

Chapter 18

Investigation of Redox Processes in Paliastomi Lake

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ABSTRACT

Paliastomi lake is a small lake near the city Poti (Georgia), connected to the Black Sea by a narrow channel. Its surface area is 17.3 km² and the depth is 2.6 m. The lake is included within the boundaries of the kolkheti National Park. Redox conditions in lakes generally are determined by the balance between the decomposition of organic matter and the supply of oxygen by circulation or vertical mixing of the water. The circulation in lakes is largely controlled by density differences, which are generally a consequence of temperature difference. That's why temperature and oxygen were also investigated. The chapter will present the results of a study of redox reactions taking place in the lake. The study is conducted by analyzing the results obtained by measuring special sensors. The chapter will discuss how this process affects the Black Sea coastline and the local flora and fauna of the lake.

INTRODUCTION

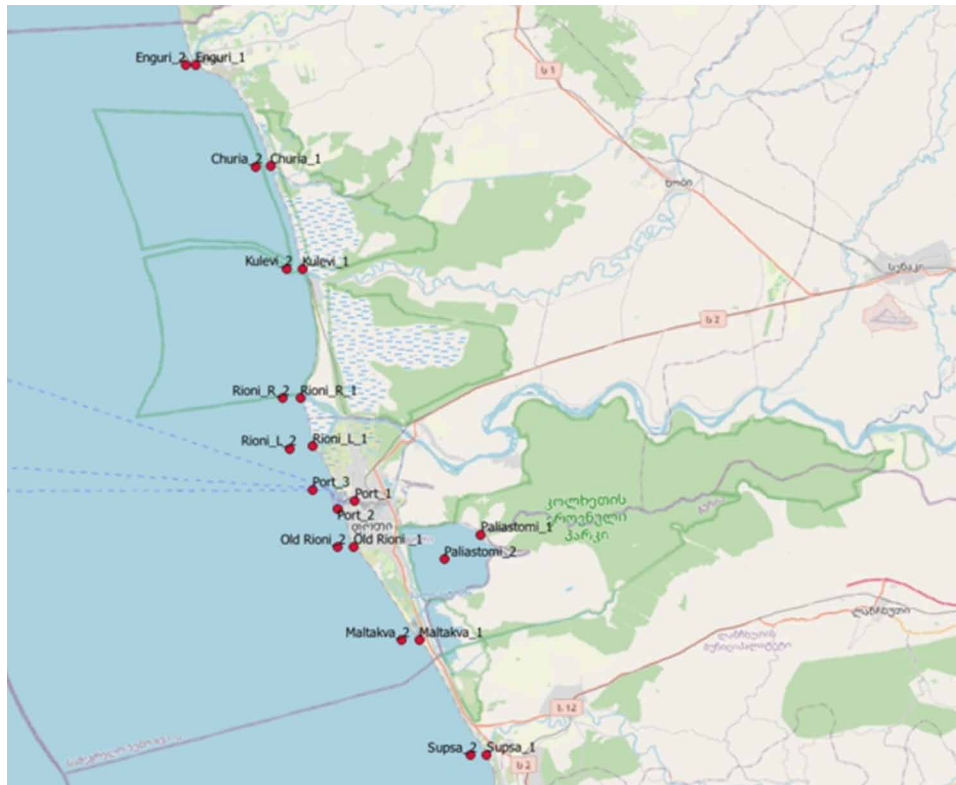
There are more than 26,000 rivers in Georgia, 99% of them are less than 25 km long. The number of average and large rivers is relatively small, however, their participation in the total volume of renewable water resources is significant. The volume of renewable surface water generated during the year is about 66 billion m³. The rivers of Georgia belong to the basins of the Black and Caspian Seas. The Black Sea basin includes Engur-Rioni, Chorokhi-Achariskalli, and Kodori-Bzifi basin areas. Mtkvari, Alazan-Iori, and Khram-Debeda basin areas are part of the Caspian Sea basin. Rivers are unevenly distributed in the territory of Georgia. 75% of Georgia's water resources originate from Western Georgia. There are about 860 lakes in the country, the vast majority of which are small (Trapaidze, 2012; Abramia, 2022; Lomsadze, 2016; Kupatadze, 2022).

DOI: 10.4018/979-8-3693-0512-6.ch018

BACKGROUND

Study Site

Figure 1. Paliastomi Lake



Paliastomi Lake was selected as a research site (Figure 1). Paliastomi Lake is a flowing lake located on the Odish-Guria lowland near the city of Poti. The surface area of the lake is 18.2 km². Basin area - 547 km², maximum depth - 3.2 m, average depth 2.6 m. The volume of water is 52 mln. m³. It is located 0.3 m below sea level. The Fichori River joins the lake, and the Kaparchina River flows out. The high-water level is characteristic in spring, summer, and autumn, and low in winter. Water temperature increases in July-August (25.1°C), and decreases in January (5.2°C). The lake is part of Kolkheti National Park (Aphkhazava et al., 1984).

According to the Ramsar Convention, Paliastomi Lake is a protected area of international importance and is part of the Kolkheti National Park. Ramsar site N° 893 “Wetlands of Central Kolkheti” consists of three different peat bog complexes (Anaklia-Churia, Nabada, and Fichora-Paliastomi), Paliastomi Lake, the surrounding sunken forests, the Black Sea coastal zone and the lower reaches of the Khobi (or Khobiskali) and Rion rivers. A total of 33,710 hectares (including the marine part of 55,500 hectares) in the central part of the Black Sea coastal plain, in Khobi and Lachkhuti administrative districts, and in the territory of Poti (Dassenakis et al., 2006).

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