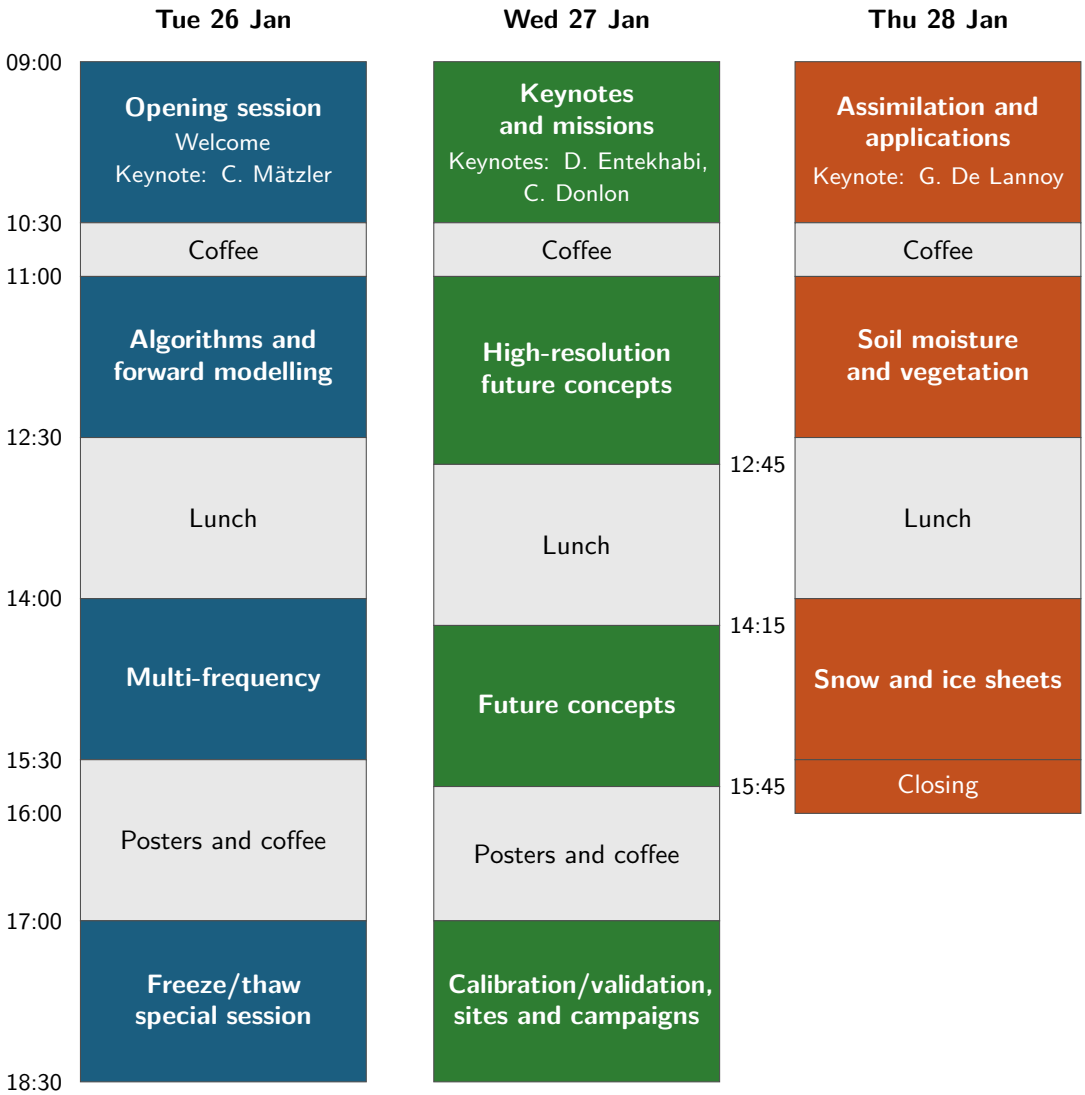
# RadLand 2027

Next-Generation Microwave Radiometry Community Forum:
Algorithms, Calibration/Validation, and Applications for Land Surfaces

## Programme

26–28 January 2027

Finnish Meteorological Institute (Dynamicum building)
Erik Palménin aukio 1, Helsinki, Finland




All talks are 15 minutes including questions. The order of talks within a session may still change.

# Tuesday 26 January 2027

| 09:00–10:30 Opening session | |
|---|---|
| *Welcome* | |
| *Keynote: Christian Mätzler* | |
| Brian Hornbuckle (Iowa State Univ.) | Multi-Frequency Microwave Radiometry of Water Stored in Vegetation: Beyond Vegetation Water Content |
| Mike Schwank (WSL) | Physically Informed Time-Series Optimization for Estimating Forward-Operator Parameters in L-Band Soil Moisture and Vegetation Optical Depth Snapshot Retrievals |

10:30–11:00 Coffee break

| 11:00–12:30 Algorithms and forward modelling | |
|---|---|
| Tianjie Zhao (AIRCAS) | Layered Soil Moisture–Temperature Profiles from Passive Microwave |
| Dávid D. Kovács (TU Wien) | A Methodology to Improve Daytime Passive Microwave Soil Moisture Retrievals |
| Sahar Rostaei (Monash Univ.) | Fuel Moisture Measurement Using L- and Ka-Band Radiometer Data Across Australian Ecosystems |
| Xiaolan Xu (JPL) | Per-Pixel Uncertainty Quantification for Passive Microwave Soil Moisture Retrieval: Analytical Error Propagation Through the Tau-Omega Model |
| Rasma Ormane (NPL) | Uncertainty Propagation Reveals Ambiguity in VOD Retrievals over Dense Tropical Forests |
| Ruxandra-Maria Zotta (TU Wien) | Improving AMSR2 Vegetation Optical Depth Retrievals via Land Parameter Retrieval Model Parameter Optimisation |

12:30–14:00 Lunch

| 14:00–15:30 Multi-frequency | |
|---|---|
| Maria Piles (Univ. Valencia) | New Monitoring Capabilities Enabled by CIMR Multi-Frequency Observations Across Global Land Surfaces |
| Iris de Gélis (Estellus) | Exploiting Microwave Surface Emission Across Multiple Frequencies: From Emissivities to Land Surface Temperature and Surface Water Extent |
| Richard de Jeu (Radio Earth) | Multi-Angle Passive Microwave Measurements for Enhanced Soil Moisture and Vegetation Retrievals |
| Anjali C V (IITB-Monash Research Academy) | Multifrequency Soil Moisture and VOD Retrieval Using Tower-Based L- and P-Band Radiometer Observations |
| Laura Almendra Martin (Radio Earth) | Using Multi-Angle Microwave Passive Observations from COWVR to Characterize Land Surface Conditions over the Desert |
| Andreas Colliander (FMI) | Using Multi-Frequency Radiometry to Tackle the Land Surface Parameter Retrieval Challenges in the Arctic-Boreal Region Across Seasons |

15:30–17:00 Posters and coffee

| 17:00–18:30 Freeze/thaw special session | |
|---|---|
| Sara Hyvärinen (FMI) | Seasonality of Methane Emissions During Spring Thaw in Northern High-Latitude Wetlands |
| Kimmo Rautiainen (FMI) | Continuous, Probabilistic Soil Freeze/Thaw Retrieval from L-Band Radiometry: A Composable Bayesian Framework Tested with SMAP |
| Hesam Salmabadi (UQTR) | Beyond Binary Freeze/Thaw: Mapping the Zero-Curtain Transition by Fusing SMAP L-Band and AMSR2 Ku/Ka-Band Observations |
| Juliette Ortet (FMI) | Retrieving Arctic Ground Temperature from SMOS L-Band Brightness Temperature Observations: Towards Uncertainty Quantification |
| Ardeshir Ebtehaj (Univ. Minnesota) | Learning Seasonal Snow and Lake-Ice Dynamics from Satellite L-Band Passive Microwave Time Series |
| Colin Moldenhauer (TU Wien) | Improving Soil Moisture Estimates Using the Land Parameter Retrieval Model for Multi-Frequency Sensors over Organic Soils |

# Wednesday 27 January 2027

| 09:00–10:30 Keynotes and missions | |
|---|---|
| *Keynote: Dara Entekhabi* | |
| *Keynote: Craig Donlon* | |
| Yann Kerr (CESBIO) | SMOS from Inception to 16 Years in Operation: Results, Lessons Learnt and Remaining Challenges |
| Shannon Brown (JPL) | A Framework for Evaluating Future Low-Frequency Microwave Earth Observatories: The Case for Tailored Observing Systems |

10:30–11:00 Coffee break

| 11:00–12:45 High-resolution future concepts | |
|---|---|
| Hao Liu (NSSC-CAS) | Multi-Frequency 1D Synthetic Aperture Radiometer for High Resolution Ocean and Land Surface Observation |
| Manuel Martin-Neira (ESA) | ESA Activities Related to Future High-Resolution L-Band Radiometry |
| Matas Gelžinis (Univ. Southampton) | Triangle Interpolation Method for Multi-Satellite Synthetic Aperture Radiometry Under Formation Uncertainty |
| Nemesio Rodriguez-Fernandez (CESBIO) | Pre-Phase 0 Science Requirements Consolidation of the FRESCH Mission |
| Eric Anterrieu (CESBIO) | Preliminary Performance of FRESCH and HAPS Aperture Synthesis Imaging Radiometers over Cartesian and Hexagonal Sampling Grids |
| Alan Tanner (JPL) | A High Sensitivity Synthetic Aperture Radiometer for Global Salinity Mapping with 10 km Resolution |
| Alex Akins (JPL) | Resolving Coastal Scenes with High-Resolution L-Band Radiometer Arrays |

12:45–14:15 Lunch

| 14:15–15:45 Future concepts | |
|---|---|
| Parminder Ghuman (NASA ESTO) | NASA Earth Science Technology Investments in L-Band and Multifrequency Radiometers |
| Rolv Midthassel (ESA) | The Copernicus Imaging Microwave Radiometer (CIMR) Instrument |
| Rajat Bindlish (NASA GSFC) | The Global L-Band Observatory for Water Cycle Studies (GLOWS) |
| Marco Brogioni (CNR-IFAC) | Ultrawideband Radiometry for Polar Regions: The CryoRad Mission |
| José Barbosa (RDA) | Assessing CryoRad Mission Performance in Phase 0 with the CryoRad End-to-End Performance Simulator (EEPS) |
| Zahra Esmati (Monash Univ.) | Trade-Off Analysis of Digital Beamforming and Interferometric Aperture-Synthesis Architectures for High Resolution L-Band Microwave Radiometry from High-Altitude Platforms |

15:45–17:00 Posters and coffee

| 17:00–18:30 Calibration/validation, sites and campaigns | |
|---|---|
| Edward Kim (NASA) | An Airborne L-Band Survey Across North America: Plains, Farms, Forests, Hills, Fire Burned Areas, and RFI |
| Noor Ul Ain Ayaz (Monash Univ.) | High Resolution Soil Moisture Retrieval from Multi-Angular UAV L-Band Radiometer Observations: Comparing Physics-Based and Machine-Learning Approaches |
| Juha Lemmetyinen (FMI) | Multi-Frequency Ground-Based Microwave Radiometer Observations of Boreal Environments in Sodankylä, Finland |
| Anna Kontu (FMI) | Advancing Calibration and Validation of Microwave Measurements at the ESA-FMI Arctic-Boreal Earth Science, Cal/Val Supersite |
| Nicolas François Bader (TU Wien) | Towards Satellite VOD Validation Using GNSS Transmissometry: Characterizing GNSS-T-Derived Vegetation Optical Depth |
| Yiwen Zhou (WSL) | L-VOD and GNSS-VOD Reveals the Diurnal Water Cycle of Trees at Pfynwald Forest Site |

# Thursday 28 January 2027

| 09:00–10:30 Assimilation and applications | |
|---|---|
| *Keynote: Gabriëlle De Lannoy* | |
| Rolf Reichle (NASA GSFC) | Multi-Satellite Soil Moisture Assimilation in the M21C-Land Reanalysis Product |
| Jouni Pulliainen (FMI) | Use of Cryosphere Information from Space-Borne Radiometry to Support Regional Carbon Exchange Monitoring |
| Chang-Hwan Park (Ajou Univ.) | How L-Band Retrieval Physics Changes Drought Extent and Wetting–Drying Trends: Evidence from SMAP |
| Jerónimo Trujillo Metsola (Univ. Valencia) | Estimation of Live Fuel Moisture Content Using Microwave Remote Sensing |

10:30–11:00 Coffee break

| 11:00–12:30 Soil moisture and vegetation | |
|---|---|
| Maria Jose Escorihuela (isardSAT) | L-Band Drought Indicators and Vegetation Optical Depth for Live Fuel Moisture Estimation: The Case for Higher-Resolution Radiometry |
| Madhurshan Ravanan (Monash Univ.) | L-Band Microwave Emission Modelling of Box-Woodland Forest Using a Ground-Truth Constrained Layered Vegetation Representation |
| David Chaparro Danon (CREAF) | Towards Global Assessment of Plant Water Status Using Passive Microwave Remote Sensing |
| Samuel Favrichon (GAMMA) | Long-Term Monitoring of Above-Ground Biomass from Multi-Sensor Microwave Observations |
| Valentina Di Francesca (CESBIO) | Passive Microwave L-Band VOD Estimation of Global Forests Vegetation Water Content |
| Jaese Lee (GIST) | Human Radio Emissions Can Exaggerate Droughts Observed from Space |

12:30–14:00 Lunch

| 14:00–15:30 Snow and ice sheets | |
|---|---|
| Jiancheng Shi (NSSC-CAS) | Microwave Modeling of Snow and Their Validations |
| Manu Holmberg (FMI) | Assimilation of Passive Microwave Satellite Observations into a Snow Process Model: Analysis over Finnish Lapland |
| Jeffrey J. Welch (Univ. Waterloo) | Combined Passive and Active Microwave Remote Sensing for Snow Property Retrievals |
| Kerttu Kouki (FMI) | Detecting Rain-on-Snow Events in the Arctic Using Passive Microwave Satellite Data |
| Alamgir Hossan (JPL) | Polar Ice-Sheet LWC Profile Retrieval Using Microwave Radiometry from SMAP to CIMR and CryoRad Like Wideband Sensors |
| Dongjin Bai (NSSC-CAS) | Active and Passive Microwave Remote Sensing for Ice Sheet and Glacier Internal Temperature Profiling: Joint Retrieval Approach and Campaign Analysis |

15:30–16:00 Closing

# Posters

Posters are on display during the poster sessions on Tuesday (15:30–17:00) and Wednesday (15:45–17:00).

| First author | Title |
|---|---|
| Jesus Gustavo Padilla Soldevilla (Wetsus) | Across Footprints and Frequencies: Comparing Airborne and Satellite Passive Microwave Observations |
| Xiaoling Wu (Monash Univ.) | A Near-Space Passive Microwave Surveillance Capability for Natural Disaster Risk Prediction and Management |
| Juha Kainulainen (Harp Technologies) | Microwave Radiometer Solutions for Multifrequency Remote Sensing |
| Andreu Melis (Zenithal Blue) | Assessment of the CryoRad RFI Scenario Using LoMiRAD Airborne Data and Spectrum-Use Databases |
| Marco Brogioni (CNR-IFAC) | CryoRad: Preliminary Mission Concepts for a 0.4–2 GHz Spaceborne Microwave Radiometer of the Cryosphere |
| Kimmo Rautiainen (FMI) | A Coupled In Situ Soil-Moisture and Soil-Temperature Reference Framework for Freeze–Thaw Algorithm Evaluation |
| Peetu Temonen (FMI) | Bayesian Trend Analysis of Soil Freezing Onset from SMOS Reanalysis Data |
| Debolina Mondal (IIT Bombay) | Toward an Optimal Soil Roughness Parameterization and RTM Parameter Interactions for CIMR L-Band SM and VOD Retrievals |
| Dharmendra Kumar Pandey (SAC-ISRO) | Synergy of Microwave Radiometry and Multifrequency SAR for Field Scale Soil Moisture Retrieval: An Active–Passive Multi Mission Approach |
| Foad Brakhasi (Monash Univ.) | Hybrid Multi-Angular Tau-Omega and XGBoost Retrieval of Near-Surface Soil Moisture from UAV-Based L-Band Radiometry |
| Noor Ul Ain Ayaz (Monash Univ.) | Snapshot and Multi-Temporal Retrieval of Soil Moisture, Vegetation Optical Depth and Surface Roughness from Multi-Angular UAV L-Band Radiometer Observations |
| Sanjay N C (IITB-Monash Research Academy) | A Differentiable JAX Tau-Omega Model for L-Band Soil Moisture and Vegetation Water Content Retrieval Using 4DEnVar and Forward Sensitivity Methods |
| Richa Prajapati (CESBIO) | Toward Multiangular Extension of the Land Parameter Retrieval Model for SMOS Soil Moisture Retrieval |
| Noemi Willman (TerraRad Tech) | A Modular Waveguide Transmission/Reflection System for Automated Permittivity Measurement |
| Yijian Zeng (Univ. Twente) | A Soil–Plant Observatory for Evaluating 100 m Soil Moisture Estimates in Heterogeneous Agroforestry |

| First author | Title |
|---|---|
| Simone Bircher (MeteoSwiss) | Novel Swiss Soil Moisture and Drought Datasets with Potential to Support Calibration and Validation of Satellite-Derived Soil Moisture Products |
| Verneri Turkki (FMI) | Portable L-Band Radiometer and Use in IM$^4$CA Field Campaign |
| Dowon Lee (GIST) | The Potential of Triple Collocation Analysis (TCA) as a Loss Function: Soil Moisture Assessment Based on Microwave Satellite Data Without a True Reference |
| Indrakant Behera (IIT Roorkee) | Hydrological Modulation of C-Band InSAR Coherence by Monsoonal Soil Moisture: Linking SMAP L-Band Radiometry and Sentinel-1 in the Garhwal Himalaya, India |
| Guillem Sánchez Alcalde (isardSAT) | A 1 km SMOS-Based Standardized Soil Moisture Index for Hydrological Drought Monitoring |
| Emmihenna Jääskeläinen (FMI) | Improved Mapping of Boreal Forest Soil Moisture Using SMAP Observations and High-Resolution Land Cover Data |
| Lixiaozhou Zhou (Monash Univ.) | A Physics-Constrained Machine Learning Framework for SMAP-NISAR High-Resolution Soil Moisture Mapping |
| Manu Holmberg (FMI) | Bayesian Time Series Approach for Retrieving Ground and Vegetation Variables from L-Band Radiometry |
| Marlena Reil (Northumbria Univ.) | Assimilation of Passive Microwave Data for Microstructure Evolution in Snowpack Models |
| Yueqian Cao (Nantong Univ.) | Snow Microwave Radiative Transfer (SMRT) Model Emulator |
| Lina Zschenderlein (FMI) | Towards a Global Multi-Frequency MCMC SWE Retrieval |
| Patrik Ahola (FMI) | Potential and Characteristics of Low-C and Low-X Microwave Channels in Microwave SST Retrieval |
| Amirreza Khalil Zadeh (Tor Vergata Univ.) | Validation of HydroGNSS Soil Moisture Products Through SMAP and SMOS |
| Guillermo González Salazar (ICE-CSIC) | First Sea Ice Thickness and Permittivity Retrieval from Dual-Frequency Dual-Polarization HydroGNSS GNSS-R Observables |
| Yann Kerr (CESBIO) | SMOS and RFI: A Long Story |