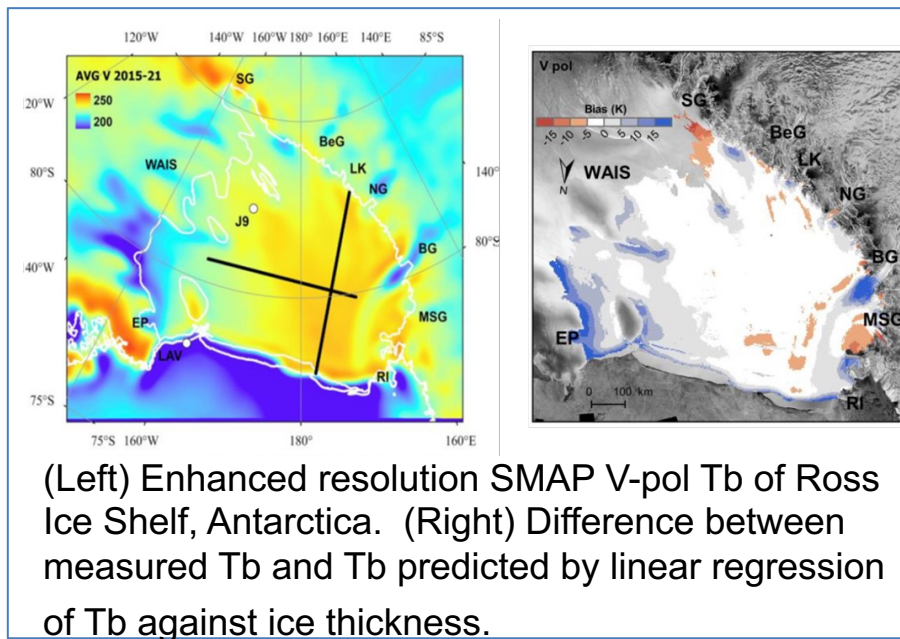


SMAP Studies of the Ross Ice Shelf, Antarctica



Problem: Understand the thermodynamic state of the Ross Ice Shelf using SMAP enhanced resolution brightness temperatures. Use that information to inform on potential for ice shelf retreat. Provide insight to development of future wideband radiometers such as ESA's Cryorad.



Finding:

SMAP TB and backscatter data are coupled to glaciological processes typical of the RIS. Tb correlates with thickness as ice shelf temperature is dominated by conduction. Unexpected is that thickness and Tb are negatively correlated due to L-band sensitivity to depths less than 500 m. Analysis also shows that interface roughness and marine ice are important controls on emission.

Impact: Ice shelves buttress the inland ice sheet and retard thinning flow from upstream that contributes to sea level rise. Understanding ice shelf thermal state improves understanding of interactions between the shelf and inland ice sheet.

Jezek, Wang, Leduc-Leballeur, Johnson, Brogioni, Miller, Long, Macelloni. 2022. Relationships Between L-Band Brightness Temperature, Backscatter, and Physical Properties of the Ross Ice Shelf Antarctica. *IEEE Trans. Geosci. Rem. Sens.*