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我国东部河流水文水质对气候变化响应的研究

Response of river hydrology and water quality to climate change in Changle River Watershed, Eastern China关键词: [长乐江流域](#) [SWAT模型](#) [SDSM模型](#) [大气环流模型GCMs](#) [水文水质](#) [污染负荷](#)基金项目: [公益性行业\(农业\)科研专项经费\(No.200903003\)](#); [国家科技支撑计划项目\(No.2012BAC17B01\)](#)

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摘要: 基于A2和B2气候变化情景,采用统计降尺度模型SDSM,将由3个国际上流行的大气环流模式GCMs(HadCM3、CSIRO-Mk2和CGCM2)模拟的未来我国东部长乐江流域的气温和降水,与水土评价模型SWAT相耦合,分析了该流域水文水质对气候变化的响应,并比较了3个大气环流模式模拟结果的异同.结果表明,所有气候情景下,TN浓度有明显的升高趋势;TP浓度有增有减,总体上仍呈微弱增加趋势,河川径流呈微弱减少趋势,而营养物质负荷量呈微弱增加趋势,说明该流域水文水质状况受气温升高的影响大于降水微弱增加的影响.另外,在不同的气候变化情景下,年内径流和营养物质负荷变化情况存在较大差异.研究结果可为理解河流环境对气候变化的响应及其应对管理提供理论依据.

Abstract: Based on climate change A2 and B2 scenarios, the statistical downscaling model (SDSM) was adopted to predict the future air temperature and precipitation with the simulation data from three global circulation modes (HadCM3, CSIRO-Mk2 and CGCM2) in Changle River Watershed, Eastern China, and then these downscaled data were coupled with SWAT (Soil and Water Assessment Tool) model to analyze the impacts of climate change on river hydrology and water quality under different climate scenarios. Results showed that there was a significantly increasing trend for TN concentrations in the rivers, but no obvious increasing or decreasing trend for TP concentrations compared with the baseline. The phenomena of a weak reducing trend for runoff and a increasing trend for nutrient loads in the rivers demonstrated that the impacts of the climate warming on water environment was greater than that of the precipitation weak increasing. Under different climate change scenarios, there was a big difference in annual runoff and nutrient loading distribution. These results can provide some theoretical basis for the response of river water environment to the impacts of climate change in the future.

Key words: [Changle River Watershed](#) [SWAT model](#) [SDSM model](#) [GCMs](#) [water quality](#) [pollution loads](#)

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