EGU24-22452, updated on 23 Jul 2024
https://doi.org/10.5194/egusphere-egu24-22452
EGU General Assembly 2024

Use of mobile L-Band interferometric synthetic aperture radar observations to inform snow property estimation

Elias Deeb[1], Tate Meehan[1], Zach Hoppinen[1], Charles Werner[2], Othmar Frey[2], Richard Forster[3], and Adam LeWinter[1]

[1]Cold Regions Research and Engineering Laboratory
[2]Gamma Remote Sensing
[3]University of Utah

With the dawn of future L-Band satellite interferometric missions (e.g., NISAR - NASA/ISRO SAR and ESA ROSE-L) upon us, there are unique opportunities to explore the use of radar methods and techniques across a variety of applications. Moreover, through the advancement of radar remote sensing hardare and software, additional opportunities exist to specifically target and explore the development of snow estimation, snowmelt impact, and resulting soil moisture detection applications. With the development of mobile interferometric synthetic aperture (InSAR) hardware and software solutions, we present findings from field campaigns using a multi-polarization L-band (1.6 GHz) InSAR system (Gamma Remote Sensing) deployed from mobile vehicle (car), unmanned aerial vehicle (UAV), and helicopter-based platforms. These platforms allow us to control the temporal repeat of InSAR acquisitions assessing the role of changing environmental conditions on InSAR coherence, bracketing synoptic weather events to identify change in the radar signal, as well as simulating the temporal repeat of future satellite missions to estimate what may be done with these data when available. Results from time-series of InSAR acquisitions exploring snow water equivalent estimation, soil moisture, and airborne deployments (e.g., helicopter and UAV) show sensitivity to L-Band coherence and phase for application development. Future work will also be discussed exploring interferometric tomography and bistatic radar applications.