

CHAPTER 7

SOILS OF THE LAKE HÖVSGÖL AREA AND ITS WATERSHED

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Abstract

The soil cover of the Hövsgöl Lake area and its watershed is complicated because of its mountainous features, differences of exposure, the influence of permafrost, the taiga-forest and the soil forming rock sediments. Compared with the western part of the Lake area, in the east there are more sandy soils, and not as much high mountain soils. The Dark Kastanozem soil of the eastern Hövsgöl area is non-carbonated, and sandy-loamy. On the northern lower slopes cryomorphous meadow, cryomorphous peat and Chernozem soils are dominant. The larch forests are mainly dominated by Mountain taiga-dermo soil, and in some lower areas there are Mountain taiga-cryomorphous soils. In the valley bottoms, cryomorphous peat, cryomorphous meadow and alluvial peat soils are common. In the western Hövsgöl area high calcium carbonated soils are wide spread, especially in the Horidil Saridag mountain areas.

Introduction

The cold-humid climate condition, wide-spread distribution of permafrost, the taiga forest and the peculiarities of the rock sediment has formed the specific soil cover of the Hövsgöl area, distinct from other parts of Mongolia. The Hövsgöl area is the most humid region of Mongolia. According to the natural zonations this is a mountain taiga zone representing the southern edge of the huge Siberian taiga.

The soil cover of the Hövsgöl lake area is still not sufficiently studied. The beginning of geographical studies of Lake Hövsgöl dates to 1830, when N. S. Turchaninov and N. V. Kirillov visited this region and gave a first brief description. Until 1960s this region was never visited by soil scientists. The first time, in 1951, the Russian soil scientist N. D. Besspalov made a visit to the southern edge of the lake, at Hatgal. In the 1970s, the State University of Irkutsk and the National University of Mongolia began a joint investigation of the Hövsgöl region. This was a complex expedition, including all of the natural sciences, including soil scientists (Ivelsky, Martynov and Batjargal). The result of this expedition was issued in several scientific volumes, "Natural Conditions and Resources of the Hövsgöl Region", ended in 1989, and completed by publication of "The Lake Hövsgöl Atlas".

In addition to this expedition, many Russian-Mongolian soil scientists (Ogorodnikov, Dorjgotov, Batkhisig) visited this region, but mainly at the southern edge of Hövsgöl lake and the Darhad depressions.

The general and specific peculiarities of this territory include the following: 1) this is the southern boundary of the Siberian taiga forest 2) the area consists of undisturbed, pristine natural conditions and soil covers, 3) a short active biological period with a long period of negative temperatures in the soil, 4) the most humid region of Mongolia, and 5) the wide distribution of cryomorphic-peaty soils, etc. The specifics of soils of the Hövsgöl region are not only caused by the present soil forming conditions, but also some relict features inherited from the former period of the areas' historical development. For example: 1) cryoturbation features in the steppe soils, as an indicator of former cold humid climate conditions, 2) sandy sediment and sand accumulation in the eastern shoreline of Hövsgöl lake, eastern part of Darhad depression as evidence of a dry windy climate condition, 3) soils on moraine sediments – Ulaan taiga mountains, Horoo river valley, and the western Darhad depression (Fig. 7.1, 7.2).

This is the most humid part of Mongolia, characterized by continental climate conditions with a wide range of temperatures, from an absolute maximum air temperature of +35 °C, to a minimum of -50 °C. Precipitation averages 300-430 mm year⁻¹ except in high mountainous zones where precipitation can be as high as 600 mm year⁻¹. This area is often under snow cover from the beginning of October to the end of April.

By the soil regionalization characterization, the study area belongs to the humid type of soil vertical zonations (Nogina, 1984). The cryomorphic taiga soils usually are surficially ferrimorphic, and include Derno-taiga deep freezing, Meadow-forest deep freezing, Chernozem without carbonate and meadow-boggy cryomorphic soils (Dorjgotov and Maximovich 1984).

The area surrounding Lake Hövsgöl is dominated by mountain soils. The upper part of mountains, above the forest line (2200 meter a.s.l. southern slopes, 2100 meter a.s.l. on northern slopes) are distributed Mountain tundra and Mountain meadow soils (Fig. 7.3). These soils are formed under dryad-lichen, kobresia-lichen-dryad and sedge-lichen plant associations, characterized by short stony profiles and the accumulation of decomposed plant residues and peats. There are very clear cryoturbation processes and cryogenic sorting of materials. Forest soils are distributed between 1800-2200 meter on southern slopes, 1900-2100 meter on northern slopes under larch (*Larix sibirica*) forests with moss and moss-bush associations. On southern slopes under forb-grass vegetation, Mountain Dark Kastanozem soils form. In eastern Hövsgöl areas non-carbonated Kastanozem soil are distributed on the sandy sediments. In northern lower slopes Chernozem or cryomorphic boggy soils occur. Valley bottoms have meadow and boggy cryomorphic soils.

The soil cover of the Western and Eastern parts of Hövsgöl lake areas differ (Fig. 7.3). In the Western parts, high mountain soils are more wide spread: Mountain tundra and Mountain meadow. Soils of this part especially of the Horidal Saridag mountain area is characterized by high carbonate content, resulting from calcite, dolomite rocks. Even, forest soil has carbonate content.

