14th International Workshop on Greenhouse Gas Measurements from Space
Toronto, Canada

Earth Sciences Centre
5 Bancroft Ave, Toronto, ON

Tuesday May 8, 2018

8:00 Registration

8:30 **Welcome, Logistics, Opening Remarks**
Dylan Jones (U. Toronto, Canada) and Ray Nassar (ECCC, Canada)

Session 1: On-going and near-term satellite missions and calibration.
Co-chairs: Annmarie Eldering (JPL/CalTech, USA), Akihiko Kuze (JAXA, Japan), and Kaley Walker (U. Toronto, Canada)

8:45 1.1: **Precision, Accuracy, Resolution, and Coverage: A few insights from GOSAT and OCO-2**
David Crisp (JPL, Caltech, USA)

9:00 1.2: **Recent progress of GOSAT project and preparation for GOSAT-2 at National Institute for Environmental Studies (NIES)**
Tsuneo Matsunaga (NIES, Japan)

9:15 1.3: **TanSat Scientific Achievements and Future Plan**
Yi Liu (Chinese Academy of Sciences, China)

9:30 1.4: **Status of the Sentinel-5 Precursor Mission and First Results on Methane**
Claus Zehner (European Space Agency)

9:45 1.5: **Measurements of Carbon Monoxide from Space using the MOPITT Instrument**
James R. Drummond (U. Toronto, Canada)

10:00 Break

Session 2: Retrieval algorithms and uncertainty quantification.
Co-chairs: Chris O'Dell (CSU, USA) and Susan Kulawik (NASA Ames, USA)

10:30 2.1: **First Copernicus Climate Change Service (C3S) satellite-derived greenhouse gas (CO_2, CH_4) data set**
Michael Buchwitz (U. Bremen, Germany)

10:45 2.2: **Carbon dioxide retrieval from OCO-2 satellite observations using the RemoTeC algorithm: application to single-view and multiple-angle modes**
Lianghai Wu (SRON, Netherlands)

11:00 2.3: **Plume detection and characterization from XCO_2 imagery: methodology and expected uncertainties on derived point source fluxes**
Claude Camy-Peyret (Institut Pierre Simon Laplace, France)

11:15 2.4: **Correction of topography related biases in XCO_2 measurements from OCO-2**
Matthäus Kiel (Caltech, USA)

11:30 2.5: **Vertical distribution of Arctic methane from ground-based FTS measurements**
Otto Lamminpää (Finnish Meteorological Institute, Finland)

11:45 2.6: **IASI for Surveying Methane and Nitrous Oxide in the Troposphere: MUSICA products and its validation**
Omaira García (Meteorological State Agency of Spain, Spain)

12:00 LUNCH

1:30 **Address by Canadian Space Agency President**
Sylvain Laporte (CSA, Canada)

Session 3: Validation and supporting observations including ground-based and in-situ observations.
Co-chairs: Debra Wunch (U. Toronto, Canada) and Mahesh Kumar Sha (BIRA-IASB, Belgium)

2:00 3.1: **First results of the ESA AO project TCCON4S5P focusing on the validation of the Sentinel-5P methane and carbon monoxide using TCCON data**
Mahesh Kumar Sha (BIRA-IASB, Belgium)

2:15 3.2: **Comparisons of MOPITT XCO with TCCON**
Jacob Hedelius (U. Toronto, Canada)

2:30 3.3: **Update on the Validation of OCO-2 XCO_2 Data**
Greg Osterman (JPL, Caltech, USA)

2:45 3.4: **Application of TanSat algorithm on GOSAT observation - ATANGO and OCO-2 XCO_2 retrieval: validation, inter-comparison and new approach**
Lu Yao (Chinese Academy of Sciences, China)

3:00 3.5: **Views from the 6 aircraft campaigns (ACT-America, HIPPO, CONTRAIL, ATom, ORCAS, and ABoVE): assimilation of airborne CO_2 measurements into GEOS and comparisons with satellite retrievals**
Brad Weir (NASA GSFC/USRA, USA)

3:15 3.6: **Validation for Greenhouse Gases Measured by the Atmospheric Chemistry Experiment (ACE) Satellite Mission**
Kaley A. Walker (U. Toronto, Canada)

3:30 POSTERS and REFRESHMENTS – **A**

5:15 End of Posters

5:30 ICEBREAKER / RECEPTION

Wednesday May 9, 2018

8:45 Additional Registration

Session 1 continued: On-going and near-term satellite missions and calibration.
Co-chairs: Annmarie Eldering (JPL/CalTech, USA), Akihiko Kuze (JAXA, Japan), and Kaley Walker (U. Toronto, Canada))

9:00 1.6: **Atmospheric Chemistry Experiment (ACE) Greenhouse Gas Measurements: CO_2, CH_4 and HFCs**

Peter Bernath (Old Dominion U. & U. Waterloo, USA/Canada)

9:15 1.7: **GOSAT Calibration Updates and Operations toward an Optimized Observation Pattern**
Akihiko Kuze (Japan Aerospace Exploration Agency (JAXA), Japan)

9:30 1.8: **Characterization of OCO-2 biases and errors for flux estimates**
Susan Kulawik (BAERI at NASA Ames, USA)

9:45 1.9: **The OCO-3 Mission: Science Objectives and Instrument Performance**
Annmarie Eldering (JPL, Caltech, USA)

10:00 1.10: **Upper tropospheric and stratospheric trends of greenhouse gases as derived from MIPAS observations**
Gabriele P. Stiller (Karlsruhe Institute of Technology, Germany)

10:15 POSTERS and REFRESHMENTS – **B**

12:00 LUNCH

Session 4: *GHG observations to quantify hot spots and local/urban emissions.*
Co-chairs: Ray Nassar (ECCC, Canada) and Johanna Tamminen (FMI, Finland)

1:30 4.1: **Comparing carbon dioxide enhancement from anthropogenic emissions observed by GOSAT and OCO-2**
Hui Zhong (Chinese Academy of Sciences, China)

1:45 4.2: **Global XCO_2 anomalies: Direct space-based observations of anthropogenic CO_2 emission areas from OCO-2 and comparison with inventory-based estimates**
Janne Hakkarainen (Finnish Meteorological Institute, Finland)

2:00 4.3: **Advances in Quantifying Power Plant CO_2 Emissions from Space**
Ray Nassar (Environment and Climate Change Canada, Canada)

2:15 4.4: **Quantifying methane point sources from fine-scale (GHGSat) satellite observation of atmospheric plumes**
Daniel Varon (Harvard U., USA)

2:30 4.5: **First methane retrievals and hotspot identification with TROPOMI**
Haili Hu (SRON Netherlands Institute for Space Research, Netherlands)

2:45 4.6: **Detection of local CH_4 sources using the WRF-CHEM and TROPOMI XCH_4**
Sudhanshu Pandey (SRON Netherlands Institute for Space Research, Netherlands)

3:00 4.7 **CO_2 emissions from power plants derived from the Ozone Monitoring Instrument NO_2 dataset**
Debora Griffin (ECCC, Canada)

3:15 Break

Session 5: *Flux inversions on regional and global scales.*
Co-chairs: Dylan Jones (U. Toronto, Canada) and Junjie Liu (JPL, CalTech, USA)

3:45 5.1: **"Are we there yet?" A look at the status and prospects of inferring top-down carbon fluxes from CO_2 remote sensing**
Christopher O'Dell (Colorado State U., USA)

4:00 5.2: **On the spatial scales informed by surface and GOSAT CO_2 observations**
Saroja Polavarapu (Environment and Climate Change Canada, Canada)

4:15 5.3: **GOSAT CO_2 Inversion Inter-comparison Experiment Phase-II: intermediate progress report**
Hiroshi Takagi (National Institute for Environmental Studies, Japan)

4:30 5.4: **The OCO-2 Level 4 Flux Product: The Global Carbon Cycle as Seen From Space**
Sean Crowell (U. Oklahoma, USA)

4:45 5.5: **Role of Climate Variability and Land Use on Fire Emissions of Carbon Gasses in the 21rst Century**
John Worden (JPL, Caltech, USA)

5:00 5.6: **Evaluating GPP and respiration estimates over northern mid-latitude ecosystems using solar induced fluorescence and atmospheric CO_2 measurements**
Brendan Byrne (U. Toronto, Canada)

5:15 End of Day

Thursday May 10, 2018

8:45 Additional Registration

9:00 5.7: **Detecting drought impact on terrestrial biosphere carbon cycle over US in the context of carbon-climate interannual variability**
Junjie Liu (Jet Propulsion Lab, USA)

9:15 5.8: **Anomalies in Chinese CO_2 fluxes during 2015/2016 El Niño: Comparison between satellite and in-situ observation assimilation**
Jing Wang (Chinese Academy of Sciences, China)

9:30 5.9: **Reconciling satellite and in-situ estimates of North American methane emissions during the unconventional gas boom of 2007–2014**
Joshua Benmergui (Harvard U., USA)

9:45 5.10: **Identifying leaky wells in oil/gas fields by satellite observation of atmospheric methane**
Daniel Cusworth (Harvard U., USA)

10:00 GROUP PHOTO

10:15 POSTERS and REFRESHMENTS – **C**

12:00 LUNCH

Session 6: *Future missions and observing strategies.*
Co-chairs: Dave Crisp (JPL, CalTech, USA), Ray Nassar (ECCC, Canada), Yasjka Meijer (ESA)

1:30 6.1: **NASA's Carbon Cycle OSSE Initiative - Informing future space-based observing strategies through advanced modeling and data assimilation**
Lesley Ott (NASA Goddard Space Flight Center, USA)

1:45 6.2: **Assessing the potential of satellite spectro-imagery to monitor fossil fuel CO_2 emissions across the globe from city and daily scales to national and annual scales**
Yilong Wang (LSCE/IPSL, France)

2:00 6.3: **An updated status of MicroCarb Project**

François Buisson (Centre National d'Etudes Spatiales, France)

2:15	6.4: **State of play of the European Anthropogenic CO_2 Monitoring Mission** Yasjka Meijer (European Space Agency)
2:30	6.5: **European Anthropogenic CO_2 monitoring mission: Instrument spectral sizing and the supporting aerosol instrument** Jochen Landgraf (SRON Netherlands Institute for Space Research, Netherlands)
2:45	6.6: **The next generation of Chinese greenhouse gas monitoring satellite mission: TanSat-2** Dongxu Yang (IAP, Shanghai Advanced Research Institute, CAS, China)
3:00	Break
3:30	6.7: **IASI-New Generation: program status, system overview and scientific objectives** Adrien Deschamps (CNES, France)
3:45	6.8: **The GeoCarb Mission** Berrien Moore (University of Oklahoma, USA)
4:00	6.9: **ARRHENIUS: Exploring Carbon Regional Flux Dynamics in Africa, Europe and the Middle East from Geostationary Orbit** Andre Butz (U. Heidelberg, Germany)
4:15	6.10: **AIM-North: The Atmospheric Imaging Mission for Northern Regions** Ray Nassar (Environment and Climate Change Canada, Canada)
4:30	6.11: **CARBO: The carbon balance observatory** Charles Miller (JPL, Caltech, USA)
4:45	6.12: **Pulsed Lidar Measurements of CO_2 Column Concentrations in the 2017 ASCENDS Airborne Campaign, and beyond** James Abshire (NASA Goddard, USA)
5:00	Wrap-up **and** Discussion for IWGGMS-2019
5:30	End of Meeting

Posters

Posters should be portrait in orientation with maximum dimensions of 122 cm (height) x 92 cm (width). Posters should be set up in the morning of their session and taken down at the end of the day.

Tuesday May 8, 3:30-5:15 pm

A1.1	**Four years of IASI CO_2, CH_4, N_2O retrievals: validation with in situ observations from the Mauna Loa station** Carmine Serio (U. Basilicata, Italy)
A1.2	**Sentinel-5 Precursor: Early In-Flight Operation** Herbert Nett (ESA ESTEC, Netherlands)

A1.3	**Retrieved of L2 Products from new V205 L1B spectra in the thermal infrared band of TANSO-FTS over the Arctic ocean and comparison with retrieval from previous versions.** Sébastien Payan (LATMOS/Sorbonne U./CNRS /IPSL, France)
A1.4	**Characterization of the TanSat slit function using solar measurements** Zhaonan Cai (Chinese Academy of Sciences, China)
A1.5	**In-Flight Performance of TanSat Atmospheric Carbon Dioxide Grating Spectrometer** Zhong-Dong Yang (National Satellite Meteorological Centre, China)
A1.6	**Using satellite observations to constrain the combined impacts of ecosystem memory and climate extremes on the tropical carbon balance** A. Anthony Bloom (JPL, Caltech, USA)
A2.1	**The total IASI level 2 processor τ^2IP: Application to Seven-years of IASI sea surface temperature, CO_2, CH_4, N_2O retrievals for the Arctic Ocean during the summer season** Guido Masiello (U. Basilicata, Italy)
A2.2	**Reducing Biases in Greenhouse Retrievals by Quantifying Aerosol Scattering Effects: Case Study Using Measurements from the California Laboratory for Atmospheric Remote Sensing (CLARS)** Vijay Natraj (JPL, Caltech)
A2.3	**Spectroscopy for the OCO-2 mission: Progress and plans for addressing remaining challenges** Vivienne Payne (JPL, Caltech)
A2.4	**Aerosol properties in the atmosphere from GOSAT/CAI and GOSAT-2/CAI-2** Makiko Hashimoto (Japan Aerospace Exploration Agency, Japan)
A2.5	**What Can We Learn From Performing Simplified XCO_2 Retrievals on Synthetic Near-Infrared Observations?** Robert R. Nelson (Colorado State U., USA)
A2.6	**Sensitivity test for PPDF-S retrieval method using atmospheric radiative transfer model** Chisa Iwasaki (U. Tokyo, Japan)
A2.7	**Single-band carbon dioxide retrievals from the OCO2-satellite using the 2 micron band** Haili Hu (SRON, Netherlands)
A2.8	**Toward improvement of the retrieval algorithm for GOSAT TANSO-FTS SWIR L2 products** Hirofumi Ohyama (NIES, Japan)
A2.9	**Yonsei CArbon Retrieval Algorithm: Validation, Error Analysis, and Its Application to OCO-2 Satellite** Jaemin Hong (Yonsei U., Korea)
A2.10	**CO_2 Retrievals from OCO-2 using the UoL Retrieval: Validation against TCCON and evaluation of fast RT methods** Peter Somkuti (U. Leicester, UK)
A2.11	**CO_2 concentration in the boundary layer estimated from a synergy of SWIR and TIR of TANSO-FTS/GOSAT** Ryoichi Imasu (U. Tokyo, Japan)
A2.12	**The improvement of using aerosol information from CAPI/TanSat nadir observation in CO_2 retrieval: Theoretical analysis**

	Xi Chen (Chinese Academy of Sciences, China)
A3.1	**Philippines TCCON Project: Result on One-year Measurements and Future** Isamu Morino (NIES, Japan)
A3.2	**TCCON Updates and Improvements to Precision Requirements** Coleen M. Roehl (Caltech, USA)
A3.3	**Calibration of TCCON observations on Ascension Island with aircraft profiles from the NASA ATom campaigns** Dietrich G. Feist (Max Planck Institute for Biogeochemistry, Germany)
A3.4	**Simultaneous Nadir Overpass Matchups of GOSAT/TANSO-FTS and AQUA/AIRS: TIR Band April 2009 – August 2017** Jonathan Gero (U. Wisconsin, USA)
A3.5	**GOSAT and OCO-2 validation activities at Saga station and campaign sites** Kei Shiomi (JAXA, Japan)
A3.6	**Long-term Monitoring of Greenhouse Gases at the Izaña Atmospheric Observatory** Omaira García (Meteorological State Agency of Spain, Spain)
A3.7	**Comparison of N_2O and CH_4 retrievals from PARIS-IR and ACE-FTS.** Paul S. Jeffery (U. Toronto, Canada)
A3.8	**Ground based and satellite borne observations of greenhouse gases at Sodankylä, Finland** Rigel Kivi (Finnish Meteorological Institute, Finland)
A3.9	**Development of a portable, low-cost XCO_2 observation system using a grating spectrometer and analysis of observation results** Xiu-Chun Qin (Nagoya U., Japan)
A4.1	**Benchmarking chemistry-climate model top-of-atmosphere flux in the 9.6 micron infrared ozone absorption band with comparisons to satellite observations** Helen Worden (NCAR, USA)
A4.2	**First year results of the Fiducial Reference Measurements for GreenHouse Gases (FRM4GHG) intercomparison campaign performed at the Sodankylä TCCON site** Mahesh Kumar Sha (BIRA-IASB, Belgium)
A4.3	**The SACH4 project: Source Attribution of CH_4 using satellite observations, isotopic measurements and GEOS-Chem simulations.** Evelyn De Wachter (BIRA-IASB, Belgium)

Wednesday May 9, 10:15 am – 12:00 pm

B1.1	**The PFT results of the mission instruments of GOSAT-2** Masakatsu Nakajima (JAXA, Japan)
B1.2	**Overview of OCO-3 Status and Development** Annmarie Eldering (JPL, Caltech, USA)
B1.3	**Methane Sensing by a Small Fabry-Perot Interferometer on the Space Station.** William Heaps (Johns Hopkins Applied Physics Lab, USA)
B1.4	**GHGSat: Towards an Operational Constellation** Jason McKeever (GHGSat Inc., Canada)
B2.1	**MIPAS IMK/IAA carbon tetrachloride (CCl_4) retrieval and first comparison with other instruments** Ellen Eckert (U. Toronto, Canada)

B2.2	**Progress status of the GOSAT and GOSAT-2 SWIR L2 retrievals** Yukio Yoshida (NIES, Japan)
B2.3	**Evaluation of OCO-2 Small-Scale Variability Using Lidar and In Situ CO_2 Observations from the ACT-America Campaign** Emily Bell (Colorado State U., USA)
B2.4	**Preliminary XCO_2 retrieval results of TanSat in Dunhuang** Shupeng Wang (China Meteorological Administration, China)
B3.1	**Time Series Analysis for the ACE-FTS and MIPAS CFC-11 and CFC-12 Data Products** Jason Zou (U. Toronto, Canada)
B3.2	**Study on the first ground-based FTS measurements at Beijing, China and comparisons with GOSAT and OCO XCO_2 data** Xingying Zhang (China Meteorological Administration, China)
B3.3	**Evaluation of the seasonal cycle and variability of the trend from GOSAT methane retrievals** Ella Kivimäki (Finnish Meteorological Institute, Finland)
B3.4	**Improving OCO-2 Northern High Latitude Retrievals Over Snow** Joseph Mendonca (ECCC and U. Toronto, Canada)
B3.5	**A real-time retrieval of greenhouse gases from portable, ground-based Fourier-Transform Spectrometers** Kang Sun (U. Buffalo, USA)
B3.6	**Validation of Satellite Measurements with Portable Fourier Transform Spectrometers (EM27/SUN)** Nasrin Mostafavi Pak (U. Toronto, Canada)
B3.7	**Comparison of atmospheric CO_2 column measurements at high latitudes from ground-based and satellite-based methods** Nicole Jacobs (U. Alaska Fairbanks, USA)
B3.8	**COCCON - a framework for operating the EM27/SUN spectrometer** Omaira García (Meteorological State Agency of Spain, Spain)
B3.9	**Retrieving CO_2 profiles from TCCON near-infrared spectra** Sébastien Roche (U. Toronto, Canada)
B4.2	**The TROPOMI CO data product: Monitoring pollution with daily global coverage and high spatial resolution** Tobias Borsdorff (SRON Netherlands Institute for Space Research, Netherlands)
B4.3	**Greenhouse gas emission from megacities observed by GOSAT TANSO-FTS** Nobuhiro Kikuchi (Japan Aerospace Exploration Agency, Japan)
B4.4	**Analysis on possible anomalous regional emission and absorption events of greenhouse gases with GOSAT and OCO-2** Koki Kasai (Hokkaido U., Japan)
B4.5	**CO_2 emissions from anthropogenic and fire activity based on SCIAMACHY, GOSAT and OCO-2** Yusheng Shi (Chinese Academy of Sciences, China)
B5.1	**Broad-scale CO_2 fluxes given by inverting new (v8) retrievals of OCO-2 column CO_2** David Baker (CIRA/Colorado State U., USA)
B5.2	**A Comparison of Eddy Decompositions of TM5 and GEOS-Chem in CO_2** Andrew Schuh (Colorado State U., USA)

B5.3	**On what scales can GOSAT flux inversions constrain inter-annual variability in terrestrial ecosystems?** Brendan Byrne (U. Toronto, Canada)
B5.4	**On the consistency of OCO-2 XCO_2 data from different observing modes and their application to atmospheric inversion analyses** Feng Deng (U. Toronto, Canada)
B5.5	**The Impact of Accounting for 3-D CO_2 Production on Inversion for Natural Fluxes Using GOSAT and In Situ Observations** James S. Wang (USRA / NASA Goddard Space Flight Center, USA)
B5.6	**Opportunities and challenges of posterior CO_2 flux validation with aircraft CO_2 observations** Junjie Liu (JPL, Caltech, USA)
B5.7	**Satellite bias estimation by independent CO_2 inversion analysis** Takashi Maki (Meteorological Research Institute, Japan)
B5.8	**Implications of Overestimated Anthropogenic CO_2 Emissions on East Asian and Global Land CO_2 Flux Inversions** Tazu Saeki (NIES, Japan)
B5.9	**Radiance offset correction for observing SIF from GOSAT and inter-satellite comparison of the derived SIF** Haruki Oshio (NIES, Japan)
B5.10	**Seasonal changes in SIF in a warm-temperate evergreen coniferous forest in Japan** Hibiki M. Noda (NIES, Japan)

Thursday May 10, 10:15 am – 12:00 pm

C1.1	**MERLIN Level 0-1 Processing and Calibration Concept** Günter Lichtenberg (German Aerospace Centre (DLR), Germany)
C3.1	**Atmospheric CO_2 Concentration Measurements to Cloud Tops from an Airborne Lidar during 2017 ASCENDS Science Campaign in Alaska** Jianping Mao (U. Maryland, USA)
C3.2	**Methane Monitor: An Airborne, Wide-Swath, Methane Mapping Instrument** William Tandy (Ball Aerospace, USA)
C4.1	**Temporal and spatial variability of methane over Alberta as observed from space** Heba Marey (U. Toronto, Canada)
C4.2	**Finding emission sources with lightweight data driven modeling** Jouni Susiluoto (Lappeenranta U. of Technology & MIT, Finland / USA)
C4.3	**A methodology for characterizing methane emissions from urban and oil and gas producing regions using a methane column imaging satellite** Joshua Benmergui (Harvard U., USA)
C4.4	**The ODIAC - A global monthly high-resolution fossil fuel CO_2 emissions data product for tracer transport simulations and surface flux inversions** Tomohiro Oda (USRA/NASA Goddard, USA)
C4.5	**Comparing potential of a satellite constellation to monitor fossil fuel CO_2 emissions from large cities and industrial sites** Franck Lespinas (LSCE, France)
C5.2	**Monitoring Global OH Abundances using Satellite Observations of Atmospheric Methane**

	Yuzhong Zhang (Harvard U., USA)
C5.3	**Development of ECCC's regional transport model to simulate high spatial and temporal variability of atmospheric greenhouse gases** Jinwoong Kim (ECCC, Canada)
C5.4	**Tropical wetland methane emissions inferred from GOSAT XCH_4 retrievals** Mark Lunt (U. Edinburgh, Canada)
C5.5	**Global CO emission estimates inferred from assimilation of MOPITT CO data, together with observations of O_3, NO_2, HNO_3 and HCHO** Xuesong Zhang (U. Toronto, Canada)
C5.6	**How well do surface observations constrain the CO state? Assimilation experiments with EC-CAS in an OSSE framework** Vikram Khade (U. Toronto, Canada)
C5.7	**Towards global and regional methane budgets estimated by high spatial resolution atmospheric inverse model with GOSAT retrievals** Aki Tsuruta (NIES, Japan)
C5.8	**Impact of coarse model resolution on chemical transport modelling of methane** Ilya Stanevich (U. Toronto, Canada)
C5.9	**A city to national scale atmospheric inverse modeling system to assess the potential of new space borne measurement concepts for the monitoring of CO_2 anthropogenic emissions in Western Europe: a case study focused on Paris.** Diego Santaren (LSCE, France)
C6.1	**GOSAT score map toward optimizing sampling pattern for global and regional flux estimation** Fumie Kataoka (Remote Sensing Technology Center of Japan, Japan)
C6.2	**The next generation of TanSat and space-air-ground monitoring system** Lin Qiu (Chinese Academy of Sciences, China)
C6.3	**The European Anthropogenic CO_2 Monitoring Mission: Instrument requirements for space-borne measurement of greenhouse gas point sources** Bernd Sierk (European Space Agency (ESA))
C6.4	**Optical Bench Breadboard Of An Imaging Fourier Transform Spectrometer (IFTS) For Climate Observations** Gurpreet Singh (York U., Canada)
C6.5	**An Imaging Fourier Transform Spectrometer for Remote Nadir Atmospheric Measurements of CO_2, CH_4 and the O_2 A-band** Zahra Vaziri (York U., Canada)
C6.6	**Determining required signal-to-noise ratios for XCO_2 and XCH_4 precision targets: Application to AIM-North** Christopher Sioris (ECCC, Canada)
C6.7	**Reevaluating the use of Oxygen band at 1.27 micron in spaceborne remote sensing of greenhouse gases** Kang Sun (U. Buffalo, USA)
C6.8	**The MicroCarb L1 & L2 algorithms and performances** Denis Jouglet (CNES, France)
C6.9	**High resolution methane tracking micro-satellites** Richard L. Lachance (Bluefield Technologies, USA)
C6.10	**The challenges of measuring Methane from orbit** Haris Riris (NASA Goddard Space Flight Center, USA)

C6.11	**A Cost Effective Laser-Based Enhancement of Passive Carbon Monitoring Approaches form GEO or LEO Orbits** Jeremy Dobler (Harris Corporation, USA)
C6.12	**Combining cloud-top and total-column methane retrievals from an active sensor** Julia Marshall (Max Planck Institute for Biogeochemistry, Germany)
C6.13	**Airborne CO_2 Lidar Measurements for the Atmospheric Carbon and Transport - America (ACT-America) Project and the ASCENDS 2017 Field Campaign** Byron Meadows (NASA Langley, USA)