O-004

Suitability of infra-red thermography to examining temperature profiles in snowpack

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Thermography, using fully radiometric infrared imagers, is a still emerging field. Thermal imaging technology is continually improving and is easy to take into the field. New applications for thermography continue to be found.

This project explores the suitability of fully radiometric thermal imaging technology to examining temperature profiles in snowpack, and to presenting the information in an intuitive, visual format that is scientifically useful. The non-contact, non-destructive and data rich (commonly there are 19,000-300,000 pixels per image, each with an associated temperature measurement) nature of IR imaging technology holds interesting possibilities for snow scientists measuring temperatures in snow. From a palette, each pixel is assigned a color based on the temperature it "sees".

During weekly field sessions to Turnagain Pass in the Kenai Mountains of Southcentral Alaska, we made full snowpit measurements and took thermal images of standardized snow study walls with a Fluke Ti25 imager. We compare snowpit measurements to thermal images and the temperature data embedded in those images. We refined methodologies in an effort to improve the images captured.

Understanding the limitations of a tool or technology is an important part of applying it well. For this reason, we paid special attention to those characteristics of thermography as well as the IR imager itself that may limit their use in the snow science fields. We present and discuss thermal images that are useful to our original purpose and others that show the limitations of the technology, equipment and methods we are currently using.