

Development of an interferometer for far-infrared surface emissivity retrieval

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Recent work has shown that incorporating more realistic representations of snow and ice infrared surface emissivity in climate models can significantly reduce Arctic surface temperature biases and may play a key role in determining the pace of change in the region. However, due to a lack of 'in-situ' observations of surface emissivity over snow and ice, particularly at far-infrared (FIR) wavelengths (wavelengths > 15 microns), the emissivity representations used in the modelling studies thus far are based on theoretical estimates.

In this poster we describe the development of a portable ground-based interferometer specifically designed to measure surface emissivity over the range 5-25 microns. Based on a commercial Bruker EM27 instrument, we have developed an external calibration system such that the system can view the full range of angles from nadir to zenith and can meet the challenging demands for stability and accuracy needed to derive emissivity to the 0.01 level or better from 20-25 microns. We will outline the calibration of the system in more detail and present initial retrievals of emissivity made over a range of different surface types.