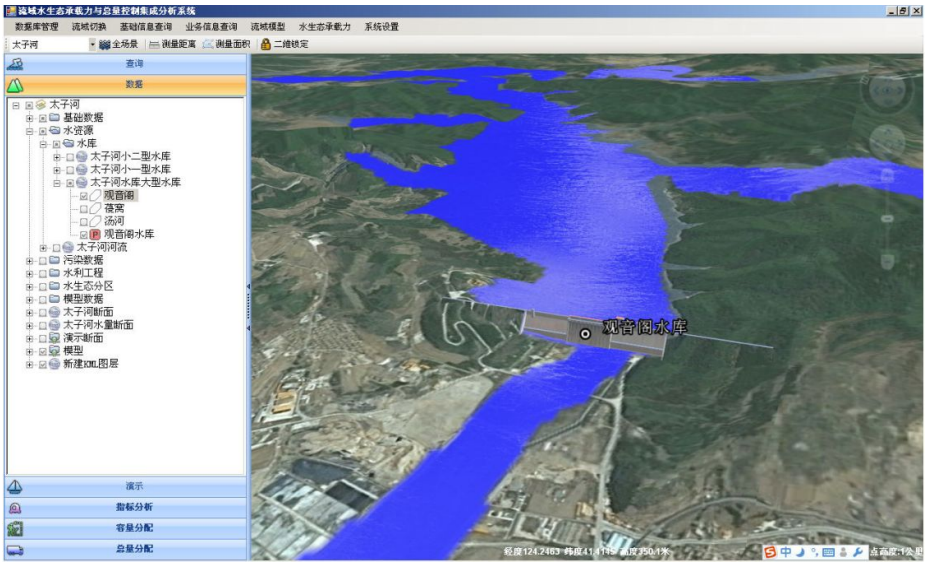
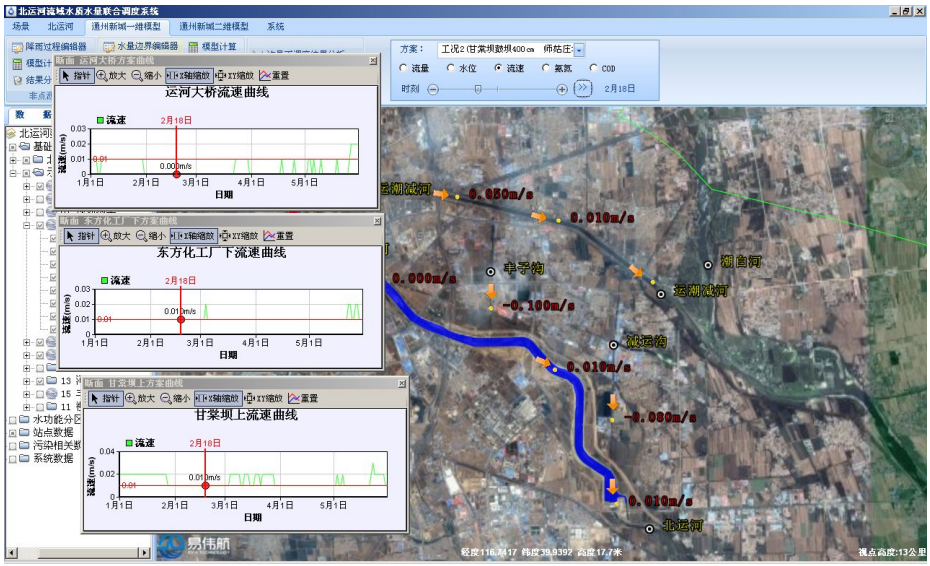
The 3D visualization solution of water environment

Business case

Total watershed water ecological distribution of 3D visualization system integration platform.

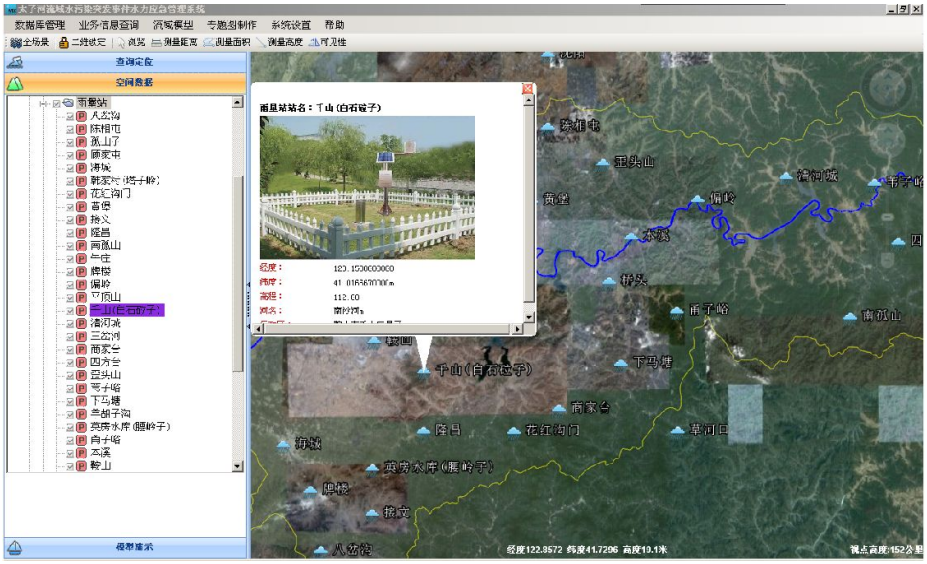


Water quality and quantity based scheduling dam joint scheduling visualization platform.



Ecology operation simulation and visualization management system of small river control.

River water pollution incident forecast and water conservancy emergency dispatching decision support system.



The 3D visualization system introduction of water environment

The state implement the management system of watershed management and region management combine to river resource, watershed management is refers to the state of major rivers and lakes in watershed as the unit, with water as the core of water matter activity

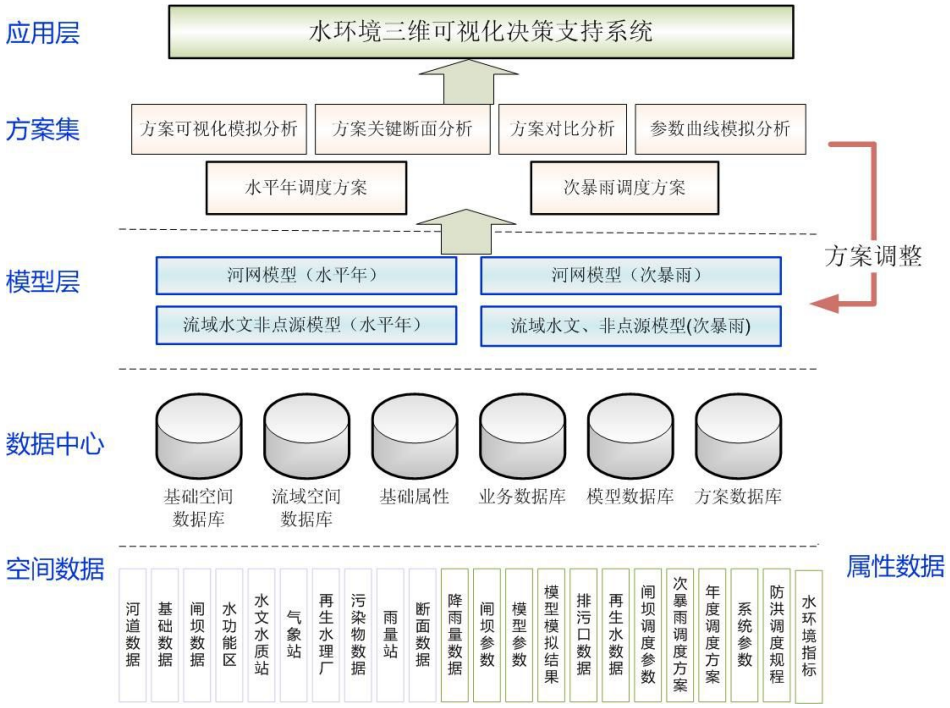
implement unified management.

With the rapid growth of China's economy, energy consumption increase resources, lead to pollution emissions intensity big and high load, at the same time the unreasonable social and economic activities, the excessive development of water and soil resources and global climate change, aggravate the deterioration of watershed ecological. The formation of main pollution load is far more than the bearing capacity of watershed ecological adverse situation, as the result it became a major bottleneck restricting economic and social development. Watershed pollution is the watershed of social economic development, pollution, climate and the change of water resources circulation system, the outcome of combined action of multiple factors.

In order to the better solution of the watershed resources management and water environment bearing capacity allocation, need to set up the technical system and watershed pollution total amount control and allocation strategy. on the basis of using the 3 d visualization technology, database technology to achieve spatial data within the scope of the basin, water resources, water conservancy projects, pollution data, the dynamic model of water function zoning, water quality data, thematic map data integration management and visualization analysis, implementation based on the visual basin, hydrodynamic model of water quality as the core, by means of such scheduling, aiming at water quality

of water dispatching, to flood control scheduling for the guidelines, to achieve the water quality of water within the scope of the basin, the water function zoning, dc, the key section of main channel and the reasonable allocation and management of water quality and quantity.

3D visualization of water environment system architecture:



The system characteristics

1. The integration of spatial data and attribute data management: apply 3D GIS technology and database technology to implement watered spatial information and attribute information management is the foundation of the realization of digital watershed.

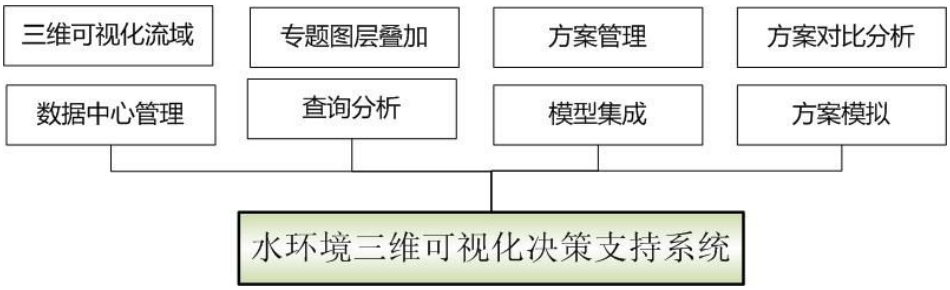
2. Digital watershed 3D visualization management: using 3D visualization of GIS technology, data management system, virtual simulation technology from structure of the space, time process, characteristic properties and objective laws in face of the holographic

and visual description of the watershed.

3. Dynamic model of water quality of seamless integration: system integration SWAT model output.

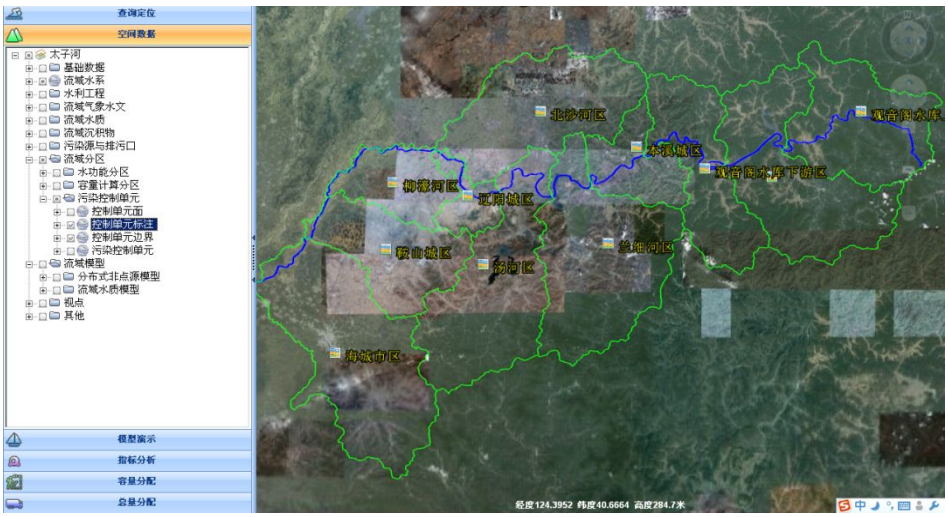
4. Auxiliary decision-making process visualization

System function



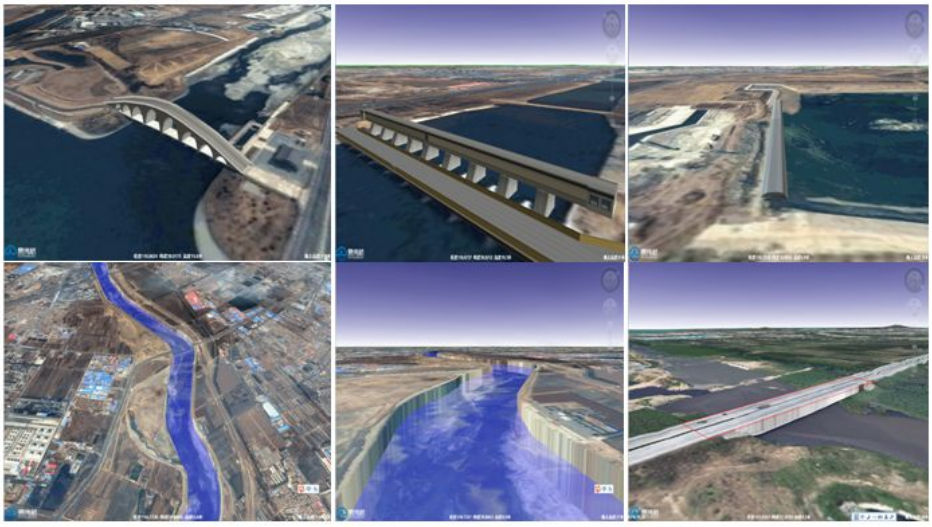
3D visualization watershed

Watershed contains spatial information including drainage watershed within the scope of the topography and image data, and the flow of river, reservoir and sites, etc. The scheme based on EVIA Earth platform to realize spatial data of the visual display , use the mouse and keyboard can realize 3D browsing whole watershed, as shown in figure:



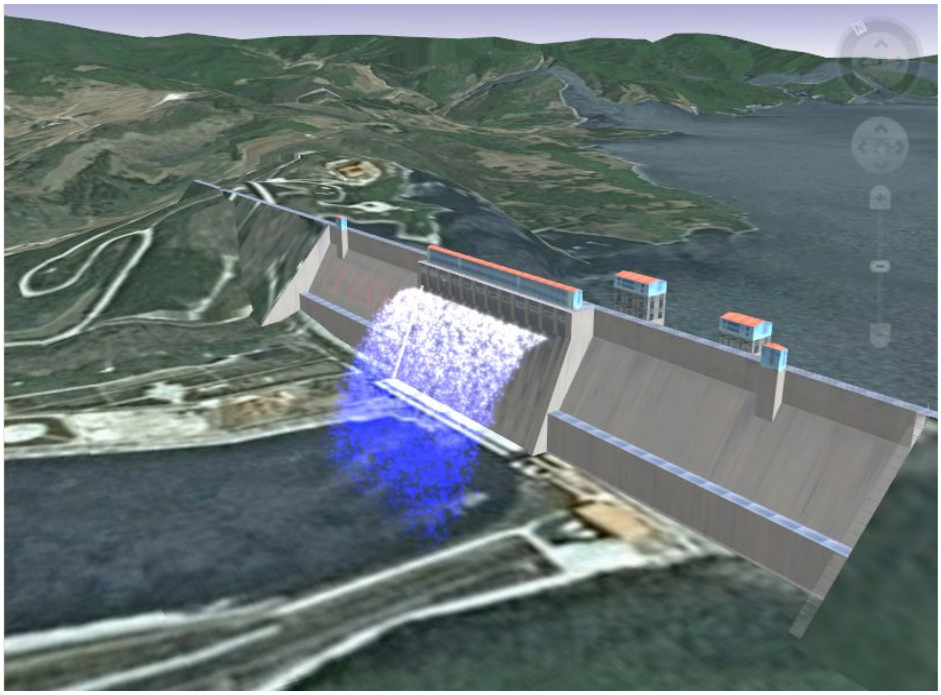
Details of the 3D hydraulic engineering, river, bridge etc, display as

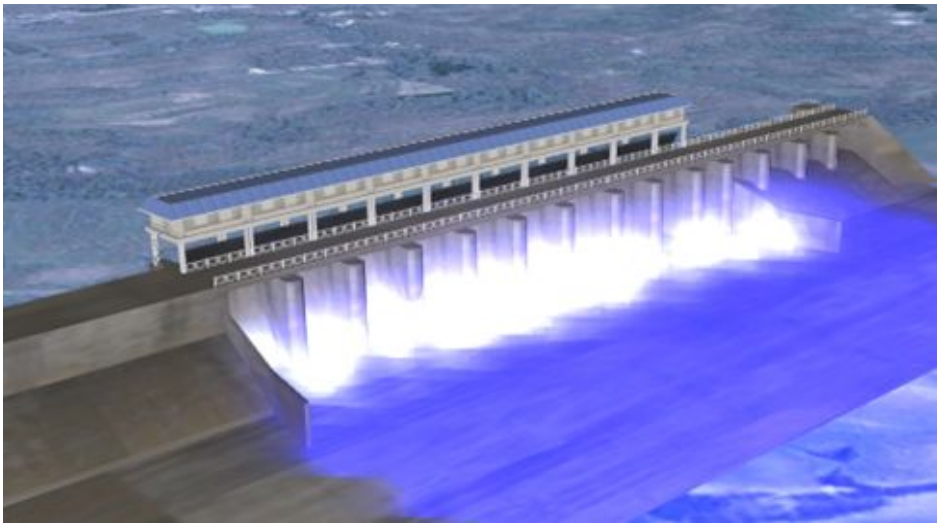
shown in figure:



Water conservancy engineering simulation

Through the reservoir terrain, the reservoir storage curve and water dispatching model of integration, which can realize water dispatching scheme of visual representation, and the reservoir flood discharge and sites for drainage scheme is key point of visual display, the effect is shown in figure:

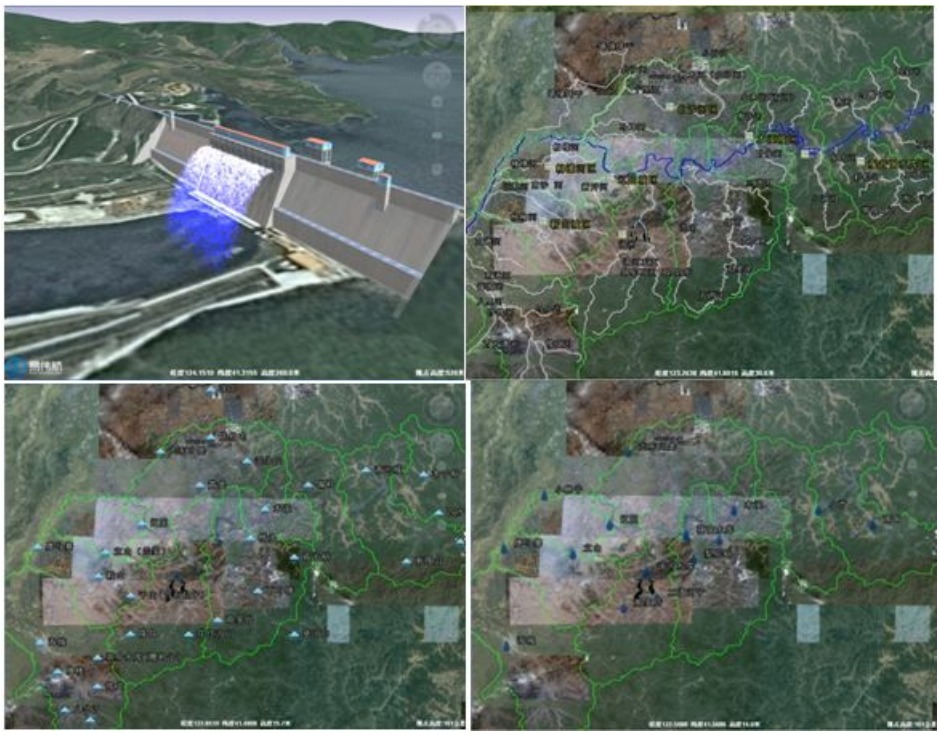




Spatial data management

Spatial data management to manage folder combination form, friendly interface and complex user habit, the user can flexibly according to the needs of the business organization, effect as shown in figure:

Spatial data include water conservancy projects, water temperature and water quality data, weather stations, rainfall stations and other thematic data, as shown in figure:

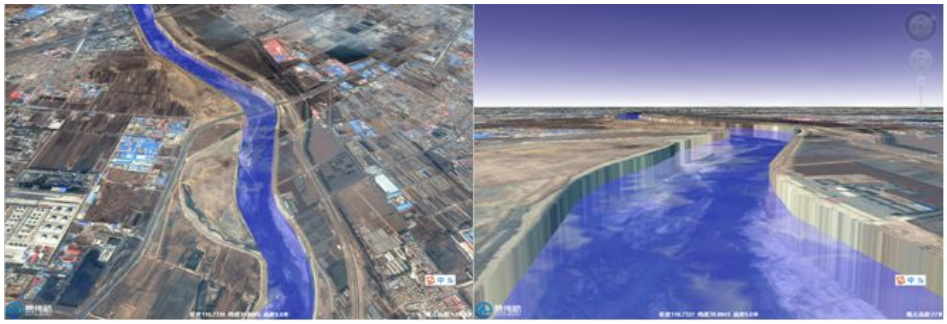


Water pollution diffusion visualization analysis

Water pollution can cause water use reduction or loss of value, pollution of the environment by harmful chemicals. Pollution of main assessment indicators are total phosphorus, total nitrogen , COD, BOD concentration in the water. Use combination with 3D visualization of the surface color and transparency in all kinds of pollutants concentration in water, the effect shown in figure:

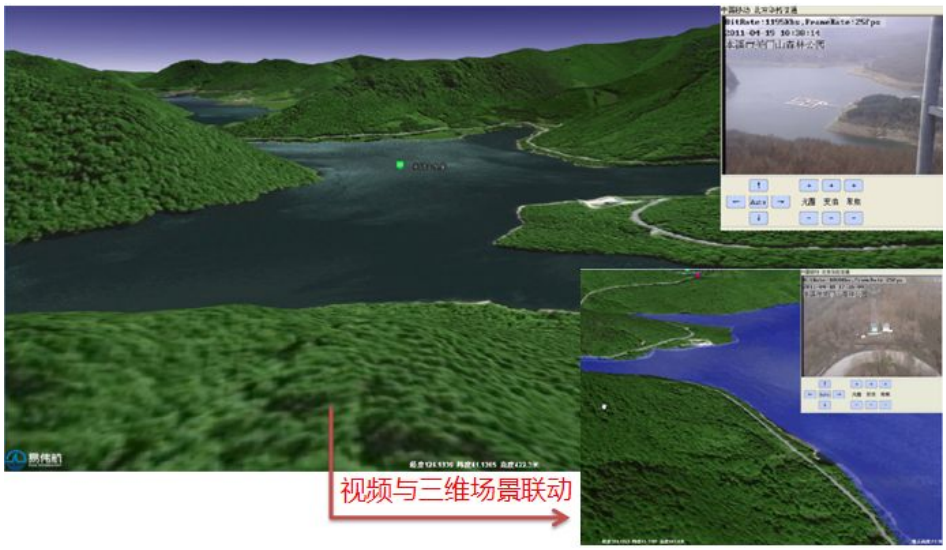
River simulation

Traditional 3D visualization on the surface of the river channel vector mode to the river in general, can only show the surface of the river forms, but can't express the depth of visualization and river water, EVIA Earth platform adopts the river elevation and dynamic water technology, real performance channel depth and channel water level, making the river more intuitive rich performance, the effect is shown in figure:



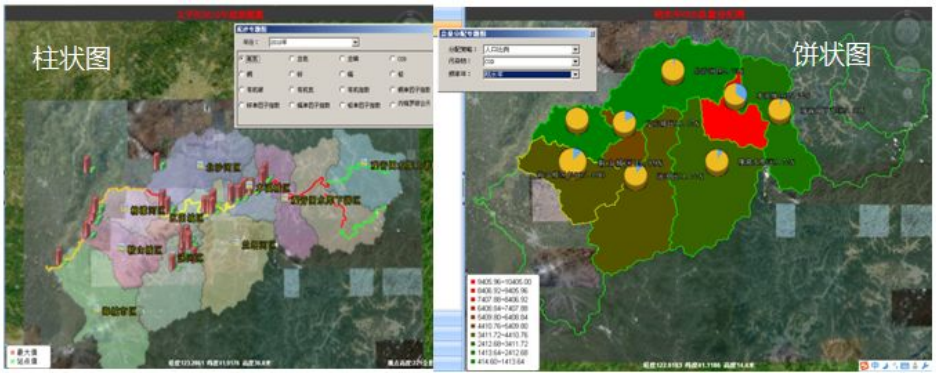
Virtual reality and video surveillance integration

Virtual 3D scene is good performance the watershed within the scope of the information such as height, valley shape, but due to adopt the historical image data , image data for the key points such as sites , major water conservancy engineering and reservoir real-time monitoring information, so virtual reality visualization of 3D scene and real-time monitoring of video information integration can complement each other, realize the whole watershed , a complete coverage of key areas, a variety of time dimension data, the effect is shown in figure:



Thematic analysis

Visualization of 3D scene using traditional histogram, pie chart combination of thematic map display, can colleague performance space, time, contrast, proportion of different business analysis demand , can more intuitive performance industry data, as shown in left picture, Pollutant concentration information and reference value on the space of comparative analysis, the pollutant total amount on each partition management unit have the graph of ratio analysis:



Thematic layer

Thematic map is down a certain type of business data in space on the map display, as shown in figure for the land using type:


土地利用