

Braulio Leon-Lopez, University of St Andrews

### Individual variation of signature whistles from bottlenose dolphins in Sarasota Bay: The ageing effect

The question that I tried to answer in my project was to what extent bottlenose dolphin signature whistles change with age. During the first visit to the Woods Hole Oceanographic Institution (September 2014), I started to revise their database of signature whistles recordings from Sarasota Bay in order to determine which individual would be potentially useful for the analysis. Signature whistles are collected in Sarasota during brief capture/release sessions with wild dolphins. I sampled individuals with a long record of capture-releases so that I could obtain at least three different years spaced in time covering from being a calf to adulthood. I selected 26 individuals as potentially useful with help from Dr Laela Sayigh. Once the animals were selected, I started digitising the analogue tapes (VHS tapes) from the respective days when they were recorded during of capture-release sessions. Digitising the tapes usually took approximate 2 hours per tape. Each digital file was named and stored on hard drives and a network server. A total of X tapes where digitised during this visit. I also looked at files already in the server database of the recordings from the more recent years which were obtained digitally in the field. I then had to determine the signature whistle pattern for each individual. Dr Sayigh has very detailed knowledge of the relations amongst the different individuals, their life histories and their acoustic repertoires. Her help was indispensable to select the individuals and to help with the field notes.

Starting at WHOI, I processed the digital files. The goal was to extract 20 non-consecutive signature whistles for each given year for each individual in the sample. I also assessed the quality of the files and reviewed the amount of signals available. Signature whistles tend to be the main signal during capture-release sessions. However, the amount of sound produced varied amongst individuals. This work was continued when I was back in St Andrews. Once the signature whistles were extracted, several parameters were measured from the fundamental frequency contour and the modulation pattern was traced. Preliminary result helped to decide which parameters would be the best to use.

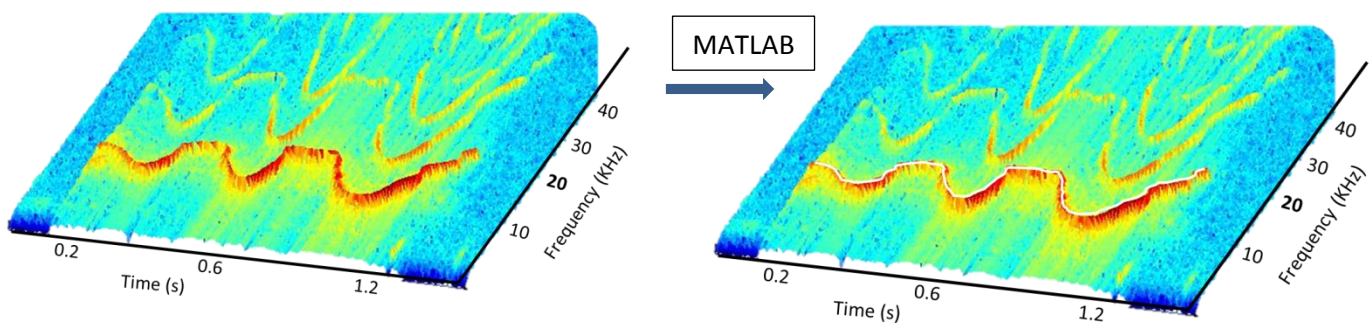


Figure 1. Fundamental frequency contour extraction.

Several of the recordings were not useable for the analysis, either because of the lack of a sufficient number of signature whistles or because the recordings were too noisy. Therefore, several individuals had to be discarded. I then had to re-visit the database of individuals to find more individuals with sufficient years sampled.

During my second visit at the Woods Hole Oceanographic Institution (March 2015), I collected data from this new set of individuals. I then extracted signature whistles from the new set of recordings. The final sample size was 18 individuals with three to six sampled years including recordings of animals of 1 to 50 years in age.

The preliminary results seem to point towards a general stability in the signature whistle, but with variation along the fundamental frequency that result in slight reshaping of the modulation pattern as the animal grows old. A series of analyses are still needed to corroborate this finding.

The visits to WHOI were extremely useful and successful in achieving the aims of data collection and processing. Furthermore, they have helped to strengthen the research network with the people involved and opened the option to continue collaboration in the longer term. I would like to thank MASTS for giving me the opportunity to participate in the MASTS-WHOI bridge programme.