



生态声学实时监测&海洋哺乳动物生物声学监测

上海瑾瑜科学仪器有限公司



公司简介

上海瑾瑜科学仪器有限公司是立足于海洋和生态环境领域的高科技公司。公司致力于引进国际先进的仪器设备，并提供专业的技术服务。公司在动物保护和生态环境领域提供高质量、完整的产品线，主要用于海洋综合科学考察、水下工程及探测、动物声音记录、海洋生态环境监测、动物跟踪定位等。

公司引进的仪器设备，广泛应用于国内“973”、“863”等大中型科研项目中，为相关科研项目的顺利完成提供了坚实的保障。公司注重终端用户的需求，拥有一支由专业技术人员组成的服务团队，以严谨创新的精神，为客户提供快捷、周到、专业的技术支持。公司将紧随科技发展前沿，秉承为国内科研单位提供最先进的设备和服务的宗旨，以一流的产品和完善的服务，成为国内科研人员和国际先进仪器厂商间的桥梁！

一、水下声学部分



RESEA



RESEA - LP



RESEA - TR

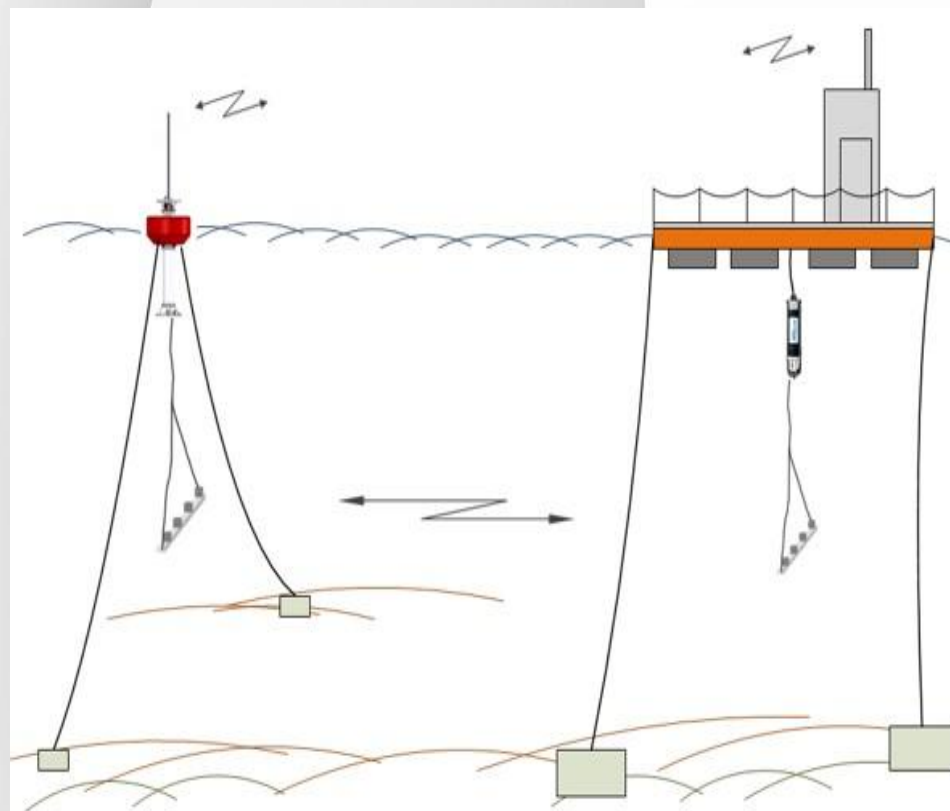




RTSYS

➤可用于如下研究项目：

- ❖ 实时噪音测量
- ❖ 环境评估
- ❖ 海上施工
- ❖ 哺乳动物研究保护





RTsys

监测水下生态系统

数据记录和后处理



Cetacean research
Environmental monitoring



Noise impact studies
Ambient noise



=> 法国RTsys水下声学记录器套装

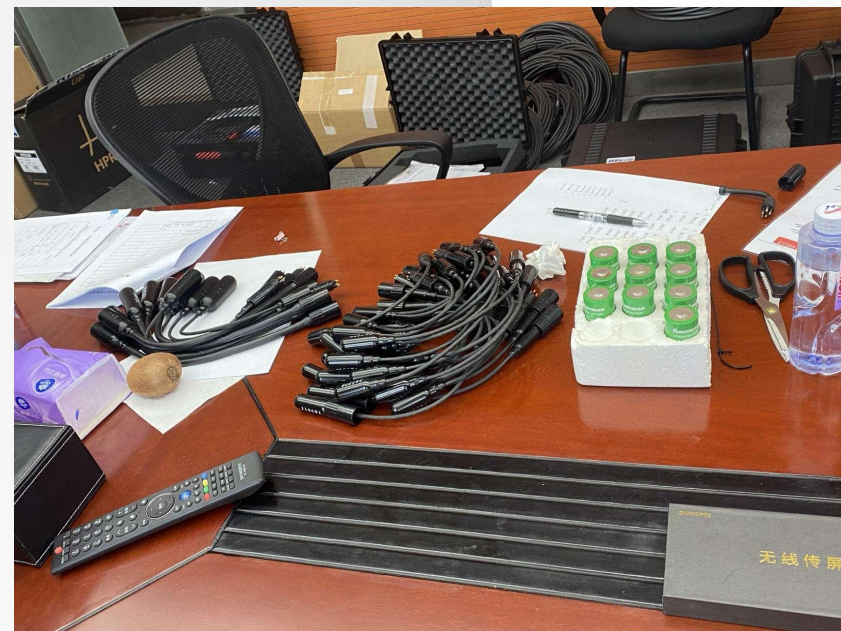
RESEA 4通道声音记录仪



Cetacean research
Environmental monitoring



Noise impact studies
Ambient noise



=> 可选标准或者超声水听器



RTSYS

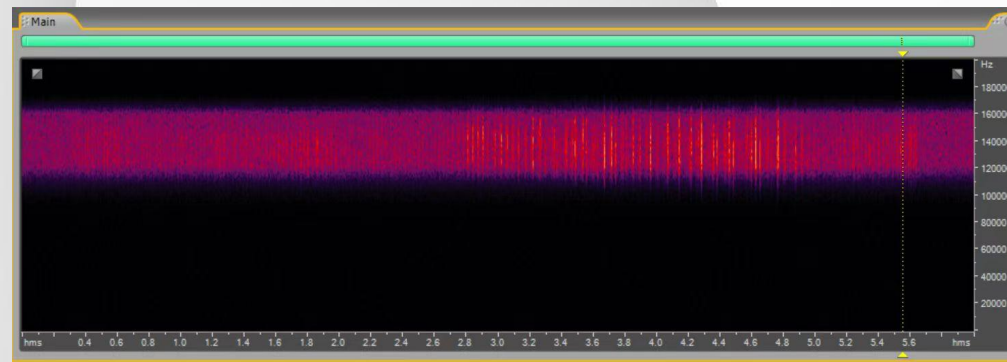
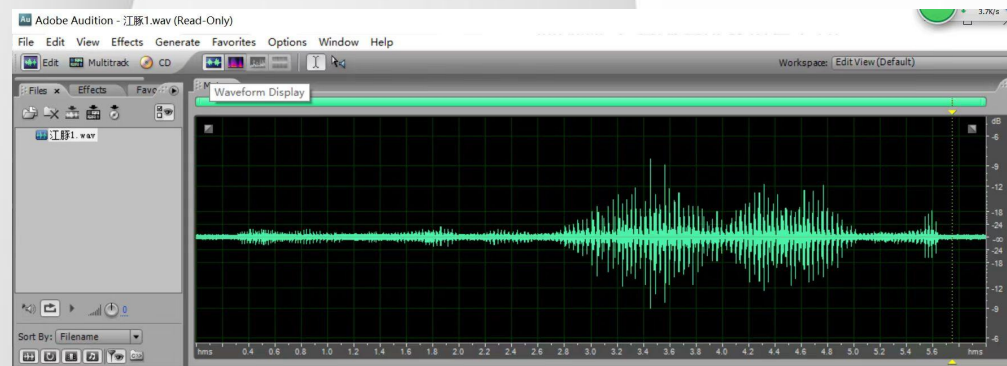
Sylence LP单通道小型声音记录仪



Cetacean research
Environmental monitoring



Noise impact studies
Ambient noise



=> 含单个水听器的水下声学记录器套装



RTSYS

声学监测浮标

记录、实时处理 & 警告传送



Cetacean research
Environmental monitoring



Noise impact studies
Ambient noise



Seismic, shipping
& construction



=> 浮标或带水声通信modem的水下监测站



RTSYS

WiFi远程声学监测系统简介

- * 被动声学记录器、WiFi远程声学浮标，实时获取声学数据并进行参数设置。
- * 4通道水听器同时输入，GPS天线，可连接其他同步传感器获取声学数据。
- * 允许任何电脑访问的WiFi网络，操作范围在3km内。
- * 配合可充电电池组和大容量的存储器使用，可不间断的进行数据获取



RTSYS

远程浮标系统介绍

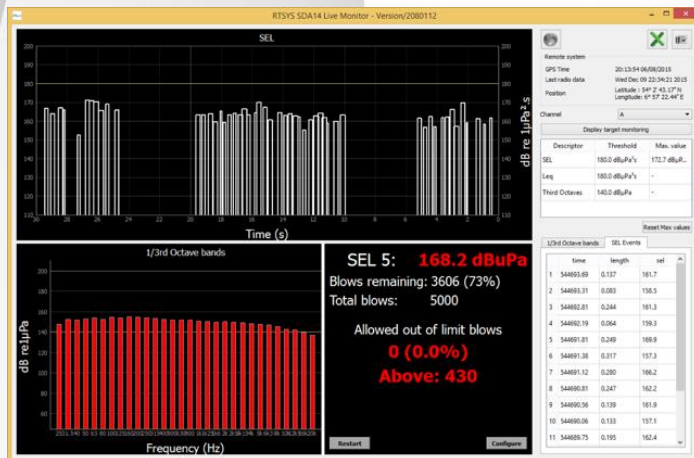




RTSYS

海上安装监测

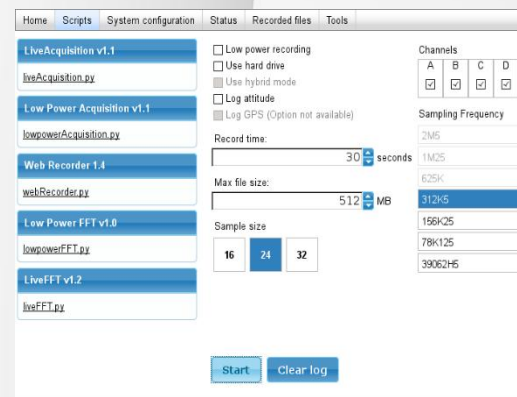
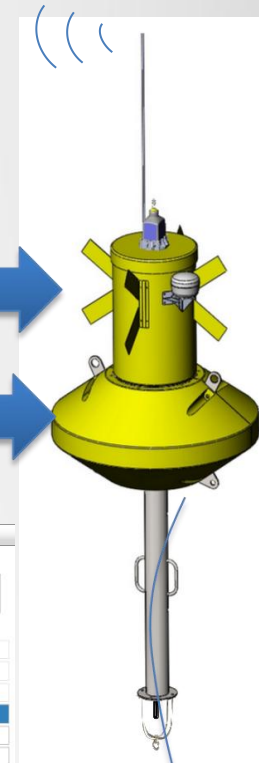
!! 168 dB !!



Up to 3,000m

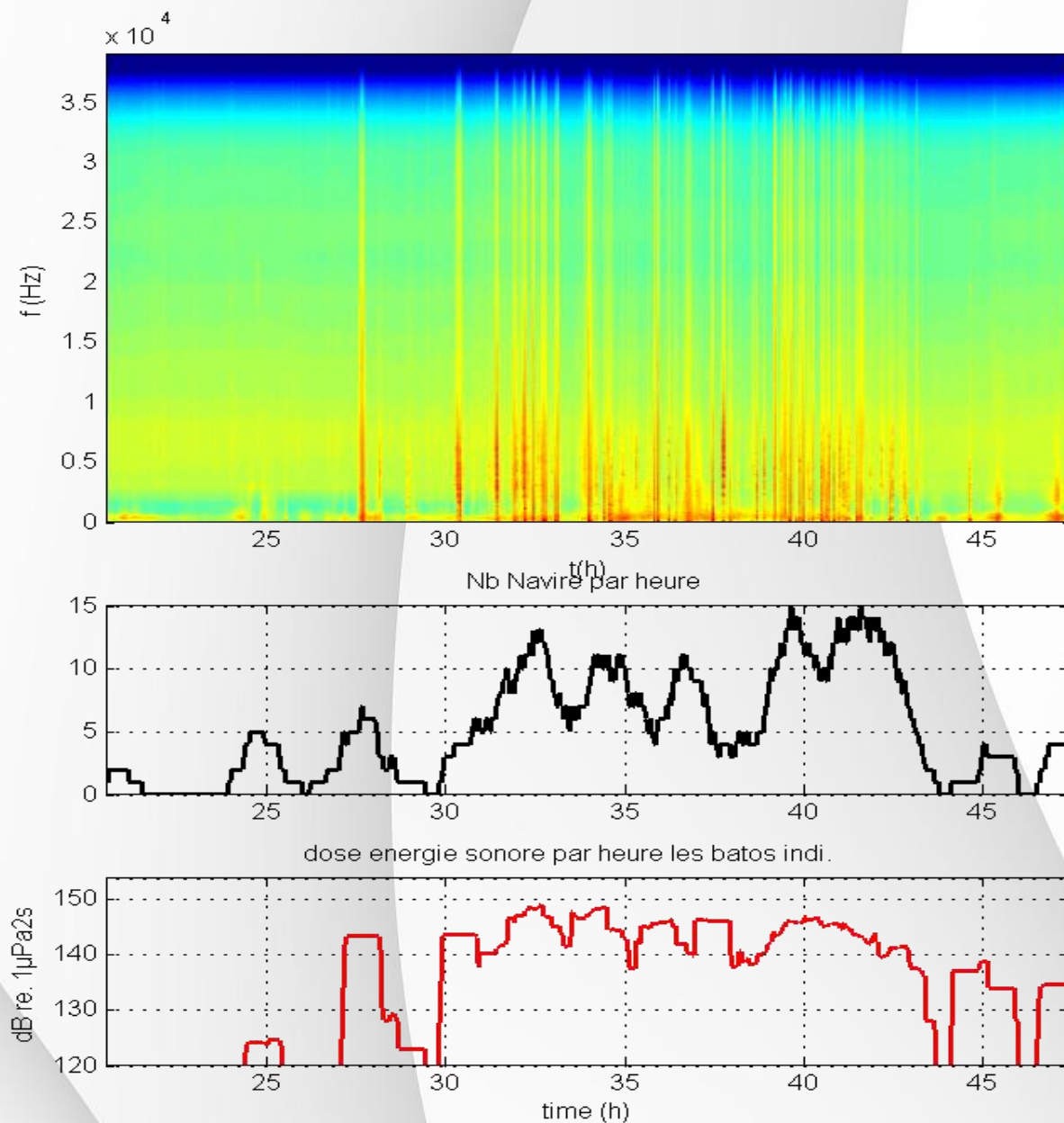
Up to 700m

750 m



- Wav 文件
- SEL, SPL .txt 文件
- 设置 (Programming)

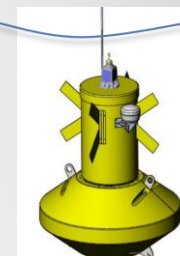
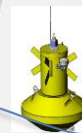
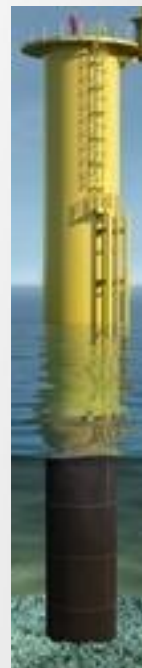
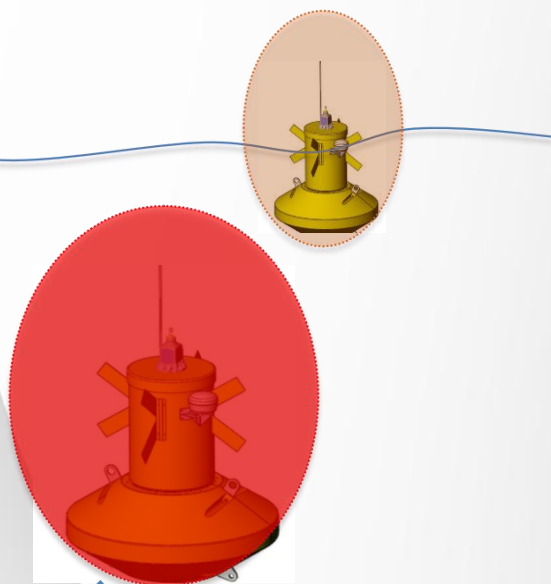
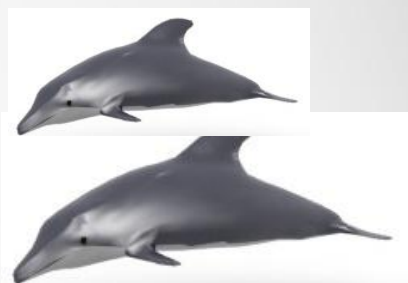
- 用于监测:
- 船舶
 - 海底
 - 海豚
 - 特殊鱼类



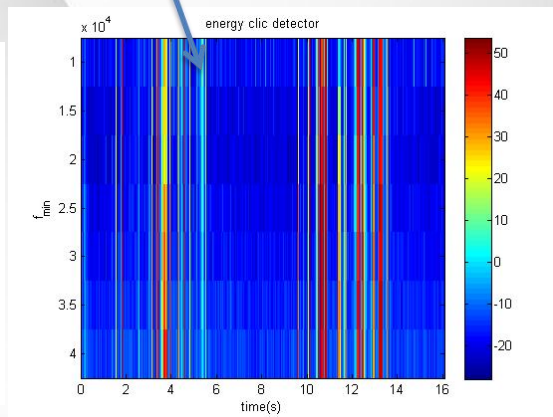
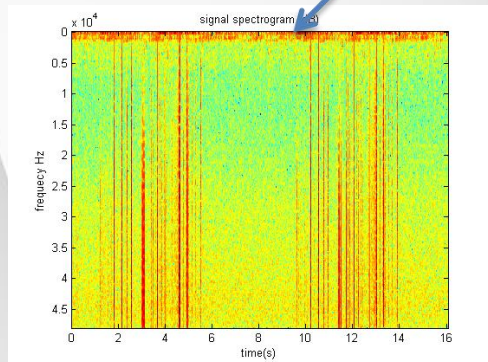
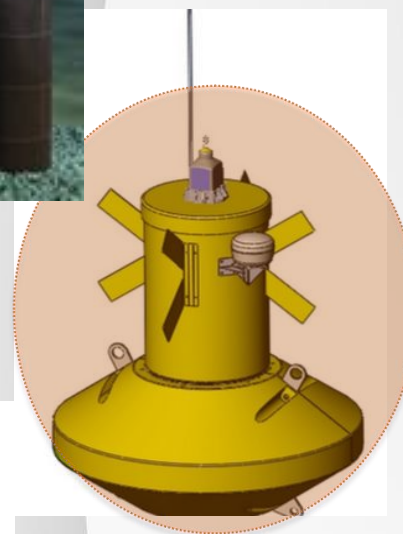


海上安装监测

识别



嵌入式算法用于哺乳动物和船舶监测



QuickReport分析软件

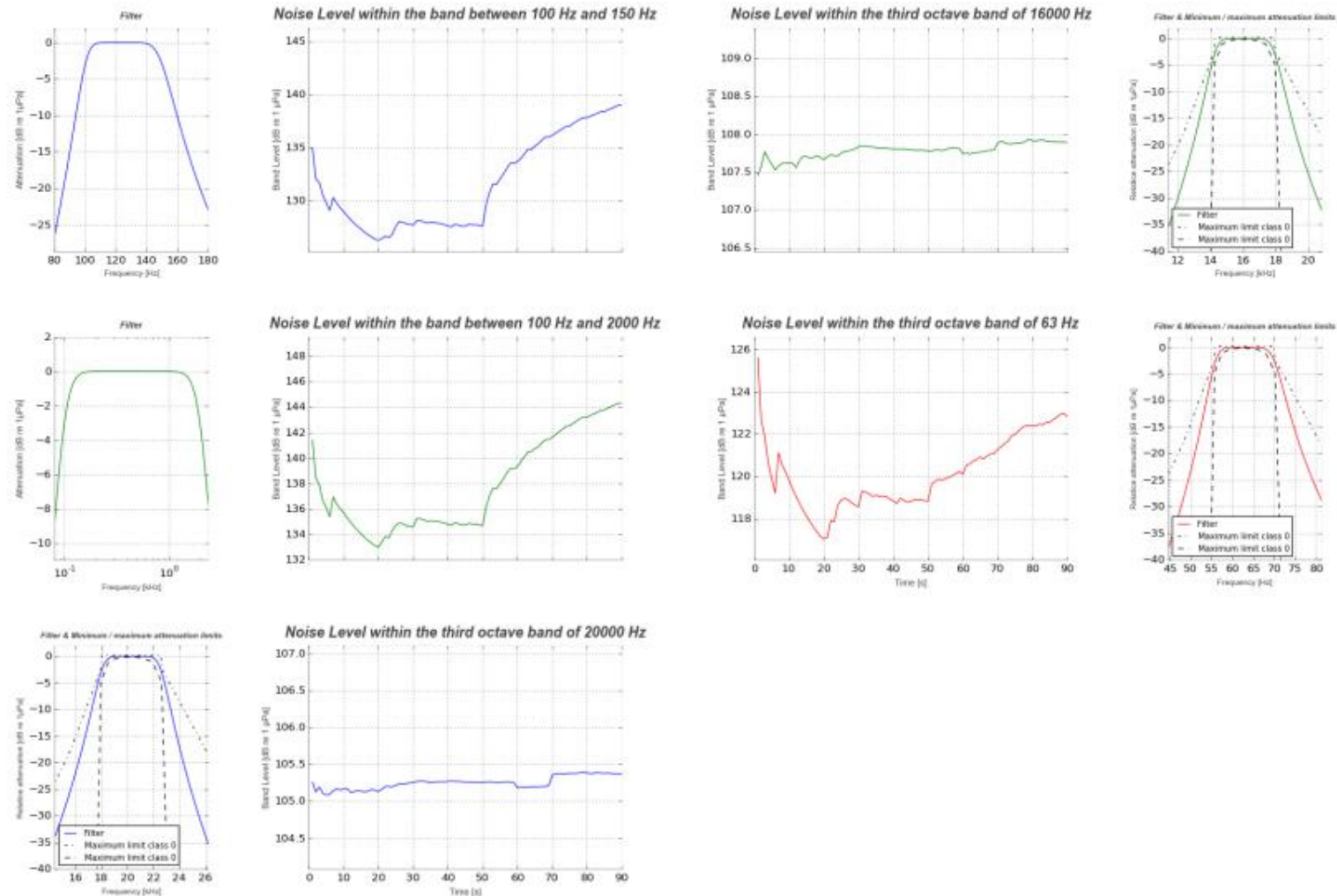
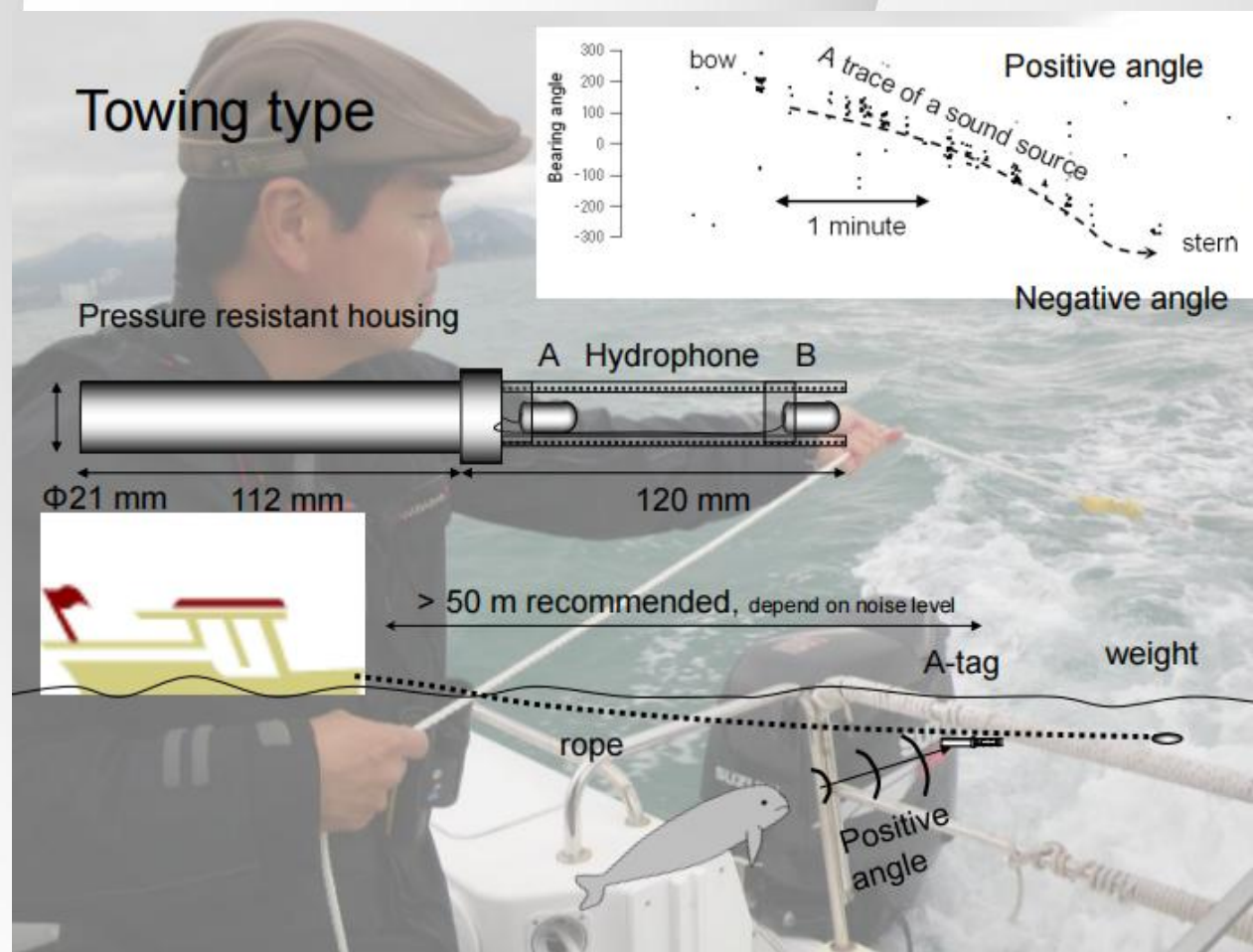


Figure 15: PNG outputs of Band Levels algorithm

拖曳式A-tag声学记录仪



拖曳式A-tag声学记录仪



Fixing A-tag on the rope.



Use a plastic band at the end of A-tag.

拖曳式A-tag声学记录仪

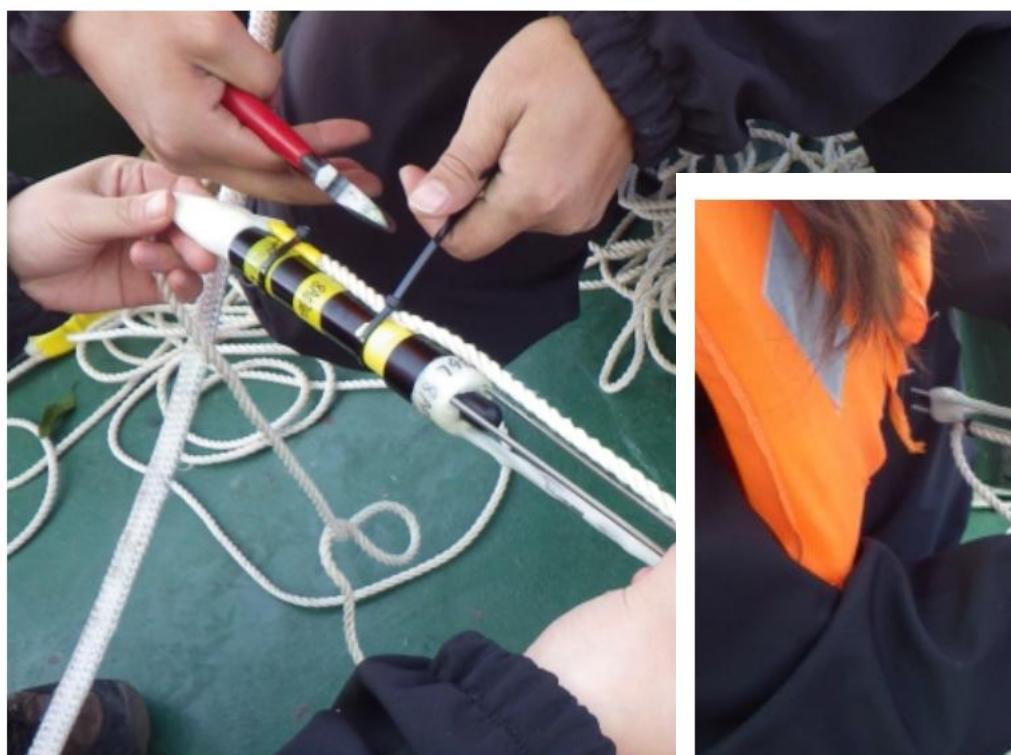


Similarly in the middle.



Fix the hydrophone stay as well. NOTE THAT DO NOT FIX WHITE STAY WHICH CONTAINS HYDROPHONE CABLE.

拖曳式A-tag声学记录仪



Cut extra plastica cables.



Round A-tag by electric tape.

拖曳式A-tag声学记录仪



BE CAREFUL NOT TO ROUND THE HYDROPHONE (THE BLACK ON

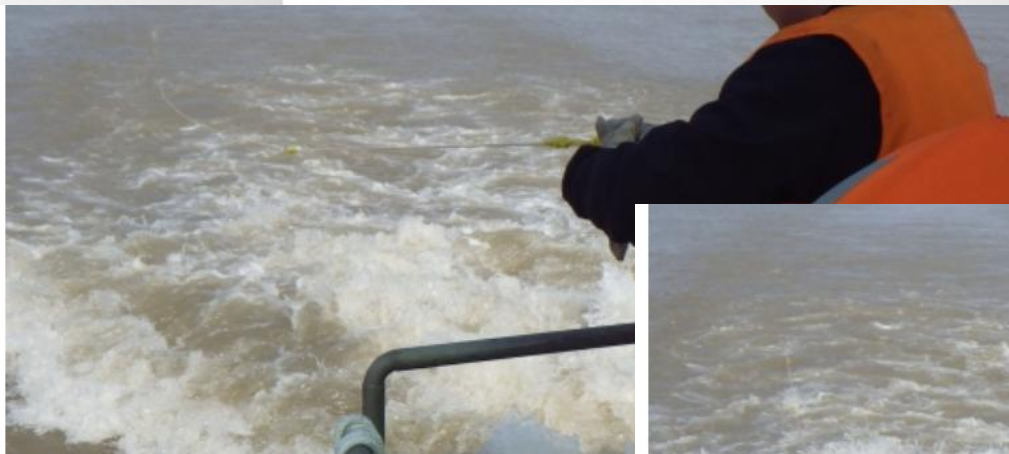


Fixed on the rope completely.

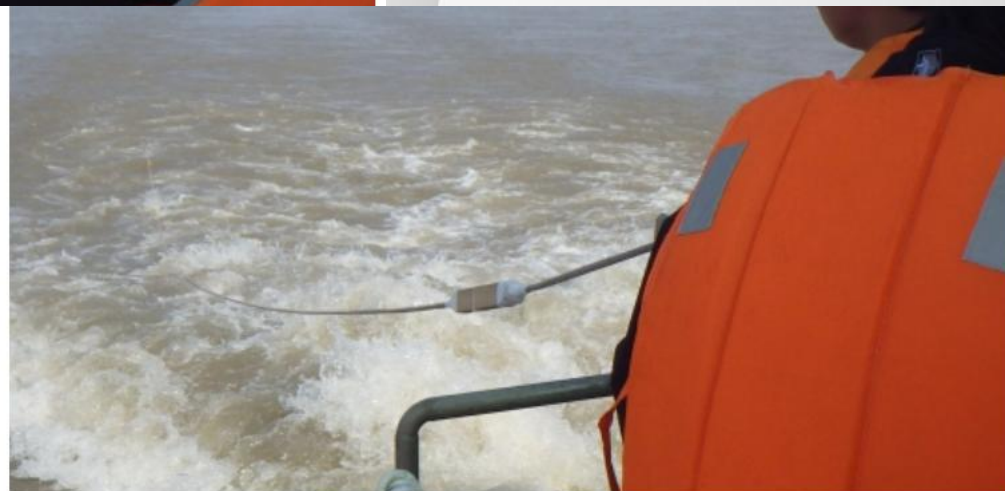


MMT INC.

拖曳式A-tag声学记录仪



Release A-tag gently.



If nessessary, add a float to prevent bottom touching.



拖曳式A-tag声学记录仪

General overview

- Li et al.(2010) Widespread passive acoustic detection of Yangtze finless porpoise using miniature stereo acoustic data-loggers: A review, J. Acoust. Soc. Am. 128, 1476-1482. [Download](#)

Towed

Range-wide distribution

- Zao, X., Wang, D., Turvey, S.T., Taylor, B., Akamatsu, T. (2013) Distribution patterns of Yangtze finless porpoises in the Yangtze River: Implications for reserve management, [Animal Conservation](#), doi: 10.1111/acv.12019.

Abundance estimation

- Akamatsu, T., Ura, T., Sugimatsu, H., Bahl, R., Behera, S., Panda, S., Khan, M., Kar, S. K., Kar, C. S., Kimura, S., Sasaki-Yamamoto, Y., (2013) A multimodal detection model of dolphins to estimate abundance validated by field experiments, J. Acoust. Soc. Am., 134, 2418-2426. [Download](#)

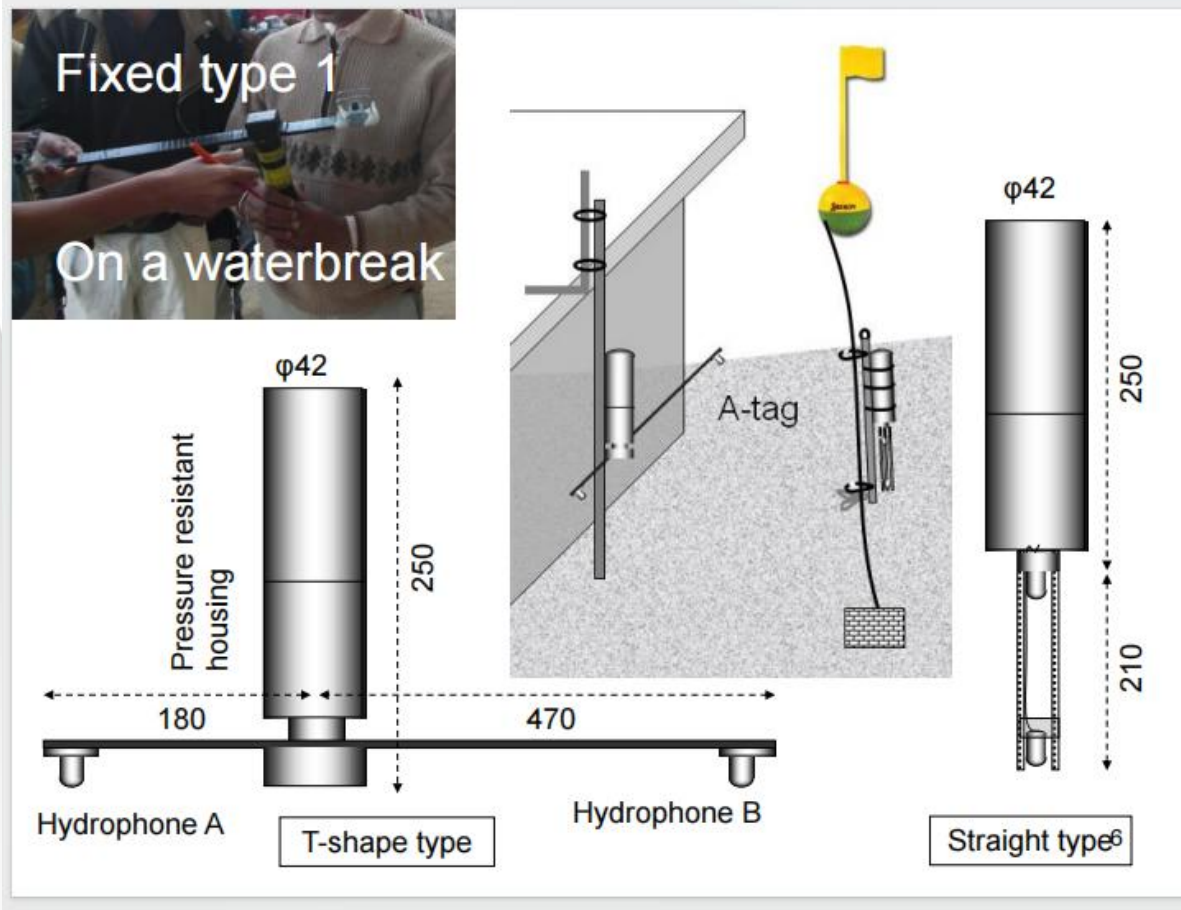
Local distribution

- Kimura, et al. (2012), Seasonal changes in the local distribution of Yangtze finless porpoises related to fish presence, Marine Mammal Science, 28(2), 308-324. [Download](#)

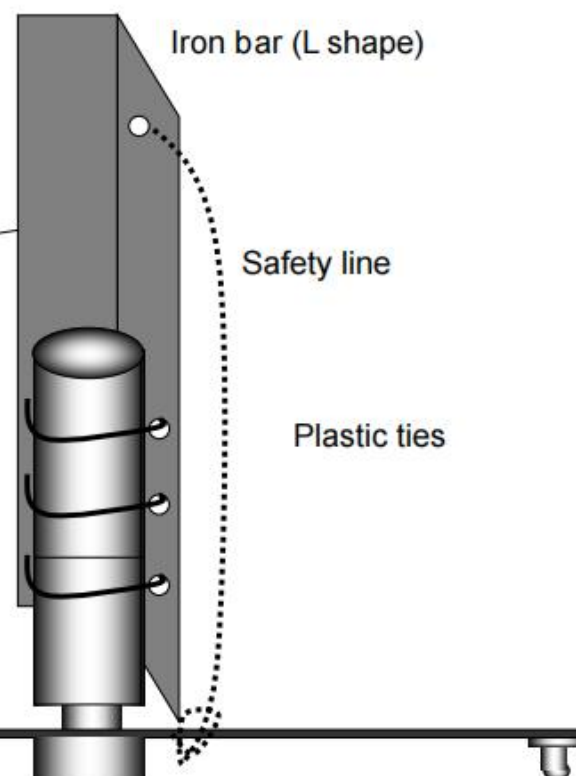
Cargoship based observation

- Dong et al.(2011), Passive acoustic survey of Yangtze finless porpoises using a cargo ship as a moving platform, J. Acoust. Soc. Am. 130, 2285-2292. [Download](#)

A-tag固定式声音记录仪



A-tag固定式



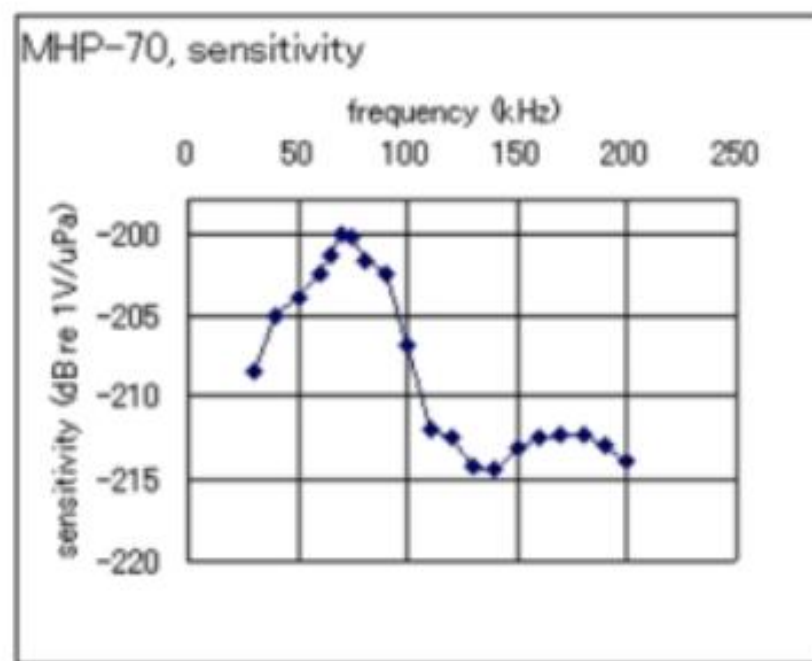
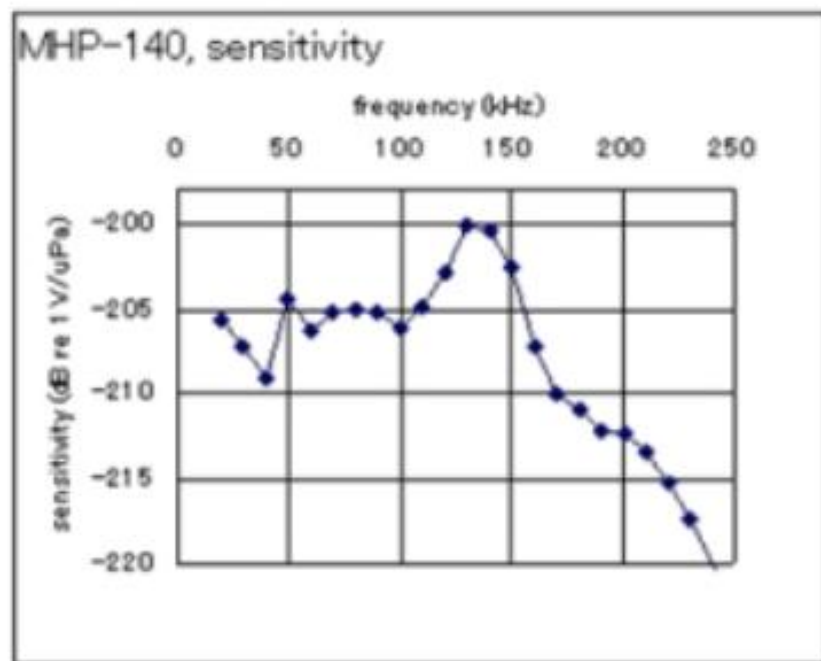
7

A-tag Type I和 Type T



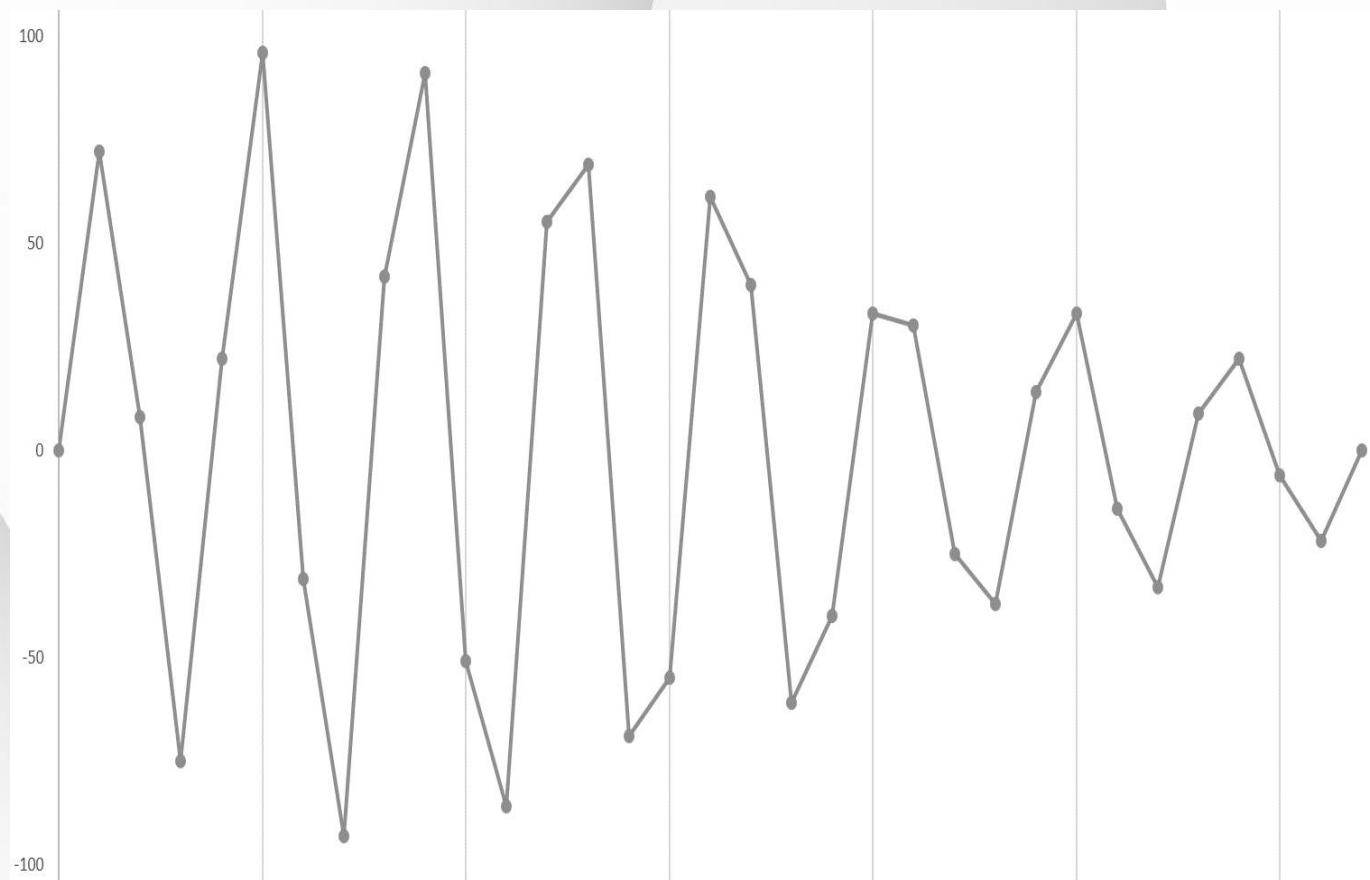
* 可选140-70或者140-140 立体水听器

A-tag水听器灵敏度

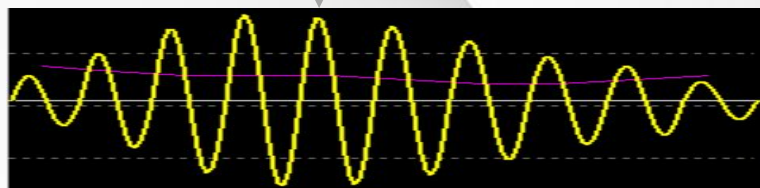
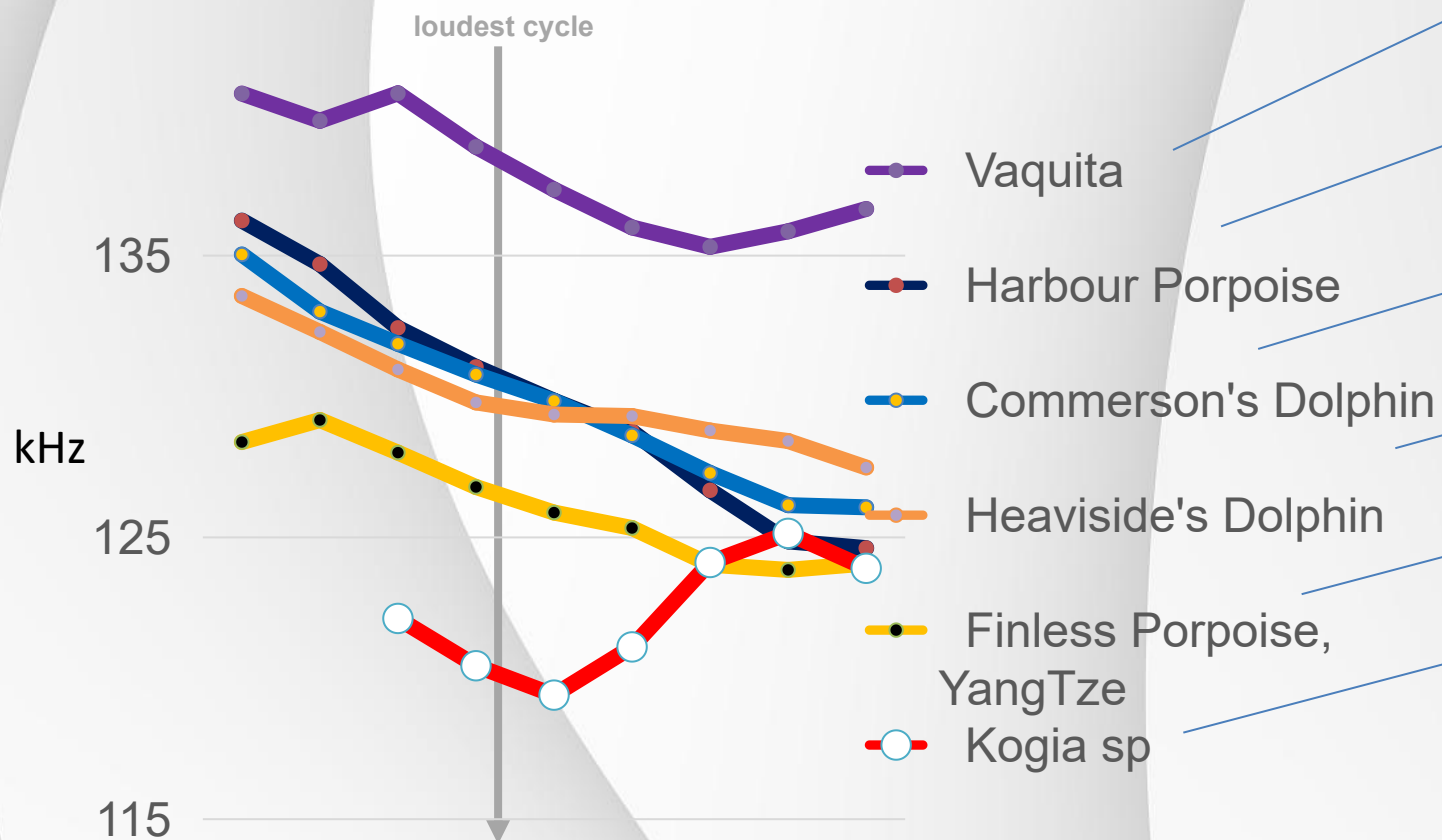




the F-POD: Data is sampled at 1 microsecond intervals

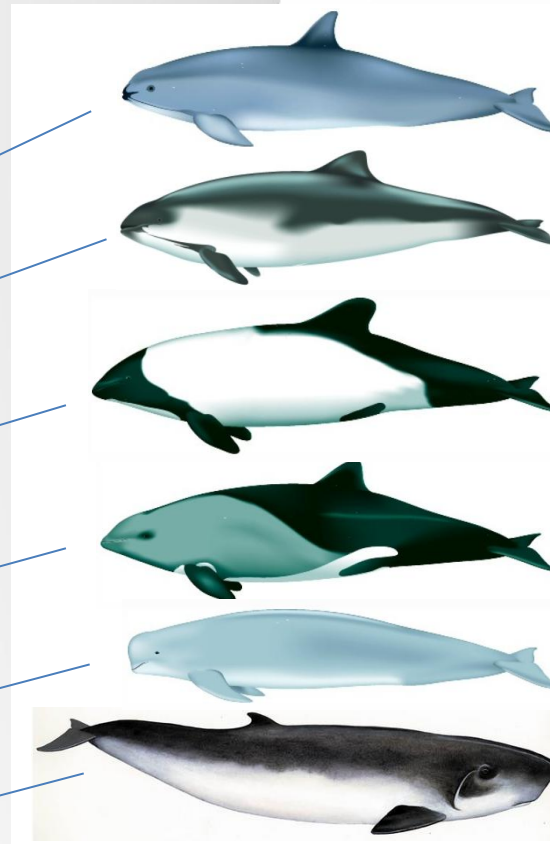


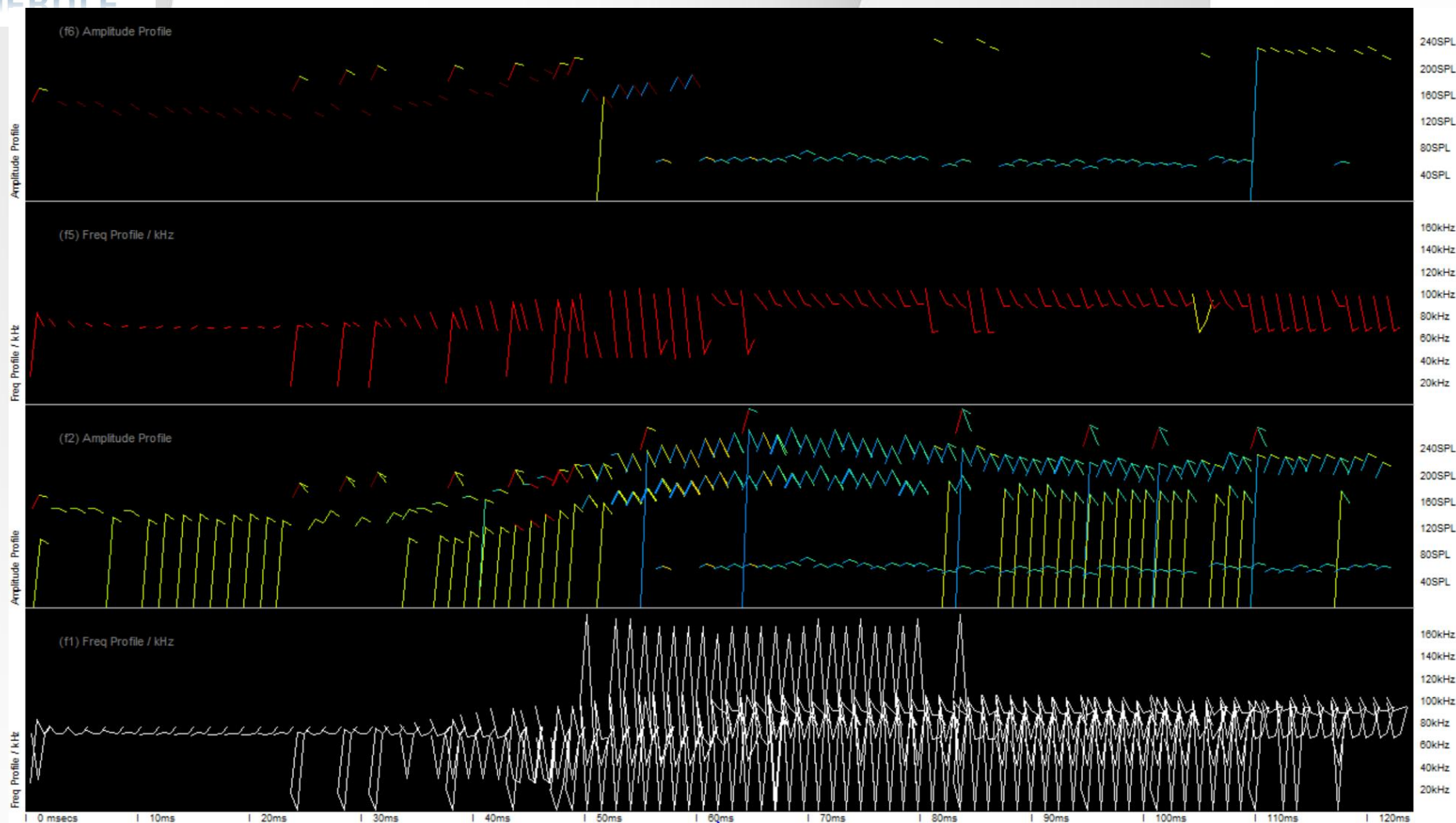
145

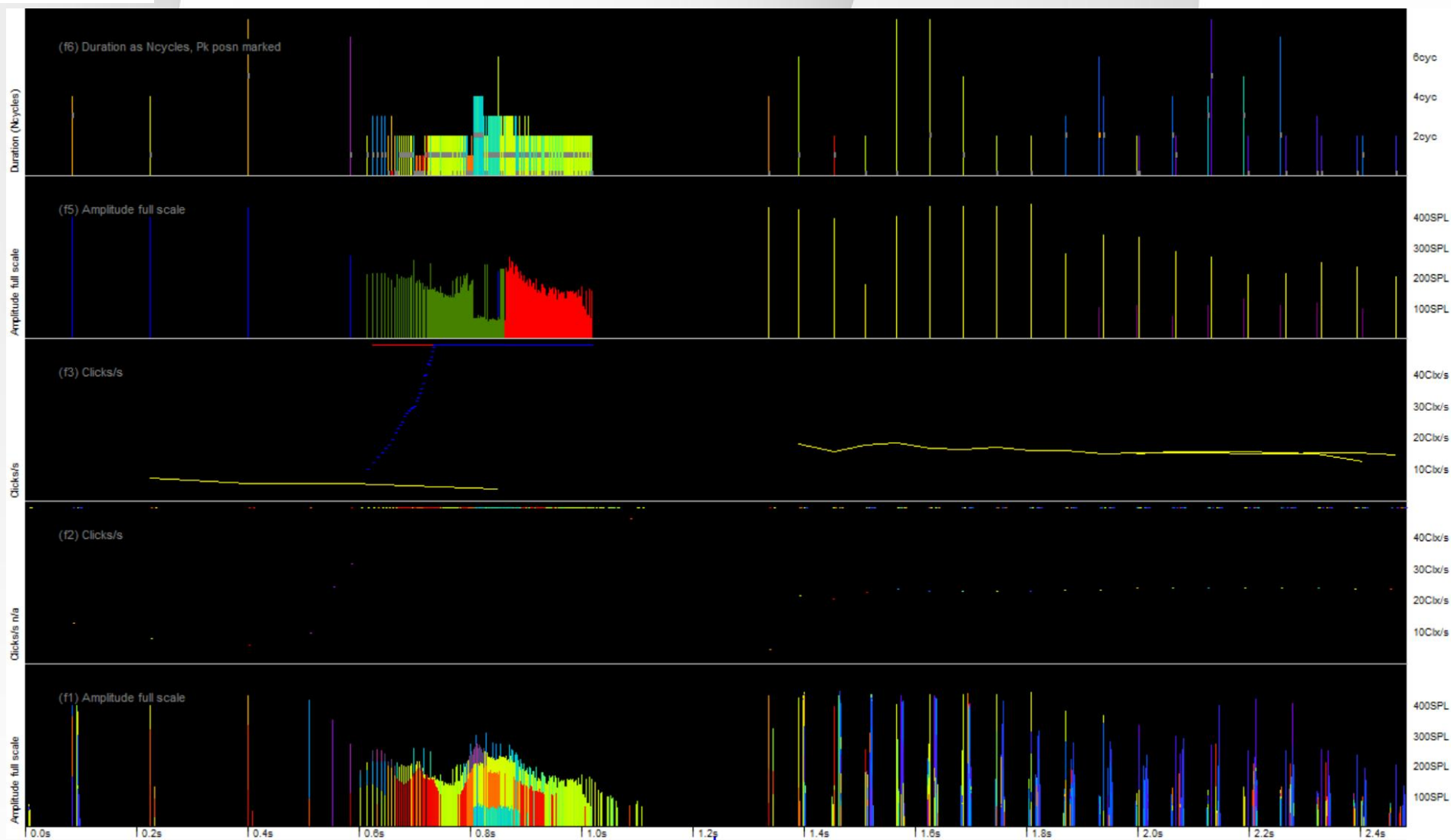


Chelonia Limited

Wildlife Acoustic Monitoring







SoundTrap ST600

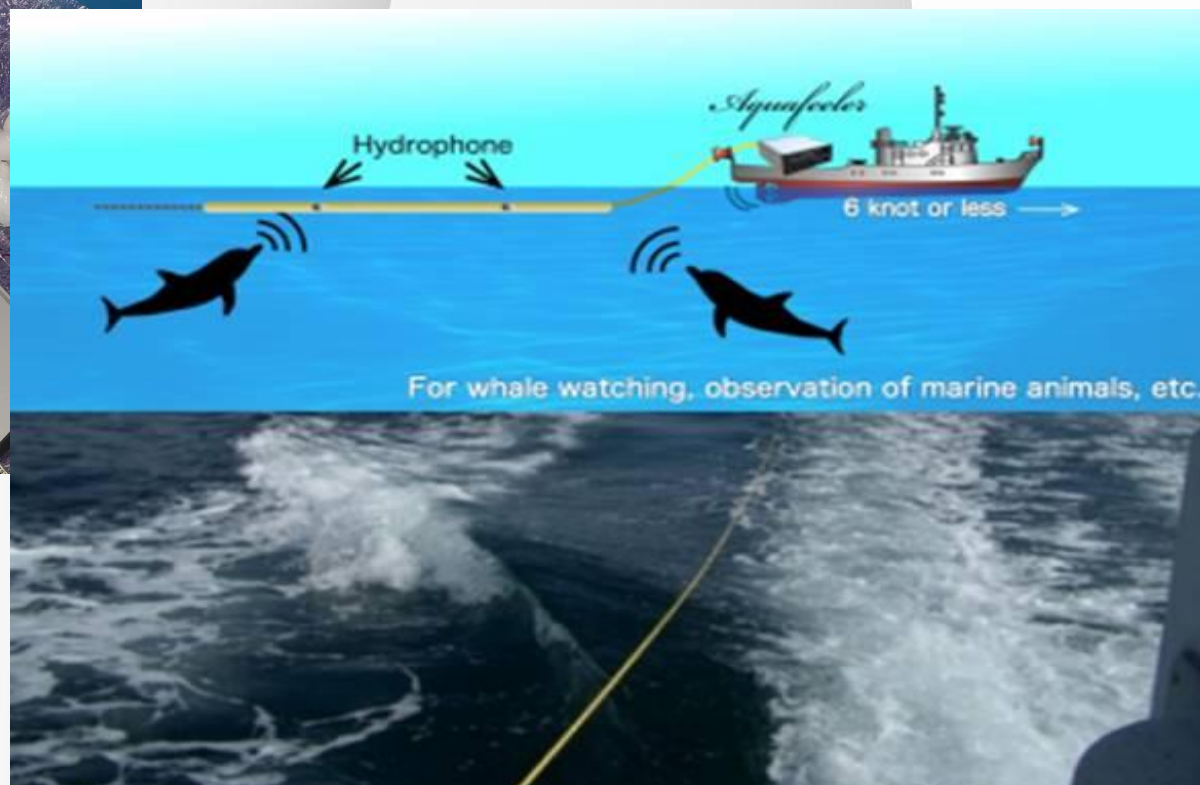
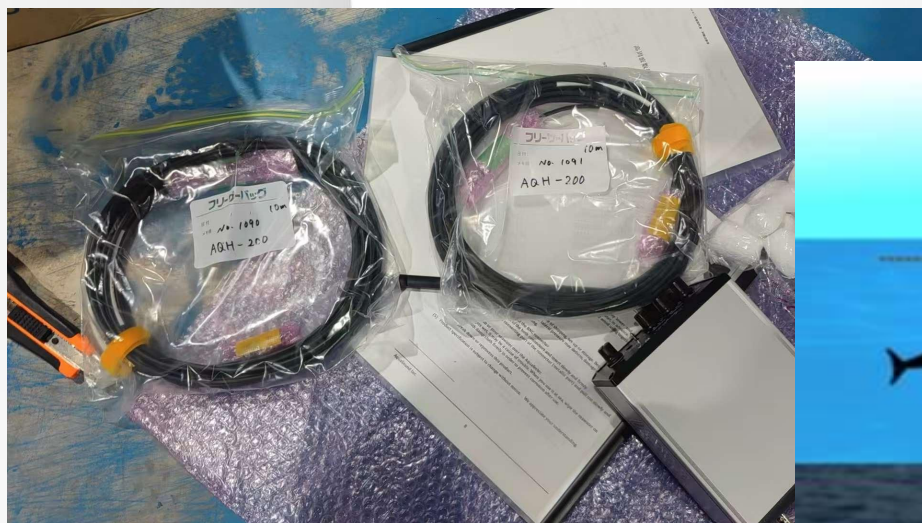
技术特点:

- * 最大可以连续150天采样;
- * 4 x microSD 最大到 2 TB内存;
- * 频率: 20 Hz – 150 kHz ;
- * 采样率: 384 kS/sec;
- * 工作深度: 500米;





拖曳式水生动物立体声学监测系统



拖曳式水生动物立体声学监测系统



技术参数:

输入-输出通道: 2;

接收范围: 100Hz~100kHz;

拖速: 最大6节;

电缆: 60m中性浮力缆;

水听器: 防油PVC, $\Phi 33 \times 4\text{m}$, 2元阵列, 间隔2米;

供电: 由Aquafeeler供电;

重量: 11kg (空气中)。

拖曳式水生动物立体声学可选水听器

	For Low		For Medium Band			For High	
	For shallow water	For deep water	For shallow water	For deep water	For fish tank	For shallow water	For deep water
	[AQH-020]	[AQH-020D]	[AQH-100]	[AQH-100D]	[AQH-100DTP]	[AQH-200]	[AQH-200D]
Receiving Range	10Hz~20kHz		10Hz~100kHz			10Hz~200kHz	
Hydrophone Sensitivity (*1)	-193dB or more	-195dB or more	-210dB or more	-212dB or more	-205dB or more	-220dB or more	-222dB or more
Max. Depth	50m	2000m (*2)	50m	2000m (*2)	—	50m	2000m (*2)
Capacitance (*3)	10000pF		9000pF		4400pF	4500pF	
Size	Φ30 × 60mm		Φ16 × 42mm		40 × 25 × 15mm	Φ10 × 43mm	
Cable	Φ4mm × 10m				Φ2mm × 10m	Φ4mm × 10m	
	Coaxial cable with urethane coating						



参考文献:

Atag 相关论文

(1) Wang, Z.-T., Akamatsu, T., Mei, Z.-G., Dong, L.-j., Imaizumi, T., Wang, K.-X. *, Wang, D. *, 2015a. Frequent and prolonged nocturnal occupation of port areas by Yangtze finless porpoises (*Neophocaena asiaeorientalis*): Forced choice for feeding? Integrative zoology 10, 122-132.
(长江江豚在码头区的被迫捕食机理)

(2) Wang, Z.-T., Akamatsu, T., Wang, K.-X. *, Wang, D. *, 2014a. The diel rhythms of biosonar behavior in the Yangtze finless porpoise (*Neophocaena asiaeorientalis asiaeorientalis*) in the port of the Yangtze River: The correlation between prey availability and boat traffic. PLOS ONE 9, e97907.
(长江江豚在码头区的被迫捕食机理 (2))



参考文献:

Atag 相关论文

(3)Wang, Z.-T., Nachtigall, P.E., Akamatsu, T., Wang, K.-X., Wu, Y.-P., Liu, J.-C., Duan, G.-Q., Cao, H.-J., Wang, D. *, 2015b. Passive acoustic monitoring the diel, lunar, seasonal and tidal patterns in the biosonar activity of the Indo-Pacific humpback dolphins (*Sousa chinensis*) in the Pearl River Estuary, China. PLOS ONE 10, e0141807. (珠江口中华白海豚的声呐活动规律)

(4)Wang, Z.-T., Duan, P.-X., Akamatsu, T., Wang, K.-X. *, Wang, D. , 2020b. Passive acoustic monitoring of the distribution patterns of Irrawaddy dolphins (*Orcaella brevirostris*) in the middle reaches of the Ayeyarwady River, Myanmar. Marine Mammal Science 36, 1241-1253. (缅甸伊洛瓦江伊江豚声学监测, 杂志封面)



参考文献:

Fpod相关论文

(1)Duan P.-X., Wang Z.-T.*, Akamatsu T., Nick T., Li G.Y., Wang K.-X.*, Wang D., 2023. Anthropogenic activity, hydrological regime, and light level jointly influence the temporal patterns in the biosonar activity of the Yangtze finless porpoise in the junction of the Yangtze River and Poyang Lake, China. Zoological Research, 44(5), 919-931. (鄱阳湖水域长江江豚的声学监测, 杂志封面)

(2)Wang Z.-T.*, Duan P.-X., Akamatsu T., Wang K.-X. *, Wang D. *, 2024. Increased Yangtze finless porpoise presence in urban Wuhan waters of the Yangtze River during fishing closures. Ecology and Evolution, 14(4), e11247. (武汉江段长江江豚的声学监测)



参考文献:

F-pod 相关论文

- (3) Wang Z.-T. *, Duan P.-X., Akamatsu T., Wang K.-X. *, Wang D. *, 2024. Temporal and spatial biosonar activity of the recently established uppermost Yangtze finless porpoise population downstream of the Gezhouba Dam: Correlation with hydropower cascade development, shipping, hydrological regime, and light intensity. Ecology and Evolution, 14(5), e11346.
(宜昌江段长江江豚的声学监测, 杂志封面)



二、陆地声学产品

用途:

- 区域性野生动物及鸟类资源，种类，追踪调查、研究
- 野生动物及鸟类的生境调查研究
- 野生动物及鸟类鸣声，声谱研究
- 珍稀濒危野生动物搜寻、研究与保护.
- 野生动物及鸟类季节变化迁徙调查
- 野生动资源监测
- 野生动物、鸟类生态保护与管理
- 飞机场驱鸟，鸟种类及群落生态调查
- 自然保护区不同生境鸟类多样性调查



二、陆地声学产品

SM4鸟类、动物鸣声自动记录仪

主机：

通道：双通道

录制格式：16-bit全频谱.wav ；

记录带宽：20HZ-48KHZ；

支持的采样率（Hz）：8000、12000、16000
、24000、32000、48000 和 96000；

内置麦克风

外壳：防风雨

灵敏度：-28dB+/-3dB（1KHz）

信噪比：80dB（1KHz）

输入声音：122dB SPL

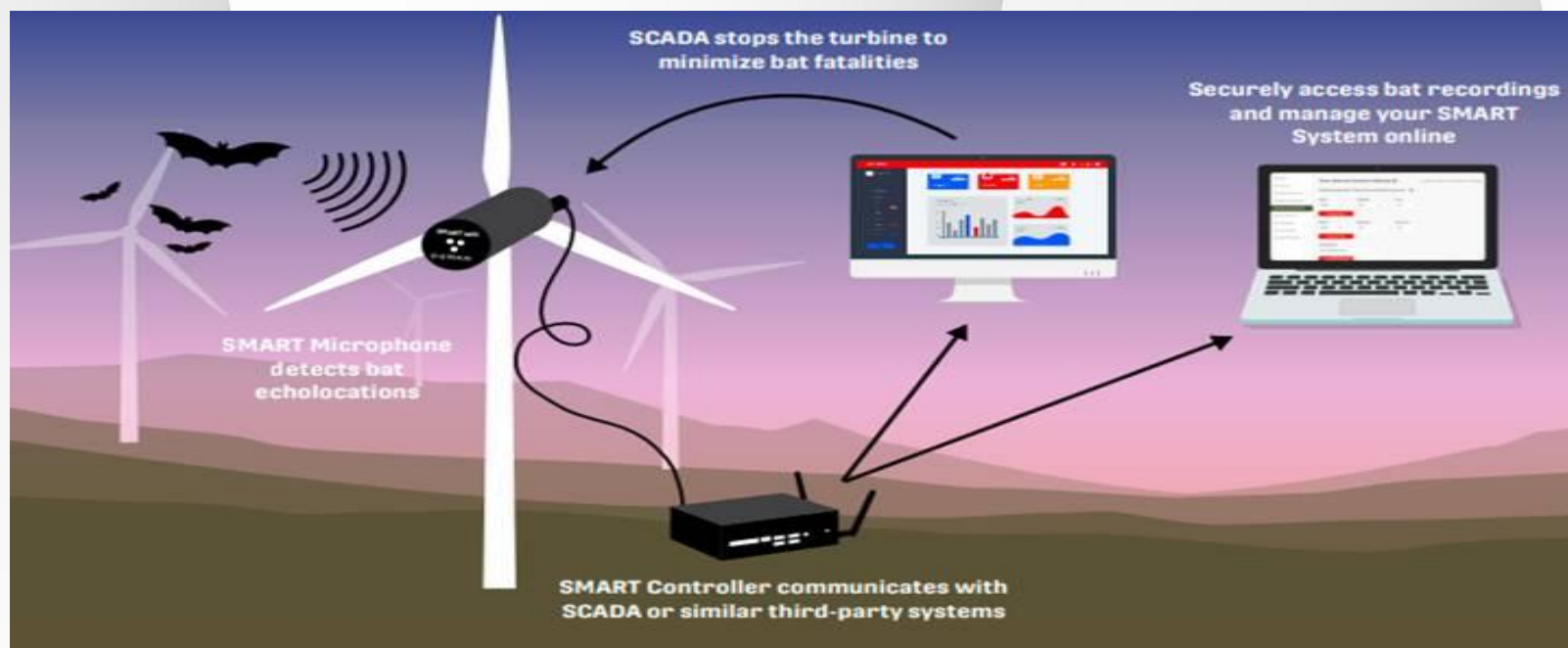
指向能力：全向





二、陆地声学产品

Song Meter Smart系统：带分析和远程传输功能
减少蝙蝠死亡和风机损坏





谢 谢！



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