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中文题名	荆江-洞庭湖系统 水系连通性初步研究
英文题名	Preliminary Research of Hydrological Connectivity of Jingjiang-Dongting River-Lake System
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中文文摘	荆江-洞庭湖区域是长江中游最重要的调洪场所和水源地, 拥有非常复杂的江湖关系。近代江湖格局形成后，受泥沙淤积等因素的影响, 荆江三口分流减少, 水系连通性变差，影响区域内河湖生态。对荆江-洞庭湖地区开展生态疏浚, 增加枯水期水资源供给, 改善水系连通性势在必行。因此, 通过水动力模型对生态疏浚方案进行模拟, 分析生态疏浚对荆江-洞庭湖的水动力特征和水系连通性的影响是生态疏浚的前提。为此, 论文以荆江-洞庭湖江湖系统为研究对象, 开展以下研究：（1）利用 HEC-RAS 和 ArcGIS 软件对荆江-洞庭湖的复杂江湖系统建立二维水动力模型。通过对模型的长序列模拟, 探究了 1992-2016 年荆江-洞庭湖区域的水位年内变化、水深年内变化和流速年内变化；定量分析了三口分流的年内变化和河流断流天数；建立了荆江流量和三口分流的响应关系以及江湖水量交换关系；阐述了城陵矶出流和下荆江的汇流情况。HEC-RAS 二维水动力模型能模拟出良好的结果, 可以作为分析生态疏浚对荆江-洞庭湖影响的工具；（2）基于《洞庭湖区治理及松滋口建闸关键技术研究总报告》和《洞庭湖生态疏浚工程初步方案》, 制定了 2 种疏浚方案, 疏浚对象是松滋河西支和藕池河东支, 疏浚深度分别为 0.7m 和 1.0m。利用 HEC-RAS 二维水动力模型对生态疏浚后的地形开展相同边界条件的水动力模拟；（3）通过对比不同疏浚方案的水动力模型模拟结果, 分析疏浚深度对荆江-洞庭湖区域的水位年内变化、水深年内变化和流速年内变化的影响；定量比对疏浚深度对三口分流和荆江来流响应关系、江湖水量交换关系、城陵矶汇流比年内变化的影响, 结果表明生态疏浚能有效改善三口分流现状、减少断流天数、调整洞庭湖蓄水量、增加城陵矶汇流比；建立荆江-洞庭湖系统综合性的水系连通性评价体系, 分析了荆江-三口、洞庭湖湖区、三口河网以及系统整体在 1992-2016 年间的水系连通性变化规律, 并评价生态疏浚对各区域水系连通性的影响。结果表明生态疏浚有利于加强该地区的水系连通性。
外文文摘	Jingjiang-Dongting River-Lake (JDRL) system is the most important flood diversion site and water source in the middle reaches of the Yangtze River, which has a very complex relationship between river and lake.After the modern formation of the river and lake pattern, influenced by factors such as sediment deposition, the diversion of the Three Diversion Outlets (TDO) decreased and the hydrological connectivity decreased, which affects the ecology of rivers and lakes.It is imperative to carry out ecological dredging in JDRL, increase water supply in dry season and improve hydrological connectivity.The premise of ecological dredging is to analyze the impact of ecological dredging on the hydrodynamic characteristics and hydrodynamic connectivity of JDRL through the hydrodynamic model.Therefore, this paper takes the JDRL system as the research object, and carries out the following research.Firstly, a two-dimensional hydrodynamic model is established for the complex system of JDRL by using HEC-RAS and ArcGIS software.Through the long series simulation of the model, the annual changes of water level, water depth and velocity in the JDRL from 1992 to 2016 are explored.Quantitative analysis was conducted on the annual changes and the number of days of river system interruption in TDO.The response relationship between Jingjiang River (JR) and TDO and the water exchange relationship between the rivers and lakes were established.The confluence of the outflow from Chenglingji and the lower JR is elaborated.HEC-RAS two-dimensional hydrodynamic model can simulate goo

	d results, which can be used as a tool to analyze the impact of ecological dredging on JDRL.Secondly, based the “General Research Report on Key Technologies of Dongting Lake Area Treatment and Songzikou Sluice Construction” and the “Preliminary Scheme for Ecological Dredging Project of Dongting Lake”, two dredging schemes were formulated.The dredging objects are the western branch of the Songzi River and the eastern branch of the Ouchi River, with dredging depths of 0.7m, and 1.0m, respectively.The HEC-RAS two-dimensional hydrodynamic model was used to simulate under the same boundary conditions.Then, the impact of dredging depth on the annual changes of water level, water depth and velocity in JDRL was analyzed by comparing the simulation results of hydrodynamic models of different dredging schemes.Quantitative comparison of the impact of dredging depth on the response relationship between TDO and JR, the water exchange relationship between river and lake, and the changes in the confluence ratio of Chenglingji within a year were conducted.The result showed that ecological dredging can effectively improve the current situation of TDO, reduce the number of days of river cutoff, adjust the storage capacity of Dongting Lake, and increase the confluence ratio of Chenglingji.Finally, a comprehensive hydrological connectivity assessment system for the JDRL was established.The hydrological connectivity dynamics in the JJ-TDO, Dongting Lake, TDO river network, and JDRL from 1992 to 2016 were analyzed.Additionally, the impact of ecological dredging on hydrological connectivity in each region was evaluated.The results indicated that ecological dredging is beneficial for strengthening the hydrological connectivity of the JDRL.
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