

Analysis and Research on the Construction of Digital Twin Watershed of Boyu Reservoir

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Objectives

This paper explores the construction scheme and management scheme of the digital twin watershed, taking Boyu Reservoir as an example. This paper further presents and analyzes the pivotal technologies utilized in the construction of the digital twin watershed for Boyu Reservoir.



Figure 1 Comprehensive Display Interface of Boyu Reservoir Digital Twin System

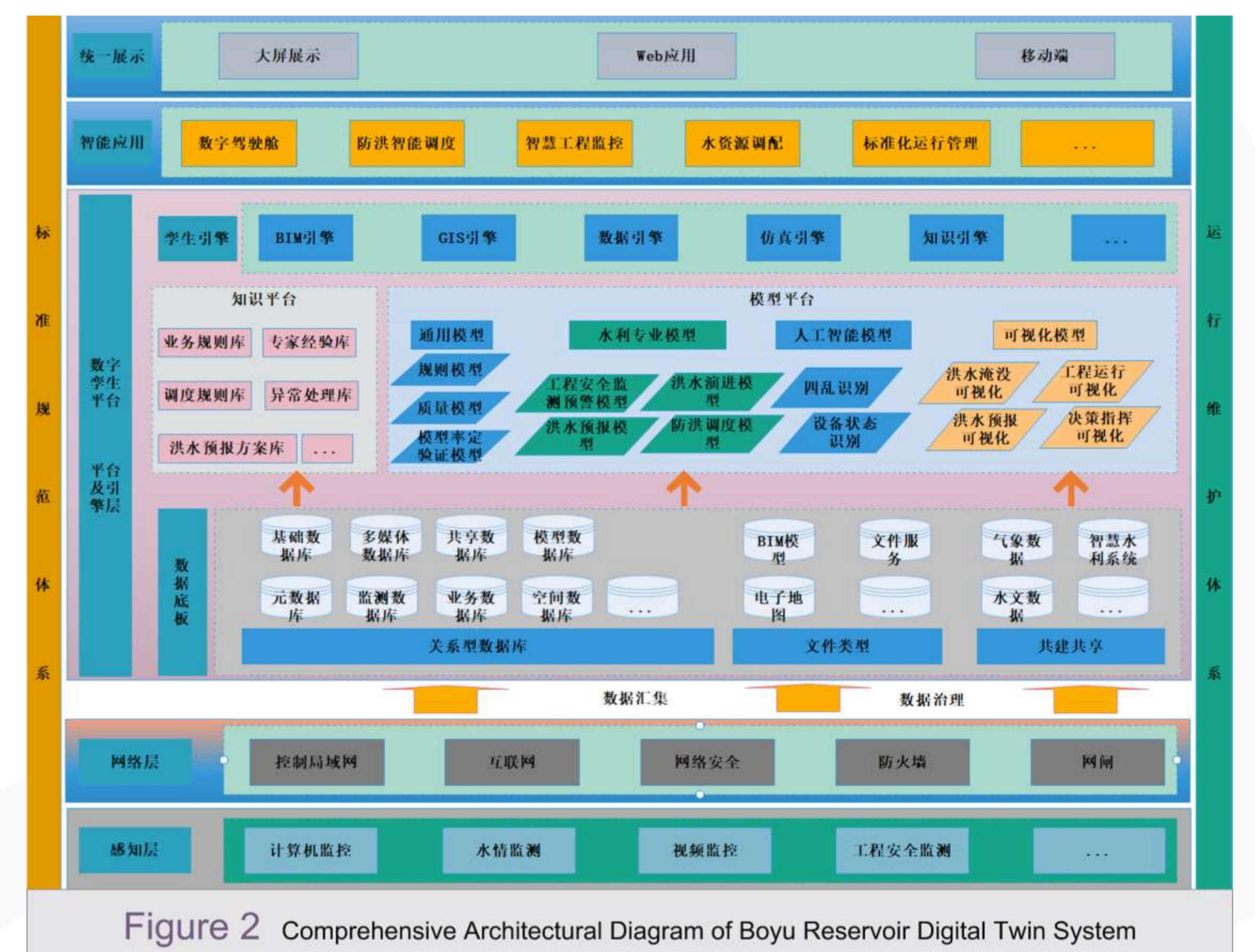


Figure 2 Comprehensive Architectural Diagram of Boyu Reservoir Digital Twin System

Methods

1. Conducted an analysis of key shortcomings in traditional water resources management technology.
 2. Focused research on Boyu Reservoir as the case study and targeted key technologies, including geospatial data acquisition, GIS and BIM models, underwater terrain models, and high-resolution three-dimensional real-life model construction.
 3. Developed the digital scene, three-dimensional visualization platform, and intelligent simulation functions to support the digital twin basin construction.
 4. Established a database and professional model bases for efficient water resources management and allocation.
- Implemented the four-forecast intelligent platform for forecasting, early warning, rehearsal, and planning in water resources management.

Results

1. Successfully analyzed and summarized the technical application and management scheme of the digital twin basin construction at Boyu Reservoir. Identified and discussed the shortcomings in the digital twin basin construction.
2. Realized efficient management and allocation of water resources through the implementation of the digital twin basin.
3. Demonstrated the achievements of the system in data backplane, model platform, and "four pre-preparation" function of the intelligent platform.

Conclusions

1. The construction of digital twin basins is an important approach for promoting the digital transformation of traditional water conservancy and plays a significant role in China's new digital water conservancy development.
2. The study effectively demonstrated the application of digital twin technology in the context of Boyu Reservoir and highlighted the key technologies used in the construction process.
3. Efficient water resources management and allocation were achieved through the establishment of a digital twin basin and the implementation of the four-forecast intelligent platform.

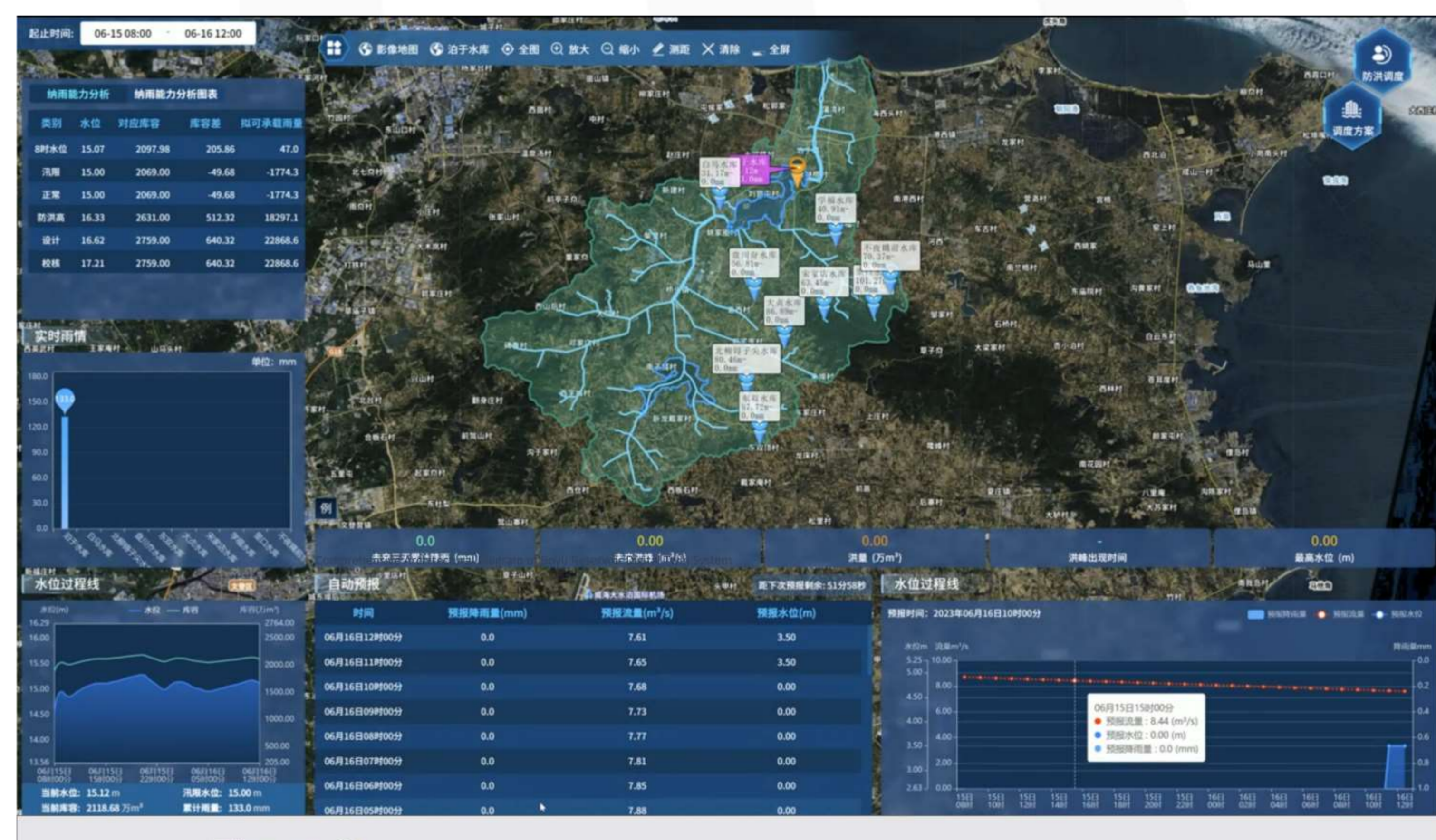


Figure 3 Flood Prediction System Interface of Boyu Reservoir Digital Twin System