

Basic Limnological Survey of Twenty-One Northern and Central Mongolian Lakes

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Abstract

This survey report presents basin morphology, water quality, and sedimentological data from twenty-one Mongolian lakes, and is meant to be used as a resource for future geological and biological investigations. The lakes are organized in three separate groups based on geographic location, and the survey results from each lake are described in detail. A short discussion of local and regional factors influencing solute concentrations and pH levels of the lakes' waters is presented. The lakes present at latitudes lower than N 50°00' (i.e. central and north/central lakes) are distributed across an area of approximately 150,000 km² and vary considerably with respect to their water quality characteristics. Regional precipitation patterns as a function of geographic location and/or catchment specific processes are indentified as the driving mechanisms for variations in solute concentrations and pH levels in these lakes. The surveyed lakes present at latitudes higher than N50°00' (i.e. northern lakes) are distributed across a smaller area (approximately 180 km²) and have relatively little variation in water quality characteristics. These lakes straddle the local taiga/alpine tundra transition zone, and elevation (i.e. valley placement) is identified as the driving mechanism for inter-lake variations in solute concentrations and pH levels.

Key words: limnology, lake, water quality, survey, sediment cores

Introduction

The diverse ecology/geology of Mongolian lakes has long been recognized (Berkey & Morris, 1927) and a history of limnological monitoring within Mongolia exists (Kondratiev, 1929; Dulmaa, 1979; Kozhov *et al.*, 1965; Kuznetsov, 1968; Tserensodnom, 1971; Sevastyanov & Dorofeyk, 2005), yet a great number of Mongolian lakes remain unstudied. Of the 3,500 lakes distributed throughout Mongolia's rugged and sparsely populated landscape, most have remained isolated from human activities. Such isolation has preserved a great number of natural, undisturbed lake systems, offering biologists and geologists the unique opportunity to study such systems in their pristine state.

Here, we report observations on the physical and chemical properties of twenty-one northern and central Mongolian lake systems, the majority

of which were previously unstudied (Table 1; Fig. 1). The simple objective of this study is to provide a basic understanding of the nature of each lake system. Furthermore, this paper aims to document the baseline conditions of each ecosystem in order to better assess any future alterations.

Materials and Methods

Physiolimnological data were collected during June, July, and August of 2005 (Table 2). Lake names were assigned as labeled on existing topographical maps, or, when unlisted, informal local names were designated. Elevations and locations were recorded using a Garmin GPS 76 hand-held unit. Transparency measurements via Secchi disk were taken during the late morning to early afternoon hours, and were measured off the shaded side of the boat. Water temperature, dissolved oxygen (DO), specific conductivity