Joint 6th ROM SAF User Workshop and 7th IROWG Workshop

Agenda

Wednesday, 18 September 2019	
16:00-18:00	**Registration**
19:00-20:00	**Dinner (paid separately as part of the registration)**

Thursday, 19 September 2019		
07:00-09:00	**Breakfast and Registration**	
Session 1: Missions – Introduction and Welcome **Chair: Sean Healy**		
09:00-09:30	Introduction to EUMETSAT ROM SAF - IROWG 2019 and welcome address: Welcome and practical information Marianne Thyrring (Director, DMI) Lothar Schueller (SAF Network Manager, EUMETSAT)	
09:30-10:00	Richard A. Anthes	Advances in Atmospheric Science Using Radio Occultation* Observations (*Still the world's most accurate and precise thermometer from space!) **(Keynote)**
10:00-10:20	Kent B. Lauritsen	Overview of ROM SAF activities
10:20-10:40	Christian Marquardt	EUMETSAT: RO Present status and Future Plans **(Invited)**
10:40-11:00	**Coffee Break**	
Session 2: Missions **Chair: Kent B. Lauritsen**		
11:00-11:30	Chen-Joe Fong	From FORMOSAT-3/COSMIC to FORMOSAT-7/COSMIC-2 Mission: A New Era of Operational GNSS Radio Occultation Constellation Observing System **(Invited)**

Thursday, 19 September 2019		
11:30-12:00	Jan P. Weiss	COSMIC-2 Status and Initial Results **(Invited)**
12:00-13:00	**Lunch Break and Group Photo**	
Session 3: Missions **Chair: Stig Syndergaard**		
13:00-13:20	Bill Schreiner	Performance Assessment and Requirement Verification of COSMIC-2 Neutral Atmospheric Radio Occultation Data
13:20-13:40	T. K. Meehan	The TriG Radio Occultation System on COSMIC-2. Early Performance Assessment
13:40-14:00	Anders Carlström	The RO Instrument for MetOp-SG – Engineering Model Test Results
14:00-14:20	Dallas Masters	Status and Plans for Spire's Growing Commercial Constellation of GNSS Science CubeSats
14:20-14:40	Neill Bowler	Initial assessment of GNSS-RO data from Spire
14:40-15:00	Christian Marquardt	Assessment of Spire Commercial RO Data
15:00-15:20	**Coffee Break**	
Session 4: Missions **Chair: Bill Schreiner**		
15:20-15:40	Alex Saltman	The CICERO constellation: Characteristics, status and data
15:40-16:00	Torsten Schmidt	An overview of radio occultation activities at GFZ Potsdam: data processing and applications
16:00-16:20	Chad Galley	Jason-CS/Sentinel-6 GNSS Radio Occultation Instrument overview and Performance
16:20-16:40	E. Robert Kursinski	PlanetiQ GNSS RO Update
16:40-17:00	Weihua Bai	The FengYun-3 radio occultation sounder GNOS: a review of the missions and early results
17:30-18:30	**Early Dinner**	
18:30-21:00	**Ice Breaker** **(Bus departure at 18:30)**	

Friday, 20 September 2019		
07:00-09:00	**Breakfast**	
Session 1: Climate **Chair: Axel von Engeln**		
09:00-09:20	Peter Thorne	The Potential role of GNSS-RO data in the IPCC AR6 report **(Invited)**
09:20-09:40	Hans Hersbach	The Importance of GNSS Radio Occultation data in the ERA5 global reanalysis **(Invited)**
09:40-10:00	Hans Gleisner	The ROM SAF RO climate data record: validation and inter-mission consistency
10:00-10:20	Panagiotis Vergados	Quantifying the lapse rate feedback using GNSS radio occultation
10:20-10:40	Jeremiah P. Sjoberg	Estimates of errors in radio occultation and multiple reanalyses
10:40-11:00	**Coffee Break**	
Session 2: Climate **Chair: Julia Danzer**		
11:00-11:20	Andrea K. Steiner	Atmospheric temperature trends from observations – an update on recent advances
11:20-11:40	Anthony J. Mannucci	An Assessment of Reprocessed GPS/MET Observations Spanning 1995-1997
11:40-12:00	Mayra Oyola	GNSS/RO data Processing for Climate Applications at JPL: Assessing the performance of the next-generation OBS4MIPS atmospheric products retrievals
12:00-13:00	**Lunch Break**	
Session 3: Climate **Chair: Christian Marquardt**		
13:00-13:20	Gottfried Kirchengast	Climate Monitoring of Atmospheric Heat Content and Heat Exchange with the Oceans: A new Key Role for Radio Occultation
13:20-13:40	Axel von Engeln	Latest Reprocessing and Occultation Prediction Activities at EUMETSAT
13:40-14:00	Marc Schwärz	Radio occultation processing at the Wegener Center: Validation results and first long-term time series of rOPS
14:00-14:20	Florian Ladstädter	Climatological trends from RO

Friday, 20 September 2019		
14:20-14:40	Jordis Tradowsky	The ongoing collaboration between GRUAN and the radio occultation community
14:40-15:00	Johannes K. Nielsen	Uncertainty of temperature, humidity and pressure profiles from the first ROM SAF Climate Data Record
15:00-15:20	**Coffee Break**	
Session 4: Climate **Chair: Congliang Liu**		
15:20-15:40	Julia Danzer	Sensitivity and impact of the ionospheric kappa-correction on RO climatologies
15:40-16:00	Stig Syndergaard	Implementation and results of the kappa residual ionospheric correction in ROM SAF processing
16:00-16:30	Presentation of IROWG Working Group and ROM SAF User Workshop objectives	
16:30-16:45	Heikki Pohjola	WMO Space Programme Update
16:45-18:45	Poster session	**Please refer to the Poster List at the end of these tables**
19:00-20:00	**Dinner**	

Saturday, 21 September 2019	
07:00-09:00	**Breakfast**
Session 1	
09:00-10:40	Working groups
10:40-11:00	**Coffee Break**
Session 2	
11:00-12:00	Working Groups
Excursion	
12:00-22:30	**Excursion and Conference Dinner (inc. lunch sandwich to-go)** **(Bus departure at 12:00)**

Sunday, 22 September 2019	
07:00-09:00	**Breakfast**
Session 1	
09:00-10:40	Working groups
10:40-11:00	**Coffee Break**
Session 2	
11:00-12:00	Working groups
Free	
12:00-	Free day

Monday, 23 September 2019		
07:00-09:00	**Breakfast**	
Session 1: Space Weather **Chair: Weihua Bai**		
09:00-09:20	Riccardo Notarpietro	A multi-mission topside Total Electron Content product from GNSS-POD receivers on-board the EUMESTAT satellites
09:20-09:40	Irina Zakharenkova	Underutilized space-borne GPS observations for Space Weather monitoring
09:40-10:00	Haixia Lyu	Two methods of electron density retrieval from truncated ionospheric radio occultation data
10:00-10:20	Dong L. Wu	Understanding solar cycle variations of D/E-region electron density and sporadic-E (Es) with new GPSRO data
10:20-10:40	Vu Nguyen	Space weather observations from Spire's Growing CubeSat Constellation
10:40-11:00	**Coffee Break**	
Session 2: Space Weather **Chair: Riccardo Notarpietro**		
11:00-11:20	John Braun	COSMIC-2 Early Orbit Space Weather Data Assessment and Validation Activity
11:20-11:40	Iurii Cherniak	3D geolocation of ionospheric plasma irregularities by combination of RO and ground-based GNSS measurement
11:40-12:00	Mengjie Wu	An Abel inversion method assisted by an improved IRI model for GPS ionospheric radio occultation data
12:00-13:00	**Lunch Break**	
Session 3: New Techniques **Chair: Ben Ho**		
13:00-13:30	Estel Cardellach	Polarimetric GNSS RO aboard the PAZ satellite: status of the ROHP-PAZ experiment **(Invited)**
13:30-13:50	Ramon Padullés	Calibration and Validation of the Polarimetric Radio Occultation and Heavy Precipitation onboard PAZ experiment and potential scientific applications
13:50-14:10	Douglas Hunt	PAZ Neutral Atmosphere Radio Occultation Retrieval Processing
14:10-14:30	Gottfried Kirchengast	ISSI-BJ Forum on Exploring Greenhouse Gases, Water and Climate Changes by LEO-LEO Occultation: Main Results and Next Steps

Monday, 23 September 2019		
14:30-14:50	Congliang Liu	Introduction of Atmosphere and Climate Explorers LABoratory (ACELAB) mission concept
14:50-15:10	Jennifer S. Haase	Impact of Airborne Radio Occultation Observations on Atmospheric River Precipitation Forecasts on the US West Coast
15:10-15:30	**Coffee Break**	
Session 4: Science Applications **Chair: Estel Cardellach**		
15:30-15:50	Riley Fitzgerald	Formation-Flying CubeSat Constellations for Internal Gravity Wave Topography
15:50-16:10	Hallgeir Wilhelmsen	Double tropopause characteristics from the full radio occultation record
16:10-16:30	Patrick Laloyaux	Towards an unbiased stratospheric analysis
16:30-16:50	E. Robert Kursinski	ERA5, MERRA2 and GNSS RO Water Vapor Comparisons and Implications
16:50-17:10	Ulrich Foelsche	Observing Water Vapor with GNSS Radio Occultation Data
17:10-17.30	Bomin Sun	Utilization of GPSRO in the NOAA Products Validation Systems (NPROVS)
17:30-19:00	**SCOPE-CM RO-CLIM side-meeting**	
19:00-20:00	**Dinner**	

Tuesday, 24 September 2019		
07:00-09:00	**Breakfast**	
Session 1: NWP **Chair: Harald Anlauf**		
09:00-09:20	Hui Shao	GNSS-RO data assimilation advancement and implementation at JCSDA and NCEP
09:20-09:40	Francois Vandenberghe	Recent and New GNSS-RO missions: Quality Assessment and Comparative Data Assimilation Study
09:40-10:00	Benjamin Ruston	Present status and future directions of GNSS assimilation at NRL

Tuesday, 24 September 2019		
10:00-10:20	Neill Bowler	Revised observation uncertainties for bending angle assimilation
10:20-10:40	Mitsuhiro Shimada	Effect of GNSS Radio Occultation Data Assimilation in JMA's Global NWP System
10:40-11:00	**Coffee Break**	
Session 2: NWP **Chair: Neill Bowler**		
11:00-11:20	Dominique Raspaud	Recent developments on the assimilation of GNSS-RO bending angles in the Météo-France 4D-Var system
11:20-11:40	Sean Healy	The use of GPS-RO at ECMWF
11:40-12:00	Liu Yan	Assimilation of FengYun GNOS Radio Occultation Data in GRAPES
12:00-13:00	**Lunch Break**	
Session 3: NWP and Science Applications **Chair: Ben Ruston and Andrea Steiner**		
13:00-13:20	Mi Liao	Processing and quality control of FY-3C/GNOS data used in numerical weather prediction applications
13:20-13:40	Chad Galley	Near-real-time radio occultation processing operations for weather forecasting applications
13:40-14:10	M. E Gorbunov	Generalized Canonical Transform Method **(Invited)**
14:10-14:30	Chi Ao	Characterizing the Vertical Stratification of the Earth's Planetary Boundary Layer with GNSS Radio Occultation
14:30-14:50	Sergey Sokolovskiy	Initial Assessment of the First Results of Sensing the Lower Troposphere with COSMIC-2
14:50-15:10	**Coffee Break**	
Session 4: Science Applications **Chair: Ulrich Foelsche**		
15:10-15:30	Shu-peng Ho	Inter-comparison between GNSS RO and hyperspectral infrared soundings and combined retrieval results
15:30-15:50	Michelle Feltz	Investigating the Comparisons of Hyperspectral IR Sounders, Radio Occultation, and Radiosondes in Radiance Space

Tuesday, 24 September 2019		
15:50-16:10	Shu-peng Ho	NESDIS RO Science Studies and Quality Assurance through the STAR Integrated Cal/Val System
16:10-16:30	Changyong Cao	The Significant Roles of COSMIC2 GNSS RO in NOAA Integrated Calibration/Validation System for NWP
16:30-16:50	Valeria Cigala	GNSS RO technique pushes forward the detection of volcanic clouds
16:50-17:10	Pawel Hordyniec	Simulations and observations of cloud contributions to RO refractivity biases
17:10-17:30	Josef Innerkofler	Multi-Mission Multi-Center Level 1 Data Inter-Validation towards Wegener Center Reference Occultation System Reprocessing
19:00-20:00	**Dinner**	

Wednesday, 25 September 2019	
07:00-09:00	**Breakfast**
Session 1: Working Groups	
09:00-10:10	Working Groups
10:10-10:30	**Coffee Break**
Session 2: Plenary and closing	
10:30-12:00	Plenary Session: Reporting from Working Groups
12:00-13:00	Closing Session (with lunch sandwich)
13:00	End of Workshop

List of Posters		
1	Richard A. Anthes	The Three-Cornered Hat Method for Estimating Random Error Variances in Multiple Data Sets
2	M. E. Gorbunov	Kirkwood Distribution Function and its Application for the Analysis of Radio Occultation Observations
3	Stanislav Kireev	NOAA STAR 1D-var Retrieval Algorithm to Process Radio Occultation Data
4	Stephen S. Leroy	Analysis of the Diurnal Cycle in RO Data using Bayesian Interpolation
5	Pawel Hordyniec	The Southern Hemisphere jets and tropopause parameters derived from radio occultation monthly means
6	Bin Zhang	Using Radio Occultation observations to detect ATMS brightness temperature bias
7	Kuo-Nung Wang	A study of the effects of heavy precipitation on Polarimetric Radio Occultation (PRO) bending angle observations
8	Evans A. Y. Adom	FORMOSAT-7/COSMIC-2 GNSS Radio Occultation Mission: The role of University of Energy and Natural Resources and Capacity Building on RO data in Africa
9	Thomas Sievert	Simulating reflected GNSS-RO signals with wave-optics propagation
10	JaeGwan Kim	GNSS Radio Occultation Techniques and Applications at KMA
11	Matthias Stocker	Stratospheric temperature signals from post-2000 volcanic eruptions
12	Eun-Hee Kim	Assimilation of KOMPSAT-5 GNSS-RO data in KMA global NWP model
13	Xinjia Zhou	Construction of Temperature Climate Data Records from June 2006 to December 2018 using Multiple RO Missions
14	Jeremiah P. Sjoberg	The N-Concerned Hat method for estimating error variances between multiple data sets: theoretical considerations and comparisons with the two-cornered hat method
15	Vladimir Irisov	Radio Occultation Observations and Processing from Spire's CubeSat Constellation
16	Christian Marquardt	Empirical RO Uncertainty Estimates Based on Signal Spectra
18	Veronika Proschek	Analyzing structural uncertainty in rOPS and GPAC/ROPP processing: the chain from bending angle to dry-air atmospheric profiles
19	Ying Li	A new method to detect and monitor Sudden Stratospheric Warming events based on radio occultation: demonstration using the Jan-Feb 2009 event
20	Kent B. Lauritsen	The 17-year ROM SAF radio occultation climate data record

List of Posters		
21	Vinícius Ludwig Barbosa	MPS simulations of ionospheric irregularities in E and F-region on GNSS-RO signals
22	Riccardo Biondi	How the recent Anak Krakatau eruption affected the atmospheric structure?
23	Stig Syndergaard	A bi-local estimation approach for residual ionospheric correction of radio occultation bending angles
24	Sean Healy	The ROM SAF reanalyses
25	Sean Healy	Estimates of forward model and instrument error statistics in the troposphere
26	Tom Yunck	To Everything A Season: RO Coming Of Age