# Detection of Permafrost Degradation in Eastern Alaska Using Modis and Landsat Data

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## SUMMARY

Rising temperatures in polar regions due to climate change are causing significant changes in landscapes dominated by permafrost. The extent and severity of these changes have previously been hard to quantify due to the remote nature of the area of permafrost for the data collection process, but modern advances in satellite remote sensing technology have allowed a plethora of relevant data to be easily accessed and used for analysis. In this study, satellite imagery is used to detect changes in the landscape that indicate melting permafrost in Eastern Alaska. Three main metrics are the focus of the review: land surface temperature (LST), vegetation cover, and the annual maximum extent of water bodies. Indexes such as Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index (EVI), and Modified Normalized Difference Water Index (MNDWI) are used to generate the results, culminating in a multivariate analysis of the change in permafrost in Eastern Alaska over the study period of 2000 – 2015. Results show that the vegetation greening trend in Eastern Alaska considering the overall change trend of EVI values are indicators of permafrost thawing in these years. Besides, based on Sen's slope, surface temperatures have been increasing over time, thus confirming that rising surface temperature is the driving force of permafrost melting.

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