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滇池流域水环境承载力及其动态变化特征研究

Water environment carrying capacity in Dianchi Lake basin and its dynamic variation characteristics

关键词: [水环境承载力](#) [指标体系](#) [滇池流域](#) [层次分析法\(AHP\)](#) [国民生产总值\(GDP\)](#) [总磷\(TP\)](#)

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摘要: 为了定量分析人口增长、经济发展、资源短缺和环境污染等因素对流域水环境的综合影响,建立了湖泊水环境承载力多目标优化模型.同时,选取人口、灌溉面积、国民生产总值(GDP)、化学需氧量(COD)、总氮(TN)、总磷(TP)作为水资源和水质量承载力指标,运用层次分析法(AHP)确定各指标对湖区水环境承载力的权重,并运用指标体系评价法分别计算了2003—2010年滇池流域水环境承载力.结果表明,流域内人口承载度超标,经济承载压力显著增长,富营养化指标——TP、TN呈高负荷波动状态.滇池流域水环境承载力为负承载,水质量承载力影响程度更大.研究结果可为滇池流域的社会经济发展规划、生态环境保护和水资源可持续利用提供科学依据.

Abstract: In this work, we quantitatively assessed the comprehensive effect of population increase, economic development, resource shortage and environment pollution on the water environment of Dianchi Lake in Yunnan. According to the basic concept of water environment carrying capacity (WECC) and the specific conditions of Dianchi Lake, a model was established to optimize the WECC. Population, irrigation area, gross domestic product (GDP), chemical oxygen demand (COD), total nitrogen (TN) and total phosphorus (TP) were selected as an index system (IS) of water resource carrying capacity (WRCC) and water quality carrying capacity (WQCC). Analytic hierarchy process (AHP) was used to determine the weight of the indexes on the water environment carrying capacity. The WECC in 2003—2010 was calculated by IS-AHP. The results indicated that population has exceeded the carrying standard, economic pressure has increased rapidly and the eutrophication index (TP and TN) has exceeded the carrying standard, with significant fluctuation in most years. The overloaded WECC is in accordance with the real conditions of Dianchi Lake and the WQCC has greater influence than the WRCC. The research may provide scientific suggestions for formulation of an economic development plan for ecological environment protection and sustainable development of the water resource in the Dianchi Lake.

Key words: [water environment carrying capacity](#) [index system \(IS\)](#) [Dianchi Lake basin](#) [analytic hierarchy process \(AHP\)](#) [gross domestic product \(GDP\)](#) [total phosphorus \(TP\)](#)

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