



Ice loss and sea level rise contribution from Alaskan glaciers derived from satellite imagery

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Over the last 50 years, retreating glaciers and ice caps (GIC) contributed 0.5 mm/yr to SLR, and one third is believed to originate from ice masses bordering the Gulf of Alaska. However, these estimates of ice wastage in Alaska are based on methods that directly measure mass changes from a limited number of glaciers and extrapolate the results to estimate ice loss for the many thousands of others. Here, using a new glacier inventory with elevation changes derived from sequential digital elevation models, we found that, between 1962 and 2006, Alaskan glaciers lost $41.9 \pm 8.6 \text{ km}^3/\text{yr}$ water equivalent (w.e.) and contributed $0.12 \pm 0.02 \text{ mm/yr}$ to SLR. Our ice loss is 34% lower than previous estimates. Reasons for our lower values include the higher spatial resolution of the glacier inventory used in our study and the complex pattern of ice elevation changes at the scale of individual glaciers and mountain ranges which was not resolved in earlier work. Estimates of mass loss from GIC in other mountain regions could be subject to similar revisions.