



Documenting and Communicating the Dynamics of a Rapidly Changing Cryosphere Through the Use of Repeat Ground-Based, Airborne, and Space-Based Photography and Multispectral Imagery

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Alaska supports thousands of glaciers, covering an area of about 75,000 square kilometers. Today, most large low elevation Alaskan glaciers are rapidly retreating and/or thinning in response to increasing temperature. Considering the breadth of Alaska's glacier cover, documenting the response of these glaciers to changing climate is only possible through a comprehensive collection and assessment of ground-based, airborne, and space-based photography and multispectral imagery. Pairing these data with historical imagery provides unequivocal visual evidence of changes within the glacier component of the Alaskan cryosphere.

Since 1972, all Alaskan glaciers have been sequentially imaged with space-based multispectral sensors. Additionally, many Alaskan glaciers have been repeatedly photographed from the ground (beginning in 1893), from the air (beginning in 1926), and from space (beginning in the early 1960s). Analysis of this massive compilation of repeat photographs and multispectral images has been used to quantitatively and qualitatively determine the distribution, extent, and multiple decadal-scale behavior of glaciers throughout Alaska. These results have recently been published by the U.S. Geological Survey in "Glaciers of Alaska", Chapter K of the "Satellite Image Atlas of the Glaciers of the World", Professional Paper 1386-K.

Additionally, a website ("Glacier and Landscape Change in Response to Changing Climate" - www.usgs.gov/global_change/glaciers/default.asp) has been developed to broadly communicate and distribute this information to the general public, scientists and engineers, the press, civil protection government agencies, and a multitude of other governmental and non-governmental agencies. This poster presents details about the new book and website.

For the poster, several areas with extensive records of historic ground-based photography and space-based imagery were selected to demonstrate the effectiveness of this approach to communicate information about sub-decadal to century-scale changes to glaciers and landscapes. These locations include: Glacier Bay National Park and Preserve of the St. Elias Mountains, Kenai Fjords National Park of the Kenai Mountains, the northwestern Prince William Sound area of the Chugach Mountains, and the Juneau Icefield of the Coast Mountains. In each, detailed assessments of these all-source data were performed and annotated image pairs and triplets are presented to show the results and positive benefits of this approach.