Dataset Title: DGPS Lake Shoreline Dataset from Field Survey

Authors: Yongwei Sheng, Kenneth Hinkel, John Lenters, Laurence Smith, and Evan Lyons

Contact Information: Yongwei Sheng, Department of Geography University of California, Los Angeles, Los Angeles, CA 90095 USA, ysheng@geog.ucla.edu

Project Title: Collaborative Research: Changes in Lake Dynamics on the Arctic Coastal Plain of North America Over the Past Half-Century

NSF Grant: ARC-0713813

Classification: Hydrology

Data Overview:

Shorelines for thaw lakes on the Alaskan North Slope were mapped in the field using high accuracy Differential Global Positioning System (DGPS). Three field sites were mapped over three years beginning with the Barrow peninsula in 2008, near the town of Atqasuk in 2009, and at the southern limit of North Slope lakes in 2010 with about a dozen lakes at each site. These three field sites form a North-South transect of the North Slope. Most lakes in the area are unnamed so for this study, the lakes were named "L" and then a number counting up from 100 for lakes mapped in 2008, 200 for lakes mapped in 2009, and 300 for lakes mapped in 2010.Lakes accessible from the town of Barrow (L100, L102, L108, and L124) were mapped all three years.

The shoreline of each lake was mapped with a backpack-mounted Trimble® 5700 GPS receiver with a Trimble® Zephyr Geodetic antenna carried on foot around the perimeter. The horizontal accuracy of the DGPS survey was a combination of uncertainty from the DGPS unit, the offset of the backpack mounted antenna, and the route walked by the surveyor. Based on the DGPS point processing reports, the mean horizontal accuracy of all points was approximately ±20 cm. The backpack system had the antenna located on the surveyor's right shoulder offset by 15 cm to the right. Based on repeated survey of one lake by two surveyors, the mean horizontal distance between the shorelines including antenna offset was ±43 cm with a maximum distance of 184 cm. Point spacing is variable as the DGPS unit logged location a one second intervals allowing the surveyor to walk slowly to map complex shoreline features or quicker in straight sections.

Data Format:

Lakes DGPSed are organized into ArcView shapefiles based on field seasons (i.e., June and August in each year). The follow shapefiles are contained in the dataset:
June2008_polygons.shp, August2008_polygons.shp, June2009_polygons.shp, August2009_polygons.shp, June2010_polygons.shp, and *August2010_polygons.shp.*

All files are projected in the UTM Zone 4 North with units of meters (m). All have the following attributes:

        FID: Unique feature identifier (integer)
        Shape: Polygon (geometry)

Name: Lake name (L100, etc... see above)
Date: Date mapped (Date)
Area: Lake area (m^2)
Perimeter: Perimeter of lake (m)
Centroid_X: X coordinate of lake centroid in UTM projection (m)
Centroid_Y: Y coordinate of lake centroid in UTM projection (m)

Reference to Cite:

Lyons, E.A., Y. Sheng, L.C. Smith, J. Li, H.M. Hinkel, J.D. Lenters, J. Wang, 2011. Quantifying sources of error in multitemporal, Landsat-based lake mapping, *International Journal of Remote Sensing*, in review.