

# TEMPO/GEMS Joint Science Team Workshop

August 26-30, 2024

Courtyard by Marriott King Kamehameha Beach Hotel, Kailua-Kona, Hawaii, USA

## Oral Sessions

Date	Time (Local Time, -10 UTC)		Title	Speaker
AUG 26 (MON)	8:30	9:30	Registration	
	9:30	9:35	Opening Remarks	Han Seung Kum (President of NIER)
	9:35	9:55	Welcome	Jack Kaye (NASA HQ Associate Director for Research)
	<b>Keynote Presentation (Session Chairs: Wonjin Lee, Barry Lefer)</b>			
	9:55	10:15	New Era of Air Quality Monitoring over Asia from Space - GEMS	Jhoon Kim (Yonsei University)
	10:15	10:35	New Developments in DOAS-Type Satellite Instruments	Ulrich Platt (University of Heidelberg)
	10:35	10:55	From the Vision of GEO-CAPE to the Reality of TEMPO: The Current Capability and the Potential Value that Will Be Provided by Satellite Measurements to Benefit the Air-Quality Community	Jack Fishman (Saint Louis University)
	10:55	11:15	My history in air quality observations from space	Kelly Chance (online) (Harvard & Smithsonian)
	11:15	11:35	Sentinel-5P Mission Status	Claus Zehner (ESA Esrin)
	11:35	12:00	Group photo	
	12:00	13:30	Lunch on your own	
	<b>Session 1: The Status of TEMPO ( I ) (Session Chair: Hanlim Lee)</b>			
	13:30	13:40	Status of TEMPO: Commissioning and First Year Operation Results	Xiong Liu (Harvard & Smithsonian)
	13:40	13:50	TEMPO Solar Calibration	David Flittner (NASA LaRC)
	13:50	14:00	Overview of the TEMPO Level 0-1 processor	Heesung Chong (Harvard & Smithsonian)
	14:00	14:10	TEMPO CLDO4	Huiqun (Helen) Wang (Harvard & Smithsonian)
	14:10	14:20	TEMPO nitrogen dioxide: Algorithm and status	Caroline Nowlan (Harvard & Smithsonian)
	14:20	14:30	TEMPO HCHO retrieval status update	Gonzalo Gonzalez Abad (Harvard & Smithsonian)
	14:30	14:40	Status of the TEMPO total ozone and the TEMPO ozone profile algorithm: Evaluation using the other satellites, ozonesonde, and ground-based observations	Junsung Park (Harvard & Smithsonian)
	14:40	15:10	Panel Discussion	
15:10	15:40	Coffee Break		

<b>Session 2: The Status of TEMPO ( II ) (Session Chair: Rokjin Park)</b>			
	15:40	15:50	TEMPO Ground Segment and Science Operations Raid M Suleiman (Harvard & Smithsonian)
	15:50	16:00	TEMPO at Night James Carr (Carr Astronautics)
	16:00	16:10	TEMPO Data Services Georgina Hayes-Crepps (NASA LaRC)
	16:10	16:20	NASA GEOS Composition Forecast: Overview, TEMPO Support, and Version 2 updates Emma Knowland (NASA GSFC GMAO)
	16:20	16:30	TEMPO SO2 Retrievals Using a Principal Component Analysis based Algorithm: Preliminary Results and Potential Applications Nickolay Krotkov (NASA GSFC)
	16:30	16:40	Aerosol layer height Jun Wang (University of Iowa)
	16:40	16:50	Space and time resolution enable new science with TEMPO Ronald Cohen (UC Berkeley)
	16:50	17:20	Panel Discussion
	18:30		Welcome Reception
<b>Session 3: Validation of TEMPO (Session Chair: Jhoon Kim)</b>			
<b>AUG 27 (TUE)</b>	9:30	9:40	STAQS Airborne Observations with TEMPO Laura Judd (NASA LaRC)
	9:40	9:50	AEROMMA and TEMPO comparisons and science Carsten Warneke (NOAA CSL)
	9:50	10:00	Validation and support of space-based measurements with the Pandora Global Network of ground-based spectrometers Thomas Hanisco (NASA GSFC)
	10:00	10:10	Validation of TEMPO NO2 and HCHO using Pandora and TropOMI Barron Henderson (US EPA)
	10:10	10:20	TOLNet activities supporting TEMPO 2023-2024 Mike Newchurch (UAH)
	10:20	10:30	Aircraft-based validation of TEMPO during the AEROMMA campaign Eleanor Waxman (CIRES)
	10:30	10:40	TEMPO Indirect Validation using high resolution regional air quality modeling Brad Pierce (University of Wisconsin)
	10:40	10:50	Evaluating TEMPO with WRF-Chem and AGES+ Observations Brian McDonald (NOAA)
	10:50	11:00	Free tropospheric NO2 over the United States: cloud-sliced observations from TEMPO satellite instrument Ruijun Dang (Harvard University)
	11:00	11:10	Evaluation of GEOS-CF NO2 columns with TEMPO data Viral Shah (NASA GMAO)
	11:10	11:40	Panel Discussion
	11:40	13:00	Lunch on your own
<b>Session 4: Application/others of Geo-ring ( I ) (Session Chair: Myounghwan Ahn)</b>			
	13:00	13:10	Potential land applications of geostationary spectrometers as demonstrated with TEMPO Joanna Joiner (NASA GSFC)
	13:10	13:20	Preparing for GeoXO ACX using TEMPO data Joanna Joiner (NASA GSFC) on behalf of Shobha Kondragunta (NOAA)
	13:20	13:30	Development of the NOAA TEMPO Aerosol Detection Product Larry Flynn (NOAA) on behalf of Pubu Ciren (NOAA)

	13:30	13:40	TEMPO aerosol optical depth and aerosol layer height retrieval algorithm	Larry Flynn (NOAA) on behalf of Hai Zhang (NOAA)
	13:40	13:50	Harnessing Machine Learning to Explore the Potential of Ocean Color Measurements from TEMPO	Zachary Fasnacht (NASA GSFC)
	13:50	14:00	Principal Component-based Radiative Transfer Model (PCRTM) for Hyperspectral Remote Sensors	Xu Liu (NASA LaRC)
	14:00	14:10	Integration of new generation satellite constellation in a global multi-model multi-constituent chemical (MOMO-Chem) data assimilation for city-to-global scale air quality and climate research	Kazuyuki Miyazaki (NASA JPL)
	14:10	14:40	Panel Discussion	
	14:40	15:10	Coffee Break	
	<b>Session 5: Application/others of Geo-ring ( II ) (Session Chair: Limseok Chang)</b>			
	15:10	15:20	NASA Health and Air Quality: Integrating Satellite Observations for Air Quality Action	John Haynes (NASA HQ)
	15:20	15:30	Use of TEMPO Data in Early Adopter and Earth Science to Action Initiatives	Aaron Naeger (NASA MSFC)
	15:30	15:40	Enabling Stakeholder Use of Earth Observation Data with the NASA Health and Air Quality Applied Sciences Team (HAQAST)	Jenny Bratburd (University of Wisconsin-Madison)
	15:40	15:50	Data assimilation of the TEMPO products with the JEDI system	Jerome Barre (JCSDA)
	15:50	16:00	How Georgia EPD will use TEMPO products	Byeong-Uk (Georgia EPD)
	16:00	16:10	Interests and Applications for TEMPO Special Operations in Colorado	Dan Welsh (Colorado Department of Public Health and Environment)
	16:10	16:20	Observations of Lightning NOx Production from TEMPO Case Studies over the United States	Dale Allen (University of Maryland)
	16:20	16:30	CPSR Analysis of Vertical Sensitivity for TEMPO Ozone Retrieval Profiles	Arthur Mizzi (NASA ARC)
	16:30	16:40	The Satellite Needs Working Group (SNWG): Solutions for TEMPO and Air Quality	Kelley Murphy (UAH/NASA SPoRT)
	16:40	17:10	Panel Discussion	
<b>AUG 28 (WED)</b>	<b>Session 6: Poster Session</b>			
	9:00	12:00	See Poster List	
<b>AUG 29 (THU)</b>	<b>Session 7: The Status of GEMS ( I ) (Session Chair: Gonzalo Gonzalez Abad)</b>			
	9:30	9:40	Status of GEMS algorithm validation/improvement and GEMS-2 plan	Won-Jin Lee (NIER)
	9:40	9:50	Current Status and Future Plans for the GEMS Operations	Kyunghwa Lee (NIER)
	9:50	10:00	Current Applications and Future Plans for GEMS	JeongAh Yu (NIER)
	10:00	10:10	GEMS L1b Update	Myounghwan Ahn (Ewha Womans University)
	10:10	10:20	GEMS VOCs products update	Rokjin Park (Seoul National University)

10:20	10:30	Current Status of GEMS Total and ozone profile product	Jaehwan Kim (Pusan National University)
10:30	10:40	Improvement of the GEMS NO <sub>2</sub> operational retrieval algorithm with validation results	Yeonjin Jung (Pukyong National University)
10:40	10:50	Diurnal SO <sub>2</sub> observations from anthropogenic sources in Asia using GEMS and comparisons with low Earth orbit satellites	Hanlim Lee (Pukyong National University)
10:50	11:00	TROPOMI and GEMS NO <sub>2</sub> validation using MAX-DOAS and Pandora at Yokosuka with improved consistency	Yugo Kanaya (Japan Agency for Marine-Earth Science and Technology)
11:00	11:30	Panel Discussion	
11:30	13:00	Lunch on your own	
<b>Session 8: Application and Others (Session Chair: Caroline Nowlan)</b>			
13:00	13:10	MAESTRO: 21 years operating on orbit!	Tom McElroy (York University)
13:10	13:20	Near-Simultaneous Observations of XCO <sub>2</sub> and NO <sub>2</sub> Over Megacities from OCO-3, GEMS, and TEMPO	Thomas Kurosu (NASA JPL)
13:20	13:30	Estimation of city-scale NO <sub>2</sub> emission flux using the GEMS dataset	Ja-Ho Koo (Yonsei University)
13:30	13:40	Interpreting Summertime Hourly Variation of NO <sub>2</sub> Columns with Implications for Geostationary Satellite Applications	Deepanshu Chatterjee (Washington University in St. Louis)
13:40	13:50	High Cadence Observations of Volcanic Activity from the Geostationary UV Satellite Constellation	Simon Carn (Michigan Technological University)
13:50	14:00	Tracking Ambient Particulate and Gaseous Pollution from Space with AI	Jun Wang (University of Iowa) on behalf of Jing Wei (University of Maryland)
14:00	14:30	Panel Discussion	
14:30	15:00	Coffee Break	
<b>Session 9: Application and Others (Session Chair: Mike Newchurch)</b>			
14:50	15:00	Middle East & Africa Space-based Monitoring of Atmospheric-pollution (MEASMA) Observatory: Proposed Mission	Raid M Suleiman (Harvard & Smithsonian)
15:00	15:10	Enhancements to the GEMS and TEMPO designs for future missions	Dennis Nicks (BAE Systems)
15:10	15:20	Application of GEMS measurements for NO <sub>2</sub> monitoring in Asia	Changqing Lin (The Hong Kong University of Science and Technology)
15:20	15:30	Current state of Sulphur emissions over Asia observed by GEO and LEO space-born instruments	MariLiza Koukouli (Aristotle University of Thessaloniki)
15:30	15:40	An examination of the diurnal variation of NO <sub>2</sub> and HCHO using observations from GEMS and TEMPO	David Edwards (NCAR)
15:40	15:50	Integrated Tropospheric NO <sub>2</sub> Data Fusion for Air Quality Monitoring	Kai Yang (University of Maryland) on behalf of Zigang Wei (NOAA)

	15:50	16:00	Exploring the quality of Aerosol Layer Height and Aerosol Index products obtained by Polar and Geostationary passive satellites	Dimitrios Balis (Aristotle University of Thessaloniki)
	16:00	16:10	NO <sub>2</sub> Stratosphere-Troposphere Separation Estimated from UV and Visible Retrievals	Kai Yang (University of Maryland)
	16:10	16:40	Panel Discussion	
<b>AUG 30 (FRI)</b>	<b>Session 10: The Status of GEMS (II) (Session Chair: Brad Pierce)</b>			
	9:30	9:40	Overview of the PEGASOS Project for the Evaluation of Operational GEMS L2 Products	Ronny Lutz (German Aerospace Center)
	9:40	9:50	Comparison of GEMS tropospheric NO <sub>2</sub> products and validation with the Asian ground-based network	Kezia Lange (IUP Bremen)
	9:50	10:00	Tropospheric NO <sub>2</sub> retrieval algorithm for geostationary satellite instruments: applications to GEMS	Sora Seo (German Aerospace Center)
	10:00	10:10	Empirical Uncertainty of GEMS AEH by AOD and Surface reflectance	Sang Seo Park (UNIST)
	10:10	10:20	GEMS Cloud Algorithm: Validation Results and Ongoing Progress	Gyuyeon Kim (Ewha Womans University)
	10:20	10:30	ASIA-AQ/SIJAQ for GEMS validation	Limseok Chang (NIER)
	10:30	10:40	The Airborne and Satellite Investigation of Asian Air Quality (ASIA-AQ): Current Status	James Crawford (NASA LaRC)
	10:40	10:50	Current states of GEMS SFC algorithm and improvements	Suyoung Sim (Pukyong National University)
	10:50	11:00	GEMS total ozone evaluation within the ESA PEGASOS project	Katerina Garane (Aristotle University of Thessaloniki)
	11:00	11:10	Ground-based remote sensing validation efforts for the GEMS during the ASIA AQ campaign	Ukkyo Jeong (Pukyong National University)
	11:10	11:40	Panel Discussion	
	11:40	13:00	Lunch on your own	
	<b>Session 11: Application/others of Geo-ring (III) (Session Chair: Aaron Naeger)</b>			
	13:00	13:10	Interpretation of GEMS tropospheric NO <sub>2</sub> columns in relation to NO <sub>x</sub> emissions over Asian sources	Si-Wan Kim (Yonsei University)
	13:10	13:20	Insights from TROPOMI observations into HCHO and NO <sub>2</sub> retrieval based TEMPO and GEMS instruments	Yuhang Zhang (BIRA-IASB)
	13:20	13:30	Leveraging the Observations of Remotely Sensed HCHO Column to Assess Surface Ozone	Prajjwal Rawat (NASA LaRC)
	13:30	13:40	Observing downwind structures of urban HCHO and CHOCHO plumes with TROPOMI and GEMS: Implications to non-methane volatile organic compound emissions	Lei Zhu (Southern University of Science and Technology)
	13:40	13:50	Data assimilation of GEMS AOD for operational air quality forecasting	Soyoung Ha (National Center for Atmospheric Research)
	13:50	14:20	Panel Discussion	
14:20	14:40	Appreciation	Myung Soo Yoo (Director General of NIER)	
14:40	14:50	Closing Remarks	Barry Lefer (NASA HQ)	

