山美水库流域水量水质模拟的SWAT与CE-QUAL-W2联合模型

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Coupling SWAT and CE-QUAL-W2 models to simulate water quantity and quality in Shanmei Reservoir watershed.

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摘要

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摘要

为更好地模拟分析流域非点源污染对山美水库水质的影响,联合运用流域日尺度分布式水文模型SWAT和二维垂向水动力水质模型CE-QUAL-W2,将SWAT模型的时序输出作为CE-QUAL-W2模型的输入条件,构建了山美水库流域水量水质模拟联合模型,并对流域径流、输沙和污染物以及水库的水位、水温和无机氮等变量进行了率定.结果表明: 尽管受流域部分计算结果的影响,误差会累积到对下游水库水体的计算,但模型的模拟结果与实测数据的吻合程度仍较高,说明联合模型可以较好地反映山美水库流域及库区水体的水动力和污染过程.模型的使用可以为定位流域关键污染源区及控制水库富营养化提供科学依据.

关键词:　SWAT　CE-QUAL-W2　联合模型　山美水库流域

Abstract:

A coupled watershed-reservoir modeling approach consisting of a watershed distributed model (SWAT) and a two-dimensional laterally averaged model (CE-QUAL-W2) was adopted for simulating the impact of non   point source pollution from upland watershed on water quality of Shanmei Reservoir. Using the daily serial output from Shanmei Reservoir watershed by SWAT as the input to Shanmei Reservoir by CE-QUAL-W2, the coupled modeling was calibrated for runoff and outputs of sediment and pollutant at watershed scale and for elevation, temperature, nitrate, ammonium and total nitrogen in Shanmei Reservoir. The results indicated that the simulated values agreed fairly well with the observed data, although the calculation precision of downstream model would be affected by the accumulative errors generated from the simulation of upland model. The SWAT and CE-QUAL-W2 coupled modeling could be used to assess the hydrodynamic and water quality process in complex watershed comprised of upland watershed and downstream reservoir, and might further provide scientific basis for positioning key pollution source area and controlling the reservoir eutrophication.

Key words:　SWAT　CE-QUAL-W2　coupled modeling　Shanmei Reservoir watershed.

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