

WET DEPOSITION MONITORING IN MALAYSIAN METEOROLOGICAL DEPARTMENT (MMD)

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Outline

- Wet Deposition Monitoring in MMD
- Sampling & Chemical Analysis
- Constraints

Wet Deposition Monitoring in MMD

- Started since year 1984.
- involve 23 stations under Atmospheric Composition Monitoring Network over Malaysia.
- current instrumentation use are:
 - i. Tisch Acid Precipitation Sampler (APS) – collect **both wet and dry deposition** by using two different collector.
 - ii. Ecotech Wet Only Sampler - collect **wet deposition only** .
- Samples are then analyzed by Department of Chemistry.

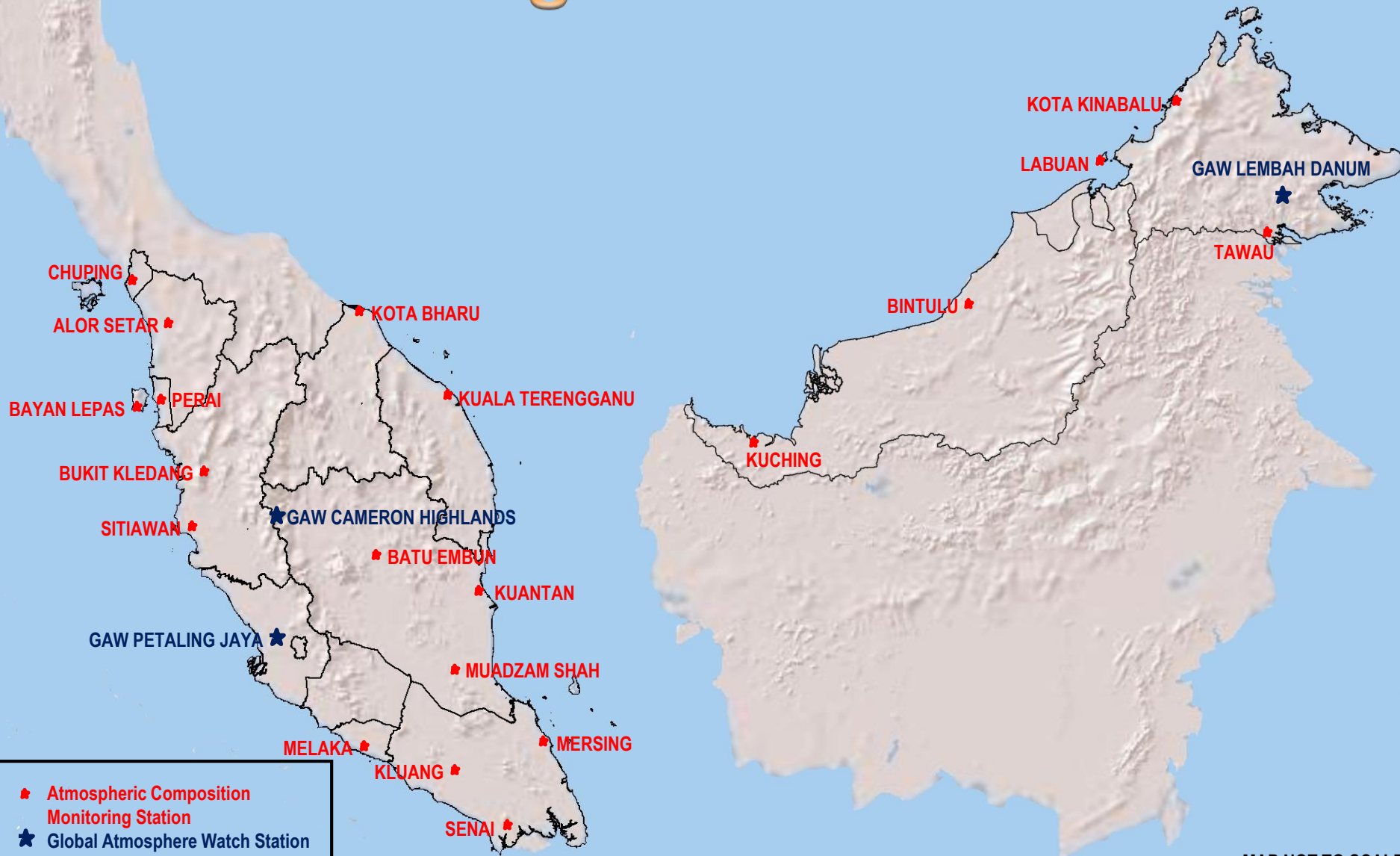


Acid Precipitation Sampler (APS)



Ecotech Wet Only Sampler

Atmospheric Composition Monitoring Network Stations



Sampling & Chemical Analysis

Instruments	Sampling Period	Parameter Analyzed	Chemical Analysis Instrument
Acid Precipitation Sampler (APS)	Wet Deposition: 1 week	Wet Deposition: Conductivity, pH, Anions(Cl^- , NO_3^- , SO_4^{2-} , organic acids), Cations (Na^+ , K^+ , Ca^{2+} , Mg^{2+} , NH_4^+) & Metals (Cd, Cu, Fe, Pb, Mn, Hg , Ni & Zn).	Wet Deposition: Ion Chromatography, Inductively Coupled Plasma Mass Spectrometry (ICP-MS), pH meter & Conductivity Meter
	Dry Deposition: 1 month	Dry Deposition: Dust weight, Metals (Mg, Ca, Cu, Fe, Pb, Mg, Mn. Hg , Ni & Zn)	Dry Deposition: Ion Chromatography
Ecotech Wet-Only Rainwater Sampler	1 week	Conductivity, pH, Anions(Cl^- , NO_3^- , SO_4^{2-} , organic acids), Cations (Na^+ , K^+ , Ca^{2+} , Mg^{2+} , NH_4^+) & Metals (Cd, Cu, Fe, Pb, Mn, Hg , Ni & Zn).	Ion Chromatography, ICP-MS, pH meter & Conductivity Meter

Wet Deposition Data

1. Monthly Wet Deposition Data - Petaling Jaya GAW Station (Urban Site)

JABATAN METEOROLOGI MALAYSIA												
Wet Fallout WEF												
Wet Fallout WEF results												
Station:	PETALING JAYA											
Period:	2017-01-01 00:00 - 2017-12-31 23:59											
Latitude :	3° 06' 07" N											
Longitude:	101° 38' 42" E											
Elevation :	58.6 m											
Unit:	umol/L											
PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CALCIUM_WETK	5.54				2.81	8.37	4.50	4.59	3.42	2.70	3.69	4.22
CHLORIDE_WETK	7.27				6.97	12.34	10.67	13.47	6.31	15.90	6.66	12.24
CONDUCTIVITY_WETK	2.33				1.93	3.53	1.81	2.22	0.94	1.40	1.15	2.09
FLOURIDE_WETK	0.40				0.39	0.68	0.45	0.43	0.41	2.63	1.52	2.35
IRON_WETK	0.21				0.19	<0.070	<0.070	0.13	0.01	0.01	0.03	0.13
MAGNESIUM_WETK	0.79				0.02	1.03	0.83	0.47	<0.070	1.00	<0.070	1.01
MSA_WETK	<0.03				<0.03	<0.03	<0.03	<0.03	<0.03	0.06	0.03	<0.03
NH4_WETK	12.41				15.04	25.92	29.38	18.71	10.03	8.02	10.07	25.91
NO3_WETK	34.61				27.59	51.13	28.86	29.49	12.73	21.64	19.57	36.91
PH_WETK	4.40				4.49	4.24	4.61	4.50	4.79	4.67	4.68	4.57
POTASSIUM_WETK	1.68				1.07	2.92	1.63	2.05	1.06	1.57	1.24	2.06
SO4_WETK	18.64				12.41	21.90	17.76	18.50	8.87	7.14	7.44	14.02
SODIUM_WETK	5.34				3.30	5.27	5.54	8.80	3.67	11.79	3.50	6.68
ACETATE_WETK	0.132				0.074	2.025	<0.050	0.510	0.375	<0.050	<0.050	<0.050
COPPER_WETK	0.024				0.034	<0.005	0.025	0.027	0.010	0.007	0.024	0.029
LEAD_WETK	0.006				0.004	<0.001	0.006	0.015	0.002	0.005	0.008	0.013
MANGANESE_WETK	0.122				0.104	<0.003	0.024	0.080	0.030	0.013	0.015	0.047
MERCURY_WETK	<0.001				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NICKEL_WETK	<0.030				<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
VOLUME	1.380				3.590	1.820	1.150	2.470	2.820	4.680	1.980	1.650
ZINC_WETK	0.246				0.133	<0.010	0.422	0.240	0.130	0.153	0.182	0.340

Constraints

1. Lack of facilities for mercury chemical analysis:

- Current instrument use are limited up to trace level detection only.
- Minimum Detection Limit (MDL) for each instruments are as follow:
 - i. Inductively Coupled Plasma Mass Spectrometer (ICP-MS) - 0.0001mg/L
 - ii. Cold Vapor-Atomic Absorption Spectrometer (CV-AAS) - 0.0008 mg/L
 - iii. Flow Injection Mercury System (FIMS) - 0.005 mg/L
- No Clean Room Class 100

2. Not able to fulfill the mercury sampling procedure:

- Technnical Manual for Wet Deposition Monitoring in East Asia by Acid Deposition Monitoring Network (EANET)
- Current rainwater monitoring instrument is not suitable for mercury monitoring.

A scenic landscape at sunrise or sunset. The sun is low on the horizon, casting a warm glow over a sea of clouds that fills the valleys. Dark silhouettes of mountains and trees are visible against the bright sky. The text "Thank You.." is overlaid in a large, red, handwritten-style font.

Thank You..