Session IIIb: Standards for GHG Emission Inventories

Pre-submitted Abstracts for Discussion Sessions:

1. GHG Measurement and Verification, Chikako Makino (Japan Accreditation Board, on behalf of ILAC and IAF)

2. What is the most important factor of controlling the carbon forests hold? Chuixiang Yi, CUNY Queens College Stockholm University Bolin Centre

3. Uncertainty Analysis of Stack Gas Flow Rate Measurement for Continuous Emission Measurement of GHGs emission, Woong KANG (KRISS)

Title: GHG Measurement and Verification

Speaker: Chikako Makino

Institute: Japan Accreditation Board, on behalf of ILAC and IAF

Abstract:

The presentation will review IAF practices in relation to ISO 14065 accreditation, how GHG measurement, reporting and verification at the installation, project, and organizational levels have been implemented with ISO standards ISO 14064, ISO/IEC 17020, and ISO/IEC 17025, and how calibrated monitoring points and accredited laboratory testing reports help minimize measurement uncertainty and assure the quality of emission factors and GHG data. The presentation will also address current and future challenges around meeting expected materiality requirements and management of uncertainty, as well as required capacity building for the future.

Title: What is the most important factor of controlling the carbon forests hold?
Speaker: Chuixiang Yi
Institute: CUNY Queens College Stockholm University Bolin Centre

Abstract:
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Terrestrial ecosystems hold about three times as much carbon as the atmosphere does, which currently serves a carbon sink by absorbing about 28% of anthropogenic CO_2 emission annually. The capacity of this terrestrial carbon storage might be degraded or shifted from carbon sinks to sources by climate change, or the forcing of atmospheric CO_2 increasing. This potential alteration of the terrestrial carbon storage would contribute to a positive climate-carbon feedback and thus accelerate global warming. Here, we use a simple land carbon budget model to investigate the equilibrium responses of terrestrial carbon storage to climate change and the increasing of atmospheric CO_2 based on data produced by the earth system models and collected by FLUXNET. We found that with increasing of atmospheric CO_2:
(1) the carbon storage of broadleaf evergreen forests will keep increasing even the increasing rate becomes slow;
(2) the capacity of coniferous forest carbon storage will become saturated at certain level of atmospheric CO2; and
(3) the terrestrial ecosystems of tundra, C3 and C4 grasslands will transit from carbon sinks into carbon sources at critical level of the atmospheric CO_2, respectively.
We are studying the sensitivities of biome carbon storage equilibrium to increasing atmospheric CO2 and climate drivers. I will report the potential answers at the workshop to the question: what is the most important factor of controlling the carbon forests hold?

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Title: Uncertainty Analysis of Stack Gas Flow Rate Measurement for Continuous Emission Measurement of GHGs emission

Speaker: Woong KANG,
Institute: KRISS

Abstract:
Under the United Nations Framework Convention on Climate Change (UNFCCC), all countries concerned are required to reduce greenhouse gases (GHGs) emission for mitigating climate change. In order to reduce GHGs emission, accurate and reliable GHGs emission estimate with proper uncertainties should be carried out first. GHGs emission estimate have been based on an activity-based method (i.e., fuel consumption and emission factor) and a continuous emission measurement (CEM). CEM directly measures GHGs emission through monitoring GHG concentrations and volumetric flow rate at a stack. In the U.S Environmental Protection Agency (EPA), GHGs emission by CEM was classified as a highest quality tier (IV) with lowest uncertainty level. For evaluating an accurate uncertainty of CEM method, flow rate measurements in the stack as well as GHGs concentration measurements by gas analyzer are crucial due to various uncertainty factors. In this study, the uncertainties in stack gas flowrate measurement with S type Pitot tube is estimated for the CEM method in a heat and power generation plant. Associated uncertainties of accumulated stack flow rate in national tele-metering system (TMS) are calculated by propagating the uncertainties of input variables such as differential pressure, density, water content and velocity distribution. The major uncertainty contributor is the velocity distribution in the cross section of the stack, which is 1.54 %. The relative expanded uncertainty for the stack gas flowrate measurement is estimated as 3.9 % at approximately 95 % confidence level with coverage factor k=2.