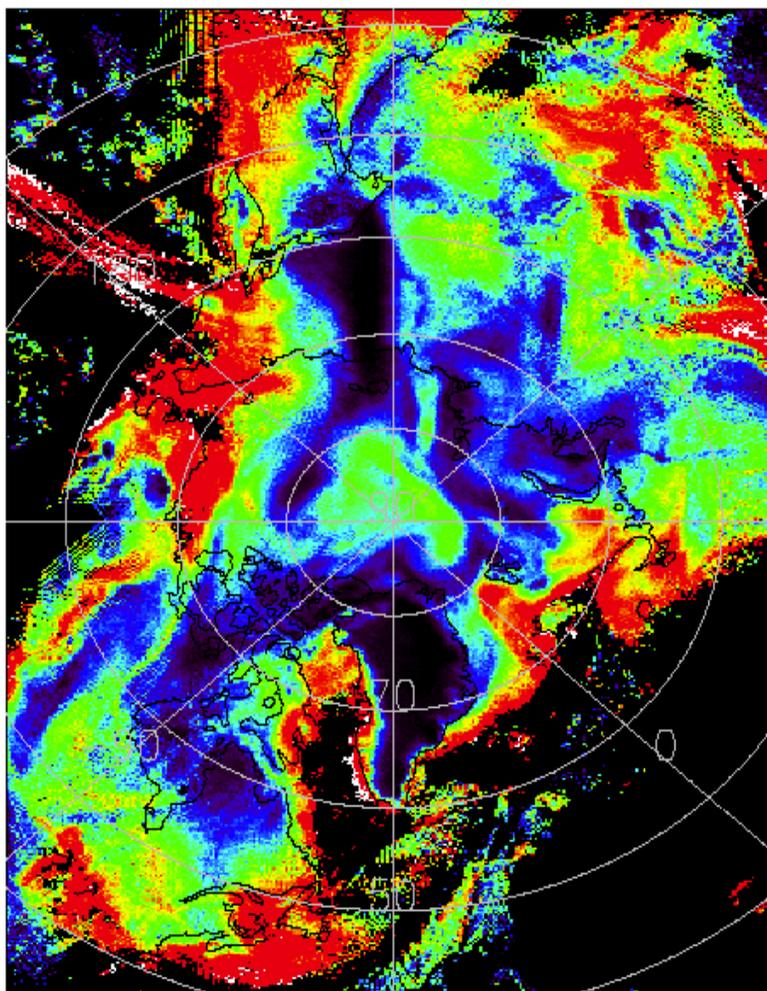
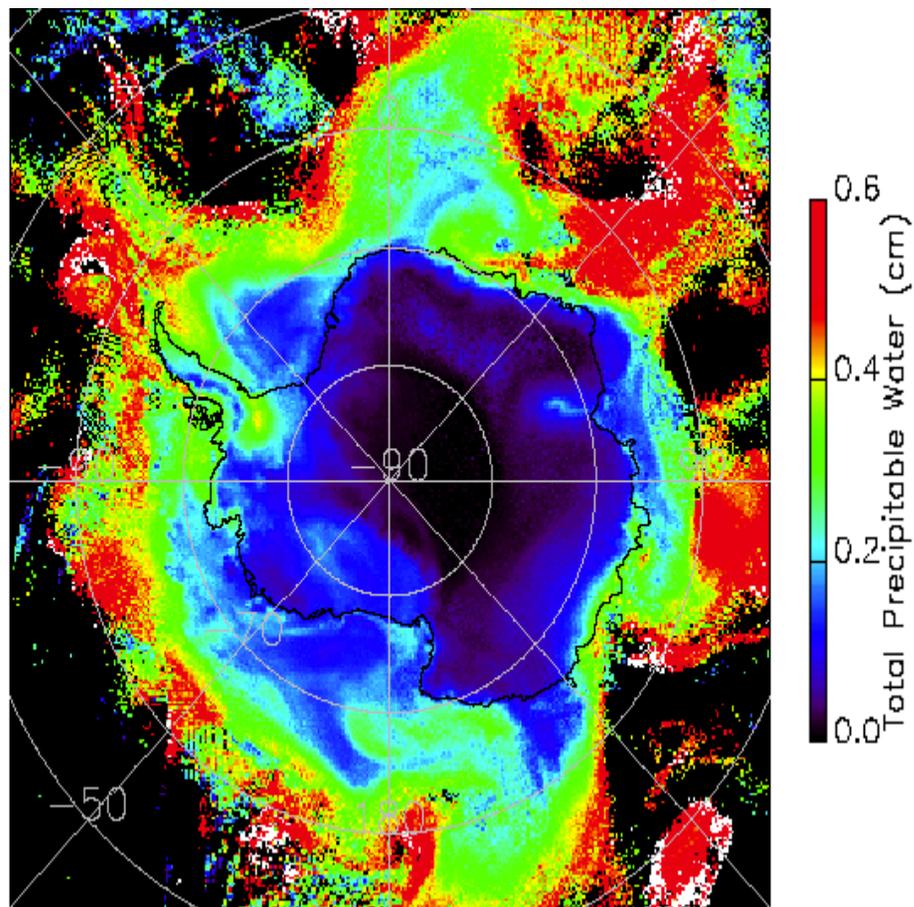


# AMSU-B Retrieved Total Precipitable Water in the Polar Regions

Arctic Region, January 15, 2003



Antarctica Region, July 1, 2003



## Retrievals of Low Precipitable Water in the Polar Regions from the AMSU-B or SSM/T-2 Measurements

- Retrievals of water vapor profiles or total precipitable water (PW) from microwave radiometric measurements are generally performed over a water surface, because the emissivity is known once the surface temperature is determined. But for low  $PW \leq 0.8$  cm, the AMSU-B (or SSM/T-2) channels near 183 GHz could be used to retrieve PW over any surface as demonstrated for the polar regions shown in the figure.
- The retrieval accuracy, without corrections for surface temperature and emissivity variations, could be as much as  $\pm 0.1$  cm. When corrections for these surface variations are made, the retrieval accuracy is excellent, generally on the order of  $\pm 0.03$  cm.
- Although the PW is generally small in these regions, it remains the most important greenhouse gas and plays a crucial role in the mass balance of the ice sheets and their corresponding effects on global sea level.
- When PW is known, the surface emissivities over a wide frequency range (up to 150 GHz) can be determined, if the surface temperature is also measured. This potentially gives a more complete and better description of the physical properties of sea ice and/or snow cover, and thus provides more reliable retrievals of these parameters.