The Seventh Senior Technical Managers' Meeting
of the Acid Deposition Monitoring Network in East Asia
1-3 August 2006, Yangon, Myanmar

Overview of the national monitoring plans of the participating countries
(The summary table)

The Network Center of EANET

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<Cambodia>	Wet deposition	Phnom Penh	Urban	Weekly	PH,EC,NH_4^+,K^+,Ca^{2+},Mg^{2+}		
<China>	Wet deposition	Chongqing -Guanyinqiao	Urban	daily	All required items + F^-	April '99	
		Chongqing -Jinyunshan	Rural	daily	All required items + F^-	January. '01	
		Xi'an -shizhan	Urban	daily	All required items	April '99	
		Xi'an-Weishuiyuan	Rural	daily	All required items	April '99	
		Xi'an-Jiwozi	Remote	daily	All required items	January. '01	
		Xiamen-Hongwen	Urban	daily	All required items	April '99	
		Xiamen-Xiaoping	Remote	daily	All required items+PO_4^{3-}	April '99	
		Zhuhai-Xiang Zhou	Urban	daily	All required items	May '99	
		Zhuhai-Zhuxiandong	Urban	daily	All required items	December '99	
	Dry deposition	Chongqing -Jinyunshan	Rural	AT	SO_2, NO_2, PM_{10}		
		Xi'an-Weishuiyuan	Rural	AT	SO_2, NO_2, PM_{10}		
		Xiamen-Hongwen	Urban	AT	SO_2, NO_2, PM_{10}		
		Zhuhai-Xiang Zhou	Urban	AT	SO_2,NO_2, PM_{10}		
	Soil and vegetation	Chongqing -Jinyunshan	Rural	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		
		Xi'an-Dabagou	Remote	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		
		Xiamen-Xiaoping	Remote	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		
		Zhuhai-Zhuxiandong	Urban	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		
	Inland aquatic environment	Chongqing-Jinyunshan Lake	Rural	4times/years	Water quality of Jinyunshan Lake		
		Xi'an-Jiwozi River	Remote	4times/years	Water quality of Jiwozi River		
		Xiamen-Xiaoping Dam	Remote	4times/years	Water quality of Xiaoping Dam		
		Zhuhai-Zhuxiandong Stream	Urban	4times/years.	Water quality of Zhuxiandong Stream	From 2004	

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<Indonesia>	Wet deposition	Jakarta (BMG)	Urban	weekly*	All required items	April '98	✓
		Serpong (EMC)	Rural	daily	All required items	April '98	✓
		Kototabang (BMG)	Remote	weekly*	All required items	April '98	✓
		Bandung (LAPAN)	Urban	daily	All required items	January '99	✓
	Dry deposition	Serpong (EMC)	Rural	FP (Weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
	Soil and vegetation	Serpong (Dramaga Experimental Forest)	Rural	once/3years	Decline, K etc. in leaves & ions in soil	From 2003	✓
	Inland aquatic environment	Patenggang Lake	Rural	3times/yr.	Water quality of Patenggang Lake		✓
<Japan>	Wet deposition	Rishiri	Remote	daily	All required items	April'98	✓
		Ochiishi	Remote	daily	All required items	April'03	✓
		Tappi	Remote	daily	All required items	April'98	✓
		Ogasawara	Remote	daily	All required items	May'99	✓
		Sado/Sado-seki	Remote	daily	All required items	April'99	✓
		Happo	Remote	daily	All required items	April'98	✓
		Oki	Remote	daily	All required items	April'98	✓
		Yusuhara	Remote	daily	All required items	December'99	✓
		Hedo	Remote	daily	All required items	December'99	✓
		Ijira	Rural	weekly(daily composite sample)	All required items	June'99	✓
		Banryu	Urban	weekly(daily composite sample)	All required items	May'99	✓

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<Japan>	Dry deposition	Rishiri	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,$PM_{10/2.5}$,HNO_3, HCl,NH_3,PMC	FP from 2002	✓
		Tappi	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Ogasawara	Remote	AT+ FP(weekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Sado/Sado-seki	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Happo	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Oki	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,$PM_{10/2.5}$,HNO_3, HCl,NH_3,PMC	FP from 2002	✓
		Yusuhara	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Hedo	Remote	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Ijira	Rural.	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
		Banryu	Urban	AT+ FP(biweekly)	SO_2,NO,NO_{x*},O_3,PM_{10},HNO_3, HCl,NH_3,PMC	FP from 2003	✓
	Soil and vegetation	Ijira	Rural/Ecolog.	Once in 5 years	All required items		✓
		Banryu	Urban/Ecolog.	Once in 5 years	All required items		✓
	Inland aquatic environment	Ijira Lake	Rural/Ecolog.	4times/yr.	Water quality of Ijira Lake		✓
		Banryu Lake	Urban/Ecolog	4times/yr.	Water quality of Banryu Lake		✓
<Lao PDR>	Wet deposition	Vientiane	Urban	daily	pH,EC	October ‘03	✓

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<**Malaysia**>	Wet deposition	Petaling Jaya	Urban	weekly*	All required items+Organic acid	April '98	✓
		Tanah Rata	Remote	weekly*	All required items+Organic acid	January '99	✓
		Danum Valley	Remote	weekly*	All required items+Organic acid		
	Dry deposition	Petaling Jaya	Urban	FP (weekly)	SO_2,NO_2HNO_3,NH_3, PMC		✓
		Tanah Rata	Remote	FP (weekly)	SO_2,NO_2HNO_3,NH_3, PMC	FP from 2001	✓
		Danum Valley	Remote	FP (biweekly)	SO_2,NO_2HNO_3,NH_3, PMC		
	Soil and	Pasoh Reserve Forest	Remote	Every 3 years		From 2001	
		Petaling Jaya	Remote	Every 3 years		From 2002	
	Inland aquatic environment	Semenyih Dam	Urban	4 times/yr.	Water quality of Semeynyih Dam		
<**Mongolia**>	Wet deposition	Ulaanbaatar	Urban	daily	All required items+F^-	August '98	✓
		Terelj	Remote	daily	All required items+F^-	September '98	✓
	Dry deposition	Ulaanbaatar	Urban	FP (weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Terelj	Remote	FP (weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
	Soil and vegetation	Ulaanbaatar (Bogdkhan mountain)	Urban/Ecolog	Every 3-5 years	PH(H_2O),pH(KCl),Exchangeable acidity, Tree decline, description tree	From 2002	
	Inland aquatic environment	Terelj River	Remote/Ecolog	4 times/yr.	Water quality of Terelj River	From 2002	✓
<**Myanmar**>	Wet deposition	Kaha-Aya, Yangon	Urban	daily	pH,EC		
<**Philippines**	Wet deposition	Metro Manila	Urban	weekly	All required items	April '99	✓
		Los Banos	Rural	weekly	All required items	April '99	✓
	Dry deposition	Metro Manila	Urban	FP (Weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Los Banos	Rural	FP (Weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
	Soil and vegetation	Los Banos	Rural	Once in 3 years	(Tree decline, description tree & ions in soil etc.)	From 2001	
	Inland aquatic environment	Pandin Lake	Rural	4 times a year	Water quality of Pandin Lake	From 2004	✓
		Ambulalakao River		1times/yr	Water quality of Ambulalakao River	From 2005	✓

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<Republic of Korea>	Wet deposition	Kanghwa	Rural	daily	All required items	March '99	
		Cheju(Kosan)	Remote	daily	All required items	April '99	
		Imsil	Rural	daily	All required items	January '01	
	Dry deposition	Kanghwa	Rural	FP(Twice a month)	SO_2, O_3, PM_{10}, Ions in $PM_{2.5}$	From 2001	
		Cheju(Kosan)	Remote	FP(Twice a month)	SO_2, O_3, PM_{10}, Ions in $PM_{2.5}$	From 2001	
		Imsil	Rural	FP(Twice a month)	SO_2, O_3, PM_{10}, Ions in $PM_{2.5}$	From 2001	
	Soil and vegetation	Imsil (Mt.Naejang)	Rural	Every 3 years	(Tree decline, description tree & ions in soil)	From 2001	
<Russia>	Wet deposition	Mondy	Remote	daily	All required items (+F^-, Br^-, HCO_3^-)	May '99	✓
		Listvyanka	Rural	daily	All required items (+F^-, Br^-, HCO_3^-)	January '00	✓
		Primorskaya	Rural	daily	All required items (+F^-, Br^-, HCO_3^-)	February '02	✓
		Irkutsk	Urban	daily	All required items (+F^-, Br^-, HCO_3^-)	January '01	✓
	Dry deposition	Mondy	Remote	AT+ FP(weekly)	SO_2,O_3,HNO_3,HCl,NH_3,PMC	From 2001	✓
		Listvyanka	Rural	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC	From 2001	✓
		Primorskaya	Rural	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC	From 2001	✓
		Irkutsk	Urban	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC	From 2001	✓
	Soil and vegetation	Mondy	Remote	Once/3-5 years	Tree decline, description tree & ions in soil	From 2001	
		Bolshie Koty	Rural	Once/3-5 years	Tree decline, description tree & ions in soil	From 2001	
		Irkutsk	Urban	Once/3-5 years	Tree decline, description tree & ions in soil	From 2001	
		Primorskaya	Rural	Once/3-5 years	Tree decline, description tree & ions in soil	From2002	✓
	Inland aquatic environment	Pereemnaya River	Rural	4times/yr	Water quality of Pereemnaya River	From 2004	✓
		Krestovka River	Rural	5times/yr	Water quality of Krestovka River	From 2005	✓

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<Thailand>	Wet deposition	Bangkok	Urban	daily	All required items+Organic acid, Phosphate	April '99	✓
		Samutprakarn	Urban	daily	All required items+Organic acid, Phosphate	January '00	✓
		Patumthani	Rural	daily	All required items+Organic acid, Phosphate	March '99	✓
		Khanchnaburi (Vachiralongkorn Dam)	Remote	daily	All required items+Organic acid, Phosphate	April '99	✓
		Chiang Mai(Mae Hia)	Rural	daily	All required items+Organic acid, Phosphate	January '01	✓
		Nakhon Ratchasima	Remote	daily	All required items+Organic acid, Phosphate		
	Dry deposition	Bangkok	Urban	AT+ FP(weekly)	SO_2,NO,NO_2,NO_x,O_3,HNO_3,HCl, NH_3,PMC		✓
		Samutprakarn	Urban	AT	SO_2,NO,NO_2,NOx,O_3		✓
		Patumthani	Remote	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Khanchnaburi (Vachiralongkorn Dam)	Remote	AT+ FP(weekly)	SO_2,NO,NOx,PM_{10},O_3,HNO_3,HCl, NH_3,PMC		✓
		Chiang Mai(Mae Hia)	Rural	AT+ FP(weekly)	SO_2,NO,NOx,PM_{10},O_3,HNO_3,HCl, NH_3,PMC		✓
		Nakhon Ratchasima	Remote	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
	Soil and	Vachiralongkorn Dam	Remote	Once/3 years	Tree Decline, Ions in soil		✓
	Inland aquatic environment	Vachiralongkorn Dam	Remote	4 times/year	Water quality of Vachiralongkorn Dam		✓

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Start time)	Available Data(2005)
<Viet nam>	Wet deposition	Hanoi	urban	daily**	All required items	August '99	✓
		Hoa Binh	rural	daily**	All required items	August '99	✓
	Dry deposition	Hanoi	urban	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Hoa Binh	rural	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
	Soil and	Hoa Binh	rural	Once a year	Decline, & ions in soil		
	Inland aquatic environment	Hoa Binh Reservoir	rural	4 times/year	Water quality of Hoa Bin Reservoir		✓

Note)*: Biocides are added to precipitation samples, **Chemical analysis is carried out for weekly composite
PMC; Particulate matter components

The monitoring situations in each participating countries for mandatory items

1. Introduction

Based on the results of the First Expert Meeting, the guidelines have been adopted at the Second Expert Meeting on Acid Precipitation Monitoring Network in East Asia, which was held in March 1995 in Tokyo.

From April 1998, the preparatory-phase activities of the Acid Deposition Monitoring Network in East Asia (EANET) started, based on the decision of the First Intergovernmental Meeting on EANET, held in March 1998 in Yokohama, Japan. Ten countries (i.e. China, Indonesia, Japan, Republic of Korea, Malaysia, Mongolia, Philippines, Russia, Thailand, and Viet Nam), in East Asia participated in the preparatory-phase activities.

During the preparatory-phase, the participating countries made effort to comply with these guidelines to the extent possible. Based on the experience gained, and the latest scientific/technical information, the guidelines were revised and adopted as a technical manual “Technical Documents for Acid Deposition Monitoring in EAST Asia “ at the Second Interim Scientific Advisory Group (ISAG) Meeting of EANET held in March 2000 in Jakarta, Indonesia.

2. Basic matters on acid deposition monitoring

2.1. Objectives

The objectives of the Acid Deposition Monitoring Network are:

(1) to create a common understanding of the state of the acid deposition problems in East Asia; and

(2) to provide useful inputs for decision-making at local, national and regional levels aimed at preventing or reducing adverse impacts on human health and the environment due to acid deposition.

2.2. Outline of the manual for monitoring

In the technical manual, standard suggested items concerning, sampling methodology, analytical methods, data control and data reporting, and quality assurance and quality control aspects on monitoring in EANET are described. For the majority of the methods, the necessary quality

assurance is facilitated by a combination of simple and robust sampling techniques with well-described sampling equipment, and use of synthetic control samples for the chemical analyses.

3. Fundamental items concerning monitoring on acid deposition

3.1. Monitoring sites

Selection of sampling sites is a critical factor in the monitoring of wet deposition. Therefore, sampling sites should be located in areas suitable for the purpose of the survey, and should properly represent the area in question. In addition, coordination is required with dry deposition monitoring, and the closest meteorological station.

EANET monitoring sites are classified into two basic categories, namely deposition monitoring sites and ecological survey sites. Deposition monitoring sites are sampling sites to collect fundamental data on the temporal and spatial distribution of acid deposition, and are further classified into three sub-categories: remote sites, rural sites, and urban sites for the objectives of the monitoring. Ecological survey sites are those to provide basic data for assessing the effects of acidification on terrestrial ecosystems, and further classified into two sub-categories: basic survey sites, and ecosystem analysis sites. All sites in each country should be classified according to these categories. Regarding the deposition monitoring sites, at least one or more remote or rural sites should be established in a country participating in the EANET activities.

3.2 Fundamental items of each monitoring

Fundamental items of each monitoring are described below.

<Wet Deposition>

1) monitoring sites

(1)general information

- ✓ represent the area in question
- ✓ coordination with dry deposition monitoring & the closest meteorological station
- ✓ At least one or more remote or rural sites should be established

(2)siting of the sampling equipment

- ✓ to remain in almost the same conditions for several decades
- ✓ sites which don't receive local wind effect(mountain top, cols, coastal, valley basins are not suitable)
- ✓ considerations of the effects of immediate surrounding and emission within the nearest 20km

(3)minimum distance to emission and contamination sources

- ✓ Regions within 50km of large pollution source should be excluded as remote sites and ecological sites
- ✓ Regions within 20km of large pollution source should be excluded as rural
- ✓ Regions within 500m of main roads should be excluded as remote and rural sites

(4)Local criteria

- ✓ An open, flat, grassy area far enough from trees, no objects
- ✓ At least twice the objection height and less than 30 degree above the horizon
- ✓ Regions within 100 m of these emission and contamination sources should be excluded.
- ✓ The horizontal distance between collector and rain gauge should be greater than 2 meters

The rain gauge and the wet deposition collector should cross the direction of the prevailing wind

2) Monitoring frequency and measurement parameters

(1)Monitoring frequency

- ✓ samples should be collected every 24 hours in principal
- ✓ combining daily samples for weekly (7 days) composite or sampling for a week can be acceptable
- ✓ collection can be conducted for each precipitation event.
- ✓ The starting time of a day should be at 9:00 local time as a general rule.
- ✓ If a refrigerator is not in use, biocide should be used for preserving the samples.

(2)Measurement parameters

a) Precipitation chemistry parameters

Mandatory items:

- ✓ pH,EC, SO_4^{2-},NO_3^-,Cl^-,NH_4^+,Na^+,K^+,Ca^{2+},Mg^{2+}

Optional items:

- ✓ F^-, HCO_3^-, NO_2^-, Organic acid ($HCOO^-$,CH_3COO^-), (Br^-,PO_4^{3-})

b)Meteorological Measurements

- ✓ Wind direction/speed, temperature, humidity, precipitation amount, solar radiation

(3)laboratory treatment of samples

- ✓ all samples should be filtered with clean membrane filters (pore size:0.45μm)
- ✓ After filtration, samples should be refrigerated at 4 degree.
- ✓ Analysis should be carried out within a week of sample arrival in the laboratory.

<Dry deposition>

Priority of the chemical species for dry deposition monitoring in EANET is as follows.

(First priority):

- ✓ SO_2, O_3, NO, NO_2(urban),HNO_3, HCl, NH_3
- ✓ Particulate component (SO_4^{2-}, NO_3^-, Cl^-, NH_4^+, Na^+, Mg^{2+}, K^+, and Ca^{2+}), PM10

(Second priority):

- ✓ NO_2(rural and remote), PM2.5

<Soil &Vegetation>

(1)Selection of basic survey site

- ■ Survey sites should preferably be located within a radius of approximately 50 km of (Dry and Wet) deposition monitoring sites.

(2)Site selection criteria

- ■ Two forests, whose soils have different sensitivities to acid deposition, are recommended to be selected.
- ■ Each sites should be established in a continuous forest area of more than one hectare.
- ■ (If the area is surrounded with a suitable shelter belt, 0.2 hectare is sufficient.)
- ■ Site must be accessible for surveying over a long period(decades).

(3)Selection of plots for soil monitoring

- ■ Several plots, at least two plots, occupying areas from 5m*5m to 10m*10m, should be selected randomly at each soil type

(4)Selection of subplots for soil sampling

- ■ In the plot, five subplots, each occupying 1m*1m,are selected in principle at the center and the diagonal lines of the plot

(5)Monitoring parameters and frequency of analysis

1)Monitoring parameter for soil(Every 3-5years)

Mandatory items:

- ✓ Moisture content/pH(H_2O)and pH(KCl)/Exchangeable Base cations(Ca,Mg,K,and Na)/Exchangeable acidity
- ✓ Effective cation exchangeable capacity(ECEC)/Carbon contents (for only calcareous soil)

Optional items:

- ✓ Exchangeable AL,H/Total Carbon content/ Total Nitrogen content/

Voluntary items:

- ✓ Available phosphate/Sulfate

2) Selection of plots for general description of the forest

- ✓ Two forest areas of more than 0.2 hectare are selected.
- ✓ a measuring plot should be subdivided to three coaxial circles of 1000,400,and 200 square meters for the detailed survey.

3) Monitoring items and frequency of monitoring for general description of the forest.

Mandatory items:(Every 3-5years)

- ✓ Description of trees; Name of species/ Diameter at Breast Height/Height of tree
- ✓ Understory vegetation survey

4) Survey of tree decline

Mandatory items:(Every 3-5years)

- ✓ Observation of tree decline

Optional items:(Every 3-5years)

- ✓ Photographic record of tree decline/Estimation of decline causes

<Inland aquatic environment>

Measurement parameters and frequency of monitoring

1)4 times/year

Mandatory items:

- ✓ W.T,pH,EC,Alkalinity,SO_4^{2-},NO_3^-,Cl^-,NH_4^+,Na^+,K^+,Ca^{2+},Mg^{2+}

Optional Parameters:

- ✓ Phytoplankton(diatom species; for lakes),Epilithic algae(for springs,headwaters,rivers)

2)once/year

Mandatory items:

- ✓ Transparency,water color,DOC(if possible COD),NO_2^-,and PO_4^{3-}

Optional Parameters:

- ✓ Total Al

3)once/in 3-5year

Mandatory items:

- ✓ Sediment(SO_4^{2-},NO_3^-,and NH_4^+ in pore water)

Optional Parameters:

- ✓ living organisms other than phytoplankton,

Sediment(Pb,Pb210,and stable isotope of S; for lake)

4. Monitoring situations in each participating countries.

The monitoring situations in each participating countries are described in Table 1-4.

Table1. Wet deposition monitoring

Country/items	City	Monitoring sites	Classification	Monitoring interval	**Mandatory items:**										**Optional items:**	Meteorology
					pH	EC	SO_4^{2-}	NO_3^-	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_4^+	F^-,HCO_3^-,NO_2^- ,Organic acid,Br^-,PO_4^{3-}	
<Cambodia>		Phnom Penh	Urban	Weekly	x	x					x	x	x	x		
<China>	Chongqing	Guanyinqiao	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
		Jinyunshan	Rural	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
	Xi'an	Shizhan	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
		Weishuiyuan	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
		Jiwozi	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Xiamen	Hongwen	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
		Xiaoping	Remote	Daily	x	x	x	x	x	x	x	x	x	x	PO_4^{3-}	x
	Zhuhai	Xiang Zhou	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
		Zhuxian Cavern	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
<Indonesia>		Jakarta(BMG)	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		x
		Serpong(EMC)	Rural	Daily	x	x	x	x	x	x	x	x	x	x		
		Kototabang(BMG)	Remote	Weekly	x	x	x	x	x	x	x	x	x	x		x
		Bandung(LAPAN)	Urban	Daily	x	x	x	x	x	x	x	x	x	x		
<Japan>		Rishiri	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Ochiishi	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Tappi	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Ogasawara	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Sado/(Sado-seki)	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Happo	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Oki	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Yusuhara	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Hedo	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Ijira	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		x
		Banryu	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		x
<Lao PDR>		Vientiane	Urban	Daily	x	x										
<Malaysia>		Petaling Jaya	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	HCOOH,CH3COOH	x
		Tanah Rata	Remote	Weekly	x	x	x	x	x	x	x	x	x	x	HCOOH,CH3COOH	x
		Danum Valley	Remote	Weekly	x	x	x	x	x	x	x	x	x	x	HCOOH,CH3COOH	
<Mongolia>		Ulaanbaatar	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
		Terelj	Remote	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
<Myanmar>		Kaha-Aya, Yangon	Urban	Daily	x	x										
<Philippines>		Metro Manila	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		x
		Los Banos	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		x
<Republic of Korea>		Kanghwa	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
		Cheju(Kosan)	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
		Imsil	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
<Russia>		Mondy	Remote	Daily	x	x	x	x	x	x	x	x	x	x	F^-, Br^-, HCO_3^-	x
		Listvyanka	Rural	Daily	x	x	x	x	x	x	x	x	x	x	F-, Br-, HCO_3-	x
		Irkutsk	Urban	Event	x	x	x	x	x	x	x	x	x	x	F-, Br-, HCO_3-	x
		Primorskaja	Rural	Event	x	x	x	x	x	x	x	x	x	x	F-, Br-, HCO_3-	x
<Thailand>		Bangkok	Urban	Daily	x	x	x	x	x	x	x	x	x	x	HCOOH,CH_3COOH,PO_4^{3-}	x
		Samuyprakan	Urban	Daily	x	x	x	x	x	x	x	x	x	x	HCOOH,CH_3COO,HPO_4^{3-}	x
		Patumthani	Rural	Daily	x	x	x	x	x	x	x	x	x	x	HCOOH,CH_3COO,HPO_4^{3-}	x
		Khanchanaburi(Vachralongkorn Dam)	Remote	Daily	x	x	x	x	x	x	x	x	x	x	HCOOH,CH_3COO,HPO_4^{3-}	x
		Chiang Mai(Mae-Hia)	Rural	Daily	x	x	x	x	x	x	x	x	x	x	HCOOH,CH_3COO,HPO_4^{3-}	x
		Nakhon Ratchasima	Remote	Daily	x	x	x	x	x	x	x	x	x	x	HCOOH,CH_3COOH,PO_4^{3-}	x
<Viet nam>		Hanoi	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		x
		Hoa Binh	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		x

Table2. Dry deposition(Air concentration) monitoring

Country/items	City	Monitoring sites	Classification	Monitoring method	Priority of the chemical species											
					SO_2	O_3	NO	NO_2	PM_{10}	HNO_3	HCl	NH_3	SO_4^{2-} (Particulate Component)	NO_3^-	NH_4^+	Ca^{2+}
<China>	Chongqing	Jinyunshan	Rural	AT	x			x	x							
	Xi'an	Weishuiyuan	Rural	AT	x			x	x							
	Xiamen	Hongwen	Urban	AT	x			x	x							
	Zhuhai	Xiang Zhou	Urban	AT	x			x	x							
<Indonesia>		Serpong(EMC)	Rural	FP	x					x	x	x	x	x	x	x
<Japan>		Rishiri	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Tappi	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Ogasawara	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Sado/(Sado-seki)	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Happo	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Oki	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Yusuhara	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Hedo	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Ijira	Rural	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x
		Banryu	Urban	AT,FP	x	x	x		x	x	x	x	x	x	x	x
<Malaysia>		Petaling Jaya	Urban	FP	x			x		x	x	x	x	x	x	x
		Tanah Rata	Remote	FP	x			x		x	x	x	x	x	x	x
		Danum Valley	Remote	FP	x			x		x	x	x	x	x	x	x
<Mongolia>		Ulaanbaatar	Urban	FP	x					x	x	x	x	x	x	x
		Terelj	Remote	FP	x					x	x	x	x	x	x	x
<Philippines>		Metro Manila	Urban	FP	x					x	x	x	x	x	x	x
		Los Banos	Rural	FP	x					x	x	x	x	x	x	x
<Republic of Korea>		Kanghwa	Rural	AT,FP	x	x			x	x	x	x	x	x	x	x
		Cheju(Kosan)	Remote	AT,FP	x	x			x	x	x	x	x	x	x	x
		Imsil	Rural	AT,FP	x	x			x	x	x	x	x	x	x	x
<Russia>		Mondy	Remote	AT,FP	x	x				x	x	x	x	x	x	x
		Listvyanka	Rural	FP	x					x	x	x	x	x	x	x
		Irkutsk	Urban	FP	x					x	x	x	x	x	x	x
		Primorskaya	Rural	FP	x					x	x	x	x	x	x	x
<Thailand>		Bangkok	Urban	AT,FP	x		x	x	x	x	x	x	x	x	x	x
		Samutprakarn	Urban	AT	x	x	x	x								
		Patumthani	Rural	FP	x					x	x	x	x	x	x	x
		Khanchanaburi(Vachralongkorn Dam)	Remote	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Chiang Mai(Mae-Hia)	Rural	AT,FP	x	x	x		x	x	x	x	x	x	x	x
		Nakhon Ratchasima	Remote	FP	x					x	x	x	x	x	x	x
<Viet nam>		Hanoi	Urban	FP	x					x	x	x	x	x	x	x
		Hoa Binh	Rural	FP	x					x	x	x	x	x	x	x

AT:Automatic Monitor,FP:Filter pack,

Table3. Soil & Vegitation monitoring

Country/items	City	Monitoring sites	Classification	Monitoring interval (Soil)	Monitoring interval (Forest)	**Soil**									
						Mandatory items:							**Opetinal items**		
						Moisture Contents	pH(H20)	pH(KCl)	Exchangeable Base Cataions(Ca,Mg,K,and Mg)	Exchangeable Acidity	Effective cataion exchngeable Capacity (ECEC)	Carbonate contents	Exchangeable (AL,H)	Total carbon content	Total nitrogen content
<China>	Chongqing	Jinyunshan	Rural	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x
	Xi'an	Dabagou	Remote	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x
	Xiamen	Xiaoping	Remote	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x
	Zhuhai	Zhuxian dong	Urban	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x
<Indonesia>		Serpong	Rural	Once/3years	Once/3years		x	x	x		x	x	x	x	x
<Japan>		Ijira	Rural	Once/5years	Once/5year	x	x	x	x	x	x		x		
		Banryu	Urban	Once/5years	Once/5year	x	x	x	x	x	x		x	x	x
<Malaysia>		Pasoh Reserve Forest	Remote			x	x	x		x					
		Petaling Jaya	Remote												
<Mongolia>		Ulaanbaatar (Bogdkhan mountain)	Urban	Once/3-5years	Once/3-5years		x	x		x					
<Philippines>		Los Banos Laguna (Makiling Forest Reserve)	Rural	Once/3years	Once/3years	x	x	x	x	x	x		x	x	x
<Republic of Korea>		Imsil (Mt.Naejang)	Rural	Once/3years	Once/3years	x	x	x	x	x	x		x		
<Russia>		Mondy	Remote	Once/3-5years	Once/3-5years		x	x	x		CEC	x	AL	x	x
		Listvyanka	Rural	Once/3-5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x
		Primorskaya	Rural	Once/3-5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x
		Irkutsk	Urban	Once/3-5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x
<Thailand>		Vachralongkorn Dam	Remote	Once/3years	Once/3years	x	x	x	x	x	x				
<Viet nam>		Hoa Binh	Rural	Once/year	Once/year		x	x	x		CEC				

x*)Monitoring plan shows.

Table3. Soil & Vegitation monitoring

Country/items	City	Monitoring sites		**Forest monitoring**						
			Voluntary item	**mandatory item(3-5years)**					**Optional items**	
			Available phosphate/ Sulfate	Name of species	Diameter at Breast Height	Height of tree	Understory vegetation survey	Observation of tree decline	Photographic record of tree decline	Estimation of decline causes
<China>	Chongqing	Jinyunshan	x	x	x	x	x	x		
	Xi'an	Dabagou	x	x	x	x				
	Xiamen	Xiaoping	x	x	x	x				
	Zhuhai	Zhuxian dong	x	x	x	x	x	x		
<Indonesia>		Serpong	x	x	x	x		x		
<Japan>		Ijira	Sulfate	x	x	x	x	x	x	x
		Banryu		x	x	x	x	x	x	x
<Malaysia>		Pasoh Reserve Forest								
		Petaling Jaya								
<Mongolia>		Ulaanbaatar (Bogdkhan mountain)		x	x	x	x	x		
<Philippines>		Los Banos Laguna (Makiling Forest Reserve)		x	x	x	x	x		x*
<Republic of Korea>		Imsil (Mt.Naejang)		x	x	x	x	x		x*
<Russia>		Mondy	x							
		Listvyanka	x	x	x	x		x	x	x
		Primorskaya	x	x	x	x		x	x	x
		Irkutsk	x	x	x	x	x	x	x	
<Thailand>		Vachralongkorn Dam								
<Viet nam>		Hoa Binh						x		

x*)Monitoring plan shows.

Table4. Inland aquatic environment monitoring

Country/items	City	Monitoring sites	Classification	Monitoring interval	Mondatory items(4times/year)												Mondatory items(Once/ year)					Mondatory items(Once/in 3-5year)				Optional(4 tim
					W.T	pH	EC	Alkalinit	SO_4^{2-}	NO_3^-	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_4^+	Transparenc y	water color	DOC	NO^{2-}	PO_4^{3-}	Sediment(SO42-,NO3-,andNH4+in pore wat				Pytoplankton
<China>	Chongqing	Jinyunshan Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x										
	Xi'an	Jiwozi River	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x										
	Xiamen	Xiaoping Dam	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x										
	Zhuhai	Zhuxiandong Stream	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x										
<Indonesia>		Patenggang Lake	Rural	2 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x				x					
<Japan>		Ijira Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
		Banryu Lake	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					x
<Malaysia>		Semenyih Dam	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x										
<Mongolia>		Terelj River	Remote	6 times/year	x	x	x	x	x	x	x	x	x	x	x	x				x	x					
<Philippines>		Pandin Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x				x	x					
		Ambulalakao		1 times/year	x	x	x	x	x	x	x	x	x	x	x	x				x	x					
<Russia>		Pereemnaya	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
		Krastovka River	Rural	5 times/year	x	x	x	x	x	x	x	x	x	x	x	x				x	x					
<Thailand>		Vachiralongkorn Dam	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x					
<Viet nam>		Hoa Binh Reservoir	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x										

Table4. Inland aquatic environment monitoring

Country/items	City	Monitoring sites	Classification	Monitoring intervalnes/year)		Optional(Once/year)	Optional(Once/in 3-5 year)				
					Epilithic algae	T-Al	Living organisms)	Sediment(Pb,Pb210, and stable isotope of S)			
<China>	Chongqing	Jinyunshan Lake	Rural	4 times/year							
	Xi'an	Jiwozi River	Remote	4 times/year							
	Xiamen	Xiaoping Dam	Remote	4 times/year							
	Zhuhai	Zhuxiandong Stream	Urban	4 times/year							
<Indonesia>		Patenggang Lake	Rural	2 times/year							
<Japan>		Ijira Lake	Rural	4 times/year							
		Banryu Lake	Urban	4 times/year		x					
<Malaysia>		Semenyih Dam	Urban	4 times/year							
<Mongolia>		Terelj River	Remote	6 times/year							
<Philippines>		Pandin Lake	Rural	4 times/year							
		Ambulalakao		1 times/year							
<Russia>		Pereemnaya	Rural	4 times/year							
		Krastovka River	Rural	5 times/year							
<Thailand>		Vachiralongkorn Dam	Remote	4 times/year							
<Viet nam>		Hoa Binh Reservoir	Rural	4 times/year							