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Impact of Human Activity on the Groundwater Chemical Composition of the South Part of the Poyang Lake Basin

Zhanxue Sun^a, E.A. Soldatova^{b*}, N.V. Guseva^b, S.L. Shvartsev^{b,c}

^aEast China Institute of Technology, Fuzhou, Jiangxi Province, 344000, China

^bNational Research Tomsk Polytechnic University, Lenina Avenue 30, Tomsk, 634050, Russia

^cTomsk Filial of the A.A. Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of the Russian Academy of Sciences, Akademicheskii Avenue 4, Tomsk, 634055, Russia

Abstract

The Poyang Lake basin is one of the main agricultural regions in China with dense population. As a result, groundwater in the research area is exposed to anthropogenic influence. This article considers distinctive features of the groundwater chemical composition. A special attention is paid to main pollutants in the research area. The chemical composition of groundwater was found to have resulted from the complex of natural and anthropogenic factors.

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1. Introduction

The Poyang Lake basin is a unique wetland system, which simultaneously is a habitat of rare animal species and an important part of economics. Wide alluvial plains, surrounding Poyang Lake, make the basin one of the main agricultural regions in China. This fact and also dense population with domination of rural

* Corresponding author. Tel.: +7-382-241-9068.

E-mail address: 2a61@mail.ru.

population lead to increasing the anthropogenic impact, which result, inter alia, in modification of the groundwater chemical composition. The vexed problem of rural regions such as the Poyang Lake basin, where intensive agricultural activity is developed, is groundwater pollution by potassium, phosphate and especially nitrogen compounds (Briling, 1985, Tyutyunova, 1987, Min et al., 2002) with fertilizers, domestic sewage, manure and other livestock waste. Thus it is reasonable to draw special attention to the major pollutants behavior in addition to the complex investigation of the groundwater chemical composition.

2. Materials and Methods

2.1. Study area

The Poyang Lake basin is situated in the south-east China, Jiangxi province. It is one of the main hydrological subsystems of the Yangtze River. The research area refers to the province with subtropical humid climate. The annual mean precipitation is 1400–2400 mm (Wang et al., 2013). An extremely irregular distribution of rainfall during year is resulted from the effect of monsoon. The relief of the Poyang Lake basin is quite various, from mountains of 2200 m height to rolling and alluvial plains (Li and Zhang, 2011).

2.2. Sampling and analytical procedures

The fieldwork in the south part of the Poyang Lake basin was conducted in January and October, 2013. In the study area 27 groundwater samples were collected from wells. The depth of wells in the most cases did not exceed 10 m. The sampling points are confined to the catchment areas of the five major rivers feeding the lake (Fig. 1).

For each sampling point 0,6 L of water was collected using polyethylene bottles to analyze the main ions, N species (NO_3^- , NO_2^- , NH_4^+), PO_4^{2-} , DOC and etc. Electrical conductivity, temperature and pH were measured *in situ*.

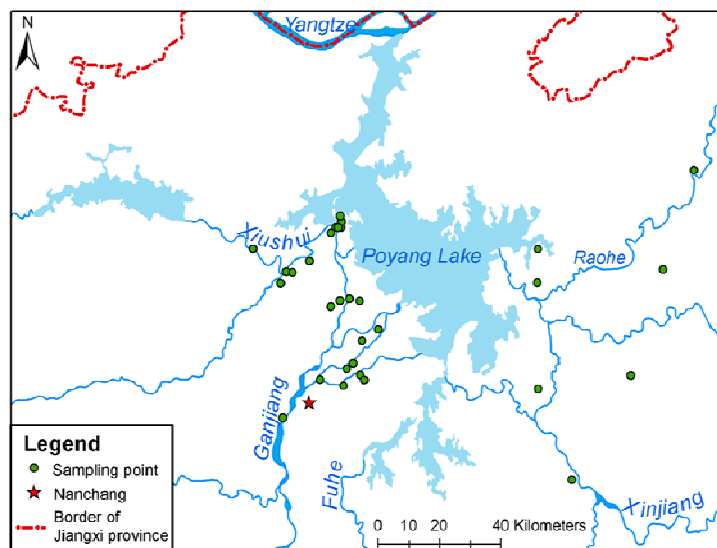


Fig. 1. Scheme of the location of the sampling points in the Poyang Lake basin.

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