcroft Media, Cascadia Research Collective, <https://worldwidewaves.files.wordpress.com/2011/10/rissos.jpg>,

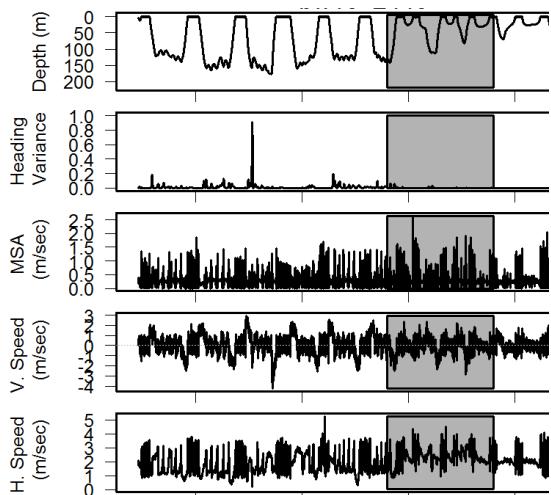
Scales of data analysis



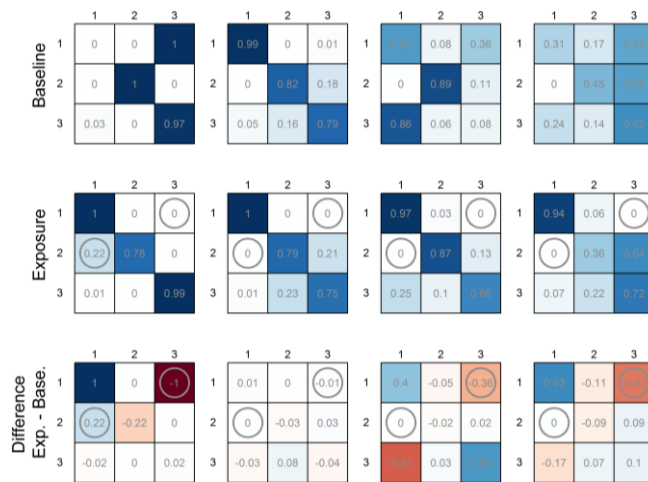
Southall et al. in prep



Scales of data analysis



Southall et al. in prep

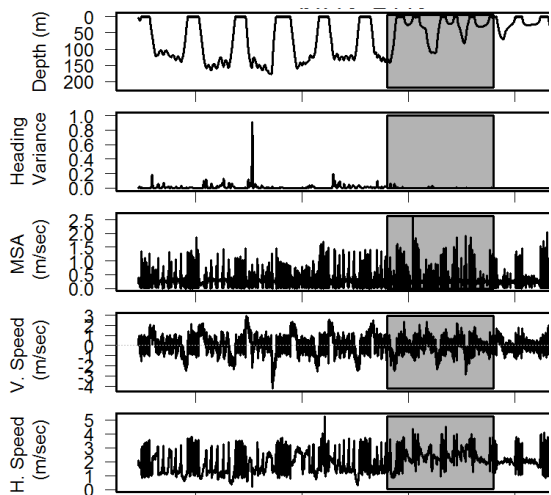


DeRuiter et al. in review

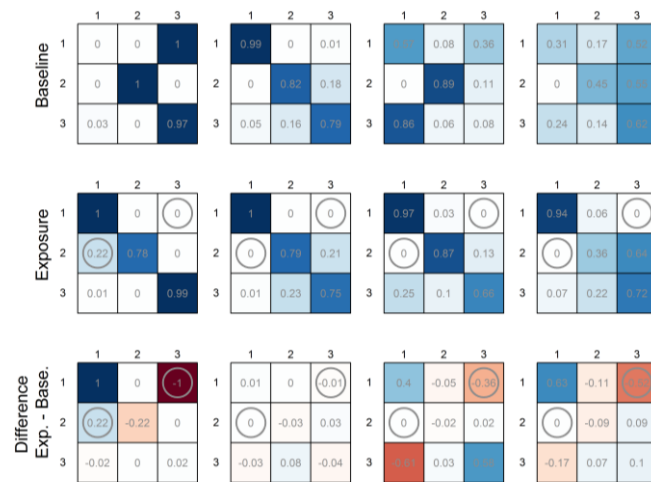
Individual

Single-Species

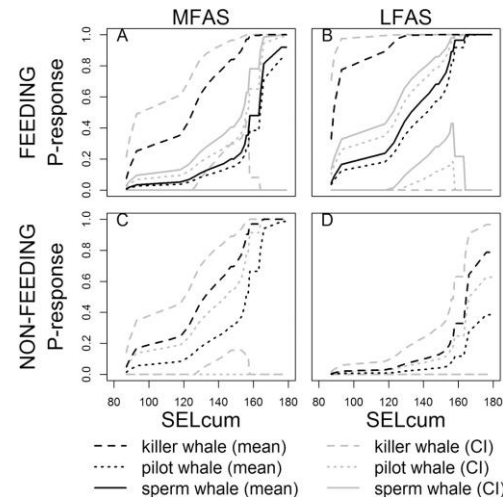
Scales of data analysis



Southall et al. in prep



DeRuiter et al. in review



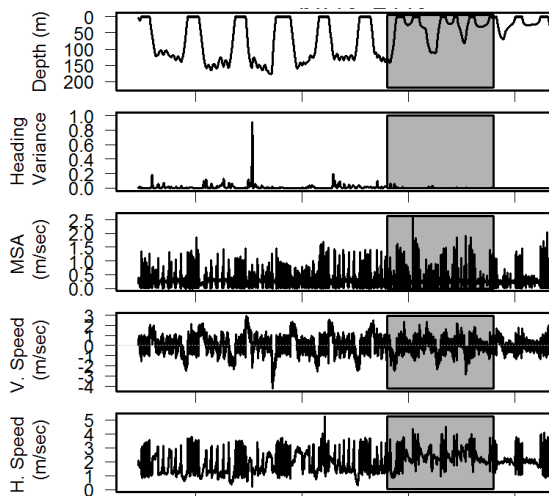
Harris et al. 2015

Individual

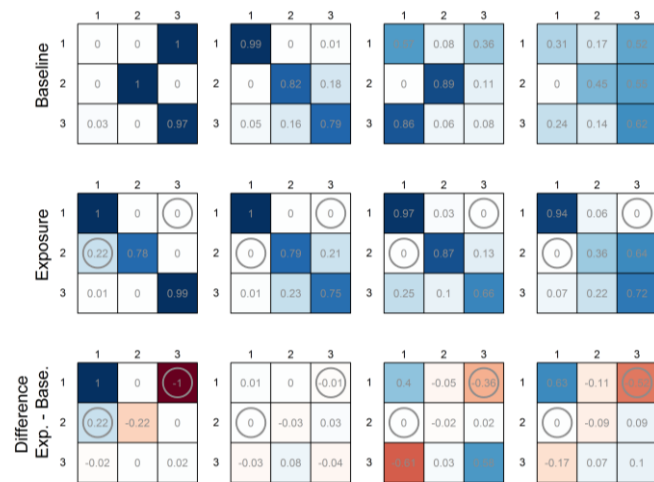
Single-Species

Multi-Species

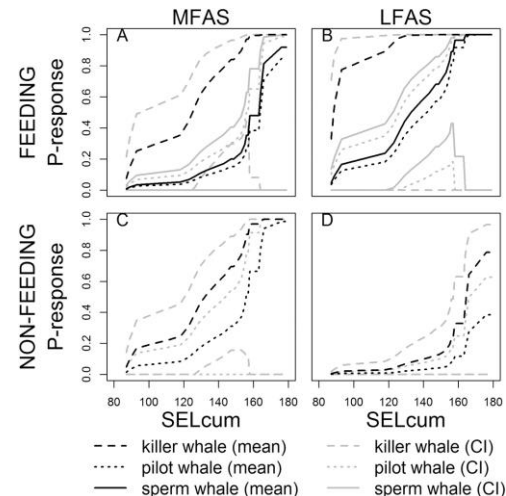
Scales of data analysis



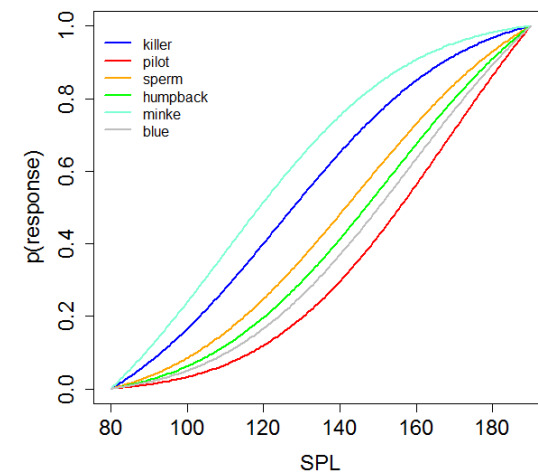
Southall et al. in prep



DeRuiter et al. in review



Harris et al. 2015



MOCHA project

Individual

Single-Species

Multi-Species

Meta-Analysis



Highlight key findings

that merit
study,
monitoring or
validation

in non-
experimental
settings