

SCIENTIFIC PROGRAM

THURSDAY, SEPTEMBER 10, 2026

08:00-09:00 **Registration** (and poster mounting time)

09:00-09:20 **Welcome & Opening Event**

Moderator: Tbd

Welcome and Remarks by the Organizers

Ulrich Foelsche, Julia Danzer, Marc Schwärz (OPAC-8): Organizational remarks

Hui Shao, Tony Mannucci (IROWG-11): IROWG introductory remarks

Welcome Address

Andrea Steiner (Dean – School of Environmental & Regional Sciences and Education, University of Graz)

09:20-10:30 **Opening Talks**

Moderator: Ulrich Foelsche

09:20-09:50 GNSS-RO for Climate (keynote)

Bill Randel

09:50-10:10 Occultations for probing atmosphere and climate at Uni Graz: highlights from 30 years ARSCLiSys Research Group science (invited)

Gottfried Kirchengast

10:10-10:30 Current and future activities in radio occultation at EUMETSAT (invited – 40 years EUMETSAT)

Christian Marquardt

10:30-11:00 **Coffee Break** (and poster mounting time)

11:00-12:25 **Morning Session**
Current Missions 1
Chair: Tbd

11:00-11:20 COSMIC Data Analysis and Archive Center GNSS Radio Occultation Status
(invited)

Maggie Sleziak-Sallee

11:20-11:40 Status on the processing of new and old satellite missions at the ROM SAF
(invited)

Stig Syndergaard

11:40-11:55 NOAA NESDIS Commercial Data Program - Overview and Status

Marc Gasbarro

11:55-12:15 PlanetiQ GNSS-RO Observing System: 2026 Update *(invited)*

Jonathan Brandmeyer

12:15-12:25 Operational and Emerging Capabilities from Spire's GNSS-RO and GNSS-R
Constellation *(invited)*

Vu Nguyen

12:25-14:00 **Lunch Break**

14:00-15:45 **Afternoon Session 1**
Current to Future Missions
Chair: Tbd

14:00-14:20 NOAA Commercial RO - Planning for the Future *(invited)*

Marc Gasbarro

14:20-14:35 Balancing RO Architecture and Design with Enterprise Needs: Take-Aways from
the NOAA RO Analysis of Alternatives

William Gullotta

14:35-14:50 Radio Occultation on Metop-D: Mission Overview and First Results

Riccardo Notarpietro

14:50-15:10 Updates on FY3F/3G/3H status and Private Sector Engagement *(invited)*

Mi Liao

15:10-15:30	Overview of YunYao RO Constellation, Data Processing and Data Quality (invited) Yan Cheng
15:30-15:45	Performance of Occultation Data from the Miniaturized GNSS Occultation Sounder (GNOS-M) Onboard the TianMu-1 Satellite Constellation Congliang Liu
15:45-16:15	Coffee Break
16:15-17:35	Afternoon Session 2 Specific occultation methods – Reflections and Airborne Chair: Tbd
16:15-16:35	Characterizing Earth's Planetary Boundary Layer (PBL) Using Grazing Reflected Signals (invited) Pangiotis Vergados
16:35-16:50	Tracking Sentinel-6 GNSS-RO Grazing Reflection Signals and its PBL Characterization Applications Kuo-Nung Wang
16:50-17:05	Toward a Mission-Agnostic Machine Learning Framework for GNSS-R Wind Speed Retrieval Elżbieta Lasota
17:05-17:20	1D-Var retrieval using refractivity observations from GNSS airborne radio occultation Pawel Hordyniec
17:20-17:35	Augmenting the dataset for investigating surface fluxes in atmospheric rivers using open-loop tracking airborne radio occultation in the lower troposphere Priyankar Bhattacharjee
17:35	Thursday Scientific Sessions Adjourn
18:00-22:00	Get-Together Party

FRIDAY, SEPTEMBER 11, 2026

09:00-10:35 Morning Session 1
NWP 1 – Processing, Assimilation and Forecasting Advancements
Chair: Tbd

09:00-09:20 Status of GNSS-RO assimilation at ECWMF (*invited*)
Katrin Lonitz

09:20-09:35 Impact evaluation of GPS Radio Occultation (GNSS-RO) In Australian Regional Models (*remote*)
Birtukan Biadglgne

09:35-09:50 GNSS RO Data Assimilation in the NOAA GFS: Recent Progress
Xuanli Li

09:50-10:05 Estimation of GNSS RO Observation Impact in CMA Global Numerical Weather Prediction System
Yan Liu

10:05-10:20 Impact of 2D ROPP Forward Operators and Airborne Radio Occultation Assimilation on Global Numerical Weather Prediction
Hui Christophersen

10:20-10:35 Increasing the impact of GNSS-RO observations in the Met Office NWP system
Neill Bowler

10:35-11:05 Coffee Break

11:05-12:30 Morning Session 2
Atmospheric Physics and Climate 1
Chair: Tbd

11:05-11:25 Global Variability of Double Tropopauses from Radio Occultation and Their Links to Climate Modes (*invited*)
Alejandro de la Torre

11:25-11:40 The impact of atmospheric extremes on tropopause characteristics
Matthias Stocker

11:40-11:55 Latest results in radio occultation wind field monitoring and analysis
Julia Danzer

11:55-12:10	Climatological Regimes of Precipitable Water Vapor Revealed by Clustering of GNSS Radio Occultation and ERA5 Data Alejandro de la Torre
12:10-12:25	Assessment of GRAS-RO and MW/IR Instruments on Metop-A in UTLS: Brightness Temperature Comparison Vinícius Ludwig-Barbosa
12:25-12:35	Group Photo
12:35-14:00	Lunch Break
14:00-15:35	Afternoon Session 1 Occultation Methodology 1 Chair: Tbd
14:00-14:20	An update of the estimation of the refractivity expression (<i>invited</i>) Josep Aparicio
14:20-14:35	Recent updates to the CDAAC neutral atmospheric RO data processing system Jeremiah Sjoberg
14:35-14:50	Characterizing Residual Ionospheric Errors in GNSS RO Bending Angles: A Comparative Analysis of COSMIC-1 and COSMIC-2 Jaehee Chang
14:50-15:05	Tandem Radio Occultation Experiments for Direct Estimation of Bending Angle Uncertainty: Metop and Sentinel-6 Applications Saverio Paoletta
15:05-15:20	GNSS RO bending angle accuracy in the lower troposphere Rob Kursinski
15:20-15:35	Commercial and COSMIC-2 GNSS-RO Neutral Atmosphere Near-real-time Product Processing and Generation at NOAA/STAR and Performance Assessment Changyong Cao
15:35-16:00	Coffee Break

16:00-17:00	Afternoon Session 2 IROWG Chair: Tbd
16:00-16:30	IROWG: Reports from CGMS-53 and CGMS-54 Tony Mannucci, Ulrich Foelsche, and Hui Shao
16:30-17:00	Open Actions from CGMS WGII and WGIII Pre-Planning of IROWG-12 (2027/28) Preparig the IROWG co-chair election
17:00-19:00	Poster Session Chair:
P1	COSMIC-2 Payload Status - From Launch through Extended Mission John Braun
P2	Evaluation of NOAA STAR-processed COSMIC-2 and Commercial GNSS RO Bending Angle Assimilation in the GFS Model William Miller
P3	Application of the three-cornered hat method to evaluate and compare model analyses and forecasts Jeremiah Sjoberg
P4	Impact of Vertical Observation Error Modeling of GNSS RO on Forecast Performance in the Korean Integrated Model Eun-Hee Kim
P5	Modulating the RO observation operator when assimilating 35,000 radio occultations per day during ROMEX Katrin Lonitz
P6	Evaluating the impact of a ray-tracing operator on the assimilation of Radio Occultation Observations Using JEDI and the GFS Atmospheric Model Hui Shao
P7	Developing a Forward Operator on Polarimetric Radio Occultation (PRO) observations Kuo-Nung Wang
P8	Assessing the potential of GNSS-R for tropospheric sensing using signal simulations Wiktoria Kowalczyk

P9	1DVAR assimilation of GNSS-ARO observations in ROPP software Aleksandra Maciejewska
P10	GNSS Radio Occultation Ducting in the Tropical Cyclone Boundary Layer and Implications for NWP Data Assimilation Kevin Nelson
P11	ROM SAF radio occultation activities for the period 2027 to 2032 Kent Lauritsen
P12	Construction and Application of Radio Occultation Bending Angle Climatology for Quality Control and Assessing Spatio-Temporal Variability Aashish Tripathee
P13	Robust Detection and Extraction of Radio Occultation (RO) Reflection Signals for Lower Troposphere Profiling Aashish Tripathee
P14	Tropopause variability at the edge of the tropics and the expansion of the tropical belt Florian Ladstädter
P15	Characterizing and Correcting GNSS Radio Occultation IWV Bias in Atmospheric River Conditions Using Multi-Source Observations Bahareh Rahimi
P16	Retrieval of Multi-GNSS TEC and Electron Density Profiles from Radio Occultation at NOAA/STAR with Applications to Recent Space Weather Storms Xi Shao
P17	Altitude and Spatial Distribution of Equatorial Plasma Bubbles Derived From GNSS Radio Occultation and Compared With GOLD Radiance Images Carles Quilis Alfonso
P18	Calibration, Processing, and Operations of the PlanetiQ Total Electron Content Observations Jonathan Brandmeyer
P19	Ionospheric Occultations and Scintillations from Cosmic-2 and Sentinel-6 Radio Occultation Antennas Chi Ao
P20	Comparing IRI-2020 Ray Tracing Absorption Estimates with Observed 10 MHz Signal Strength via the HamSCI GRAPE Network Gamal Zayed
19:00	Friday Adjourn
19:00-20:00	Dinner

SATURDAY, SEPTEMBER 12, 2026

09:00-10:30 IROWG Subgroup Working Meetings

10:30-11:00 Coffee Break

11:00-12:30 Consolidation of IROWG Subgroup-Recommendations

12:30-13:30 Lunch Break

13:30-22:00 Excursion and Dinner*

SUNDAY, SEPTEMBER 13, 2026

Optional excursion to Graz or explore Castle Seggau.*

*** SEE ENCLOSED INFO SHEET!**

MONDAY, SEPTEMBER 14, 2026

09:00-10:35	Morning Session 1 Specific occultation methods – Polarized and Infrared Chair: Tbd
09:00-09:20	Polarimetric Radio Occultations: Processing, simulations and exploitation (invited) Ramon Padullés
09:20-09:35	Processing Polarimetric Radio-Occultation Soundings with Wave Optics Methods Jonathan Brandmeyer
09:35-09:55	PlanetiQ linearly polarized RO results measuring precipitation Rob Kursinski (invited)
09:55-10:10	Development of a broadband frequency locked laser source for SWIR atmospheric occultation measurements Ting Yu
10:10-10:25	Fullink uncertainty evaluation for spaceborne infrared laser occultation measurements Sho Huang
10:25-10:55	Coffee Break
10:55-12:30	Morning Session 2 Current Missions 2 Chair: Tbd
10:55-11:15	The Operation and Orbit maintenance of FORMOSAT-7/COSMIC-2 Constellation Cheng-Yung Huang (invited)
11:15-11:30	GRAS-2 In-Orbit Verification Results for the First Metop-SG Satellite Anders Carlström
11:30-11:45	Precise orbit determination for Metop-D at EUMETSAT: status and challenges Verónica Rivas Boscán
11:45-12:00	Sentinel-6B Non-Time-Critical Radio Occultation products by EUMETSAT Sebastiano Padovan

12:00-12:15 Enhanced PBL Capabilities from the COSMIC-2 and Sentinel-6 Missions
Chi Ao

12:15-12:30 Advance of the Climate and Atmospheric Composition Exploring Satellites
Mission (CACES) in China
Zhihua Zhang

12:30-14:00 Lunch Break

14:00-15:35 Afternoon Session 1
Radio Occultation Data for Climate Monitoring
Chair: Tbd

14:00-14:20 GNSS radio occultation processing at the GFZ: 25 years of data for weather
forecast and climate research (*invited*)
Torsten Schmidt

14:20-14:35 EUMETSAT Reprocessing Activities
Francisco Martin Alemany

14:35-14:50 How recent armed conflicts disrupt RO GNSS climate monitoring
Sebastian Scher

14:50-15:05 The radio occultation reprocessing at the Wegener Center: Validation and
uncertainty evaluation of rOPS long-term climate monitoring data
Marc Schwärz

15:05-15:20 Methodology for determining climatic winds from radio occultation data
Irena Nimac

15:20-15:35 The impact of propagated GNSS RO uncertainties on climate trend estimates
Florian Ladstädter

15:35-16:05 Coffee Break

16:05-17:50	Afternoon Session 2 NWP 2 – ROMEX Data Usage Chair: Tbd
16:05-16:20	An extended ROMEX experiment Christian Marquardt
16:20-16:35	Dry temperature comparisons and diurnal variability from ROMEX radio occultation observations Jeremiah Sjoberg
16:35-16:50	Status of GNSS-RO in global data assimilation at DWD Harald Anlauf
16:50-17:05	GNSS-RO capabilities in JEDI Ben Ruston
17:05-17:20	Global Forecast Impacts of Radio Occultation Observations Using Traditional and AI-Based Data Assimilation with the AIFS Kristen Bathmann
17:20-17:35	Radio occultation simulation and prediction at EUMETSAT: current and future applications Francisco Sancho
17:35-17:50	Beyond COSMIC-2: Can polar and mid-inclination orbits fill the tropical gap? Francisco Sancho
17:50	Monday Scientific Sessions Adjourn
18:30-19:30	Dinner
20:00-22:00	Wine Tour

TUESDAY, SEPTEMBER 15, 2026

09:00-10:15 Morning Session 1

Occultations in ionospheric and planetary science

Chair: Tbd

09:00-09:15 Performance Assessment of Total Electron Content Products from the Spire Constellation

Matthieu Talpe

09:15-09:30 Development of GNSS-Based Data Assimilation for Space Weather at NRL Using JEDI

Hui Shao

09:30-09:45 Ionospheric Radio Occultation Data from LEO Satellite Constellations and Their Data Assimilation Applications

Naifeng Fu

09:45-10:00 Equatorial ionospheric irregularities from the COSMIC-2 mission during solar cycle 25

John Braun

10:00-10:15 Definition of system requirements and hardware selection for a cross-link radio occultation instrument to observe the lunar ionosphere

Giacomo Radaelli

10:15-10:45 Coffee Break

10:45-12:30 Morning Session 2

NWP 3

Chair:

10:45-11:00 Taking into account the uncertainty in the expression of refractivity in the GNSS-RO observation operator

Dominique Raspaud

11:00-11:15 Towards the Operational Assimilation of Polarimetric Radio Occultations: Forward operator development and NWP applications

Antía Paz Carracedo

11:15-11:30	First results from assimilating Polarimetric RO data K.atrin Lonitz
11:30-11:45	Integrated Impact of GNSS-RO and GNSS-R Data Assimilation on Tropical Cyclogenesis Prediction: A Case Study of Typhoon Gaemi (2024) Shu-Ya Chen
11:45-12:00	Assessments of new data sources and observation error statistics Liam Hall
12:00-12:15	Study on the Distribution Characteristics and Collaboration of Global GNSS Occultation Missions Wenqiang Lu
12:15-12:30	Establishing a Standard for the Modeled Radio Occultation Christopher Barsoum
12:30-14:00	Lunch Break
14:00-15:30	Afternoon Session 1 New Techniques – AI and NI Chair: Tbd
14:00-14:15	Bias characteristics and estimation of the FORMOSAT-7/COSMIC-2 radio occultation bending angle in the low troposphere with a machine learning algorithm Gia-Huan Pham
14:15-14:30	Processing deep occultation data from GRAS-2 using sliding window phase matching and multiple correlators Joel Rasch
14:30-14:45	Wavelet-Transform-based Phase Matching Method for Impact Multipath Mitigation in GNSS Radio Occultation Jonghyeon Park
14:45-15:00	Reliable Ducting Detection with Sliding Window Phase Matching Jonathan Brandmeyer
15:00-15:15	Deep Learning for Detecting Atmospheric Ducting in GNSS-RO Data Hsiang-Wen Cheng
15:15-15:30	Generating realistic synthetic RO soundings in extreme atmospheric events Clémence Allietta

15:30-16:00	Coffee Break
16:00-17:20	Afternoon Session 2 Climate Trends and Water Vapor Chair: Tbd
16:00-16:20	Atmospheric temperature trends from observations: an update (invited) Andrea Steiner
16:20-16:35	Leveraging GNSS radio occultation excess phase and bending angle observables for anthropogenic climate signal detection in the troposphere and stratosphere Josef Innerkofler
16:35-16:50	An observational perspective on wind trends: a comparison of RO and reanalysis data Annika Reiter
16:50-17:05	The ROM SAF tropospheric humidity Climate Data Record development. Johannes Nielsen
17:05-17:20	Observing Atmospheric Rivers and their Vertical Structure with GNSS Radio Occultation Ulrich Foelsche
17:20	Tuesday Scientific Sessions Adjourn
18:00-19:00	Dinner
19:00-21:00	WGIII discussion (IROWG to assess the impact of the decline in COSMIC data availability)

WEDNESDAY, SEPTEMBER 16, 2026

09:00-09:40	Morning Session 1 IROWG – Reporting of Subgroups Chair: Tony Mannucci
09:00-09:20	Reporting of the IROWG Subgroup on NWP (invited) Neill Bowler and Katrin Lonitz (Subgroup co-chairs)
09:20-09:40	Reporting of the IROWG Subgroup on Climate (invited) Panagiotis Vergados and Andrea Steiner (Subgroup rapporteur and chair)
09:40-10:00	Reporting of the IROWG Subgroup on Space Weather (invited) Riccardo Notarpietro and NN (Subgroup rapporteur and chair)
10:00-10:20	Reporting of the IROWG Subgroup on Innovation (invited) John Braun and Rob Kursinski (Subgroup rapporteur and chair)
10:20-10:50	Coffee Break
10:50-12:50	Morning Session 2 IROWG Recommendations to CGMS Chairs: Hui Shao and Ulrich Foelsche
10:50-11:05	Report from WGIII discussion to CGMS
11:05-11:10	BUFR format brief Harald Anlauf, Christian Marquardt, Hui Shao
11:10-12:50	Main IROWG Recommendations to CGMS (Moderated by IROWG co-chairs)
12:50-13:00	Workshop Wrap-up & Farewell
13:00-14:00	Lunch (optional)