We present results of an investigation of microwave backscatter anisotropy in Wilkes Land, East Antarctica, and its relation to surface roughness and snow properties. Microwave backscatter depends on the roughness of the snow surface and properties to a depth of some metres within the snow/firn layer. Surface roughness elements that form through the erosion of the surface by wind, and the redistribution of the snow over the surface, are preserved in the snow pack by progressive accumulation of snow. Microwave backscatter throughout much of the Antarctic continent displays a strong azimuthal dependence. This has been linked to the presence of roughness elements in the form of sastrugi and snow dunes aligned parallel to the direction of the prevailing (often katabatic) wind. Appropriate modelling and removal of this azimuthal modulation is key to retrieval of snow and firn properties in these regions. We discuss several such models, and their physical interpretation. Data from the EUMETSAT Advanced SCATterometer (ASCAT) instrument is used because of its wide range of both azimuth and incidence angles over much of the Antarctic continent. Ground truthing of the azimuthal dependence of microwave backscatter is provided from Australian traverse campaigns dating from the 1970s and 1980s.