

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observations to address Earth's Environment and Climate Challenges (7)

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L-BAND SAR SOIL MOISTURE MAPPING FOR CLIMATE RESILIENCY

Abstract

The Climate change crisis has intensified weather events both in their frequency and magnitude. Soil moisture data is essential for a wide range of fields, from agriculture to transportation and infrastructure. The ability to identify areas with high soil moisture content can be lifesaving as high soil moisture is often the root cause of such events as landslides and slope failures which can be catastrophic. Additionally, decreasing soil moisture in wet environment can cause cracks in levees and flood protection causing failure catastrophic events. As climate change continues lead to environmental events from extreme drought to extreme saturation, the need for a tool to identify potential risk has become even more crucial. While there are several methods for soil moisture measurement both in-situ and ex-situ, there is a strong need for soil moisture content for widespread areas that does not involve field measurement. L-Band SAR provides a highly efficient solution for soil moisture content estimation over large areas due to its unique penetration capabilities. The product is based on hundreds of in-situ soil moisture measurements taken in coincidence L-Band SAR satellite imagery from JAXA's ALOS-2 PALSAR-2 CONAE's SAOCOM1A 1B. The results were then analyzed in order to correlate between the soil moisture content and the backscatter values in the SAR imagery. The final product is a soil moisture monitoring tool, which allows for early detection and mitigation of risk before an event such a landslip or slope failure occurs.