

Asian Soundscape Listening to the Ecosystem

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Objectives

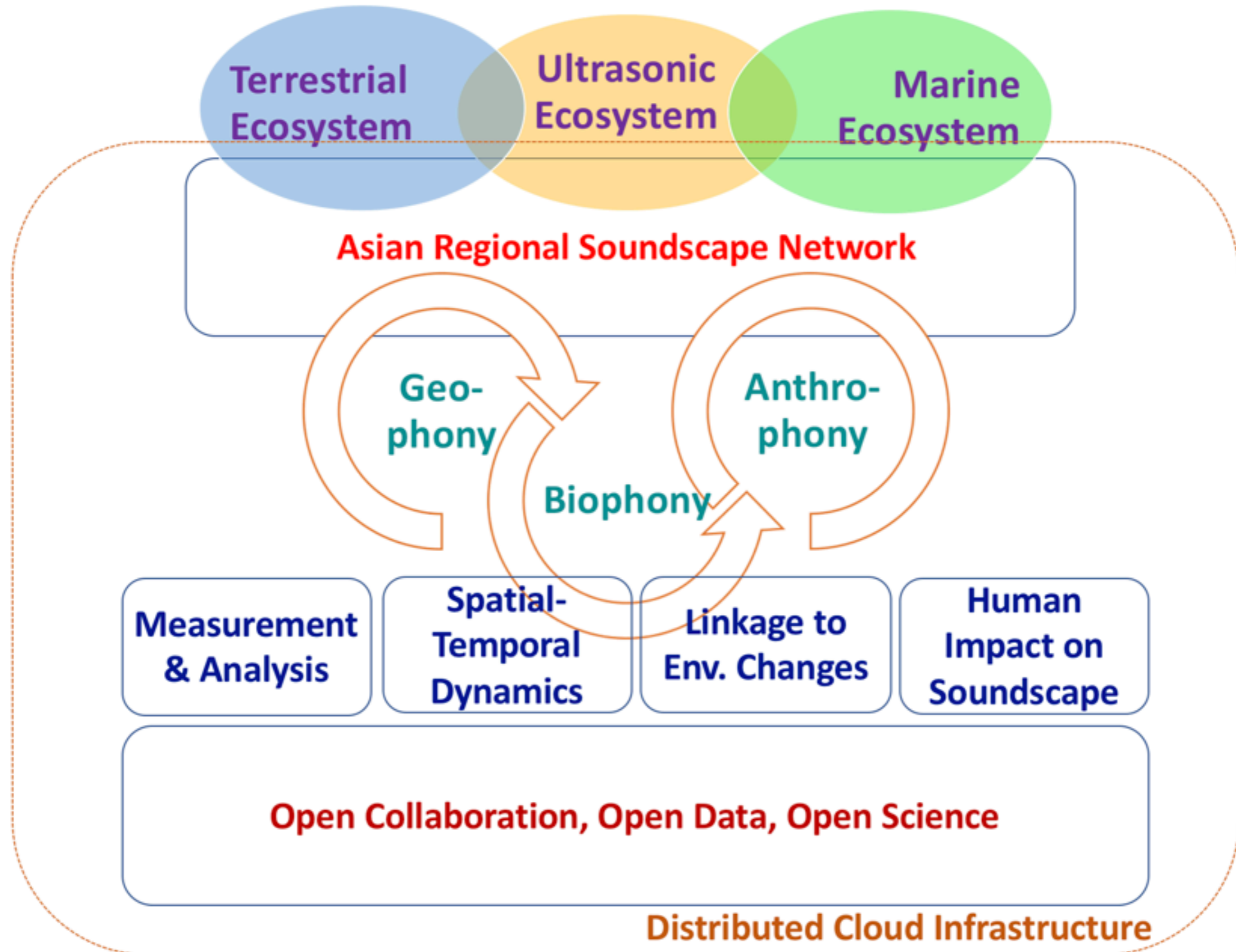
- **Goals:**

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

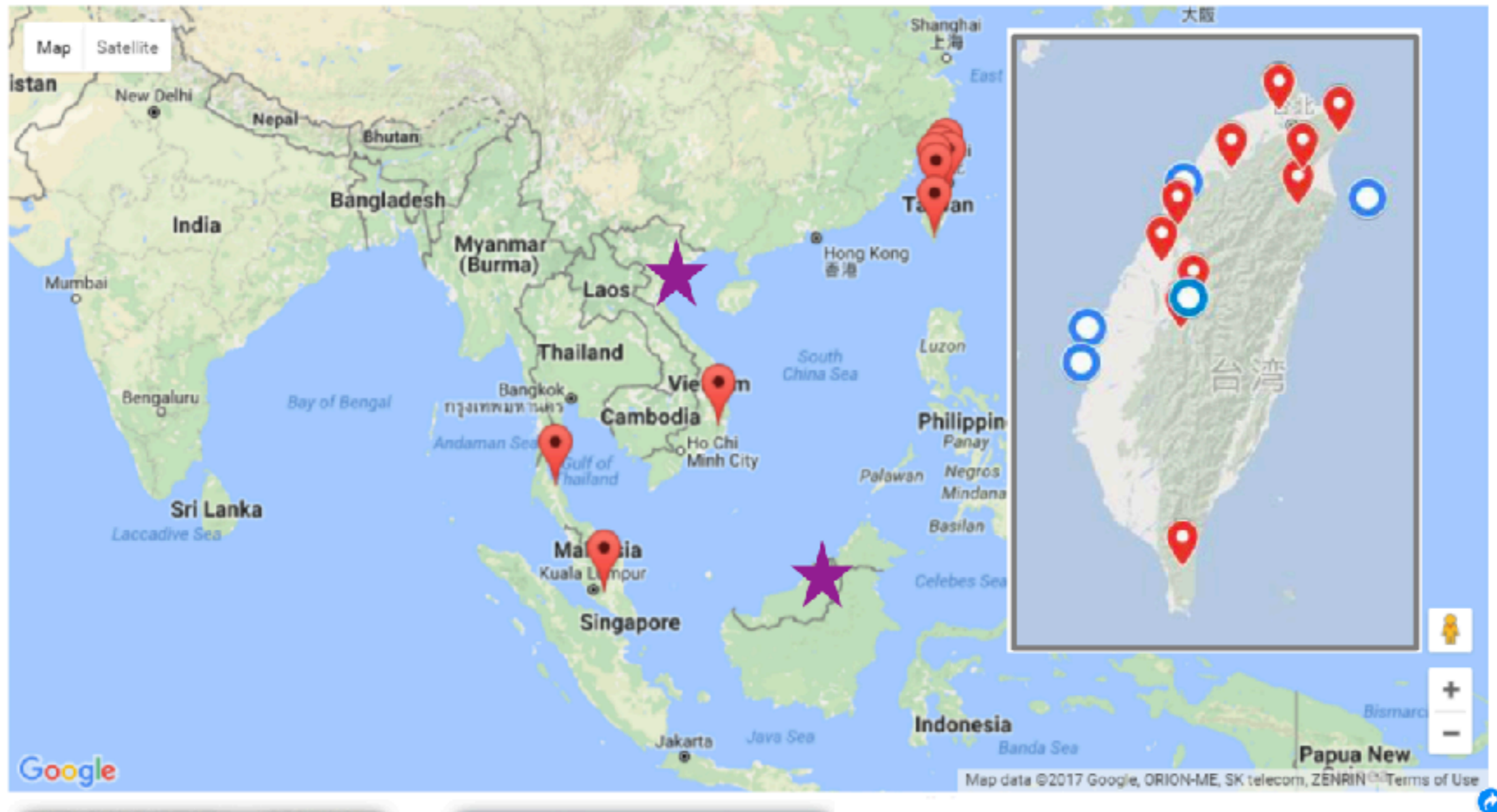
- **Expected Results**

- **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

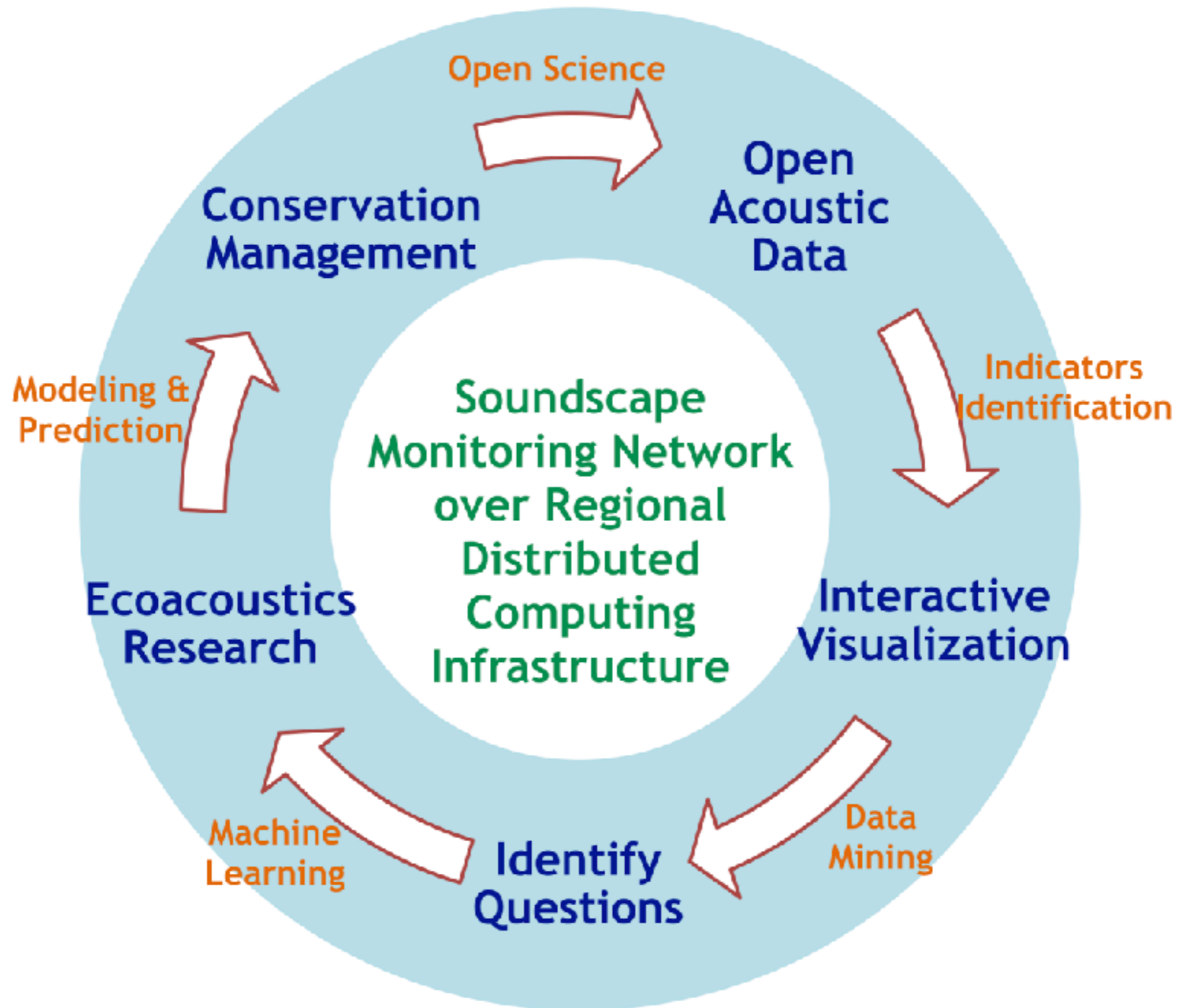


- **Operational since Oct 29, 2014**
 - 1M+ sound files (33K+ hours, 100TB+) from 18 sites in 4 countries
- **New sites: VN, TH, MY, PH, and LA, KH**
- **ASEAN Center for Biodiversity (ACB) is also a collaborator**

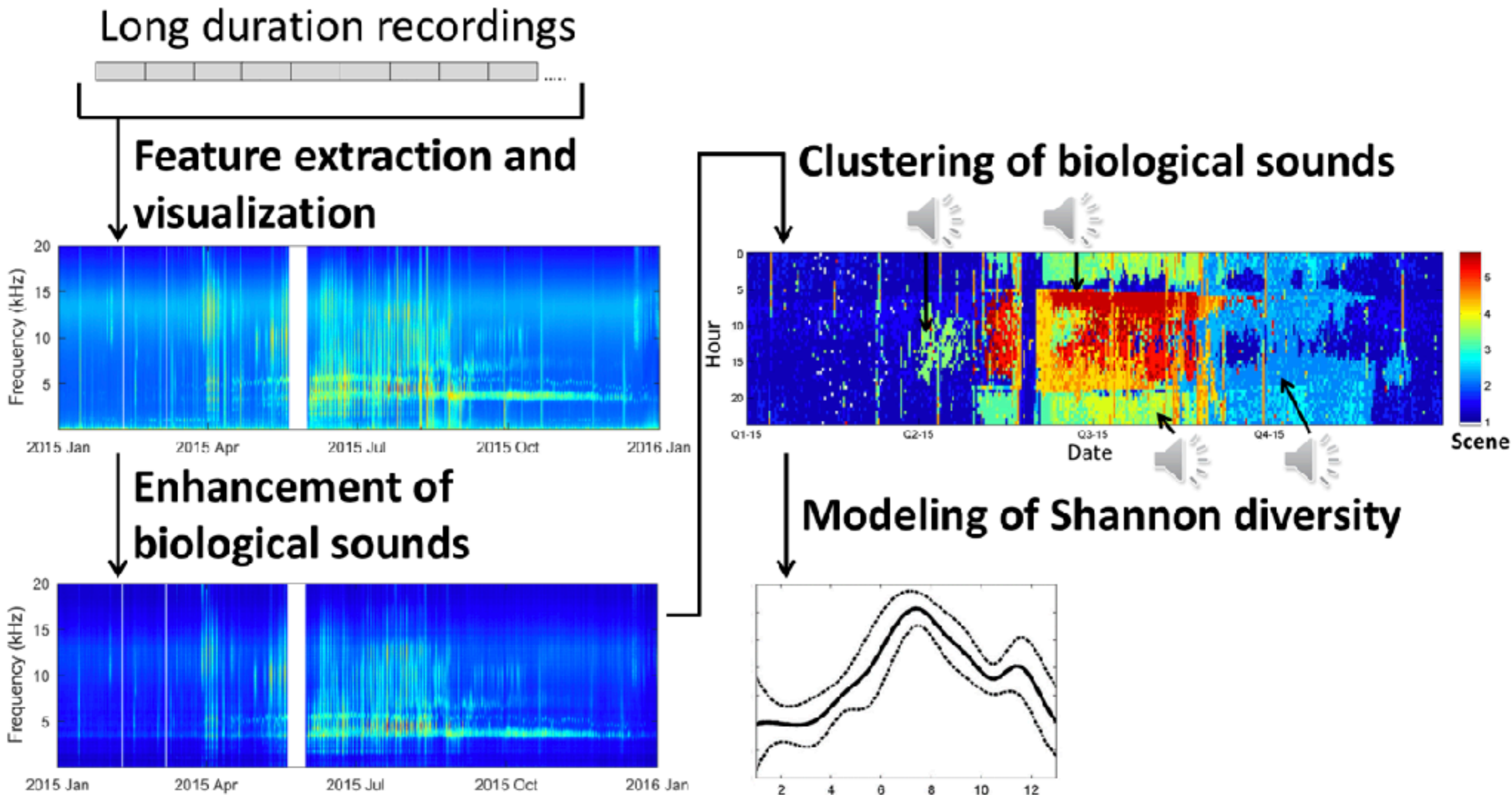
Asia Soundscape Collaboration Network

	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 Ba National Park	Gunung Mulu National Park			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 NREN	VAST NREN	UPM NREN	HAI NREN	HKU NREN	ASGC ASGCNet
Data Collection Workshop (by PM3)	V	V				V
Data Analysis Workshop (by PM12)	V (ACB)					V

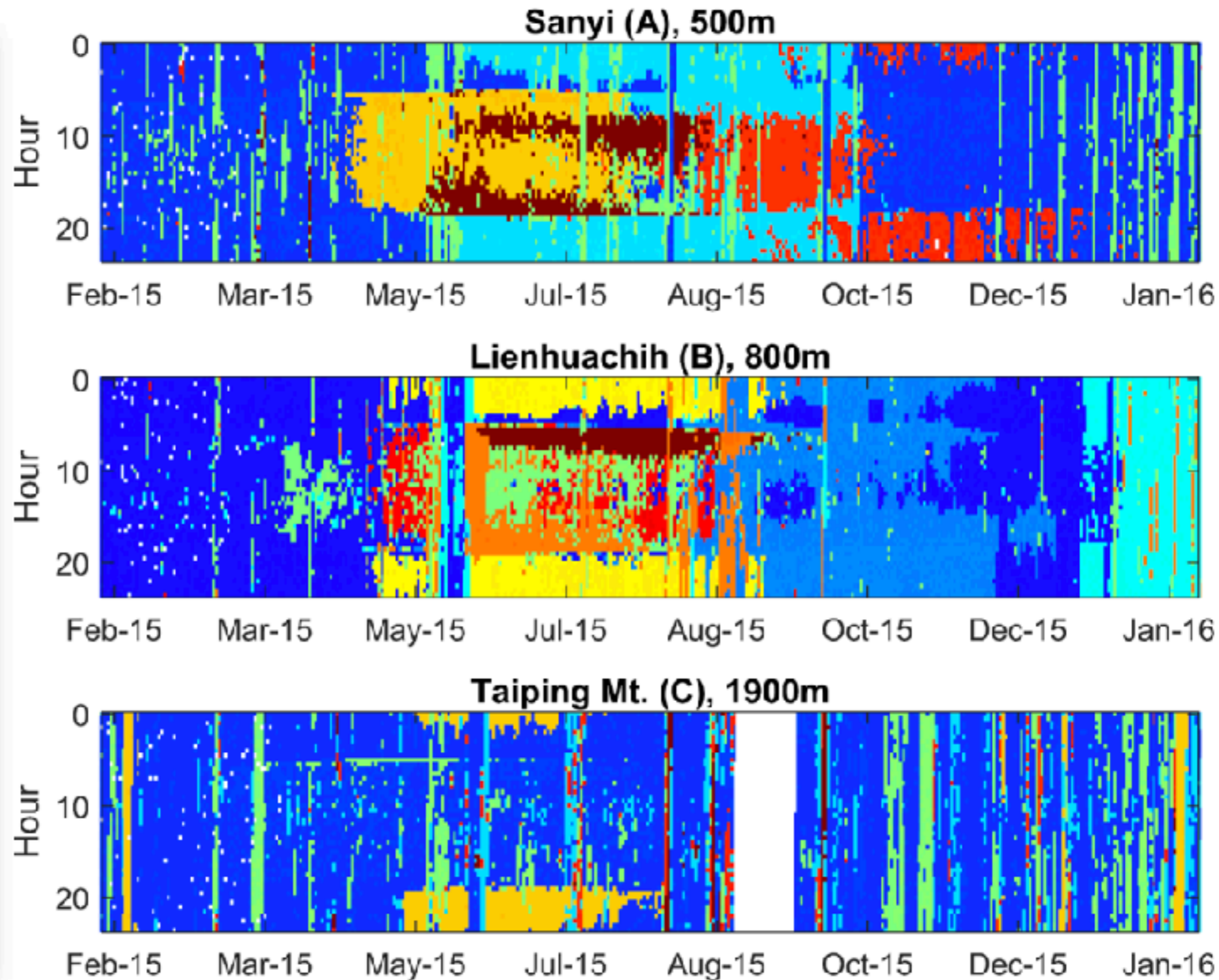
Biodiversity Changes and Impact Analysis



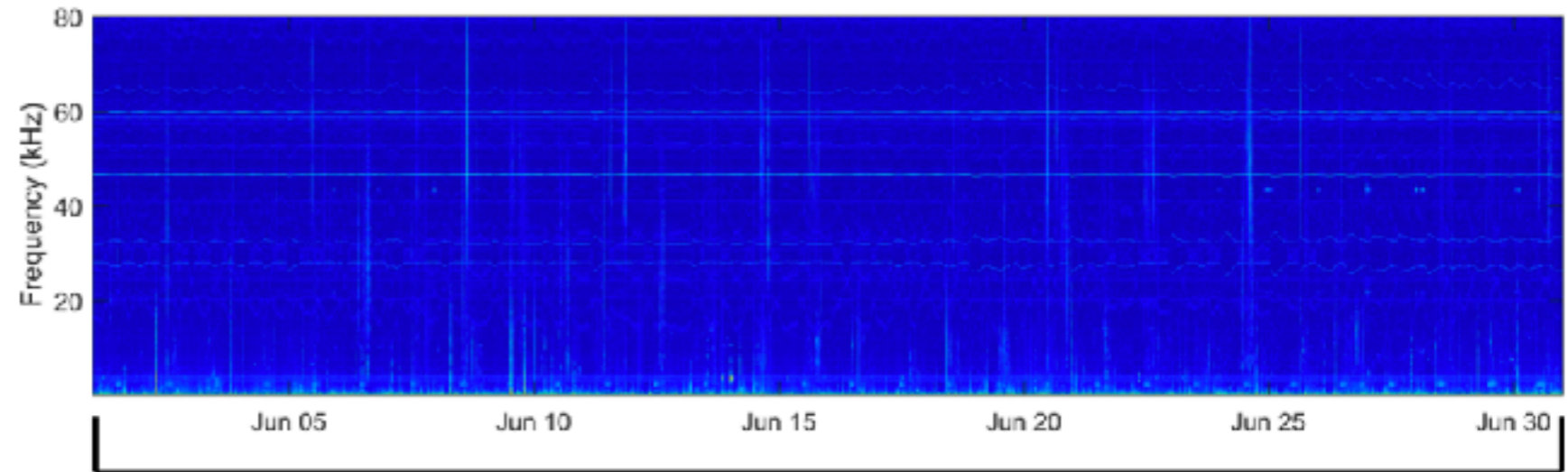
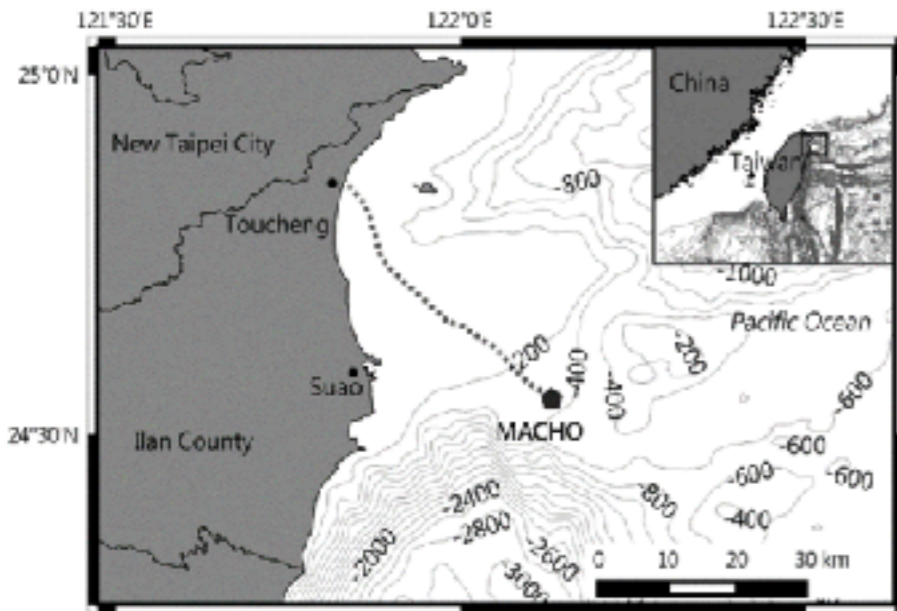
Biodiversity Monitoring & Dynamics



Terrestrial Soundscape: Featuring Differences of Sites by Soundscape

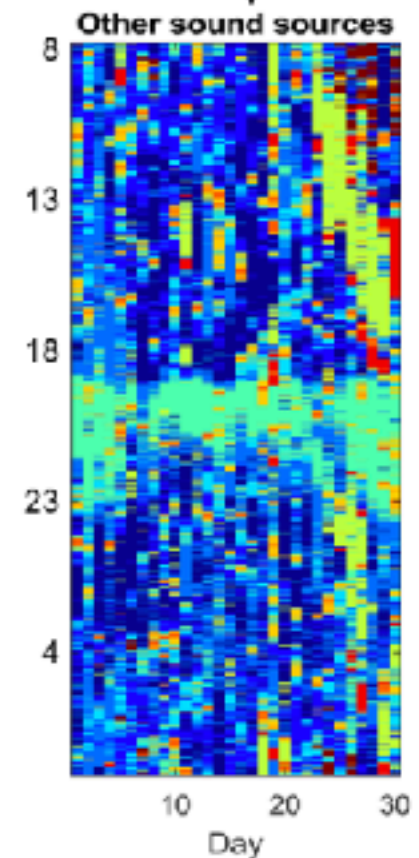
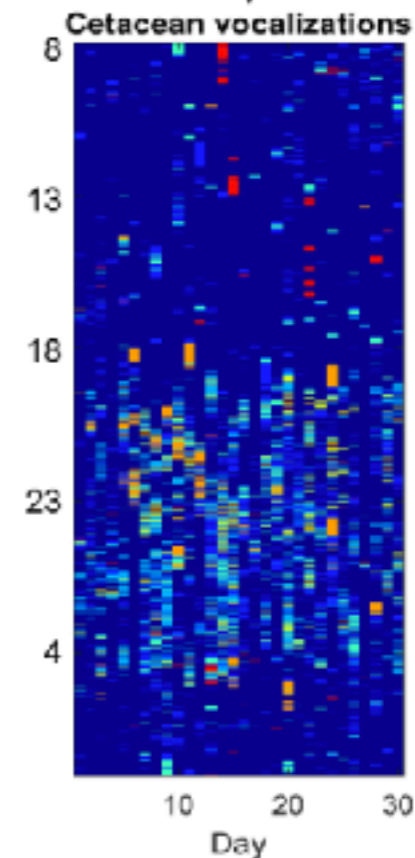
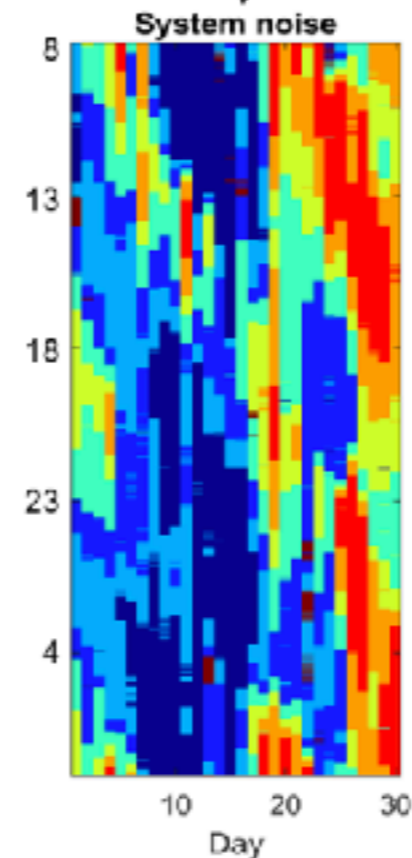
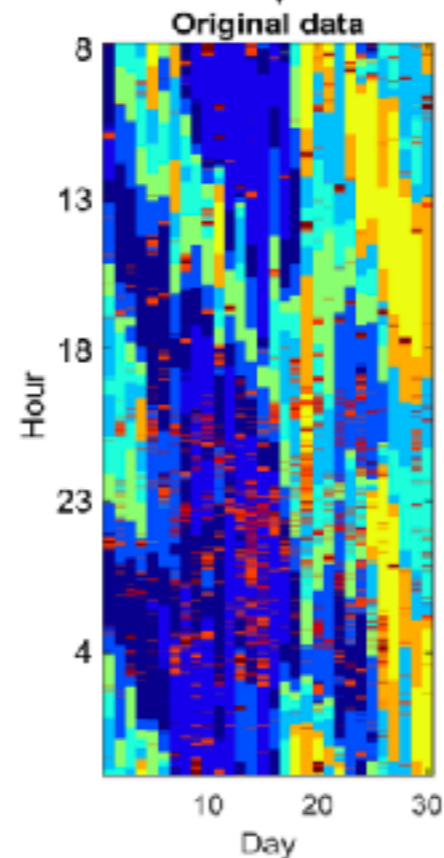


Marine Soundscape: Separation of Biological and Non-Biological Sounds



Clustering

Blind source separation + clustering



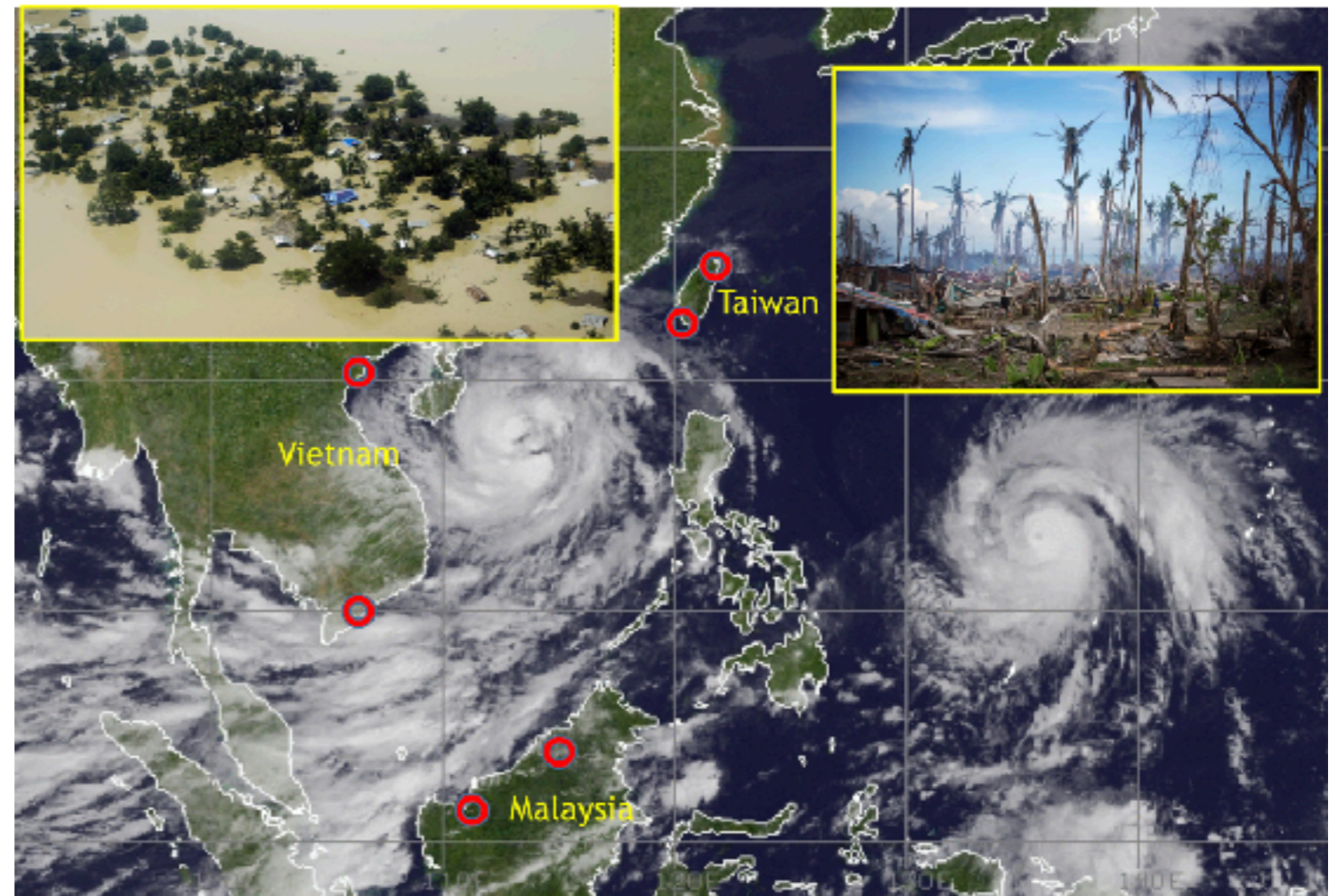
Ultra-Soundscape

Eavesdropping the Impacts of Extreme Weather Events to Ultra-soundscape

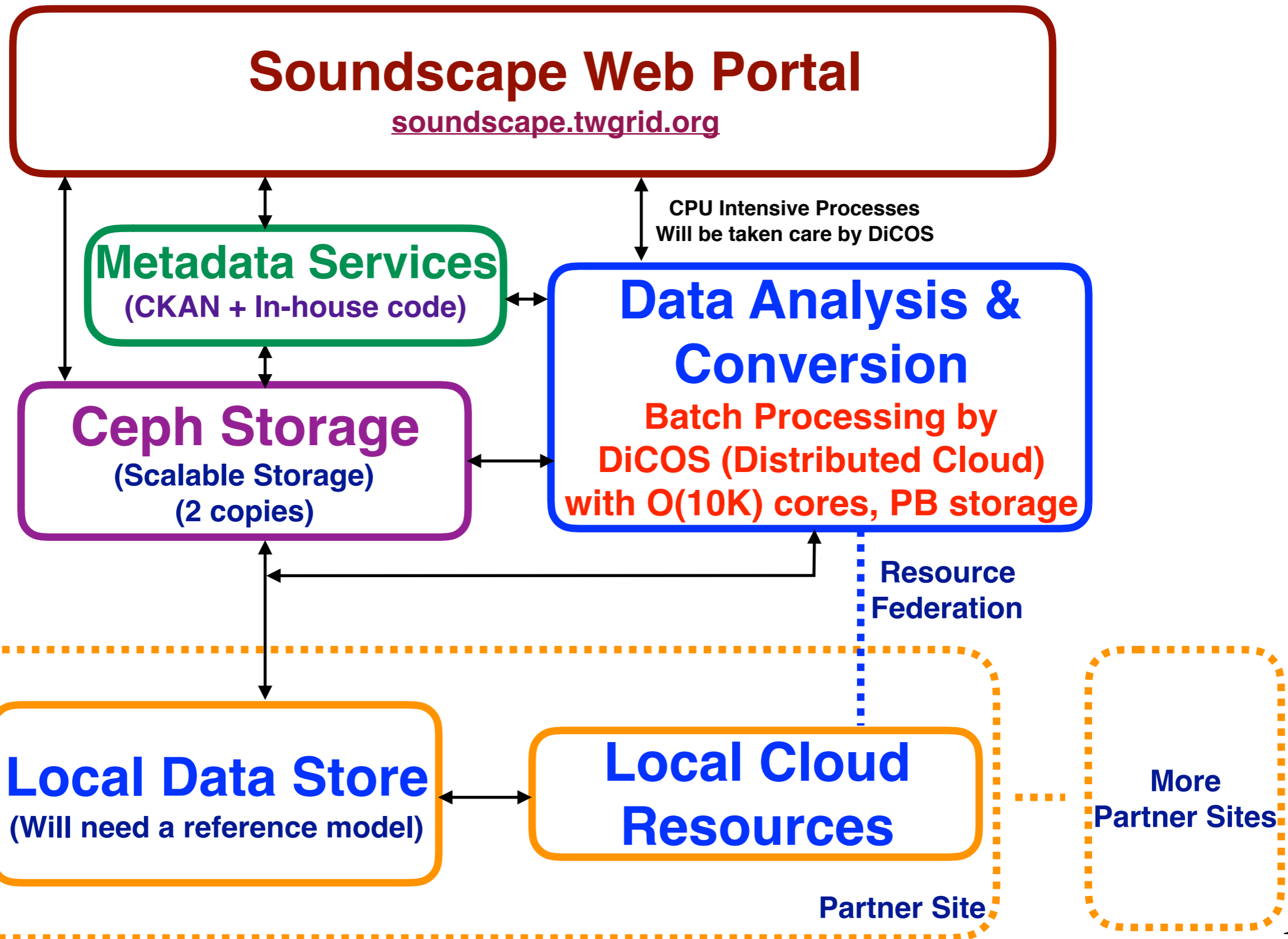
- Develop automatic ultrasound signal analysis tools for regional communities
- Case study: Measuring resilience and robustness of ultra-soundscape to extreme weather events



Cave, forest and other important habitats

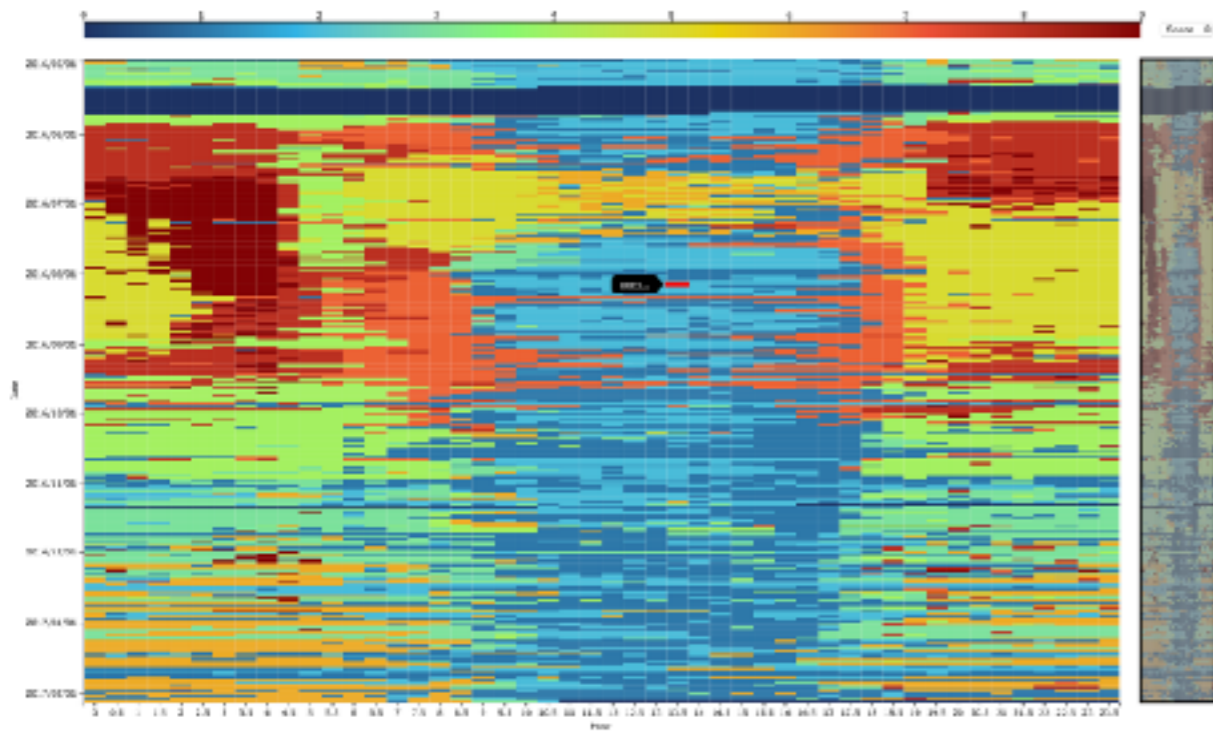


System Architecture



Soundscape change at Taipei Guandu Nature Park

Project website: <https://www.researchgate.net/publication/311111111>. Scroll your mouse wheel to zoom in the detail result.



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Example

Pumilio.2

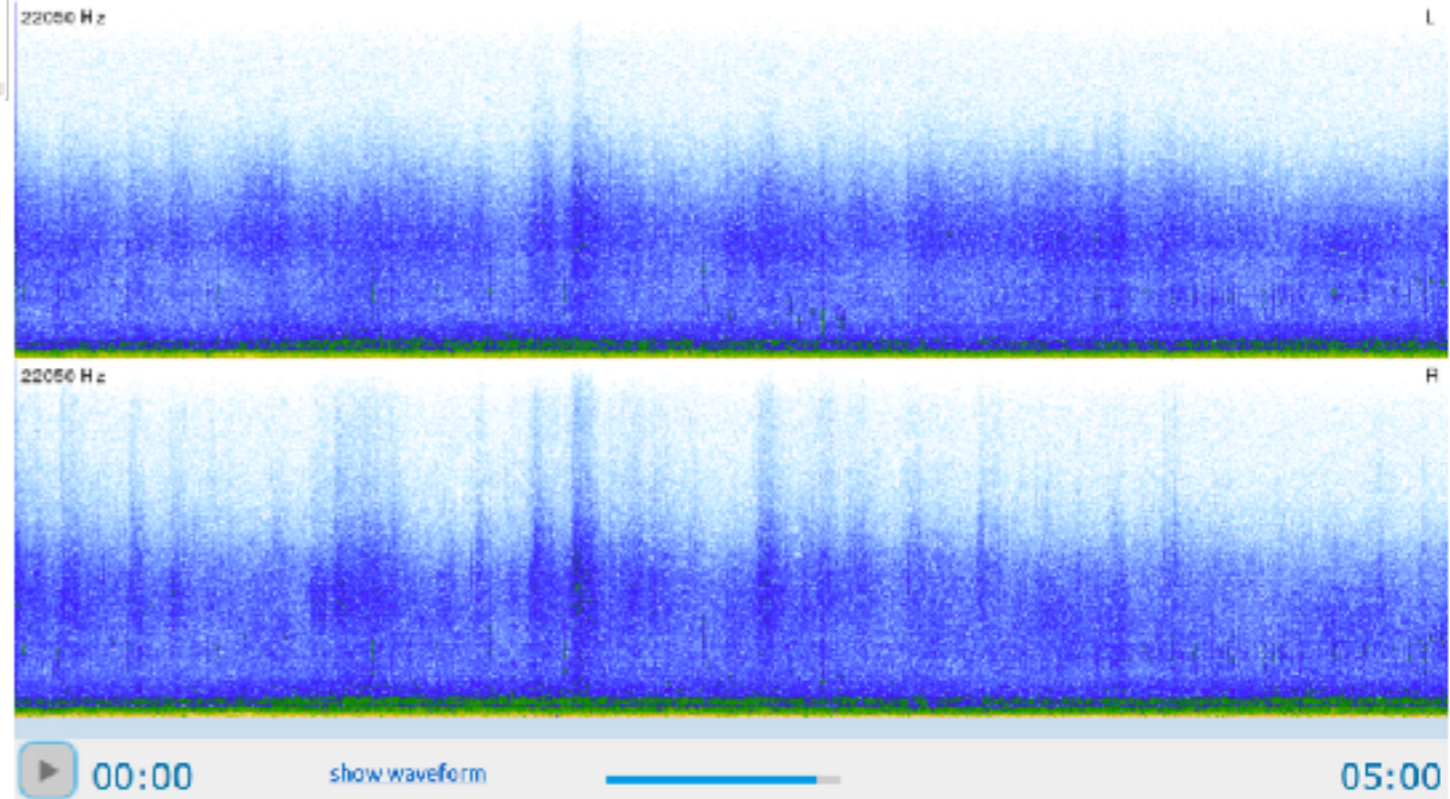
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TW_SAT_TPGDNP01_20160805_133000.wav
05-Aug-2016 13:30:00

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



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)

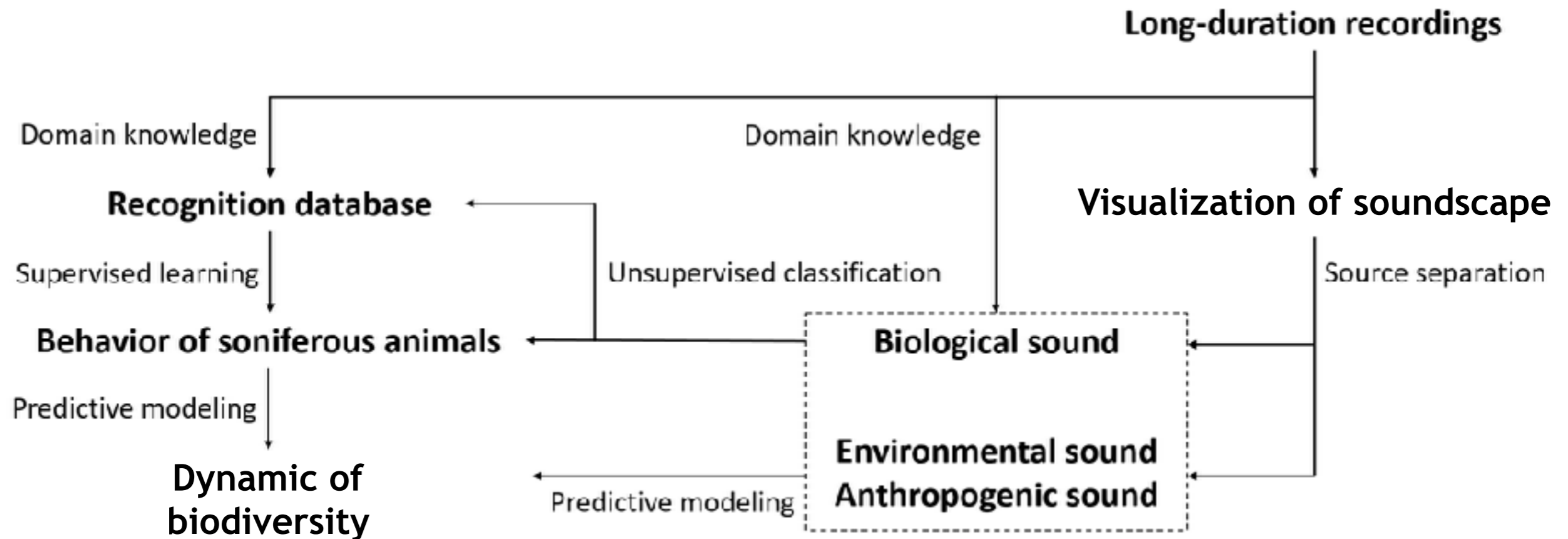
Site Data

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

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Future Plan of Soundscape Analysis for Biodiversity Monitoring



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**