

# Thermal Mapping of Wedgemount Glacier

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## SUMMARY

The main objective of this paper is to create a thermal orthophoto of Wedgemount Glacier in British Columbia, Canada using a forward looking infrared (FLIR) camera mounted on an unmanned aerial vehicle (UAV). Previous research aimed at creating thermal orthophotos has focused on using a mix of equipment and custom programming. Good results can be obtained using such methods; however, the process is not easily replicable. The current research aimed to use a readily available FLIR UAV system, the Mavic 2 Enterprise Dual (M2ED), and common photogrammetry software programs, such as Agisoft Metashape Professional, to create a thermal orthophoto. Ground temperature measurements were intended to assess the accuracy of the FLIR temperature readings. Absolute temperature values are not included in the thermal image metadata for the M2ED. An additional goal was therefore to recreate the function used to create the DJI thermal color palette. This would allow for absolute temperature values to be associated with the thermal orthophoto and compared with ground temperature measurements. In addition to the thermal orthophoto, a regular orthophoto was created using the M2ED visual camera. This was used to make comparisons with previous survey data of the glacier to determine the rate of glacial recession.

The visual and thermal orthomosaics were successfully created. The glacier was found to have significantly receded over 10 years. However, the DJI function for the thermal color palette was not successfully recreated. Suggestions were made to better carry out the process of recreating the function for the DJI thermal color palette for future studies.