Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2015-379-RC1, 2016

Atmospheric Measurement Techniques Discussions
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EGU

Interactive comment on "A microbolometer-based far infrared radiometer to study thin ice clouds in the Arctic" *by* Q. Libois et al.

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Received and published: 2 February 2016

Current prospects for FIR remote sensing from orbit are improving and a number of instrumental architectures may be useful for sensing in this spectral region. Unknowns in both clear and cloudy sky radiance/irradiance result in great difficulties for models that attempt to constrain the OLR which is generally highly variable. The TICFIRE mission will address uncertainties in FIR interaction with thin ice clouds through imaging measurements in 9 spectral bands from 8-50 microns. The development of TICFIRE instrumentation and its deployment for ground testing is detailed in this report. Although the mission is described as an imager, the demonstrated hardware does not meet this goal.

Although the instrument functioned in its capacity to measure FIR radiation, the perfor-

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Discussion paper

mance was limited due to the need for spatial averaging across the focal plane. Nevertheless, the results are still useful for statistical and modeling purposes and provide valuable insight into FIR cloud interactions.

It is not clear whether or not the TICFIRE mission will have to change its objectives to accommodate for the reduced sensitivity. The conclusion vaguely refers to the "ergodicity hypothesis", this should be discussed and quantified if the presented hardware is to be useful for orbital remote sensing.

Some technical aspects of the calibration procedure are noteworthy. (1) The filter wheel is said to have an 'opaque position' which is a curious thing considering the blocking object itself would have some blackbody temperature and emissivity that will produce a signal for FIR detectors; (2) similarly each spectral filter might be characterized for spectral emissivity as well as spectral transmission; (3) perhaps the blackbody calibration will account for some of the filters spectral emission, but there does not seem to be a wavelength dependent calibration associated with the filters themselves as radiative sources, and being situated some distance from the focal plane and filling the field of view, these photons may be expected to travel through the optics differently (compared to the transmitted scene) perhaps adversely affecting the image.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2015-379, 2016.