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生态学研究

中国生态系统研究网络水体pH和矿化度监测数据初步分析

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摘要：

介绍了中国生态系统研究网络(CERN)陆地生态系统水环境监测指标与频率。初步分析了CERN 31个典型陆地生态系统监测地表水和地下水、6个湖泊和海湾生态系统、1个城市生态系统地下水体pH、矿化度(电导率)状况。结果表明，我国森林生态系统pH和矿化度分布规律基本一致，为从西向东、从北向南逐渐降低的趋势，pH在鼎湖山自然保护区出现强酸性(4.15)，其他台站为弱碱性、中性或弱酸性(6.01~8.26)，森林生态系统矿化度均较低(33~322 mg/L)。我国农田、荒漠、湿地生态系统水体pH和矿化度分布规律为：华北与黄土农业区、西北绿洲农业与牧业区相对较高，东北农业区和青藏高原农牧区其次，南方农业区最低;除南方农业生态系统与北方三江湿地生态系统水体pH为弱酸性(6.27~6.82)外，其他监测水体均为中性和弱碱性，500 mg/L以上矿化度水体主要出现在西北部荒漠生态系统，黄河冲积平原农业生态系统。湖泊、海湾生态系统水体和北京城市生态系统地下水pH均为弱碱性，海湾水体pH季节波动不明显，湖泊水体和北京城市地下水pH和电导率呈明显季节波动，湖泊水体pH表现为夏秋季节较高，电导率表现为6~9月较低;北京城市地下水pH为5~10月较低，矿化度(电导率)为5~7月较高。建议未来水体pH和矿化度(电导率)采取传感器原位高频率监测、在坚持长期定位监测同时增加区域调查、结合科学问题开展监测和研究，提高监测数据回答水质长期变化趋势、区域尺度人类活动影响的能力。

关键词： 中国生态系统研究网络 水环境 监测;pH;矿化度;电导率

Primary Analysis of Water pH and Salinity Monitoring Data on Chinese Ecosystem Research Network (CERN)

Abstract:

The water quality monitoring index and frequency of typical terrestrial ecosystem on the Chinese Ecosystem Research Network (CERN) were reviewed. Furthermore, the water pH and salinity of the 31 typical terrestrial ecosystems during 2004 to 2006, of the 6 lake and bay ecosystems during 2003-2007, and of one urban ecosystem during 2008 were assessed. The results showed: 1) The pH and salinity of the CERN forest ecosystems decreased from northern to southern ecosystems and from western to eastern ecosystems. The lowest pH value was in the southeast Dinghu forest ecosystem (4.15), while the pH value ranged from 6.01 to 8.26 in the other forest ecosystems. The salinity ranged from 33 to 322 mg L-1 in the forest ecosystems.2) The pH and salinity of the CERN agriculture-, oasis-, and marsh-ecosystem had obvious spatial trends, with the higher values in the North China Plain, Northwest oasis and desert area, the lower values in the northeast agricultural area and the lowest values in the southern agricultural area. The pH ranged from 6.70-8.45 except those in Sanjiang marsh ecosystem and southern agricultural ecosystems with the lower pH values. The higher salinity values (more than 500 mg L-1) were mainly in the western oasis and Yellow River floodplain agricultural ecosystems.3) The pH in the lake, bay and Beijing urban underground water were ranged from 6.8-8.8. There is little seasonal variation of pH in bay site but significant seasonal variation of pH and electrical conductivity in the lake sites and Beijing urban underground water. In the lake sites, the pH values were higher in summer and autumn, but the electrical conductivity values were lower during June to September. While in the underground water of Beijing urban site, the pH values were lower during May to October, while the salinity (electrical conductivity) values were higher during May to July. The study suggests that the advanced in-situ remote sensor technique, with high monitoring frequency, is needed to monitor the water pH and electrical conductivity. Furthermore, in order to differentiate the seasonal variation with long term trend and clarify the natural variation with the human being effects on water quality, it is necessary to continue long-term monitoring and undertake short time investigation in catchment or regional scales, and consider the human effects (acid deposition, agricultural fertilization, irrigation and drainage, point or non-point source pollution et al.) on water quality.

Keywords: Environmental Chang Network US Long-Term Ecological Research Network Chinese Ecosystem Research Network Water Quality, Monitoring

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