



ACID DEPOSITION MONITORING IN VIETNAM – CURRENT SYSTEM AND FUTURE PLAN

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Outline



1. Existing monitoring system
2. Participating Labs
3. National monitoring plans
4. Future activities
5. Challenges

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1. Existing monitoring system

Monitoring stations

- 7 monitoring stations
- 3 categories

Urban

Hanoi

Da Nang

Ho Chi Minh city

Rural


Yen Bai

Hoa Binh

Can Tho

Remote

Cuc Phuong



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1. Existing monitoring system (cont'd)

Monitoring stations	Wet deposition	Dry deposition
Hanoi	✓	✓
Hoa Binh	✓	✓
Yen Bai	✓	✓
Cuc Phuong	✓	
Da Nang	✓	
Ho Chi Minh city	✓	✓
Can Tho	✓	✓

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1. Existing monitoring system (cont'd)



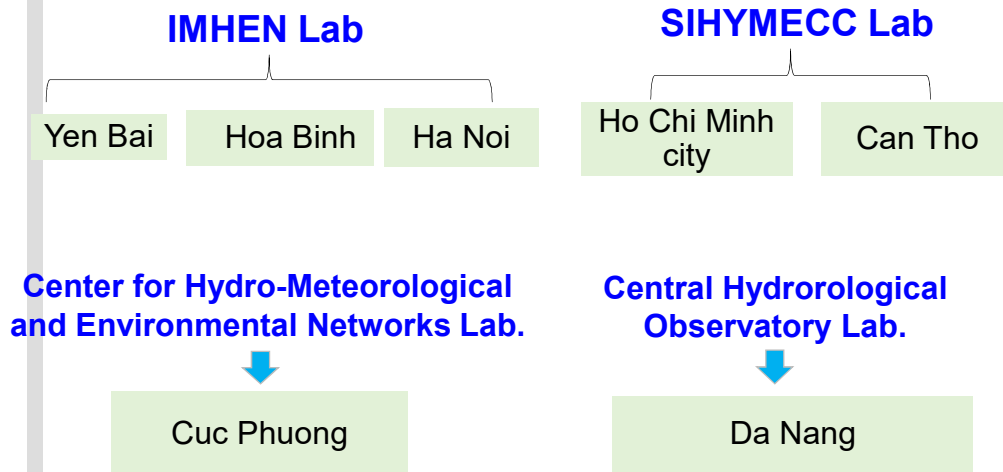
Analysing parameters and sampling frequency

	Parameter	Monitoring Interval
Wet Deposition	pH, EC, Cl ⁻ , NO ₃ ⁻ , SO ₄ ²⁻ , Ca ²⁺ , Mg ²⁺ , K ⁺ , Na ⁺ , NH ₄ ⁺ and meteorological parameters	Daily The weekly-composite samples were prepared for chemical analysis.
Dry deposition	<ul style="list-style-type: none"> Gases: SO₂, HCl, HNO₃, NH₃ Ions in aerosol: Cl⁻, NO₃⁻, SO₄²⁻, Ca²⁺, Mg²⁺, K⁺, Na⁺, NH₄⁺ 	Weekly
Inland Aquatic Environment	Temperature, pH, EC, Cl ⁻ , NO ₃ ⁻ , SO ₄ ²⁻ , Ca ²⁺ , Mg ²⁺ , K ⁺ , Na ⁺ , NH ₄ ⁺ , alkalinity, COD _{KMnO4} , colour, NO ₂ ⁻ , transparency	4 times/year

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2. Participating laboratories



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3. National monitoring plans



1. Operation and maintenance of the existing monitoring system

- ✓ **Wet deposition at**
 - 3 urban sites (Ha Noi, Ho Chi Minh, Da Nang)
 - 3 rural sites (Hoa Binh, Can Tho, Yen Bai)
 - 1 remote site (Cuc Phuong)
- ✓ **Dry deposition at**
 - 2 urban sites (Ha Noi, Ho Chi Minh)
 - 2 rural sites (Hoa Binh, Can Tho, Yen Bai)
- ✓ **Soil and vegetation at 1 remote site (Cuc Phuong)**
- ✓ **Inland aquatic environment at rural site (Hoa Binh)**

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3. National monitoring plan (cont'd)



2. Continue current participating laboratories

- 1) IMHEN Lab – Code – VN 01
- 2) Central Hydrology Observatory (National Hydro-Meteorological Service of Vietnam) Lab - Code VN 02
- 3) SIHYMECC Lab – Code – VN 03
- 4) Center for Hydro-Meteorological and Environmental Networks Lab - Code VN04

3. Continue co-operation with EANET

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3. National monitoring plans (cont'd)



- ❖ Using the acid deposition modeling for simulating atmospheric transport and deposition to evaluate the state of the acid deposition problems in East Asia, based on the monitoring data
- ❖ Increasing the number of monitoring interval and parameters, and new monitoring sites as well (especially in the central region)
- ❖ Monitoring the soil and vegetation/forests one time/year

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4. Future activities



Strengthening and promotion of acid deposition monitoring

- ❖ Training technicians for sampling and analysis
- ❖ Develop institutional framework for environmental education and publish awareness raising
- ❖ Promotion of public awareness in general public and environmental education in high schools and universities
- ❖ Conduct research on acid deposition distribution and mapping

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4. Future activities (cont'd)



Expansion of acid deposition monitoring

- ❖ Promotion of ozone and PM2.5 monitoring including research cooperation and installation of new PM2.5 monitoring station
- ❖ Capacity building activities especially for ozone and PM2.5 monitoring
- ❖ Promotion of research and technical cooperation on emission inventory
- ❖ Data sharing: collaborating with Vietnam Environmental Administration

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4. Future activities (cont'd)



Development of monitoring network

- ❖ Collaboration with Vietnam Environmental Administration and Vietnam Meteorological and Hydrological Administration to install new monitoring sites
- ❖ Proposal on integration with the national environmental and meteorological and hydrological monitoring networks

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5. Challenges



- Acid deposition monitoring is currently managed by different organizations, and a uniformed network is yet to be established
- Some analytical instruments are outdated and old, need intensive maintenance
- Coverage of monitoring stations not sufficient to provide adequate data for research
- Acid deposition monitoring and research funding is limited

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Thank you for your attention!

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