Study on Water Resources Regulation and Reservoir Operating Prediction for Suppression of Salt Water Intrusion in the Pearl River Estuary

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Abstract

Salt water intrusion occurred frequently during dry season in Modaomen waterway of the Pearl River Estuary. With the development of region's economy and urbanization, the salt tides affect the region's water supply more and more seriously in recent years. Regulation and allocation of freshwater resources of the upper rivers of the estuary to suppress the salt tides is becoming important measures for ensuring the water supply security of the region in dry season. The observation data analysis showed that the flow value at the Wuzhou hydrometric station on the upper Xijiang river had a good correlation with the salinity in Modaomen estuary. Thus the flow rate of Wuzhou has been used as a control variable for suppression of salt tides in Modaomen estuary. However, the runoff at Wuzhou mainly comes from the discharge of Longtan reservoir on the upper reaches of Xijiang river and the runoff in the interval open valley between Longtan and Wuzhou sections. As the long distance and many tributaries as well as the large non-controlled watershed between this two sections, the reservoir water scheduling has a need for reasonable considering of interaction between the reservoir regulating discharge and the runoff process of the interval open watershed while the deployment of suppression flow at Wuzhou requires longer lasting time and high precision for the salt tide cycles. For this purpose, this study established a runoff model for Longtan - Wuzhou interval drainage area and by model calculations and observation data analysis, helped to understand the response patterns of the flow rate at Wuzhou to the water discharge of Longtan under the interval water basin runoff participating conditions. On this basis, further discussions were taken on prediction methods of Longtan reservoir discharge scheduling scheme for saline intrusion suppression and provided scientific and typical implementation programs for effective suppression flow process at the Wuzhou section.

Key words: Pearl River, Modaomen estuary, salt tide, reservoir regulating, saline intrusion suppression

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