



## CALL FOR PAPERS

### IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing Special Issue on “Advances in Microwave Remote Sensing of the Cryosphere”

The cryosphere constitutes the most sensitive and least understood component of the Earth’s climate system, acting as both a critical indicator of planetary change and a key driver of global feedback mechanisms. Active and passive microwave remote sensing provides an unparalleled, all-weather capability for observing the cryosphere, including glaciers, snow, permafrost, sea ice, ice shelves, ice sheets, firn, polar seas, etc. Rapid environmental changes—such as sea-ice thinning, enhanced surface melt on ice sheets, weakening of ice shelves, evolving firn structures, and widespread permafrost degradation—underscore the urgency of improving large-scale, long-term monitoring. With increasingly rich multi-frequency and multi-angle observations from passive microwave missions such as SMOS, SMAP, AMSR2, the Chinese Ocean Salinity Mission (COSM), and the upcoming CIMR and CryoRad missions, together with high-resolution, polarization- and incidence-angle-dependent measurements from spaceborne SAR such as Sentinel-1, ALOS-2, TerraSAR, BIOMASS, and NISAR missions, and with emerging observation technologies such as GNSS-R, new opportunities are emerging to advance geophysical retrievals of snow water equivalent, melt onset, sea-ice thickness, firn evolution, ice-sheet mass balance, and freeze–thaw dynamics. Growing airborne and ground-based passive and active datasets further strengthen validation and regional process studies. The new observation paradigms and datasets have led to deeper understanding and theoretical advancements in cryosphere microwave remote sensing.

This Special Issue aims to invite cutting-edge contributions that present studies that utilize active and passive microwave observations to map, quantify, or interpret cryosphere processes. This issue also highlights theoretical modeling studies, algorithm development, multi-mission data fusion, and passive–active integration. We also welcome studies on physics-informed machine learning and innovative uses of current or next-generation missions.

The broad topics include (but are not limited to):

- **Novel observation concepts, advanced instruments, and mission status:** Design, measurement principles, and early-stage results of next-generation missions and innovative airborne or ground-based experiments. New designs and analyses for advanced instruments used in cryospheric component observations, including cal/val techniques, are welcomed.
- **Advanced physical modeling methodologies:** Advances in electromagnetic scattering and emission theories for layered or complex structures in snow, glacier ice, sea ice, and frozen soil.
- **Retrievals of cryospheric parameters with enhanced physical mechanisms:** New methodologies for quantifying snow water equivalent (SWE), sea-ice thickness, firn evolution, ice-sheet mass balance, polar sea properties, and permafrost freeze–thaw dynamics.
- **Multi-source data fusion and cross-mission synergy:** Integration of active and passive microwave data, long-term consistent dataset construction, and multi-sensor inter-calibration for large-scale change assessment.
- **Emerging technologies and AI-physics integration:** Application of deep learning and physics-informed machine learning (PIML) for automated feature detection and high-efficiency geophysical parameter inversion.

#### Schedule

April 1, 2026 Submission system opening

December 31, 2026 Submission system closing

#### Format

All submissions will be peer reviewed according to the IEEE Geoscience and Remote Sensing Society guidelines. Submitted articles should not have been published or be under review elsewhere. Submit your manuscript on <http://mc.manuscriptcentral.com/jstars>, using the Manuscript Central interface and select the “**Advances in Microwave Remote Sensing of the Cryosphere**” special issue manuscript type. Prospective authors should consult the site <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9082768> for guidelines and information on paper submission. All submissions must be formatted using the IEEE standard format (double column, single spaced). Please visit [http://www.ieee.org/publications\\_standards/publications/authors/author\\_templates.html](http://www.ieee.org/publications_standards/publications/authors/author_templates.html) to download a template for transactions. Please note that since Jan. 1, 2026, IEEE J-STARS, as a fully open-access journal, is charging a flat publication fee \$1,800 per paper.

**Guest Editors**

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