Workshop for Strengthening Air Quality Monitoring in Latin America
August 26-29, 2019

Location: ***Sistema de Monitoreo Atmosférico Ciudad de México (SIMAT- Laboratorio)***
Av. Sur de los Cien Metros S/N. Col. Nueva Vallejo, Alcaldía Gustavo A. Madero.

The air quality in heavily dense cities is a topic of concern to governments due to the growing impact of pollution in the public health. According to the World Health Organization (WHO), 93000 deaths in low and middle-income countries (LMIC) and 44000 in high income (HI) countries are attributable to environmental air pollution. In addition to the human health factor, pollution also has effects on the environment and the economy. Consequently, governments are putting a lot effort on air pollution monitoring.

Bearing in mind the importance of this topic for the region, the Organization of American States (OAS) and the National Institute of Standards and Technology of the United States (NIST), together with the Costa Rican Metrology Laboratory (LACOMET), The National University of Costa Rica (UNA) and the National Metrology Center of Mexico (CENAM) implemented the Regional Workshop: Contribution of Metrology for the Quality Assurance of the Measurements of the Air Quality Monitoring Networks in June of 2018. The activity addressed metrological capabilities associated with the operation of the air quality monitoring stations, as well as their maintenance and calibration.

The event had the participation of 70 experts from 15 countries of the Region, whom analyzed issues such as the role of metrology in the operation and management of air quality monitoring systems; calibration and traceability protocols for air quality monitoring systems; instrumentation, CRM, etc. The workshop also included practical examples on how countries with more developed air quality monitoring networks such as Brazil, Mexico and the United States performed quality assurance and compliance of the air quality measurements. The activity generated opportunities for meeting people with common interests and /or complementary knowledge, exchange of best practices in the fields of metrology and air quality.

See agenda here:

http://www.oas.org/es/sedi/dsd/Energia/Metrologia/Documentos/TallerCR_AgendaPresentaciones.pdf

Following up the results achieved in this workshop, a new activity intended to address the traceability of measurements is currently being planned. The workshop's objective is to train the operators of atmospheric monitoring networks in the main cities of Latin America, in order to improve the traceability of the measurements that are made and achieve a network of cooperation at a regional level.

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The activity will consist of a practical theoretical workshop that will begin with the presentation of the current situation of the different countries followed by practical (hands on in the lab) and theoretical training in the following topics:

I. Techniques and calibration methods for automatic analyzers and manuals for suspended particle (PM10 and PM2.5), calculations to determine the minimum detection limit and its traceability; Contrasted/comparison methods; equivalent alternative methods vs reference methods.

II. Methods to ensure the correct generation of calibration standards. Zero air, ozone and dilutions used mass dilution systems in the gas calibration systems criterion. Calculation of uncertainty of the dilutions.

III. Determination of the uncertainty in the measurements of the criteria pollutants: O3, NOx, CO, SO2 and Particulate Material using FRM / FEM.

IV. Representativeness of the measurement point: Correct location of Atmospheric Monitoring stations and sampling system requirements.

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Agenda:

Monday August 26, 2019	
09:00 AM – 9:20 AM	Welcoming Remarks and Members Presentation **Mexico City Environment Secretariat (Sedema)-** ***Dr. Marina Robles García, Secretary** of the **environment** of **Mexico City*** **Organization of American States (OAS)-** ***Ambassador Dr. Aníbal Enrique Quiñónez*** **National Institute of Standards and Technology (NIST) U.S.A –** ***Mrs. Magdalena Navarro***
9:20 AM	Group Picture
Presentations of air quality monitoring systems (15 minutes each PPT)	
09:25 AM - 11:00 AM	**Costa Rica - San José:** Red de Monitoreo de Calidad del Aire para el Gran Área Metropolitana de Costa Rica (GAM)- Universidad Nacional de Costa Rica ***- José Felix Rojas Marín*** **Ecuador** - **Quito**: Secretaria de Ambiente- Gobierno Autónomo descentralizado de Quito. Unidad de Investigación, Análisis y Monitoreo- Red Automática de Monitoreo de la Calidad del Aire - ***Agustín Bolaños*** **México- Ciudad de México:** Sistema de Monitoreo Atmosférico de la Ciudad de México (SEDEMA–SIMAT) - ***Olivia Rivera Hernandez*** **México: Guanajuato:** Secretaría de Medio Ambiente y Ordenamiento Territorial- Estado de

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	Guanajuato. - ***Juan Pablo Arredondo Acosta - Coordinador de Monitoreo Atmosférico*** **México-Jalisco:** Sistema de Monitoreo Atmosférico- Secretaría del Medio Ambiente y Desarrollo Territorial- Estado de Jalisco - ***Jorge Edgar Blanco Gomez*** **México-Nuevo León:** Departamento del Sistema Integral de Monitoreo Ambiental- Dirección de Gestión Integral de la Calidad del Aire- Secretaría de Desarrollo Sustentable- Gobierno del Estado de Nueva León - ***Jaime Alejandro de la Garza Diaz*** **Peru-Lima:** Dirección de Calidad Ambiental y Ecoeficiencia- Dirección General de Calidad Ambiental- ***Luis Antonio Ibáñez Guerrero***
11:00 AM – 11: 15AM	Coffee break (15 min)
11:15 AM – 12:15 PM	**Argentina - Buenos Aires** Agencia de Protección Ambiental –S.O Monitoreo Atmosférico, Buenos Aires - ***Maria Inés de Casas*** **Brasil - Sao Paulo** Companhia Ambiental do Estado de Sao Paulo (CETESB) - ***Maria Lucia Gonçalves Guardani*** **Colombia – Medellín** Red de Monitoreo del área metropolitana del Valle de Aburra – ***Tiberio Benavides Hernandez*** **Chile –Santiago** Superintendencia del Medio Ambiente (SMA)- ***Isabel Leiva Campos***

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	Uruguay- Montevideo Laboratorio Tecnológico del Uruguay- ***Phd Jorge Zarauz***
Presentation of Institutes providing traceability to the gas emission measurements	
12:15PM – 1:15 PM	Laboratorios de Referencia del Instituto Nacional de Ecología y Cambio Climático (INECC- México)- **Valia Martitza Goytia** Centro Nacional de Metrología (CENAM-México)- **Roberto Arias** NIST (EPA)- ***James E. Norris***
1:15 PM – 2:15 PM	Lunch
TOPIC*: Procedures to ensure the correct generation of calibration standards.*	
2:15PM- 3:45 PM	a) Zero Air, certification –CA- **Jaime Contreras (30 min)** b) Ozone generator, distinction between levels (SRP1, L2,L3 y L4) &Transfer of standard ozone level L3 and certification 6x6 de L3 and L2 (equipment traceability up to SRP1) – **James Norris (NIST**) (30 Min) c) Ozone level 2 and 3 certification by 6X6 providing traceability to SRP. Procedures for calibration of O3 equipment with standard level L3 or L4. Equipment practice (demonstration) - Questions and Answers – CHRD – ***James Norris*** **& Joel Craig (30 min)**
3:45PM – 4:00PM	Coffee Break
4:00PM – 5:00 PM	Ozone equipment lab demonstration (Interactive discussion: Q&A)

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Tuesday, August 27, 2019	
TOPIC: *Procedures to ensure the correct generation of calibration standards (continuation).*	
9:00 AM- 10-45 AM	a) Obtaining and using mix cylinders or individual gases and the recommendation– **James E. Norris - NIST/ Jorge Koelliker CENAM** b) Calibration of MFCs, dilutions' generation (traceability of equipment) and use of mass dilution systems in the calibration systems of criteria gas. (Equipment traceability). Discussion on uncertainty/allowable tolerance. Practice with equipment (ML800) – Q&A. **Joel Craig (30 - 45 min)**
10:45- 11:00 AM	Coffee Break
TOPIC: *Quality control procedures in the monitoring of criteria pollutants and Good Practices.*	
11:00 AM – 12:45 PM	c) Flow, pressure and temperature measurement standards, measurements (CENAM) - **Roberto Arias (CENAM) (45 min)** d) Calibrations of automated Reference Method (FDS/METONE/FH62C14/TEOM) PM10 y PM2.5 samplers, general recommendations for other types of equipment. Equipment practice. Q&A- **Joel Craig (45- 60 min)**
12:45 PM- 2:00 PM	Lunch
2:00 PM – 3:45 PM	e) Comparison between equivalent methods against reference method and Good Practices- **Jaime Contreras (30-45 min)** f) Quality Assurance in manual samplers, field blanks, trip blanks, duplicates, special samples and data management - **Armando Retama/Jaime Contreras (60 min)**
3:45 PM- 4:00 PM	Coffee Break
4:00 PM- 5:00 PM	g) Why QC is critical? And data validation template- **Jaime Contreras**

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	(30-45 min) h) Performance Audits: current practice and challenges- **Jaime Contreras (30-45 min)**
Wednesday, August 28, 2019	
TOPIC: *Representativeness of data for air quality monitoring*	
9:00 AM- 10-45 AM	a) General planning for the establishment of new stations. Discussion on station siting criteria including spatial scale of representativeness of monitoring sites. (microscale, neighborhood, regional, microscale, state level, and others)- **Joel Craig (60 min)** b) Data Validation Steps- **Joel Craig (30-45 min)**
10:45 AM- 11:00 AM	Coffee Break
11:00 AM – 12:45 PM	c) Electronic Documentation System Using Excel- **Joel Craig (30 - 45 min)**
12:45PM – 2:00 PM	Lunch
2:40 PM – 5:00 PM	Visit to the Reference Laboratories of the National Institute of Ecology and Climate Change **(INECC-SEMARNAT).** How to achieve traceability for O3: reference photometer? Open forum discussion.
Thursday, August 29, 2019	
TOPIC: Importance of having an assurance system and quality control to operate the monitoring network.	
9:00 AM- 10-45 AM	a) General requirements and structure of standard operating procedures including quality control criteria for gas and particulate measurements. – QAPP- QMP-SOP- **Joel Craig (30 – 45 min)** b) Performance and Technical Systems Audits- **Jaime Contreras (30 -45 min)**

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10:45 AM- 11:00 AM	Coffee Break
11:00 AM – 12:45 PM	c) Staff training plans and evaluation of technical staff- ***Joel Craig (20 – 30 min)*** d) Use of low-cost technologies to complete the monitoring network and / or in which cases they can be used- **Jaime Contreras (30 – 45 min)**
12:45PM – 2:00 PM	Lunch
3:00 PM – 5:00 PM	Visit to the Air Quality Information Center of the atmospheric monitoring system of Mexico City / Open forum discussion

Location

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