



## **Quantifying shallow and deep permafrost changes from Sentinel-1 data**

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Widespread thawing of permafrost in the northern Eurasian continent cause severe problems for infrastructure and global climate. We test the potential of Sentinel-1 SAR imagery to enhance detection of permafrost surface changes in the Siberian lowlands of the northern Eurasian continent at Kytalyk research station site and Yamal peninsula site. We used InSAR time-series technique to detect seasonal surface movements related to permafrost active layer changes. Preliminary InSAR results for Yamal test site show up to 60 mm/yr of seasonal active layers changes and linked to anthropogenic impact on the permafrost surface changes in the area. These changes are due to ongoing gas and oil exploration of the Yamal peninsula. At Kytalyk test site we derived up to 20 mm/yr of seasonal active layer changes. These seasonal ground displacement patterns align well with lithology and reflect the thaw of yedoma plateaus. These results suggest that the ice-rich yedoma sediments may be subject to much larger volume loss by thaw. There is abundant evidence of small-scale runoff channels and erosion on many yedoma surfaces by which the surface subsides. The eroded material is deposited as slope material on the side slopes of the plateaus and possibly slow creep of the ice-rich material occurs. This study shows the potential of Sentinel-1 data in detection of seasonal permafrost surface changes in Siberian lowlands.