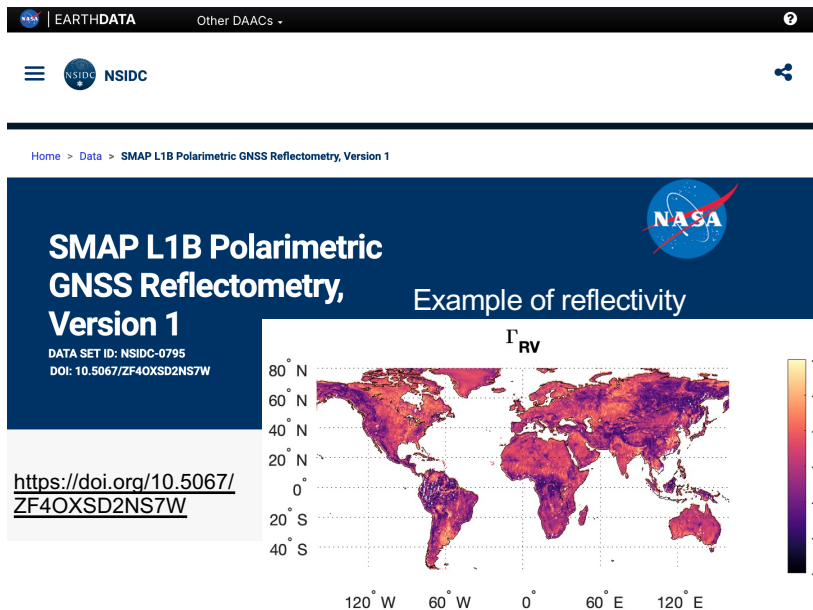


SMAP-Reflectometry (SMAP-R) Dataset



Problem: Shortly after the radar transmitter anomaly occurred, the mission decided to switch the radar receiver bandpass filter from the original frequency of 1.26 GHz to 1.22742 GHz frequency, enabling the reception of Global Positioning System (GPS) L2C signals as they scatter off the Earth's surface. The processing of SMAP radar receiver acting as an opportunistic reflectometer (SMAP-R) was on hold for years.

National Snow and Ice Data Center (NSIDC) Dataset Release



Finding: The SMAP-R team formed thanks to a NASA ROSES SMAP Science Team funding opportunity and developed all the mathematical formulation and proper calibration of this unique dataset. SMAP-R measures the horizontal and vertical components of the GPS signal as it is reflected and scatters from the Earth's surface. Stokes parameters are computed with these horizontal and vertical polarization measurements. The dataset comprises a full reconstruction of the Earth's surface polarimetric values, covering the period October 2015 to present, with approximately 3,200 observations per day and about 1,200,000 per year.

SMAP-R Released in September 2024

Impact: The SMAP Mission, thanks to SMAP-R, has become the first spaceborne mission carrying a full-polarimetric Global Navigation Satellite System Reflectometry (GNSS-R) instrument. Studies through SMAP-R enable the GNSS-R science community to understand advantages, limitations, and key design features of future polarimetric GNSS-R missions.

Rodriguez-Alvarez, N., Munoz-Martin, J. F., Bosch-Lluis, X. & Oudrhiri, K. (2024). SMAP L1B Polarimetric GNSS Reflectometry. (NSIDC-0795, Version 1). [Data Set]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. <https://doi.org/10.5067/ZF4OXSD2NS7W> Date Accessed 09-24-2024