Despite its importance in projections of sea level rise, dynamic mass loss from tidewater glaciers remains poorly constrained and understood. Owing to this difficulty, very few long-term or estimates of dynamic losses exist, and regional estimates of dynamic loss are nonexistent. Many studies have highlighted the importance of Alaska glaciers to sea level rise (e.g., Berthier and others, 2010). In this study, we present a detailed record of length fluctuations of Gulf of Alaska (GOA) tidewater glaciers, and propose a method to estimate calving fluxes on a regional level.

**For the purpose of this study, we divide the GOA into 6 subregions, based on geography and coverage with Landsat scenes. The number of glaciers varies between regions, with a total of 50 glaciers considered in the study. Not all of these glaciers calve into tidewater for the duration of the study.**

**METHOD**

- Terminus outline is manually digitized for each Landsat scene.
- Length change calculated using “Box Method” (Moon and Jouhgin, 2008).
- Reduces error in length calculation, results are more representative of glacier length.
- Glacier length is defined along a centerline coordinate system, individually determined for each glacier.

**ACKNOWLEDGEMENTS**

Thanks to Sam Herreid and Dave Podrasky for their helpful and insightful comments on digitizing outlines. This work is funded in part by NSF grant EAR-0943742, NASA grant NNX11AF41G, and NASA grant NNX11A023G.

**REFERENCES**


**SUMMARY**

- Very few Gulf of Alaska tidewater glaciers advance or retreat more than about 500 meters over the course of the study; only one glacier (Columbia Glacier) has retreated over 6 km in that time.
- Since ca. 2000, clear annual cycles in length change are observed in the glaciers of the Western Chugach. At present, this is the only region with such a detailed length record. Work is being completed on the other six regions.
- All four glaciers in the Coast Range (upper left figure, middle panel) show a similar pattern of ~ 2 km retreat, followed by a period of stagnation. The timing of the retreats, however is not synchronous.
- Several of the glaciers in Icy Bay have begun to re-advance since hitting their length minimum.
- The two glaciers in the Yakutat region (Hubbard and Turner Glaciers) appear to exhibit multi-year cyclic behavior.