

Asian Soundscape Listening to the Ecosystem

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Workshop on Joint Monitoring of Asian Terrestrial Soundscape

29-30 May 2018



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Objectives

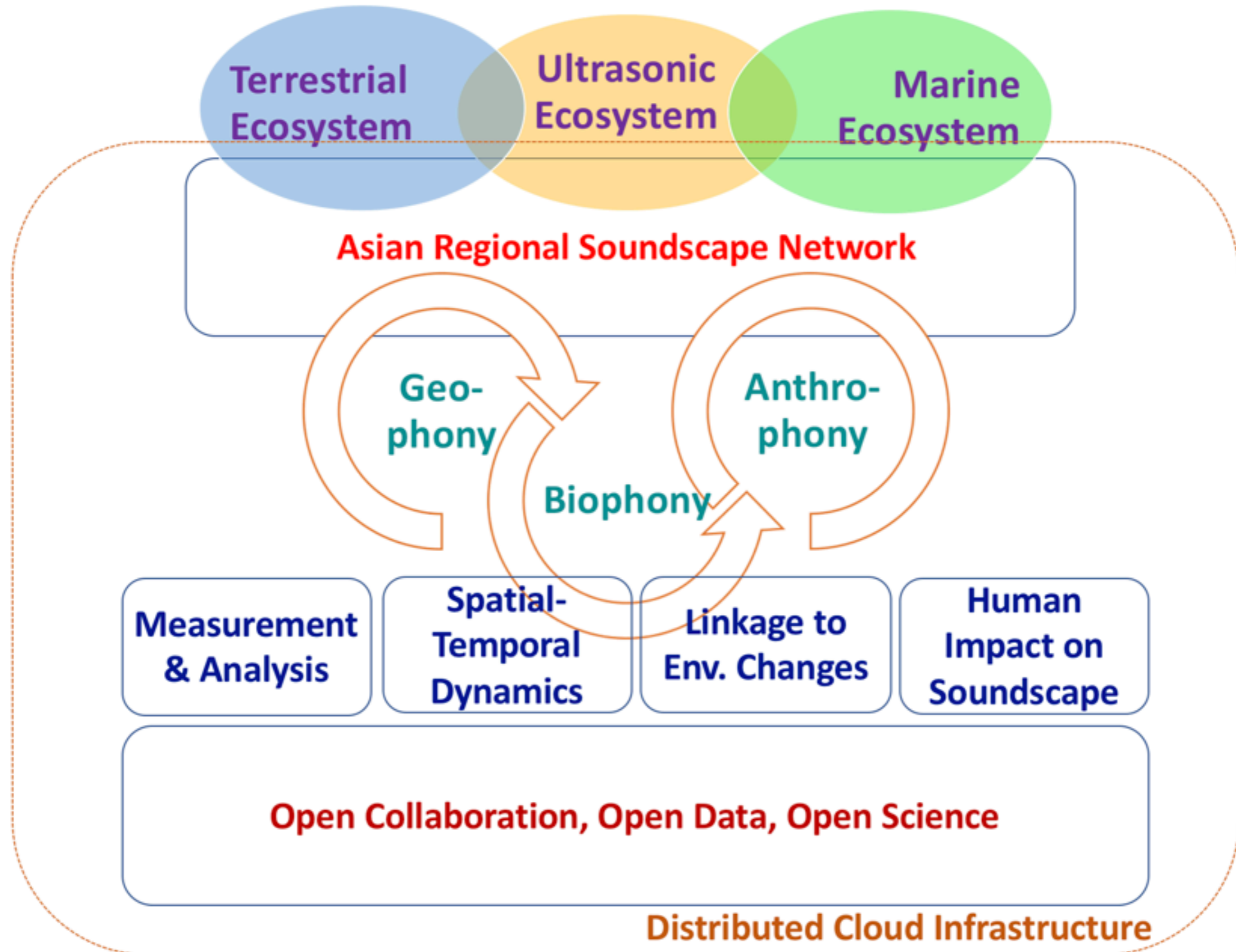
- **Goals:**

- **Building capacity to understand the ecological changes of anthropogenic and environmental impacts and facilitate innovative applications on soundscape supported by collaborative infrastructure**

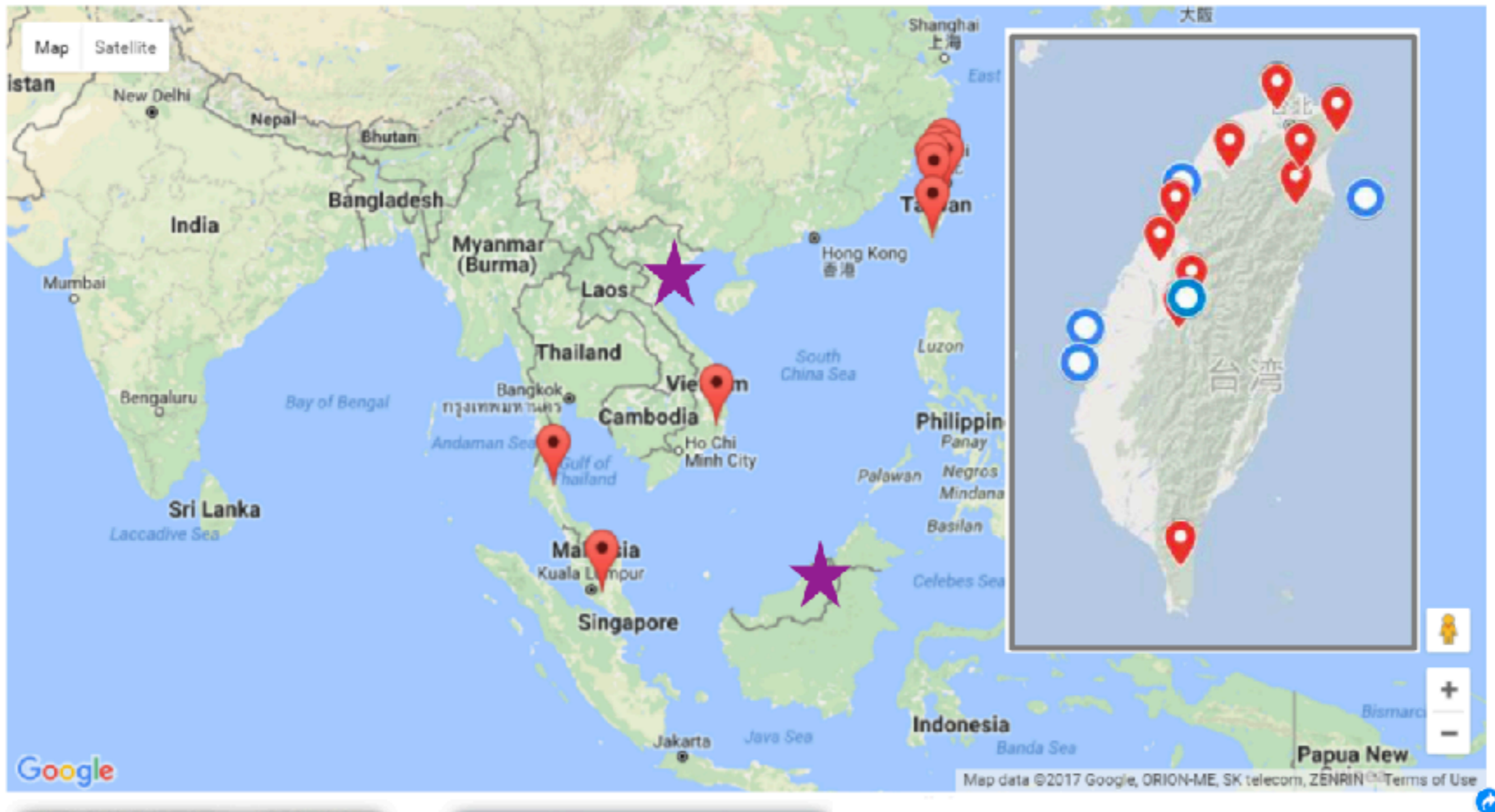
- **Expected Results**

- **International open science platform of soundscape: scalable analysis and application facility composed by sensor network, distributed computing infrastructure, data repository and application platform**
- **Capacity building by training on data collection, analysis and applications of soundscape data: 6 events were planned**
- **Case studies: Terrestrial soundscape, Ultrasonic soundscape, Marine soundscape**
- **Enhanced capacity of ecology and biodiversity monitoring by soundscape for both country-level and Asia regional level**

Characterizing Rhythms of Nature



Building Asia Regional Soundscape Monitoring Network



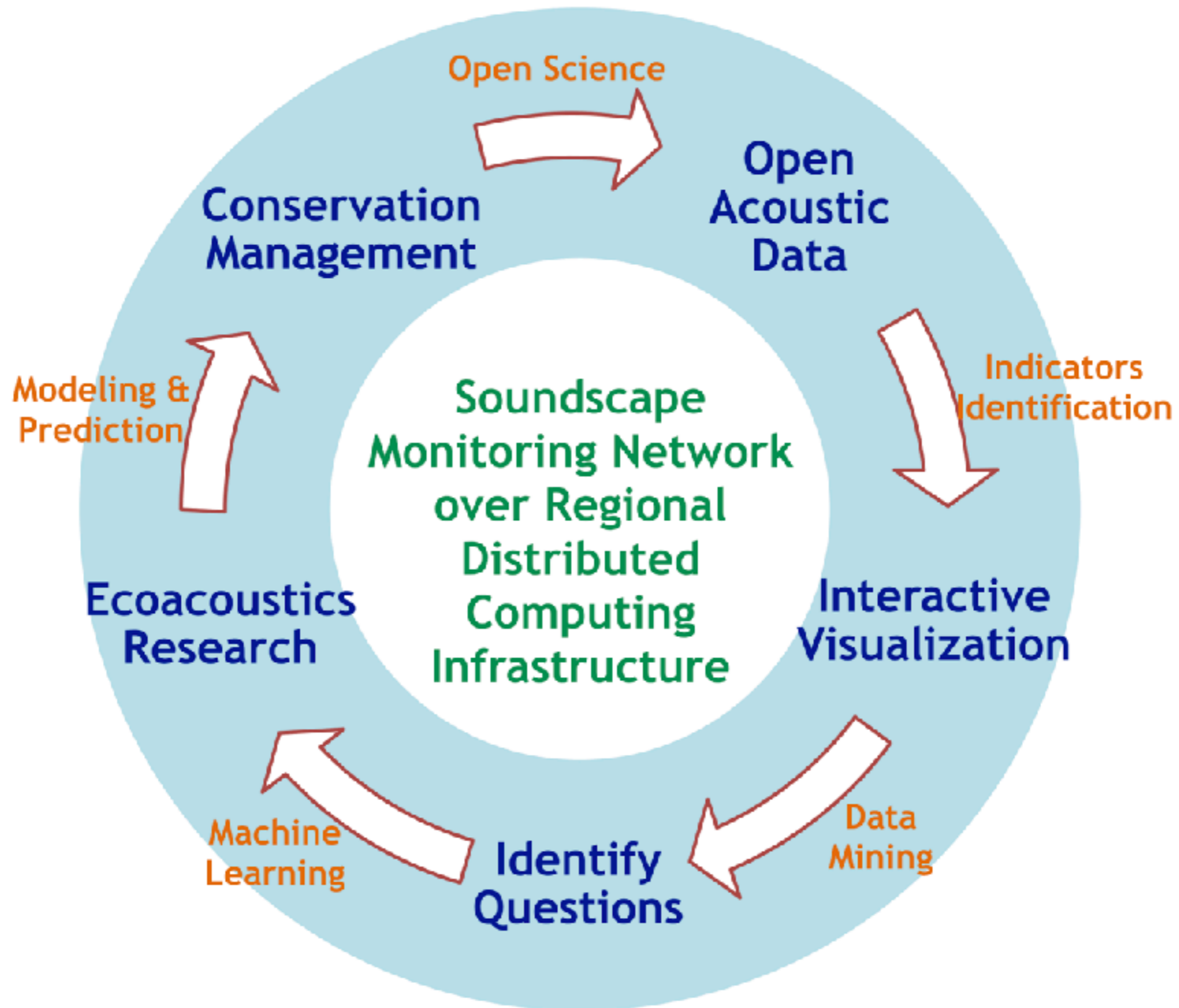
- **Operational since Oct 29, 2014**
 - 1M+ sound files (33K+ hours, 100TB+) from 18 sites in 4 countries
- **New sites: VN, TH, MY, PH, and LA, KH**
- **ASEAN Center for Biodiversity (ACB) is also a collaborator**

Asia Soundscape Collaboration Network

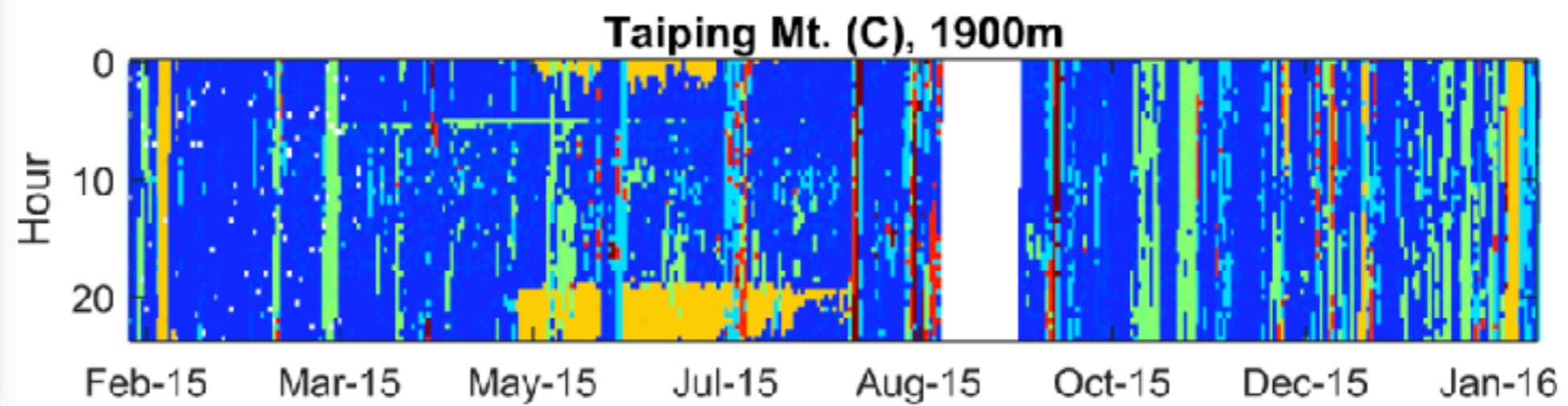
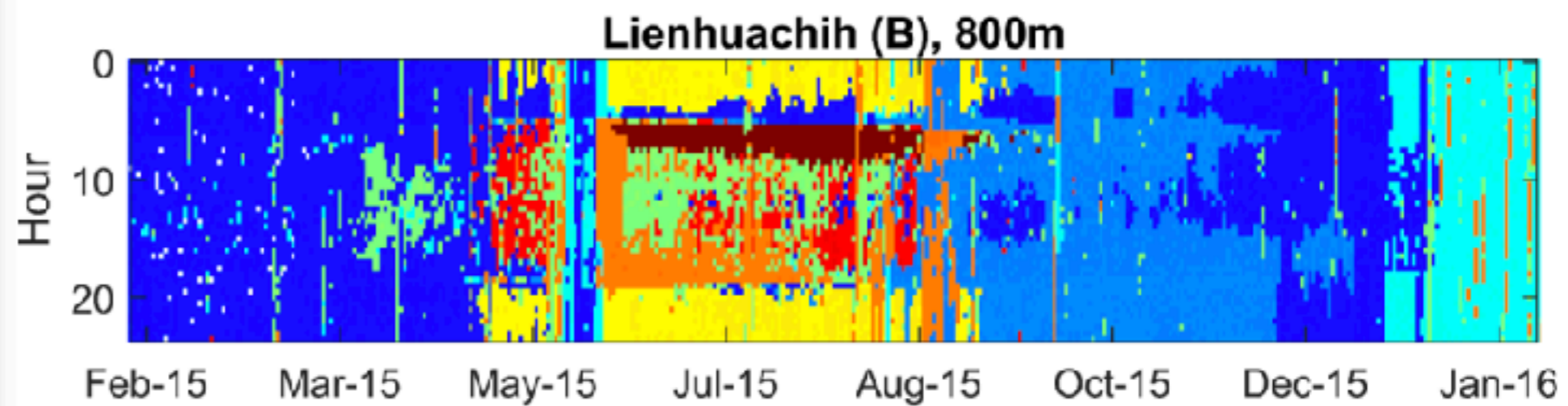
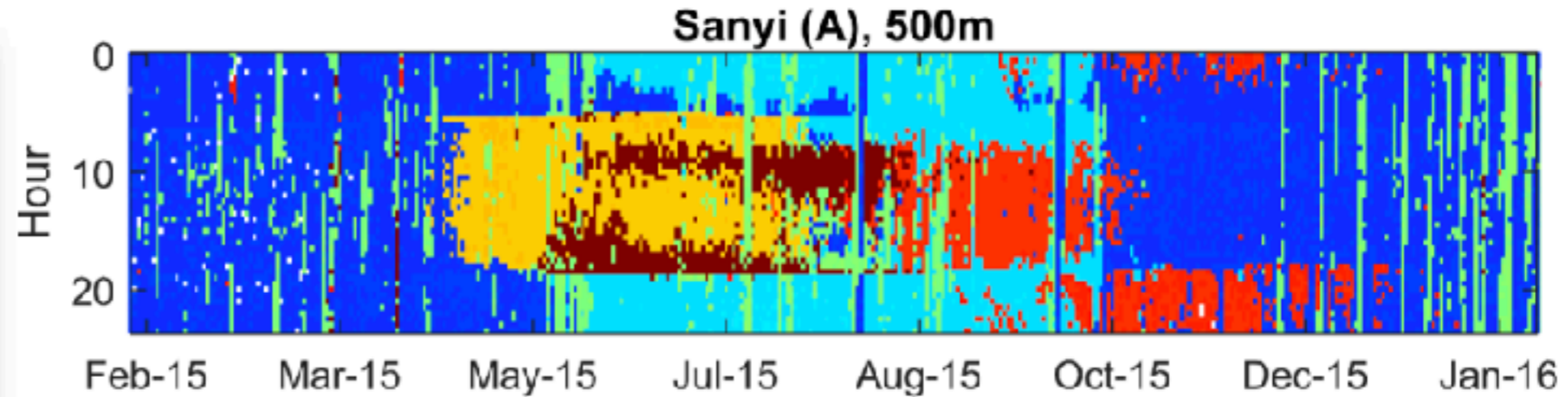
	PH	VN	MY	TH	HK	TW
Partner Institutes	U. Philippine Cebu	Vietnam Academy of Sci & Tech	UNIMAS & Forest Research Inst. Malaysia	CEESS, Walailak U.	HK Univ.	AS, Taiwan Forestry Research Inst.
Ultrasonic Soundscape		Cat Tien National Park+1	Gunung Mulu National Park +1			2
Terrestrial Soundscape	+1	Bidoup-NuiBa NP +Cat Ba NP	Pasoh Research Forest +1	Khao Nan National Park +1		10
Marine Soundscape	+Cebu				Collab. Site	5
Platform & Infrastructure	ASTI PREGINET	VAST VinaREN	UPM MYREN	HAI ThaiREN	HKU HARNET	ASGC ASGCNet
Data Collection Workshop (by PM3)	V	V				V
Data Analysis Workshop (by PM12)	V (ACB)					V

+ ASEAN Center for Biodiversity

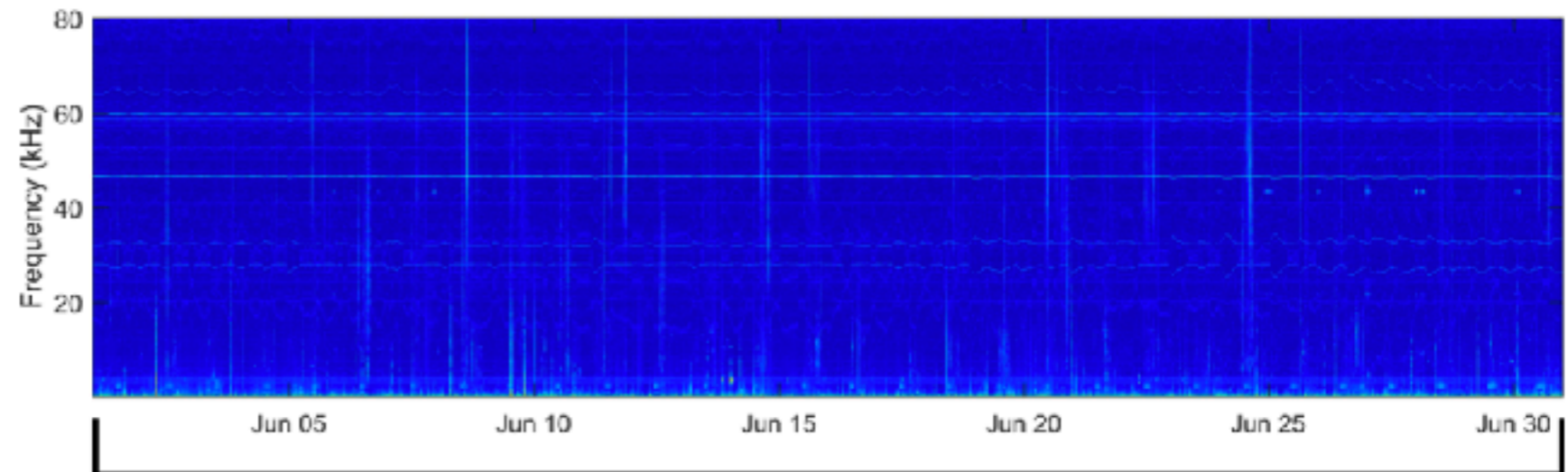
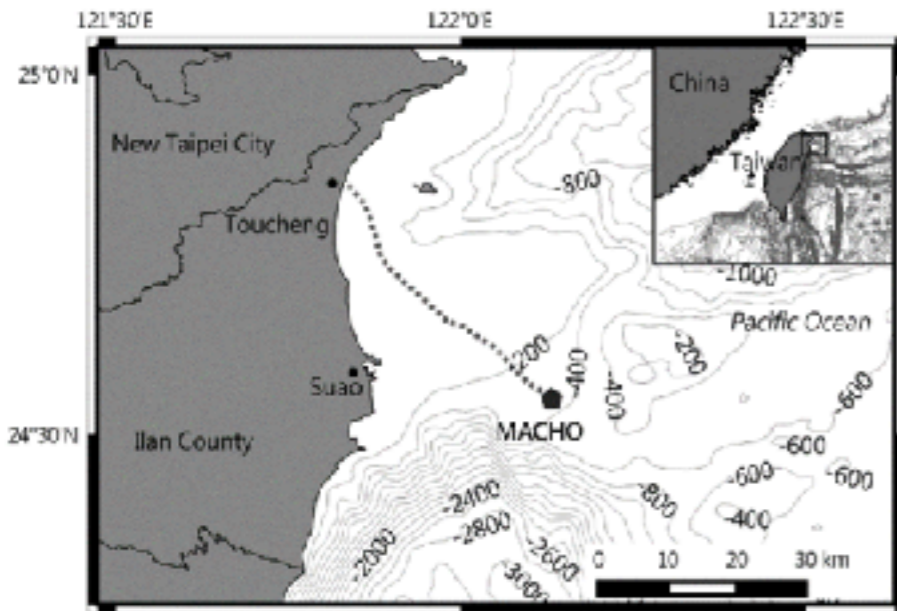
Biodiversity Changes and Impact Analysis



Terrestrial Soundscape: Featuring Differences of Sites by Soundscape

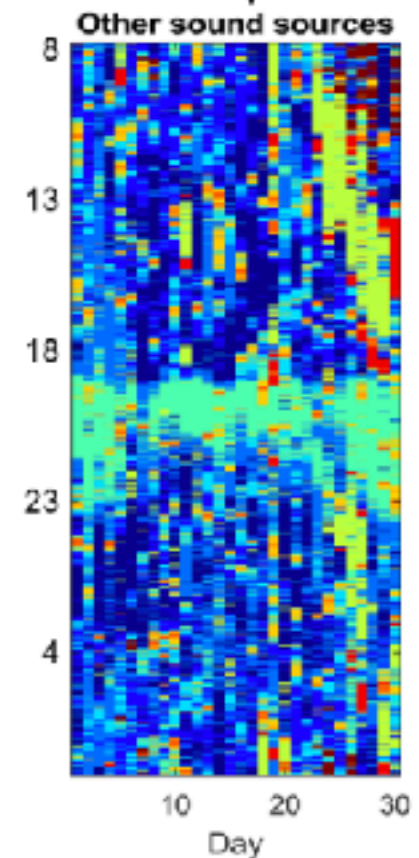
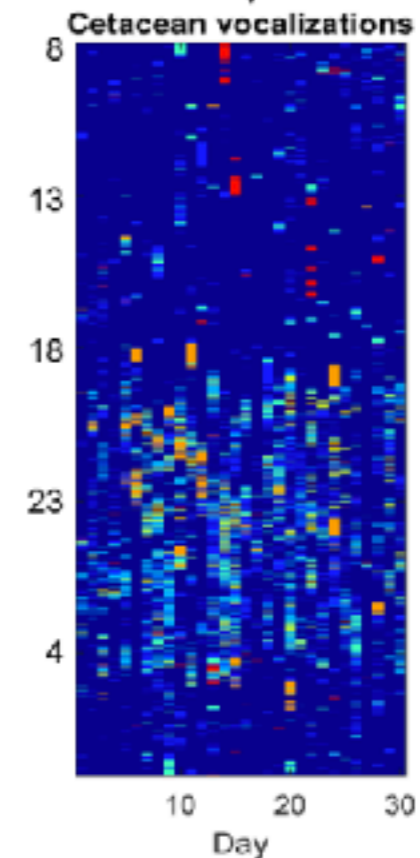
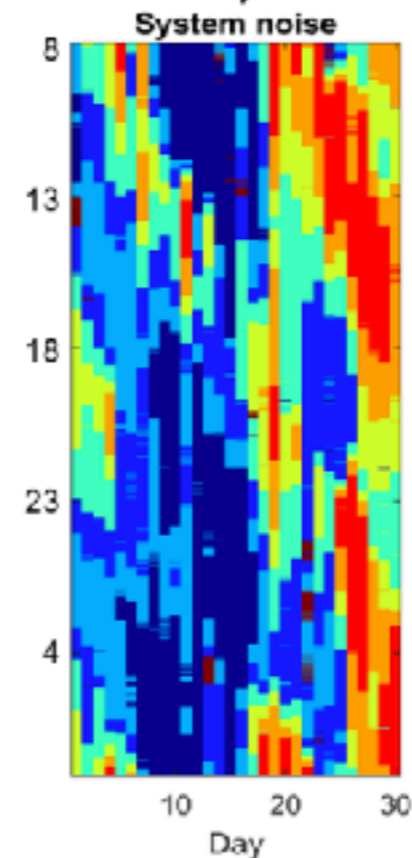
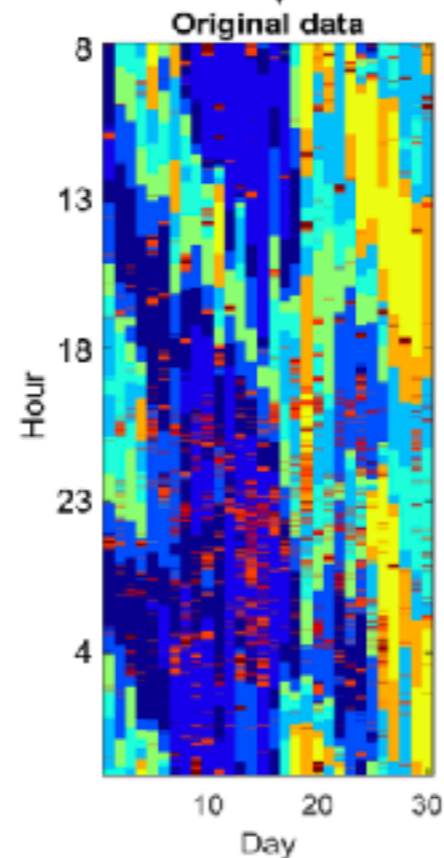


Marine Soundscape: Separation of Biological and Non-Biological Sounds



Clustering

Blind source separation + clustering



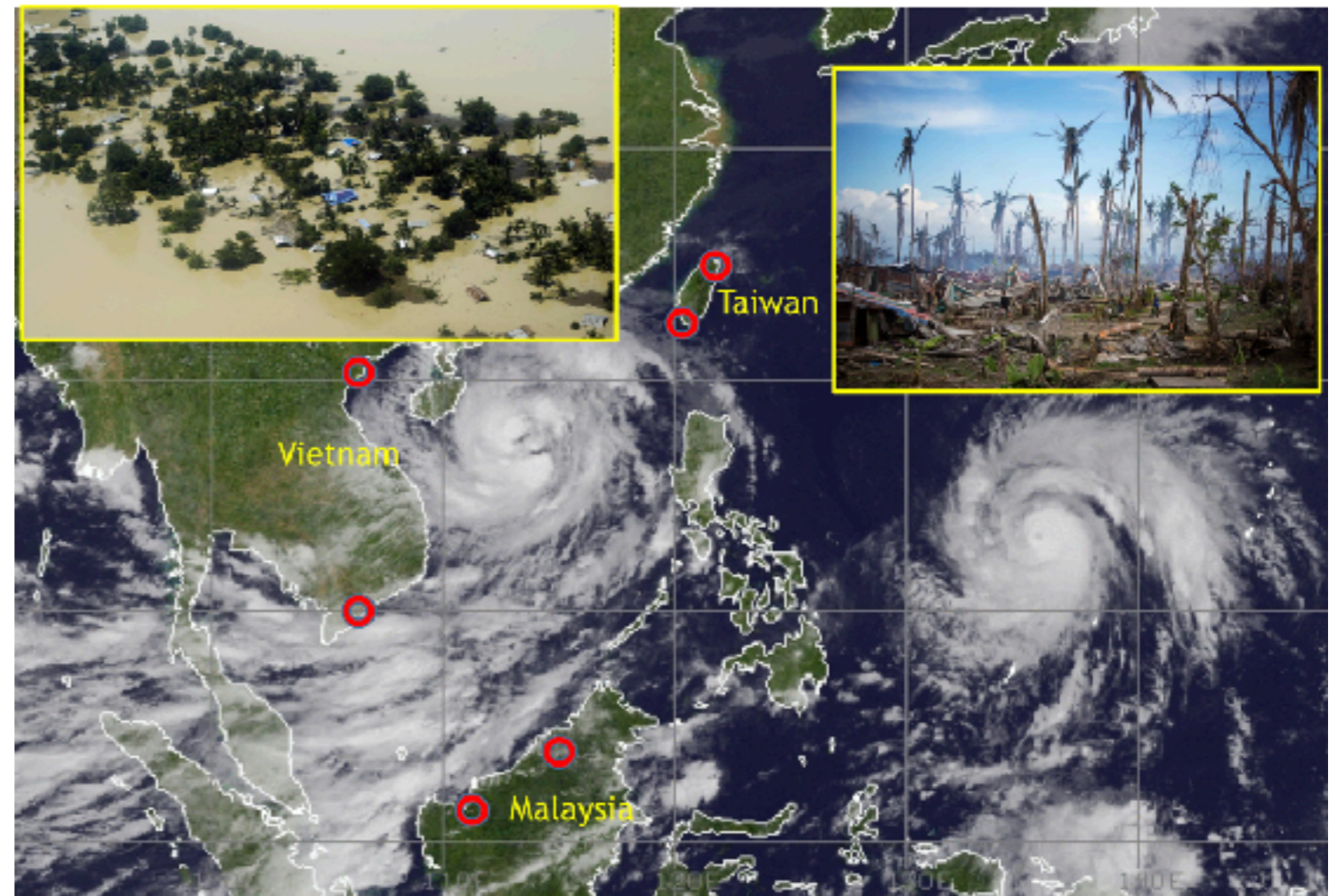
Ultra-Soundscape

Understanding the Impacts of Extreme Weather Events to Ultra-soundscape

- Develop automatic ultrasound signal analysis tools for regional communities
- Case study: Measuring resilience and robustness of ultra-soundscape to extreme weather events



Cave, forest and other important habitats

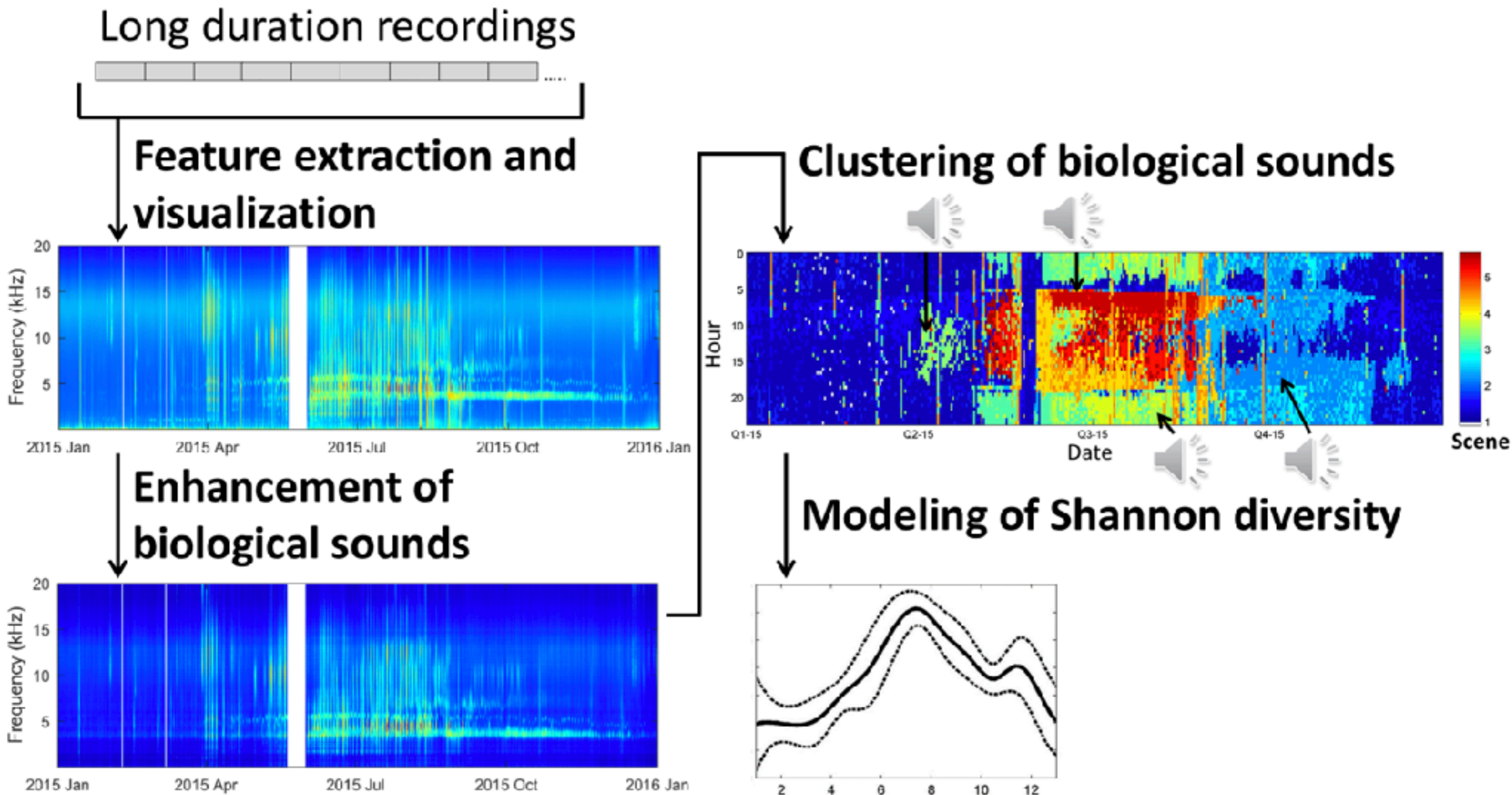




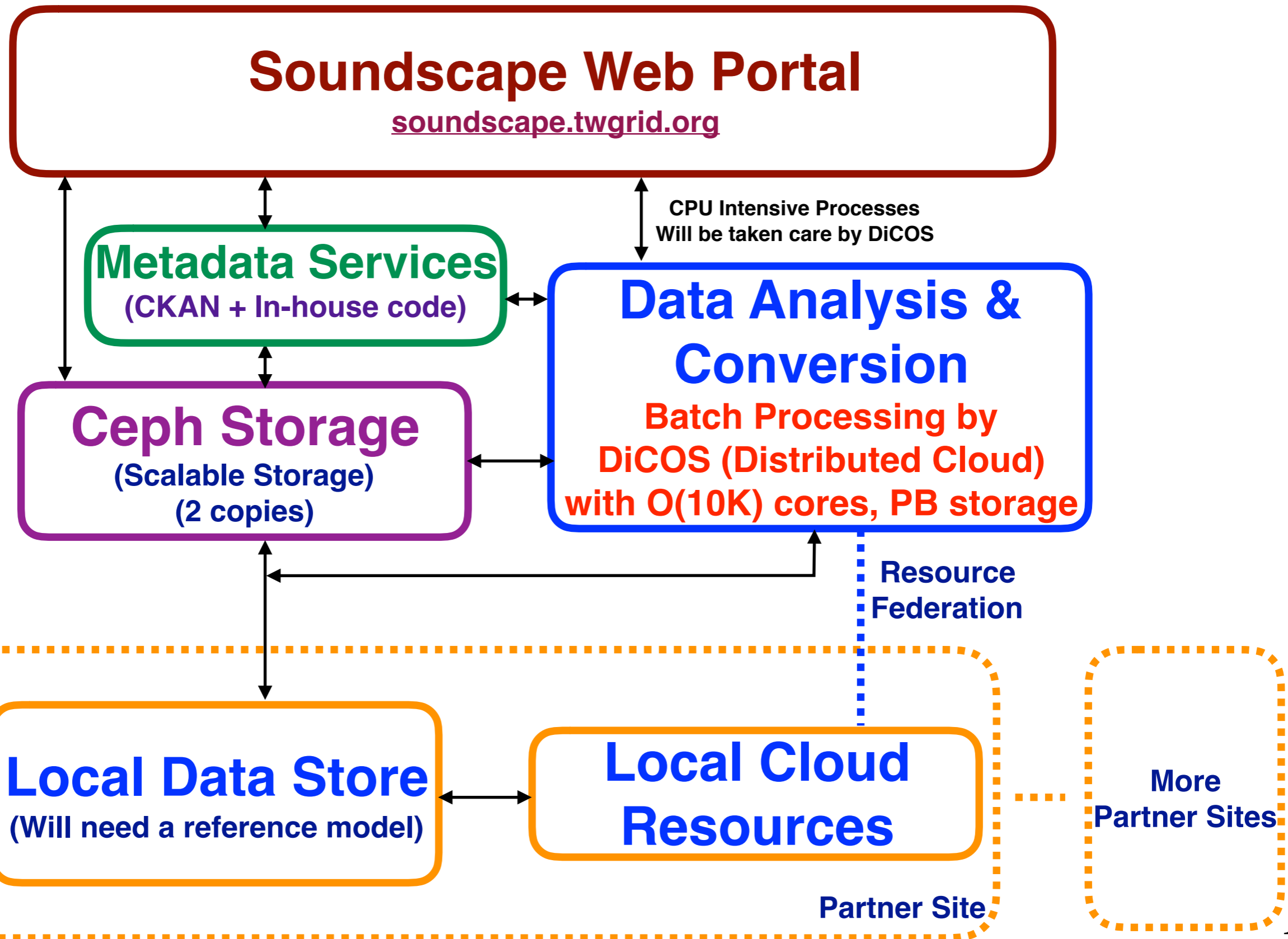
超音波麥克風
(Ultrasonic Microphone)

溫濕度計
(HOBO)

Biodiversity Monitoring & Dynamics

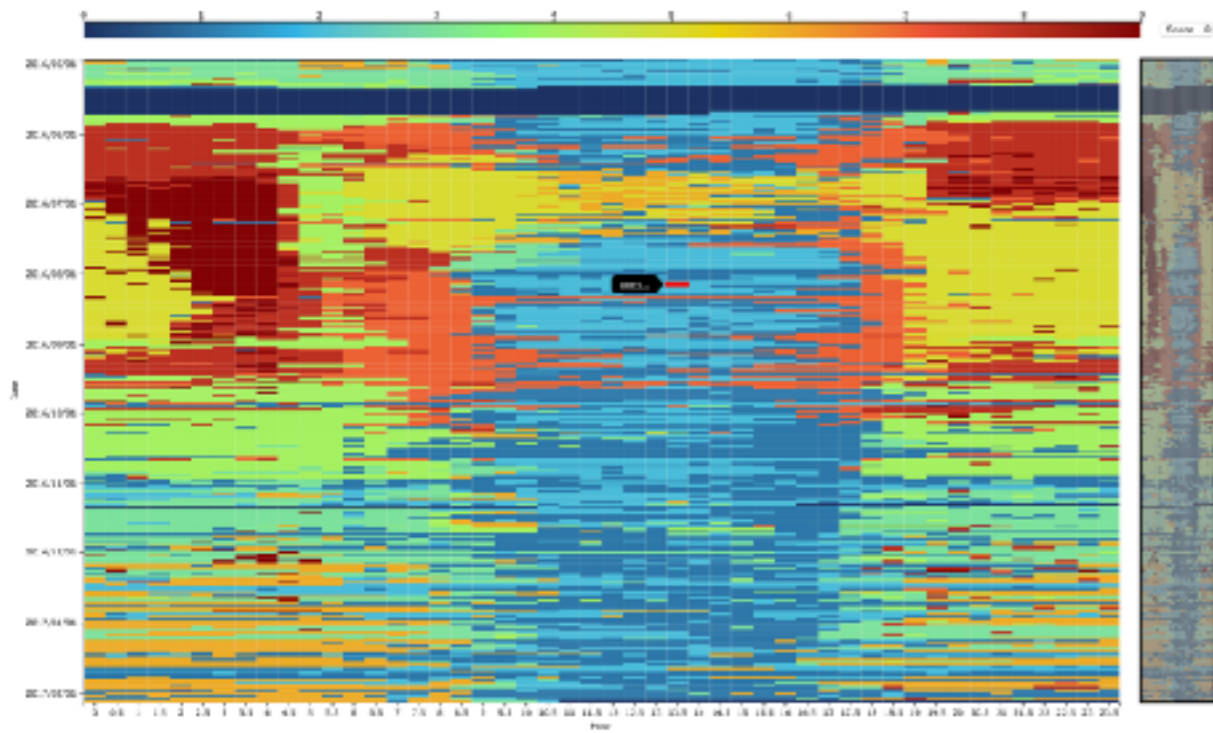


System Architecture



Soundscape change at Taipei Guandu Nature Park

Project website: <https://vdr.org.tw/tpgdnps.com/multi-position/>. Scroll your mouse wheel to zoom in the detail result.



CC BY Asian Soundscape

TPGDNP01-2016-08-05

File data

- Original filename: TW_SAT_TPGDNP01_20160805_133000.wav
Download: [wav](#) | [mp3](#)
- Date: 05-Aug-2016
- Time: 13:30:00
- Duration: 00:05:00 (hh:mm:ss)
- File Format: wav
- Sampling rate: 44100 Hz
- Number of channels: 2
- File size: 50.47 MB
- Spectrogram settings:
 - Max frequency: 22050 Hz
 - FFT size: 1024
- Database ID: 189713
- Sensor used: Wildlife Acoustics SM4, Built-in microphones (NULL)

Site Data

- Site: TW_SAT_TPGDNP01
- Latitude: 25.11903
 - Longitude: 121.47667
 - Notes: Wetland in Taipei Guandu Nature Park

Example

Pumilio.2

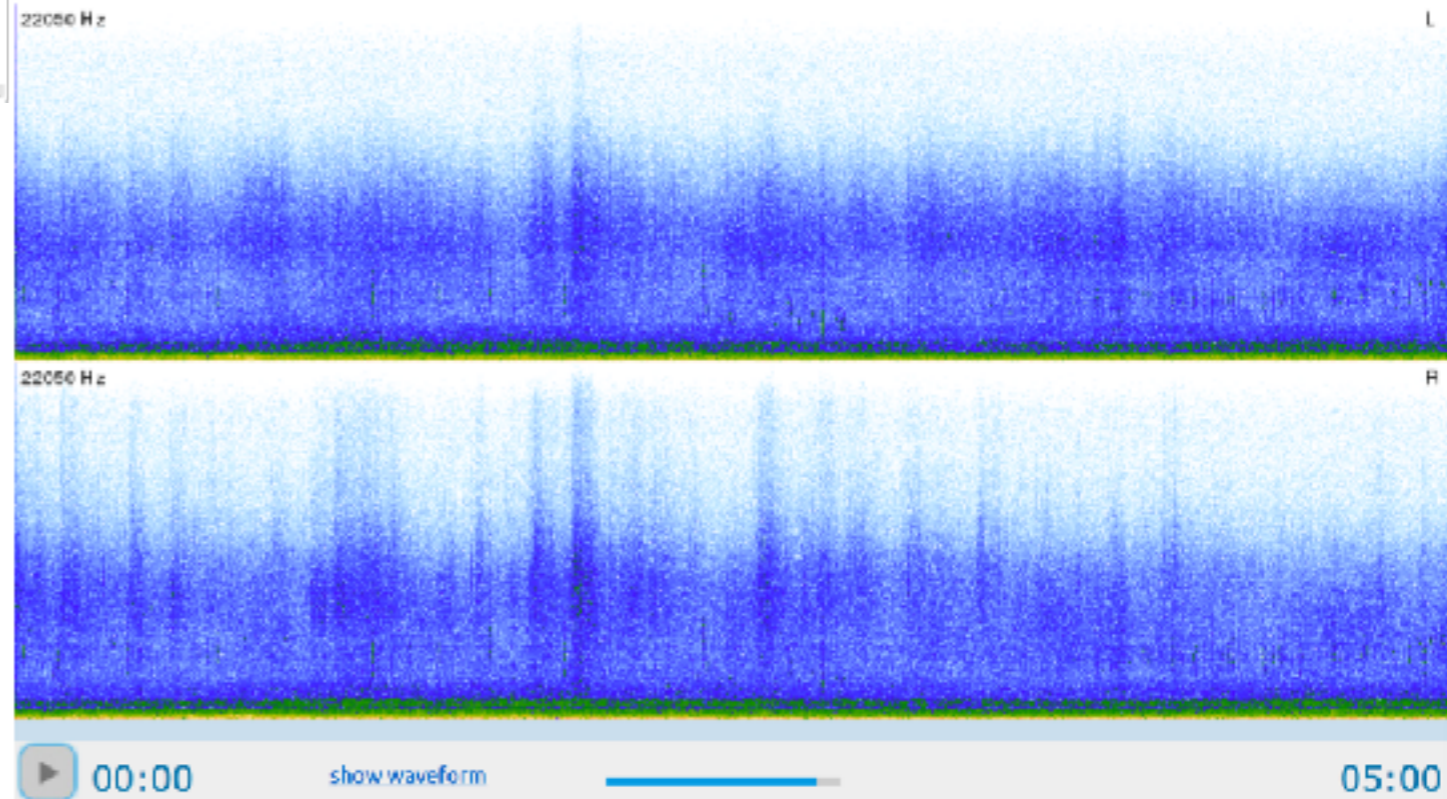
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TW_SAT_TPGDNP01_20160805_133000.wav
05-Aug-2016 13:30:00

Collection: TW_SAT_TPGDNP

Site: TW_SAT_TPGDNP01
Coordinates: 25.11903, 121.47667



[Open file in Pumilio Viewer](#)

- > File data
- > Site Data
- > File Tags
- > File Quality Data

Maps



License:

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Future Perspectives: An Open Science Platform on Soundscape

- **To explore dynamics of soundscape**
- **To evaluate biodiversity change based on biological sounds**
- **To study the interactions between wildlife, habitat, and human activities based on soundscape data**
- **Facilitate advancement of biodiversity monitoring & analysis by interaction with Machine Learning Technologies**
- **Extending the communities in Asia Pacific region and the international collaborations**
- **Towards Open Science Cloud in Asia**

Long-term Open Collaboration: Building Capacity and Sustainable Development

- **Local user (research) community engagement: Soundscape Network, User Network and Web Portal**
- **Open Network: Sustainable Data Collection**
 - Federating existing soundscape network
 - Extending by new sensor sites
- **Scalable and Flexible Data Analysis Workflow and Services: Growing data values**
 - Linking with labeled data sources
 - Developing and Integrating state-of-the-art ML/DL-based analysis services
- **Open Data Repository: Long-term data availability**
 - Sustainable data repository and services
 - Supporting and Leveraging Citizen Science
- **Enhanced Biodiversity and Ecology Monitoring: Application & Case Study**
- **Training, Dissemination & Outreach**
 - Three Data Collection Workshops held in May 2018, in VN, PH and TW
 - Three Data Analysis Workshops will take place in early 2019
 - Project conference is collocated in ISGC 2019, 31 March - 5 April, 2019, TW
 - Events: APAN, Asi@Connect, APBON, ACB, and others

Workshops Details

- **Bat Bioacoustic Workshop: 8-11 May, Cat Then National Park, VN**
 - <https://indico4.twgrid.org/indico/event/6/>
- **Acquatic Soundscape: 14-16 May 2018, UP Cebu, PH**
 - <https://indico4.twgrid.org/indico/event/7/>
- **Workshop on Joint Monitoring of Asian Terrestrial Soundscape, Academia Sinica, TW**
 - <https://indico4.twgrid.org/indico/event/5/>