Noisy Data or Noisy Landscape? Putting New Calibrated, Enhanced-Resolution Brightness Temperatures to the Test

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ABSTRACT

With funding from the NASA MEaSUREs program, the National Snow and Ice Data Center (NSIDC) produced the Calibrated, Enhanced-Resolution Brightness Temperatures (CETB) Earth System Data Record (ESDR) for the complete record of legacy and ongoing SSM/I, SSMIS, AMSRE (and soon SMAP) sensors. CETB data were created using the radiometer version of the scatterometer image reconstruction (rSIR) technique. These enhanced-resolution data are 64 times higher spatial resolution (3.125 km pixels at 36/37 GHz frequencies) and 8 times high spatial resolution (6.125 km pixels at 18/19 GHZ frequencies) than the historical 25 km data products. They appear to provide significant improvement in the ability to distinguish finer spatial patterns. We started to work with them for assessing snow melt timing and snow water equivalent in diverse and heterogeneous landscapes. Colleagues asked us "How do you know your data are that good? Aren't they just noisier?" So, we set out to test whether the higher spatial resolution successfully captures accurate differences in real, heterogeneous landscapes. Sites are selected at or near locations with ground-based observations to aid in interpretation and understanding of detected variations. We compare sites with similar characteristics, controlling for variation in topographic relief, standing water, and land cover. Sites are compared using average, minimum and maximum brightness temperature, diurnal variability, and intra-pixel variability for pixels at differing resolutions compared to elevation and other factors. We found that CETB data, though having a slightly higher noise level than conventional products, also have finer effective resolution that better matches high resolution comparison sets.

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