

Online Ocean Modeling User Manual

FIRST INSTITUTE OF OCEANOGRAPHY, MNR

2025. 3. 12

Menu

1	PREFACE	1
1.1	BACKGROUND OF SYSTEM DEVELOPMENT	1
1.2	PURPOSE OF THIS MANUAL	1
1.3	OVERVIEW	2
1.4	OPERATING ENVIRONMENT	2
1.5	CASE DEMONSTRATION	3
1.5.1	Case 1. Default Bohai Sea range:.....	5
1.5.2	Case 2. Customize the mesh range.....	12
1.5.3	Case 3. Upload existing project files.....	21
2	SYSTEM FUNCTIONS.....	30
2.1	SYSTEM MANAGEMENT.....	30
2.1.1	User login.....	30
2.1.2	User registration	30
2.1.3	User management.....	31
2.2	SYSTEM HOME PAGE	32
2.2.1	Switch map.....	32
2.2.2	Map operations.....	33
2.3	PROJECT MANAGEMENT MODULE	34
2.3.1	New project	34
2.3.2	Query project.....	41
2.3.3	Project management	41
2.4	FUNCTION OPERATION LIST.....	43
2.4.1	Project selection	43
2.4.2	Mesh operations	43
2.4.3	Shoreline operations.....	50
2.4.4	Water depth operations.....	58
2.4.5	Tidal boundary	62
2.4.6	Parameter configuration	64
2.4.7	Other operations	70
2.5	START SIMULATION	72
2.6	RESULTS	73
2.6.1	Thematic maps	73
2.7	ENVIRONMENTAL FIELD VISUALIZATION.....	82
2.7.1	Current visualization	83
2.7.2	Pollutant visualization	84

1 PREFACE

1.1 Background of System Development

With the increasingly severe global marine environmental issues, the impacts of marine engineering activities on marine ecosystems have gradually become a key concern for both the public and governments. Marine engineering projects such as offshore wind farms, oil and gas exploration, and port construction often exert complex influences on water quality, currents, sediment dynamics, and ecosystems. Therefore, conducting systematic marine environmental impact assessments is crucial for ensuring the sustainable development of marine engineering.

However, traditional environmental assessment methods primarily rely on limited field monitoring data and empirical analyses. When applied to complex marine environments, these approaches often face constraints due to data scarcity and spatial limitations. To address these shortcomings, the development of a comprehensive and precise numerical simulation system for marine engineering environmental impact assessment has become particularly urgent.

The development of this system aims to provide comprehensive environmental impact assessment support for marine engineering projects through numerical simulation technology. By integrating multiple functional modules including hydrodynamic simulation and pollutant dispersion modeling, the system can accurately predict the potential impacts of engineering activities on the marine environment.

1.2 Purpose of This Manual

This document serves as an operational guide for users of the Online Ocean Modeling website. It provides a comprehensive description of all system functionalities and detailed user permissions. By reading this manual,

users can quickly familiarize themselves with the website and begin utilizing its features.

1.3 Overview

The Online Ocean Modeling system is functionally composed of core modules including numerical simulation, environmental visualization, thematic mapping, project management, and system administration.

1.4 Operating Environment

Users can access the system directly through mainstream web browsers on their computers without installing additional software or plugins. However, the system has specific browser version requirements. The following browsers are supported:

- ① Firefox 45.0.1 or later
- ② Google Chrome 30.0.1599 or later
- ③ IE 9 or later

1.5 Case Demonstration

This section presents three system application cases using flowchart methodology, designed for users with varying levels of proficiency in either the system operation or marine environmental numerical simulation. The cases include:

Case 1. Default Bohai Sea range: This case is designed for new users of the system or those with limited experience in marine environmental numerical simulation. Users can complete default-range numerical simulations by using the system's preset values and following just a few core operational steps, with options to export thematic maps and automatically generated reports.

Case 2. Customize the mesh range: This case targets users with foundational numerical modeling experience, particularly those familiar with professional software packages such as DHI-MIKE or SMS and have basic mesh generation/modification skills. The demonstration will incorporate advanced system functionalities including custom mesh generation and parameter configuration. Upon completion, users will be able to use the system more effectively for completing complex numerical simulation tasks.

Case 3. Upload existing project files: This case is designed for users who are familiar with the system or have expertise in marine engineering. It covers most of the system's advanced features, including uploading project files and mesh files, configuring project and model parameters, and customizing output elements. Users are required to upload their own project or mesh files for simulation or download the corresponding templates, modify them, and upload them as their own files. Through this case, users will further enhance their

proficiency with the system and be able to independently address complex environmental impact simulations.

The case flowchart uses orange highlights to distinguish key operations. Darker sections represent core steps that are essential for completing the case, while lighter sections indicate optional steps that users can choose to perform based on their needs. Gray text denotes parts not covered in this case and does not require any action.

If you have questions about certain steps in the flowchart or want to learn more details, you can refer to the corresponding images at the end of the case by matching the step number next to the boxes. Each image includes a thumbnail indicating its position in the flowchart. Alternatively, in the PDF version, you can click directly on the text, or in the Word version, press "CTRL" + left-click to jump to the relevant section of this user manual.

1.5.1 Case 1. Default Bohai Sea range:

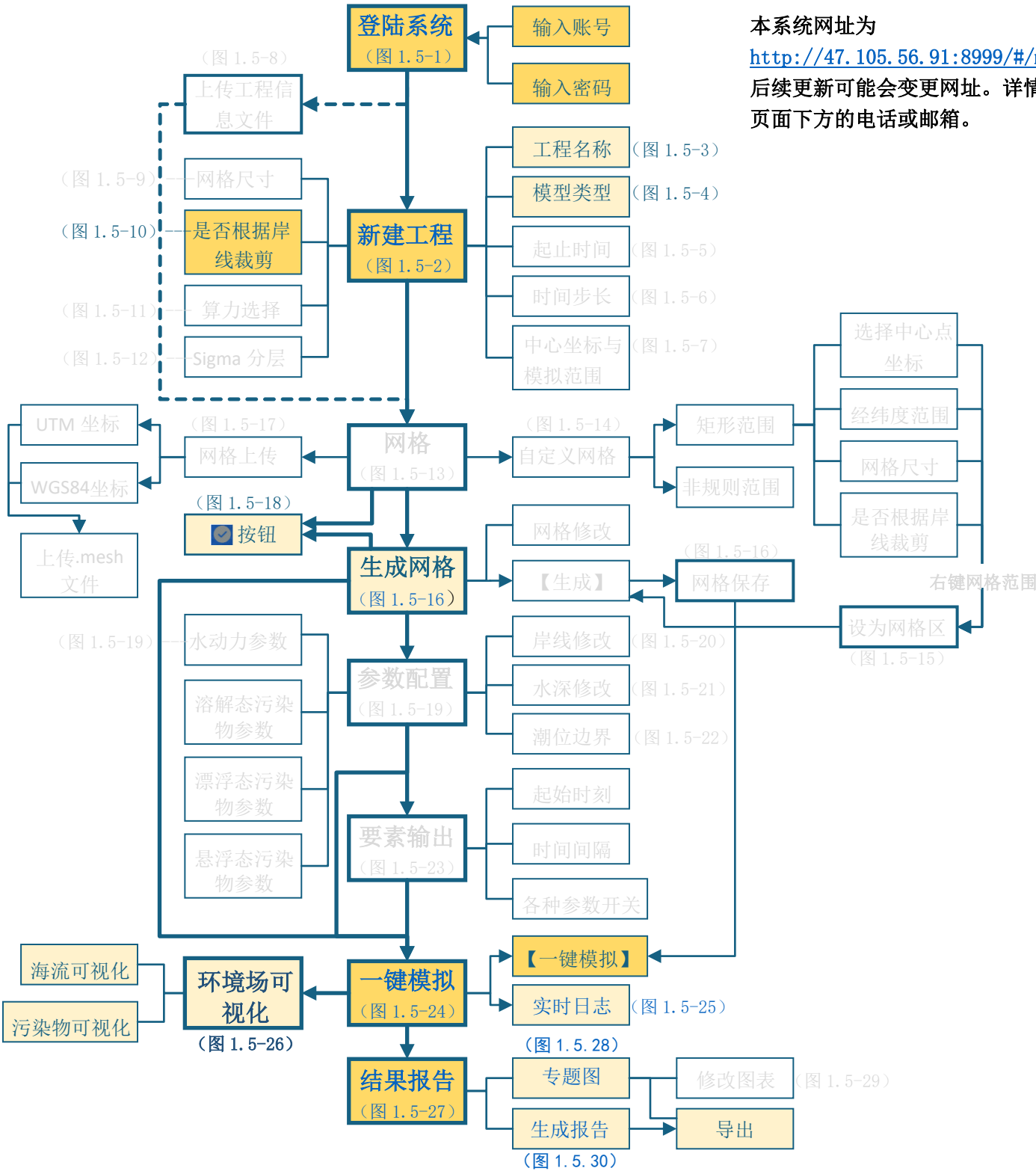




图 1.5-1 用户登陆界面

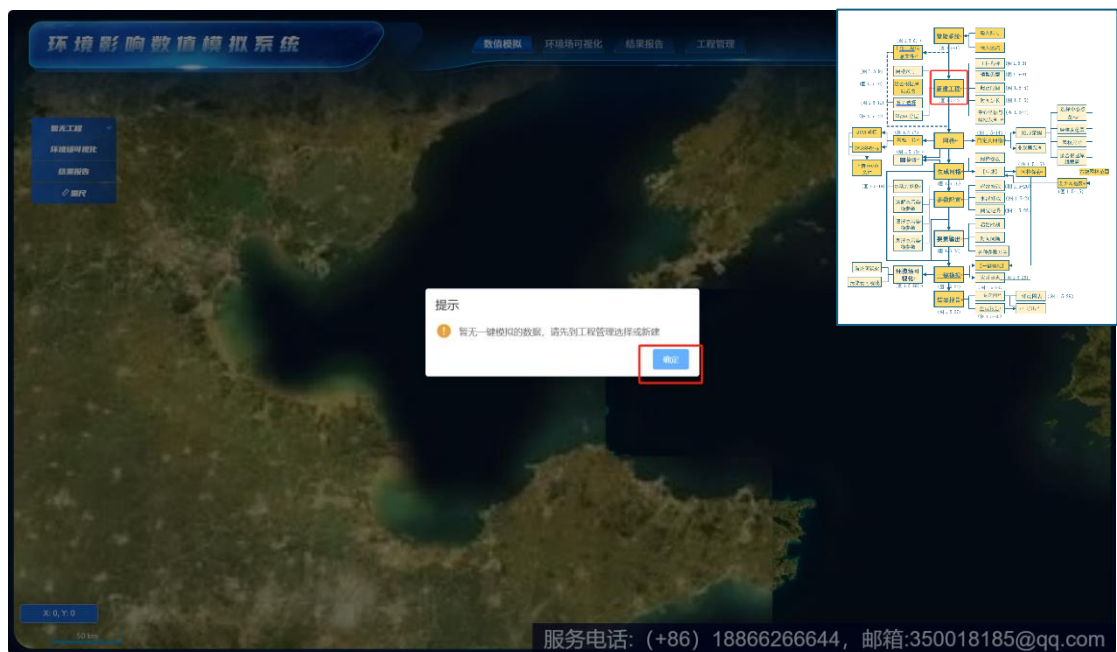


图 1.5-2 无一键模拟工程时将弹出此弹窗，点击【确定】将会跳转至工程管理界面



图 1.5-3 点击【新建工程】按钮，可自定义工程名称



图 1.5-4 选择模型类型（默认为“水动力模型”）



图 1.5-5 选择“根据岸线裁剪”。此步骤将对模拟结果产生影响，具体详见小节 2.3.1.8

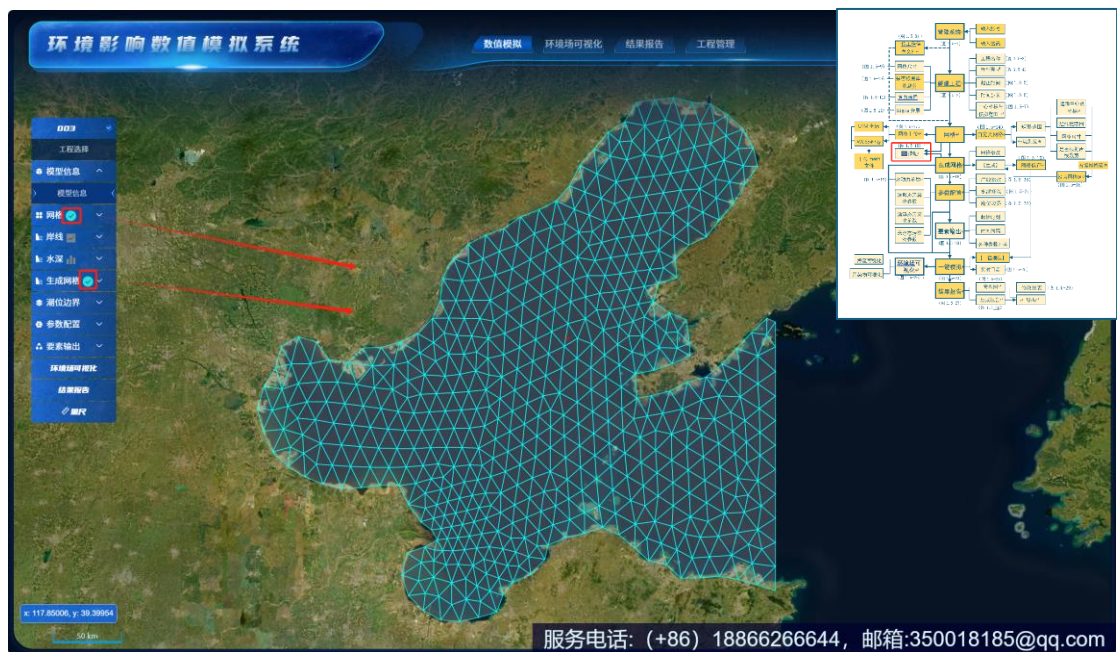


图 1.5-6 点击【网格】或【生成网格】旁边的按钮，可以显示/关闭当前工程的网格，默认为关闭

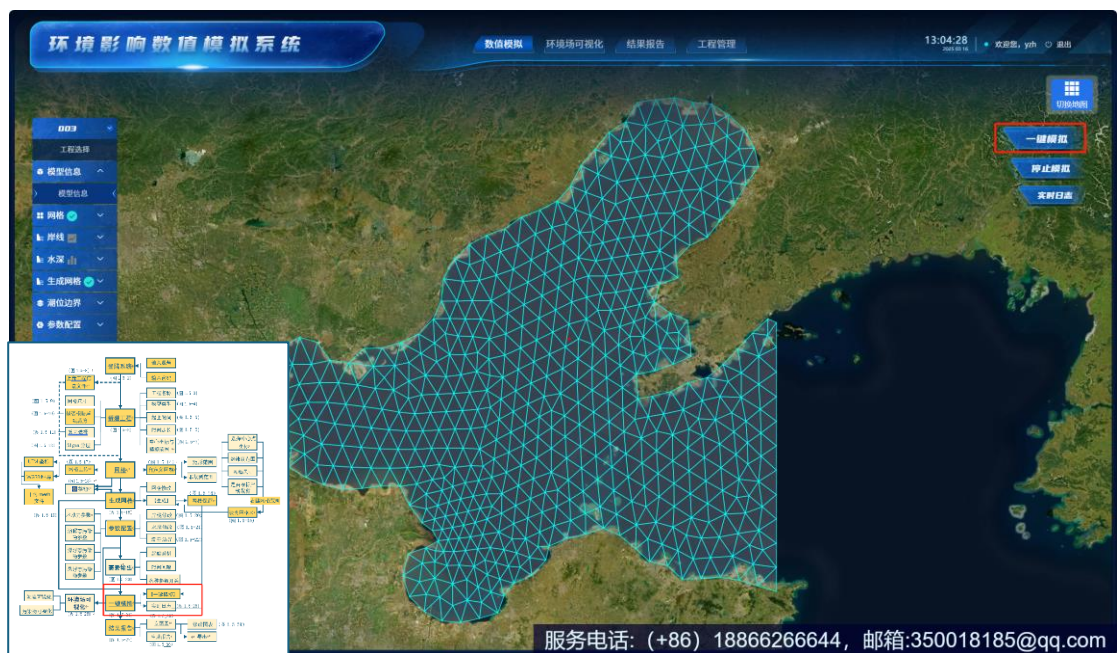


图 1.5-7 设置完成后，点击屏幕右侧【一键模拟】按钮开始模拟



图 1.5-8 实时日志界面，可查看剩余模拟时间



图 1.5-9 可点击左侧或上方功能栏中的【环境可视化】按钮，查看海流和污染物模拟结果的可视化

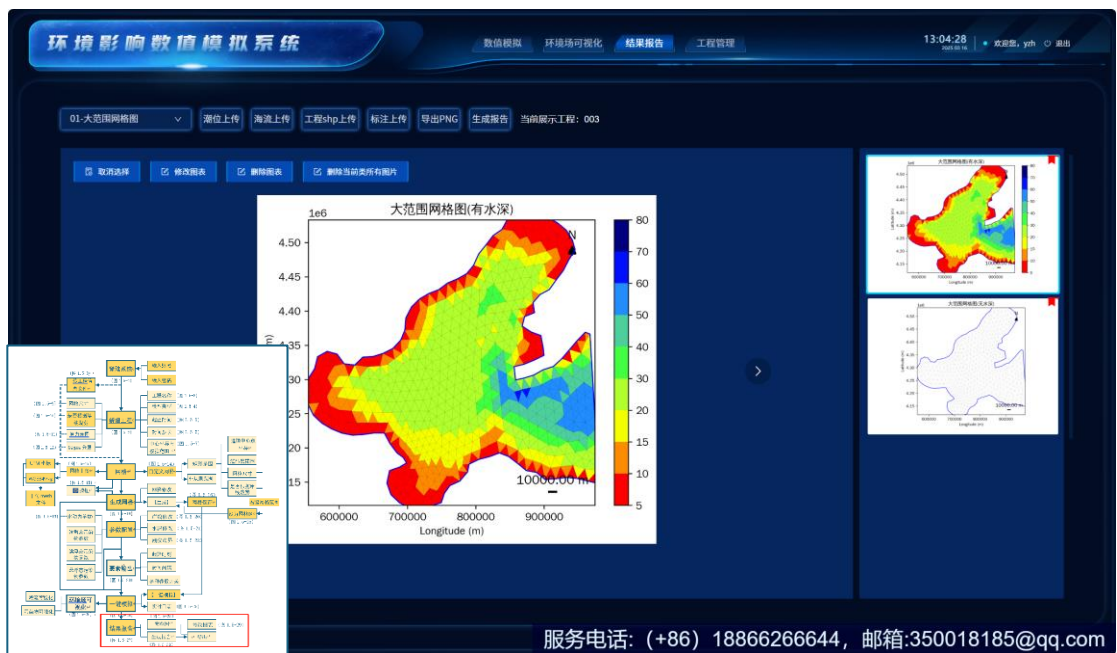


图 1.5-10 模拟完成后可点击左侧或上方功能栏中的【结果报告】按钮，查看本次模拟的结果

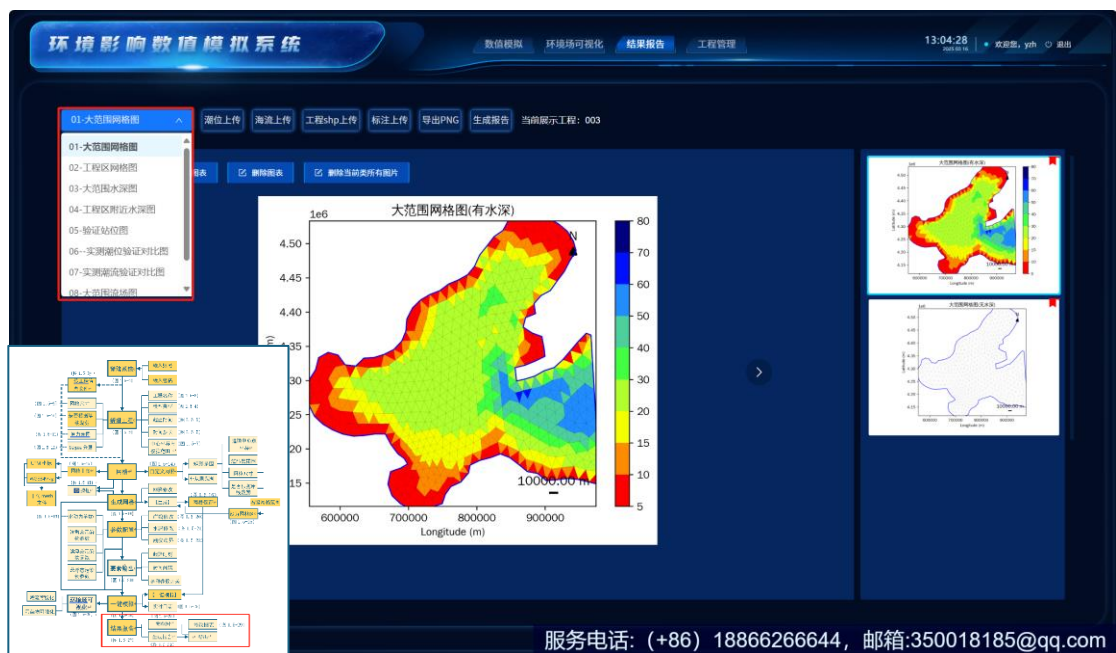


图 1.5-11 在【结果报告】页面中，点击左上方的专题图选择下拉菜单可以浏览与本次模拟相关的各种专题图

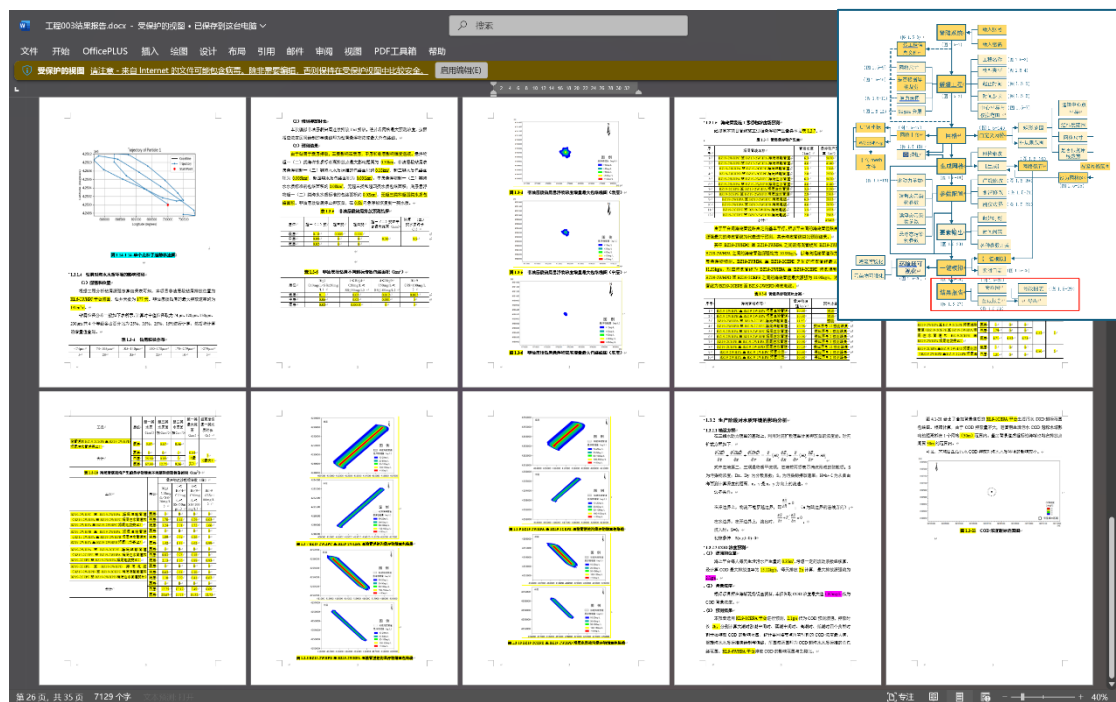


图 1.5-12 自动生成的结果报告文档部分页面展示

1.5.2 Case 2. Customize the mesh range

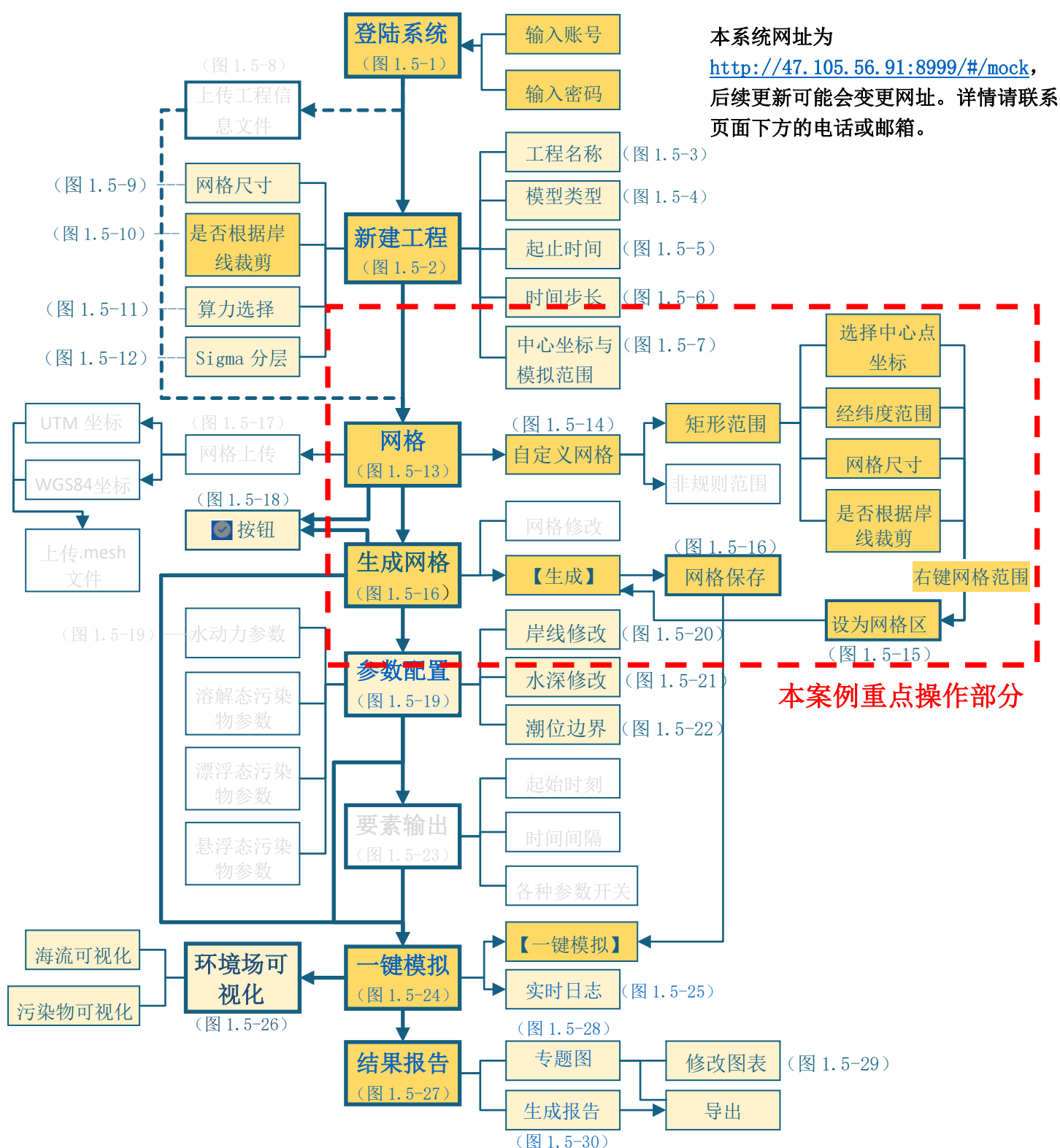




图 1.5-13 【网格】功能包括网格上传和自定义网格选项



图 1.5-14 选择【自定义网格】-【矩形范围】，可设置新的网格区域参数



图 1.5-15 右键自定义的网格范围，选择【设为网格区】

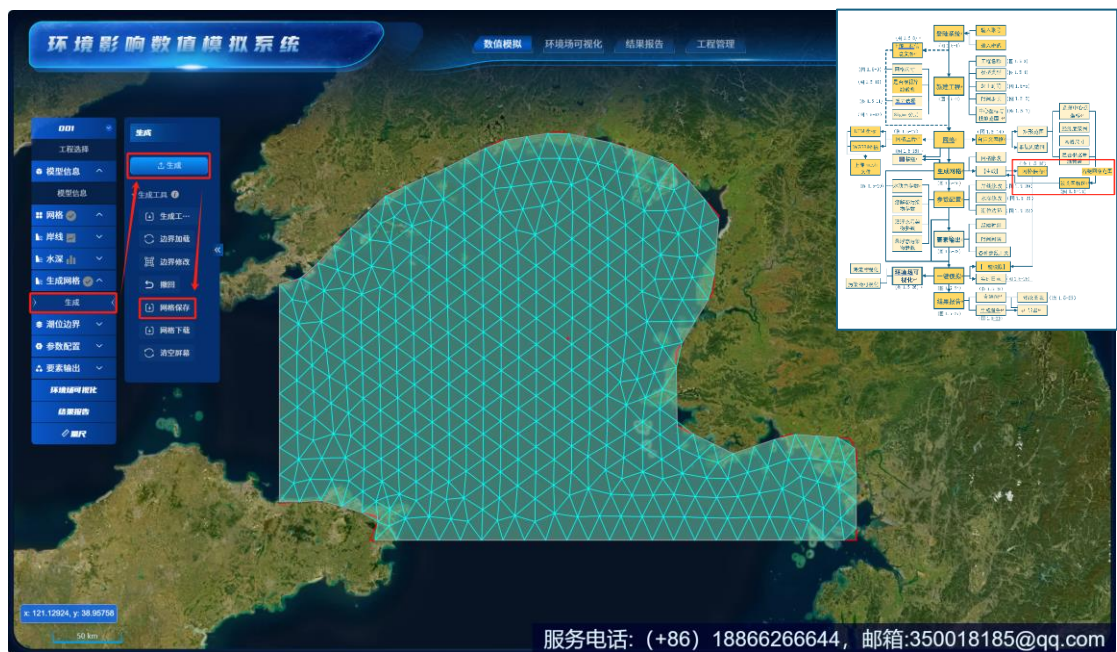
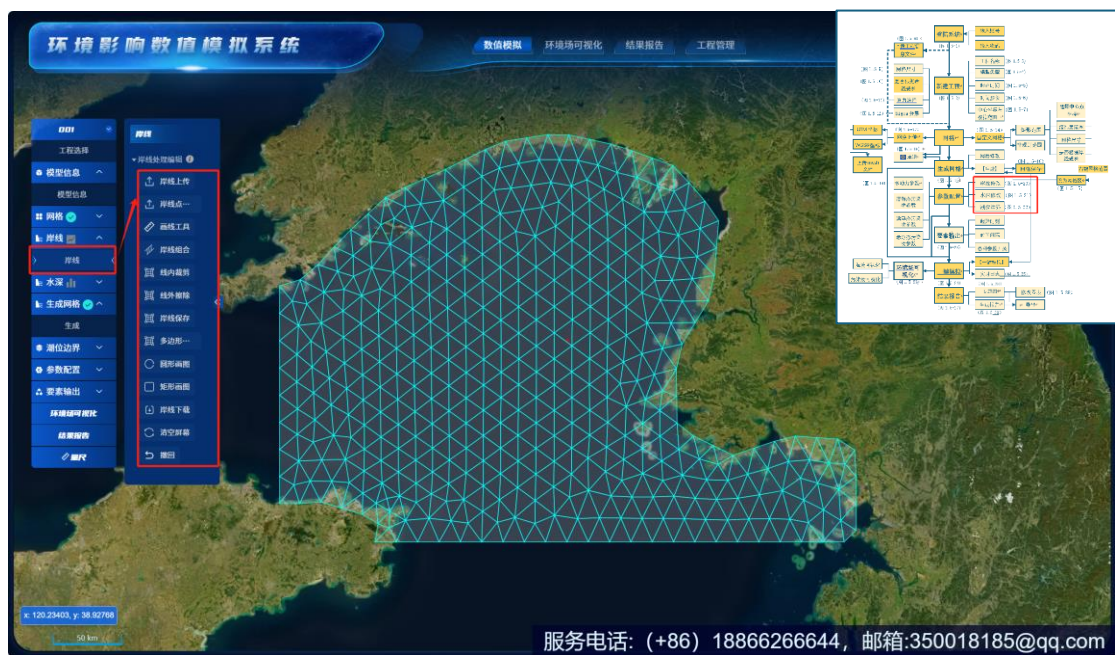
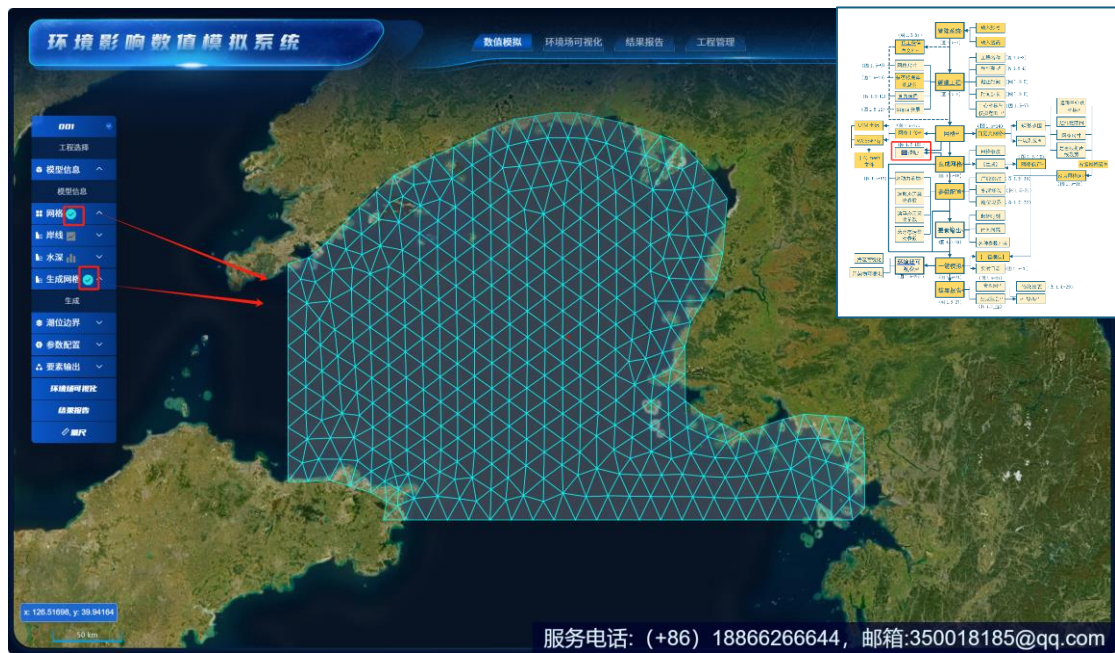


图 1.5-16 生成网格并保存网格到此工程中



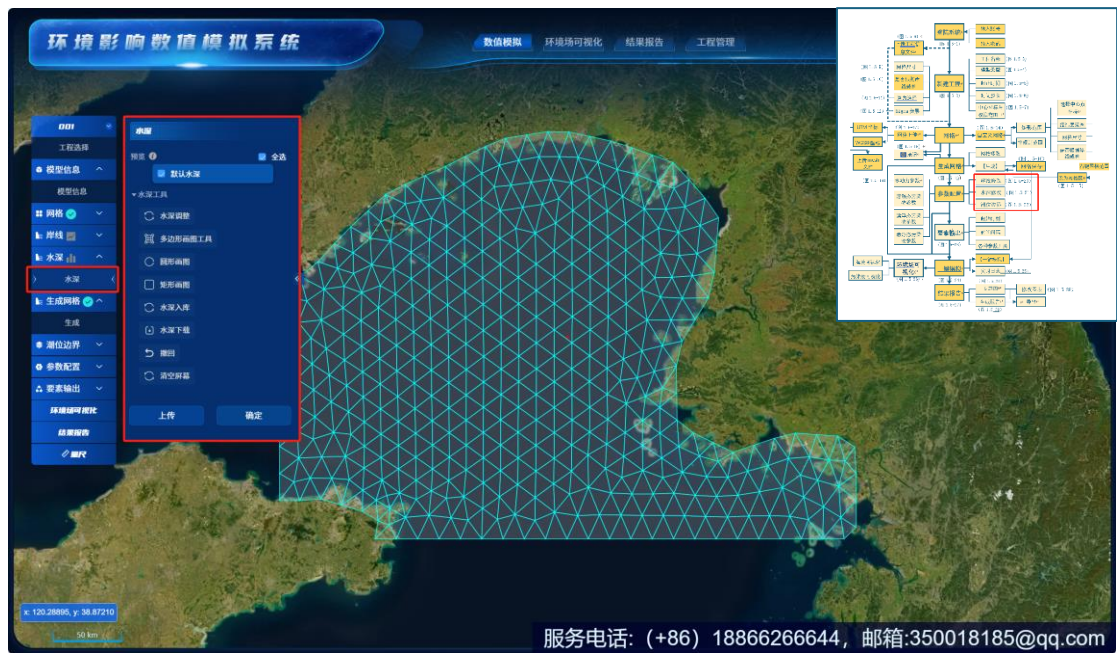


图 1.5-19 水深修改功能，包含多种水深工具



图 1.5-20 潮位边界功能配置界面，可上传潮位文件，或使用默认潮位

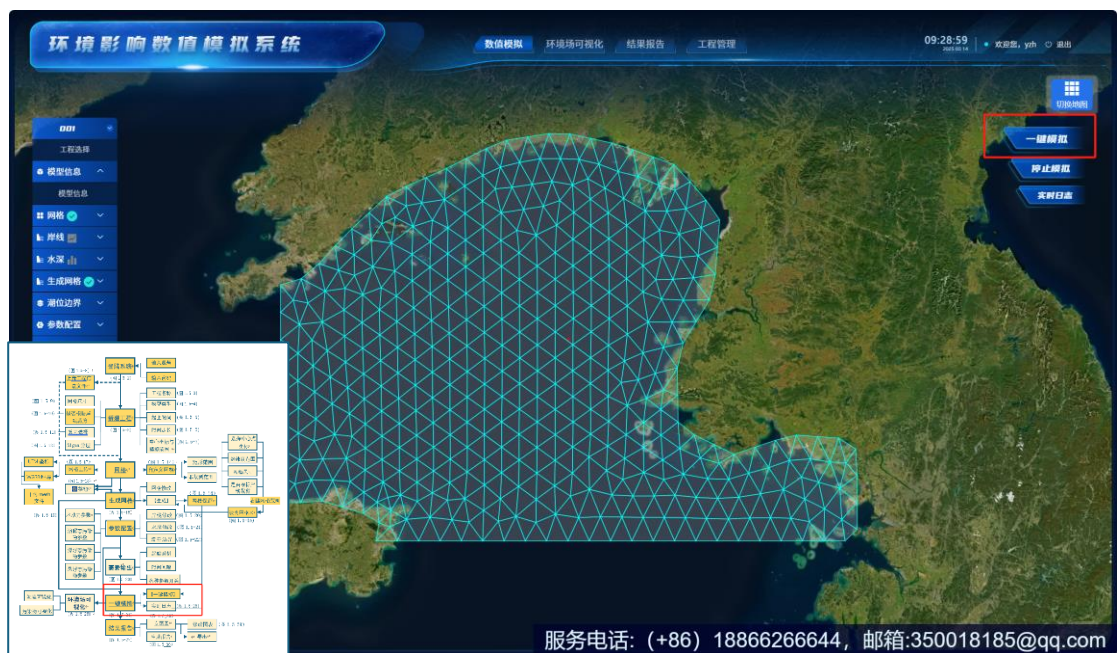


图 1.5-21 设置完成后，点击屏幕右侧【一键模拟】按钮开始模拟



图 1.5-22 实时日志界面，可查看剩余模拟时间



图 1.5-23 可点击左侧或上方功能栏中的【环境可视化】按钮，查看海流和污染物模拟结果的可视化

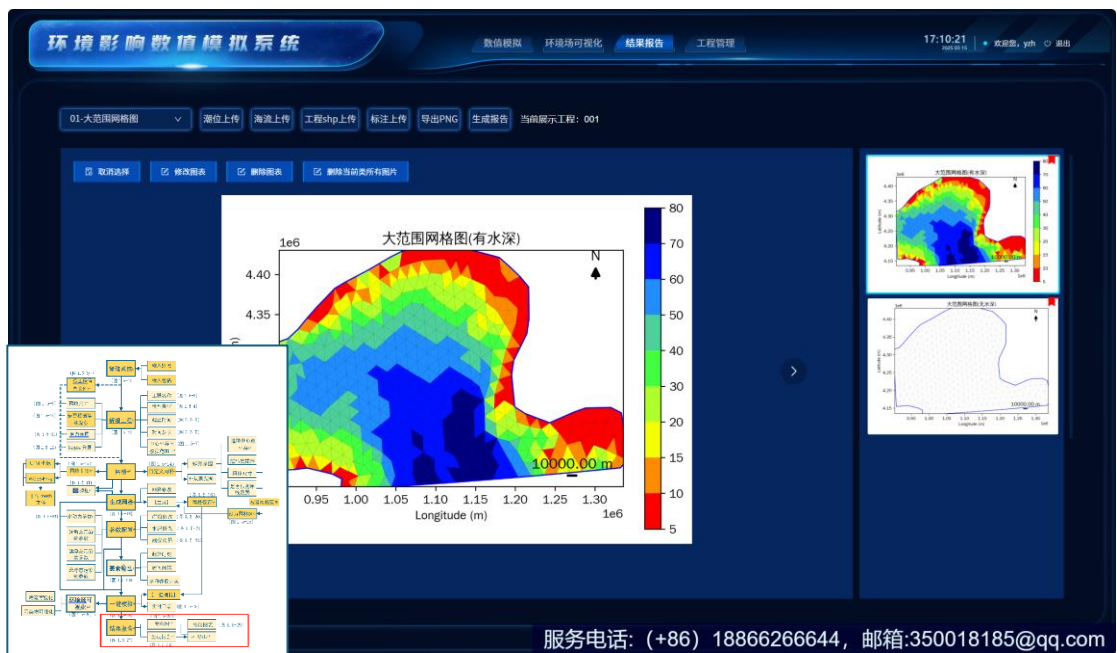


图 1.5-24 模拟完成后可点击左侧或上方功能栏中的【结果报告】按钮，查看本次模拟的结果

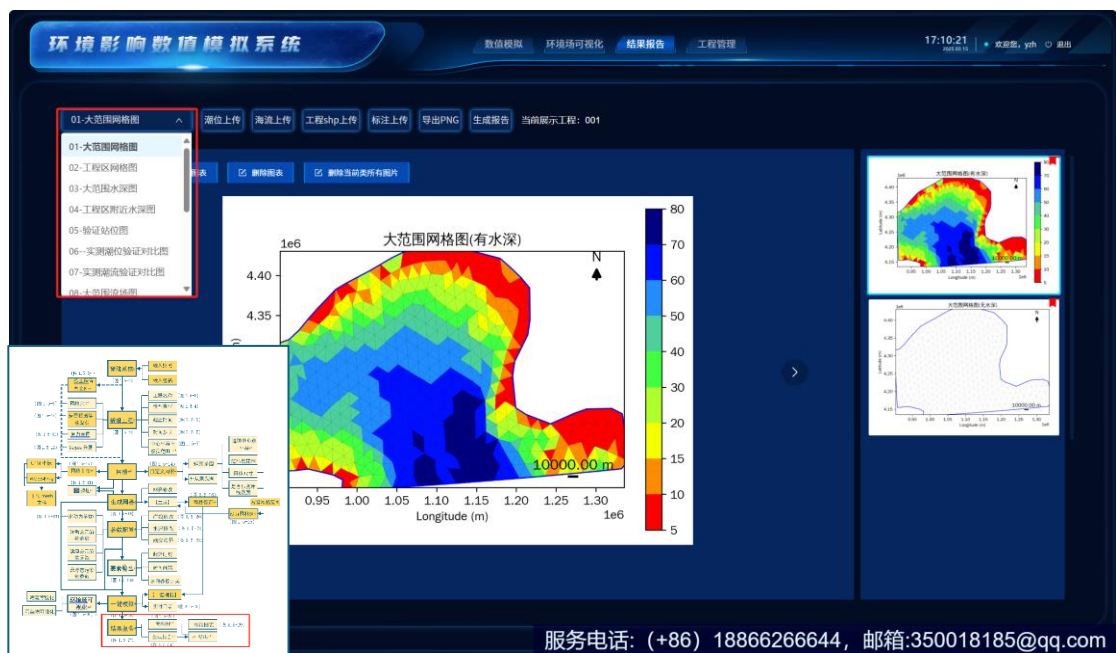


图 1.5-25 在【结果报告】页面中，点击左上方的专题图选择下拉菜单可以浏览与本次模拟相关的各种专题图

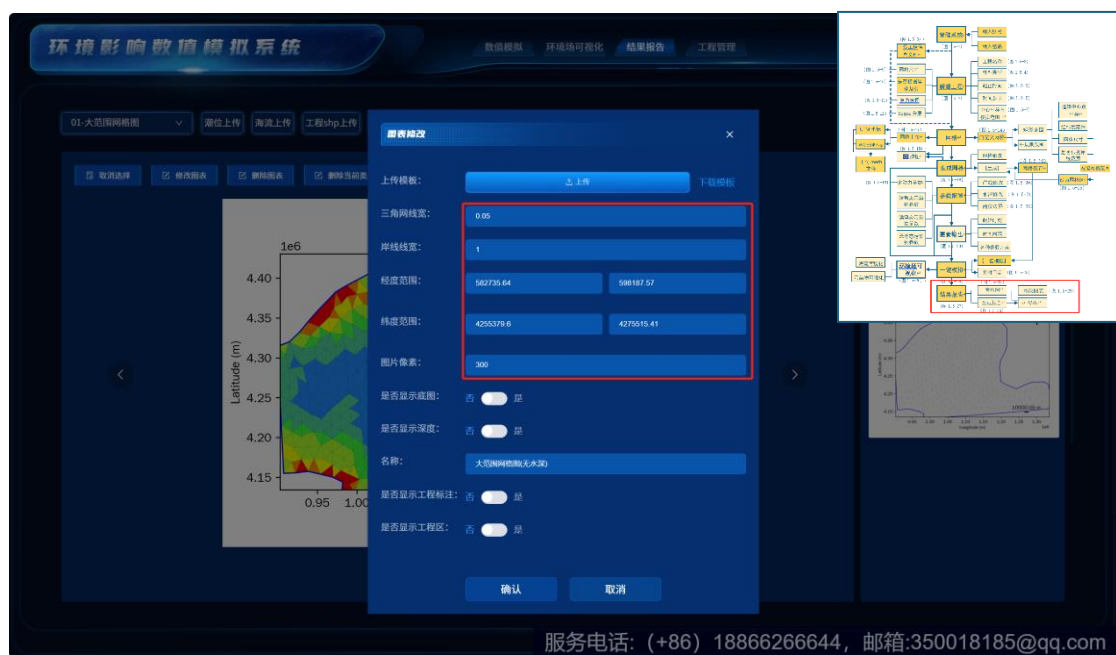


图 1.5-26 点击左上角【修改图表】按钮可修改图表信息

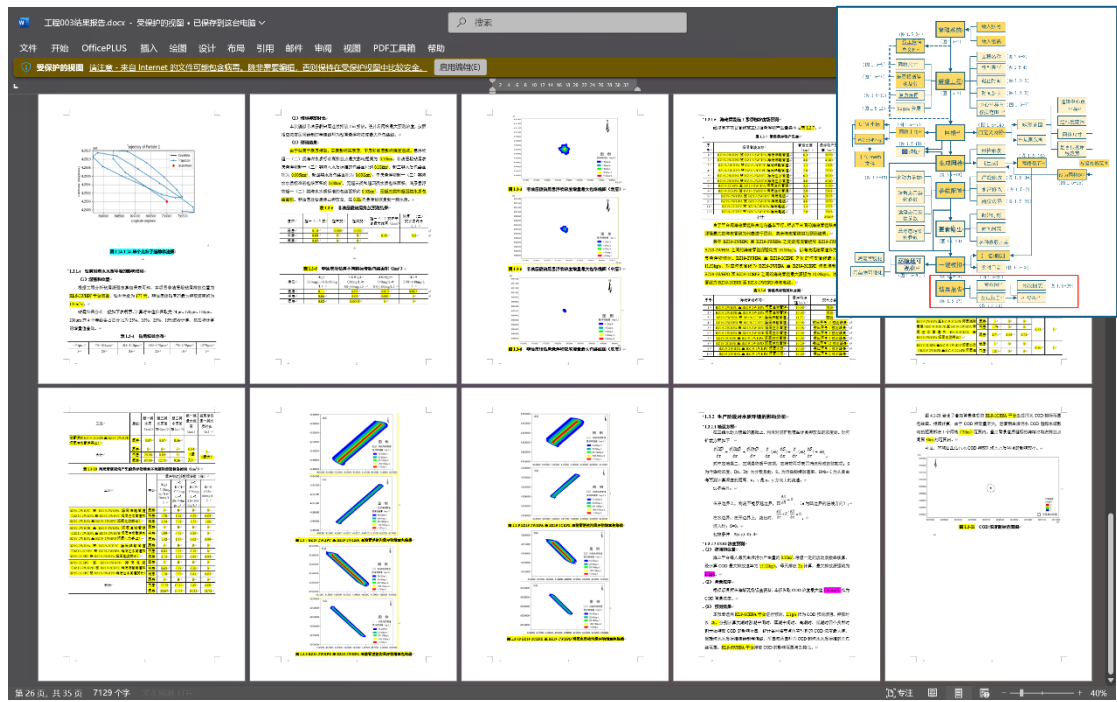


图 1.5-27 自动生成的结果报告文档部分页面展示

1.5.3 Case 3. Upload existing project files

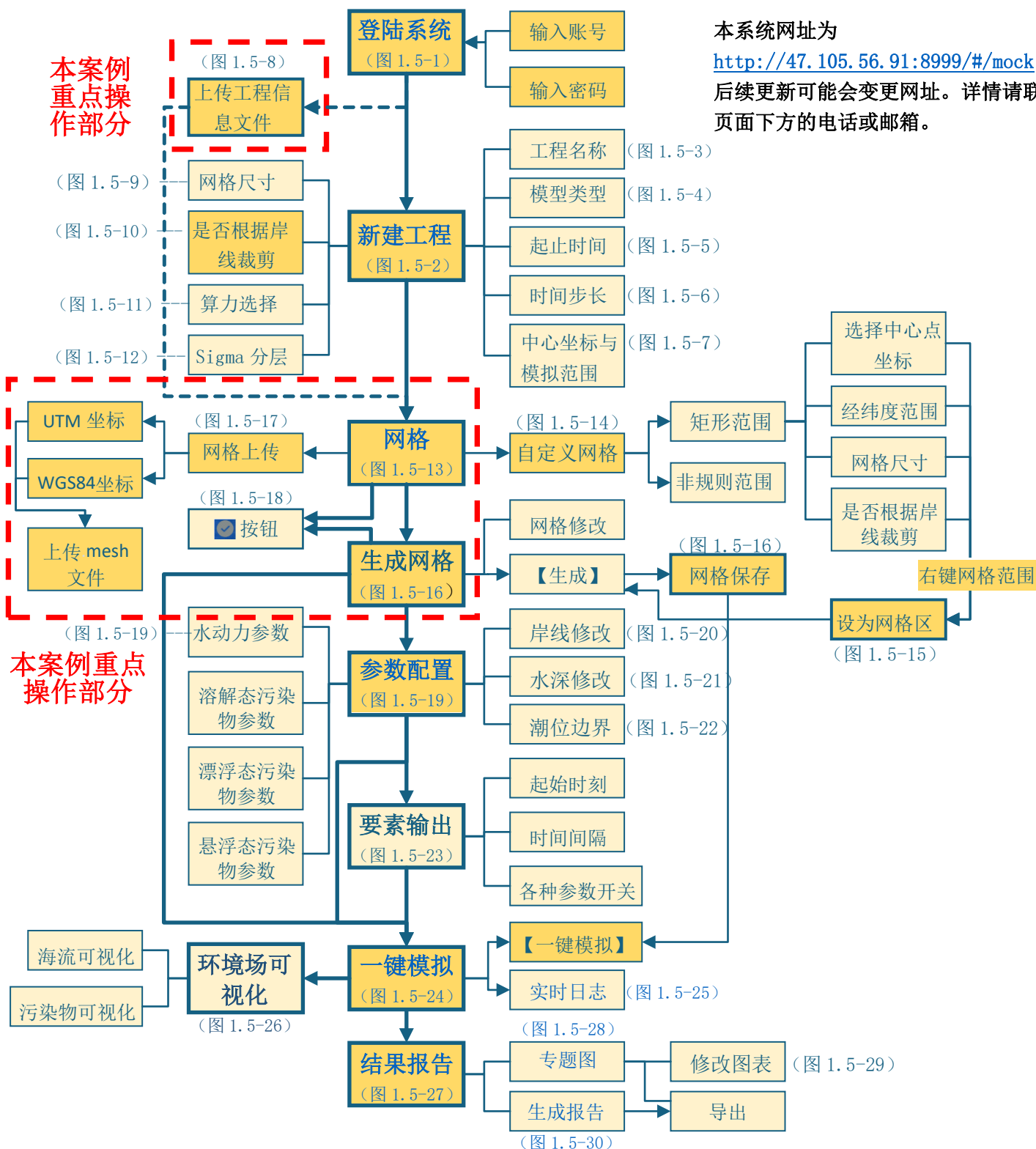




图 1.5-28 【网络】功能包括网络上传和自定义网络选项

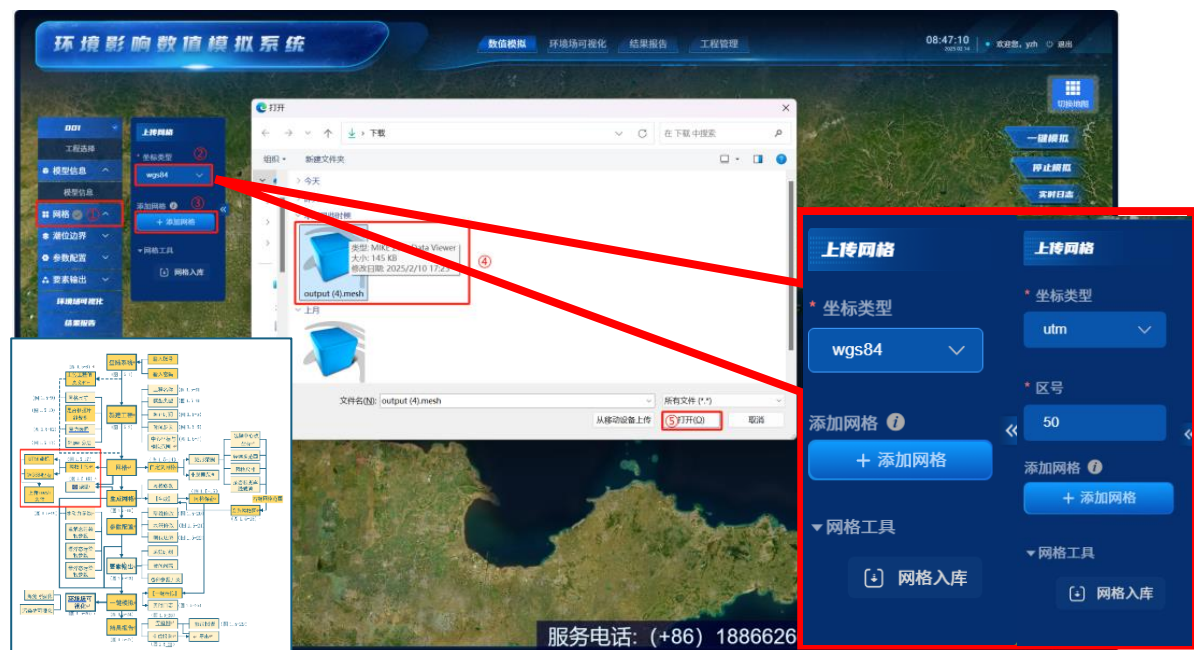


图 1.5-29 (1) 上传网络文件，需选择坐标类型

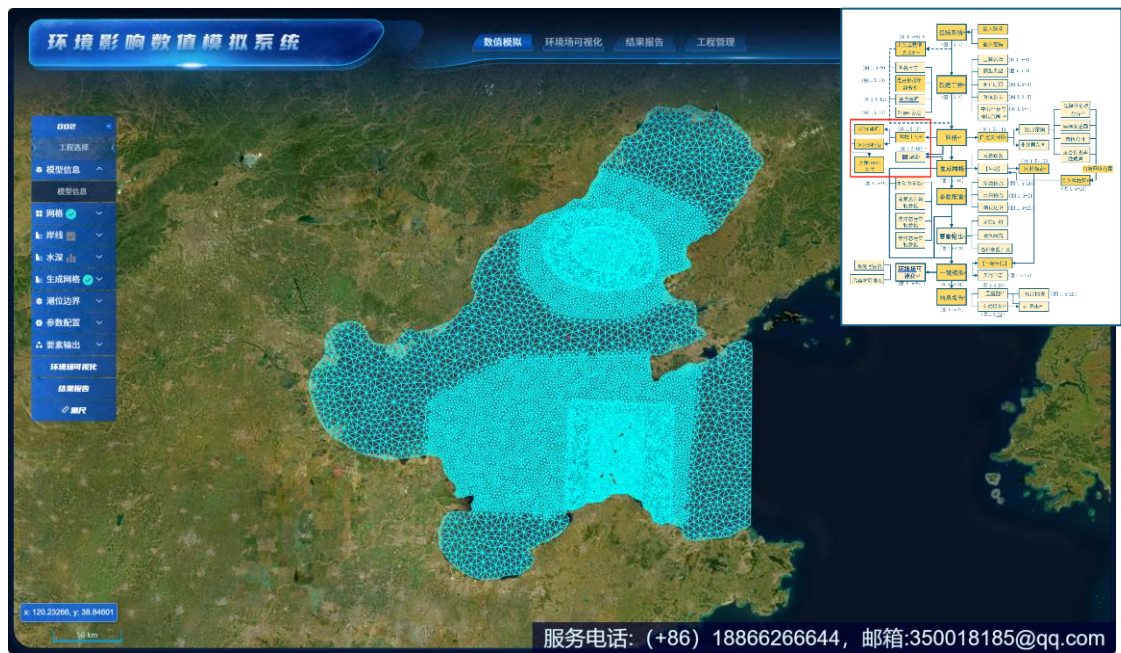


图 1.5-17 (2) 上传的网格文件示例

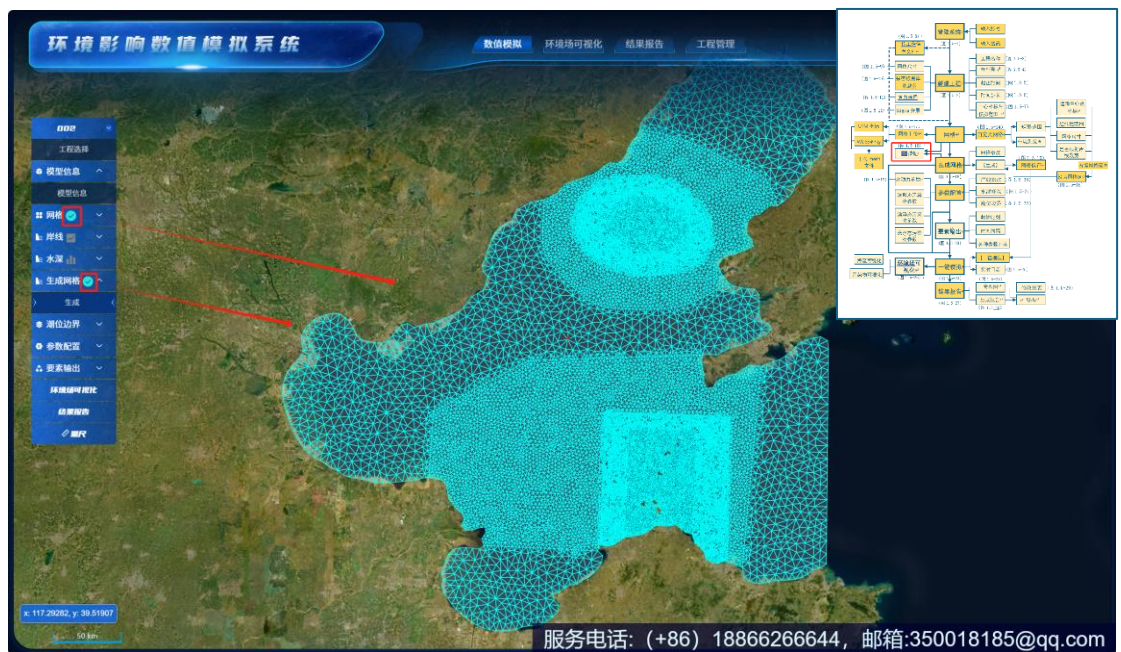


图 1.5-30 点击【网格】或【生成网格】旁边的按钮，可以显示/关闭当前工程的网格，默认为关闭

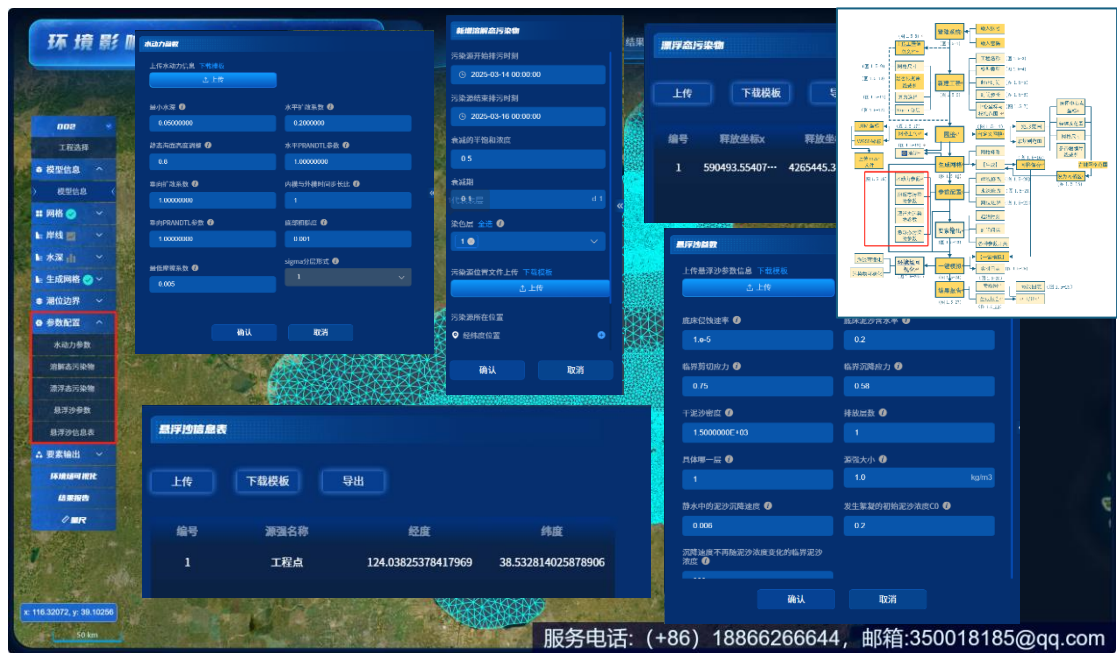


图 1.5-31 参数配置功能包含各种模型参数细节的设置

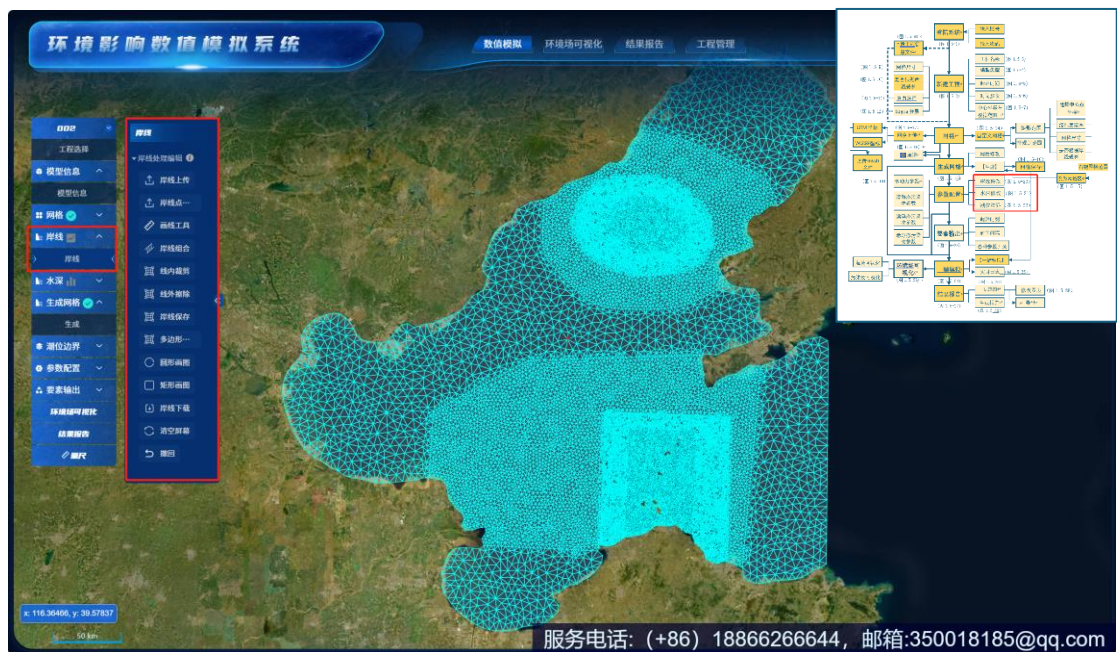


图 1.5-32 岸线修改功能，包含多种岸线工具

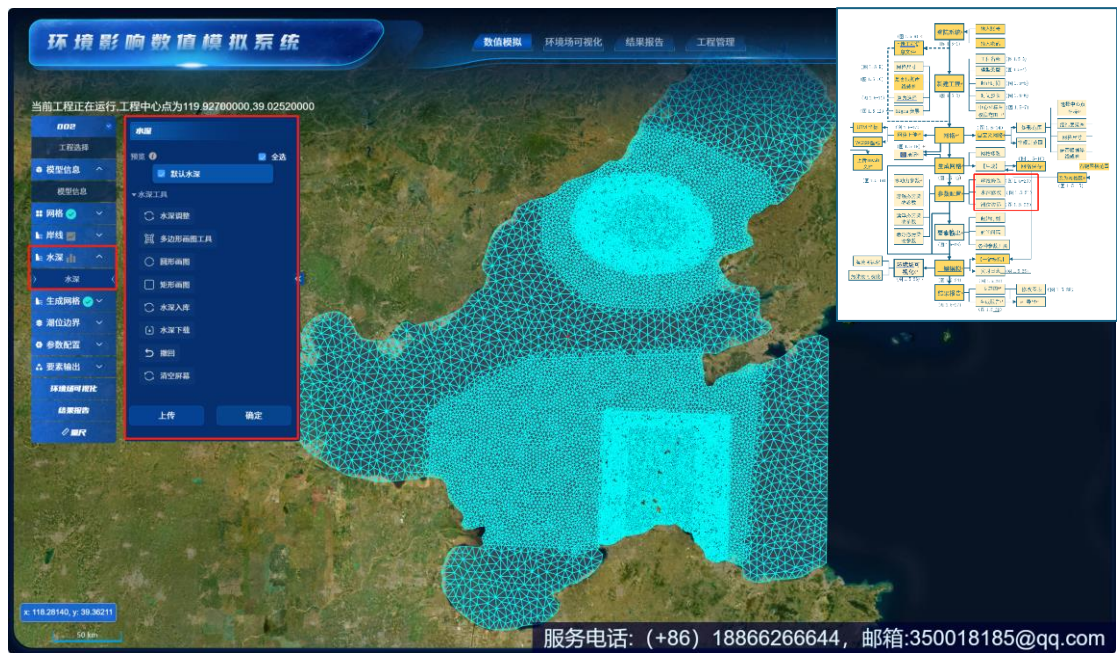


图 1.5-33 水深修改功能，包含多种水深工具

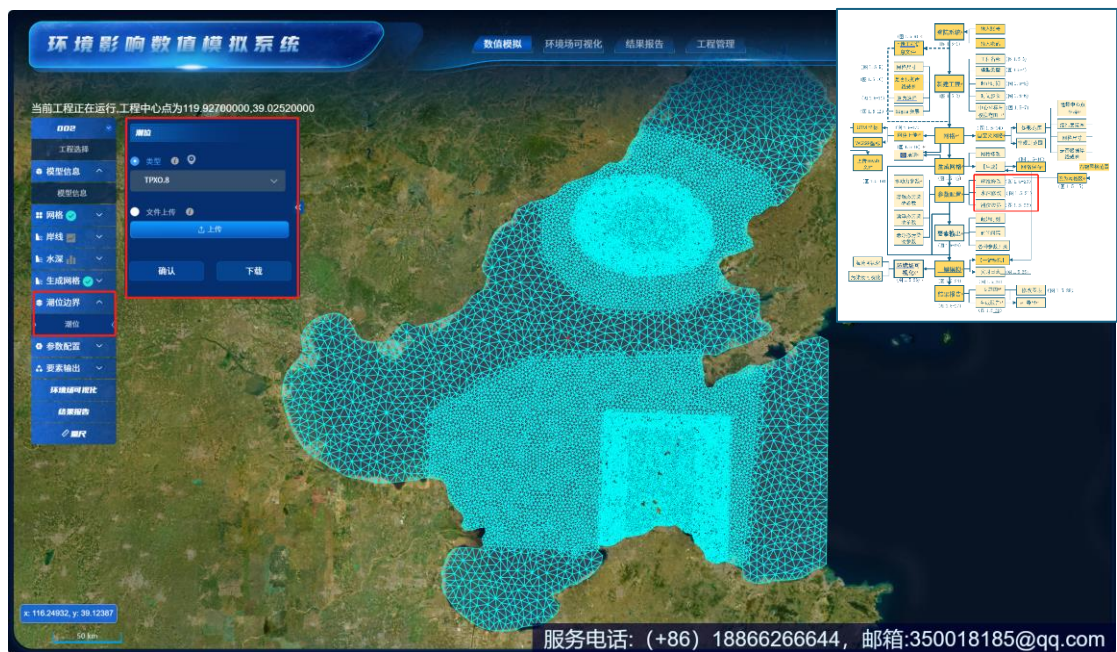


图 1.5-34 潮位边界功能配置界面，可上传潮位文件，或使用默认潮位



图 1.5-37 实时日志界面，可查看剩余模拟时间



图 1.5-38 可点击左侧或上方功能栏中的【环境可视化】按钮，查看海流和污染物模拟结果的可视化

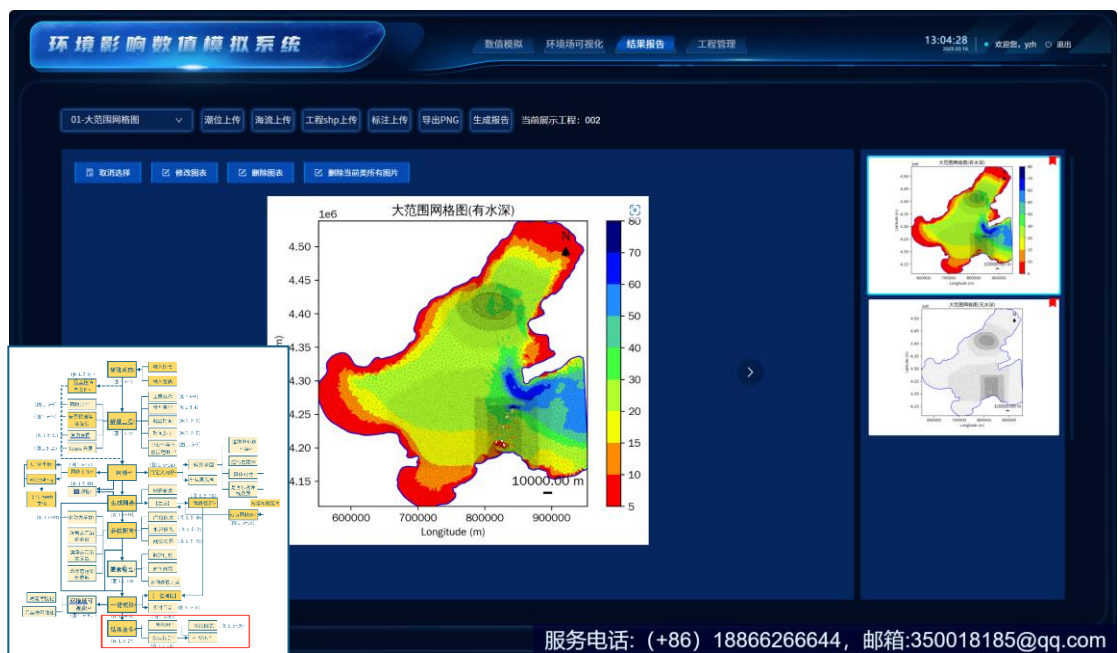


图 1.5-39 模拟完成后可点击左侧或上方功能栏中的【结果报告】按钮，查看本次模拟的结果

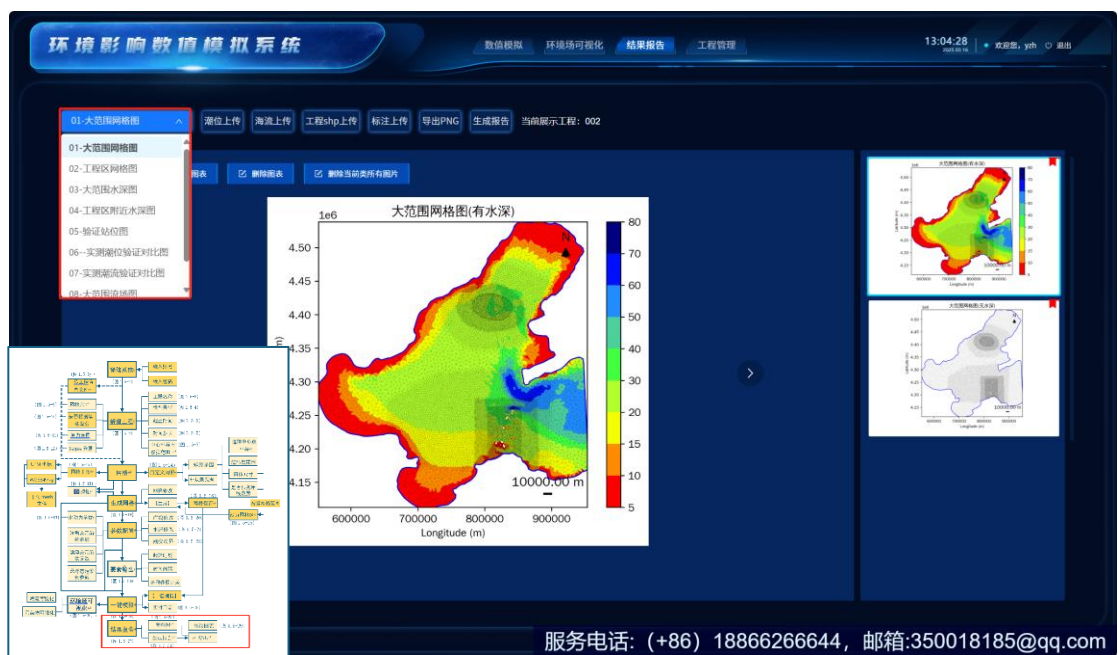
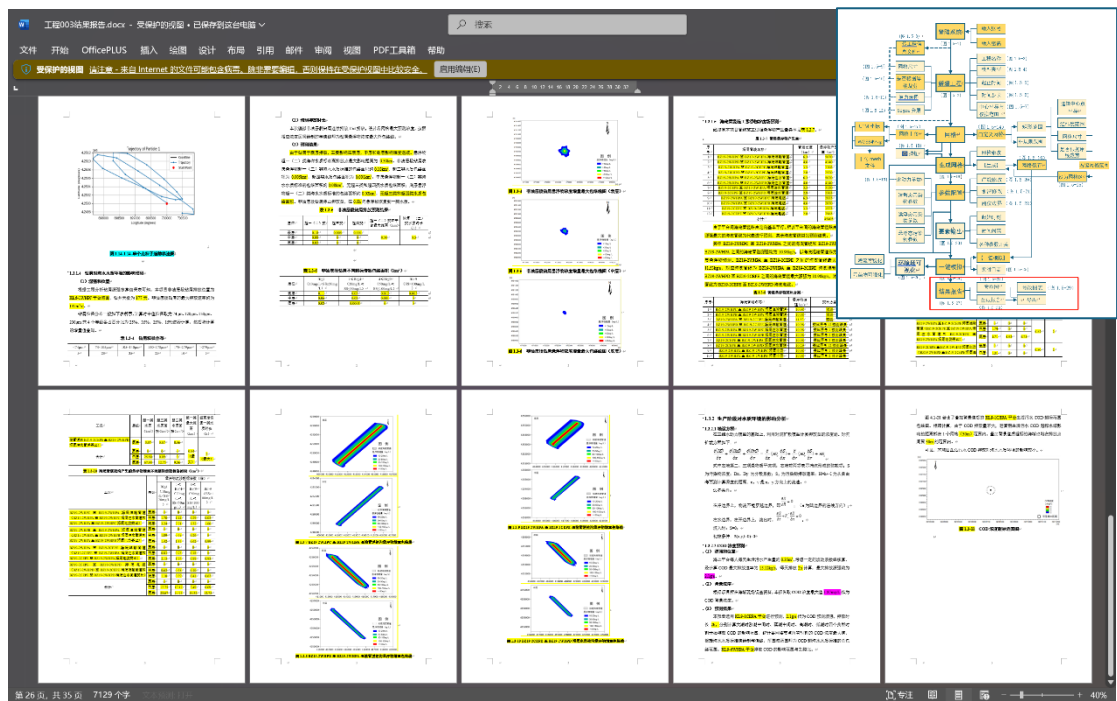


图 1.5-40 在【结果报告】页面中，点击左上方的专题图选择下拉菜单可以浏览与本次模拟相关的各种专题图



图 1.5-41 点击左上角【修改图表】按钮可上传或修改标注信息



2 SYSTEM FUNCTIONS

2.1 System Management

2.1.1 User login

Online Ocean Modeling system Home page: <http://47.105.56.91:8999/#/mock>.
Enter the URL in your browser and press Enter to go to the following page:



图 2.1-1 系统登陆界面

- ① Left click the account input field to enter the correct account name.
- ② Left click the password field to enter the correct password.
- ③ Left click “☐” next 【Remember Password】 to remember the password for next login.
- ④ Left click 【Login】 , the system will automatically enters the home page.

2.1.2 User registration

*** Note: You can only add a new user from an administrator account, or contact the phone or email address at the bottom of the screen.**

First click ① 【Projects】 , then click ② 【System】 to enter the User Management tab.



图 2.1-2 选择“工程管理”按钮



图 2.1-3 选择“系统管理”按钮

Click **【Add New User】** , the new user information window pops up on the right. Fill in the information and click **【Submit】** to complete the registration.

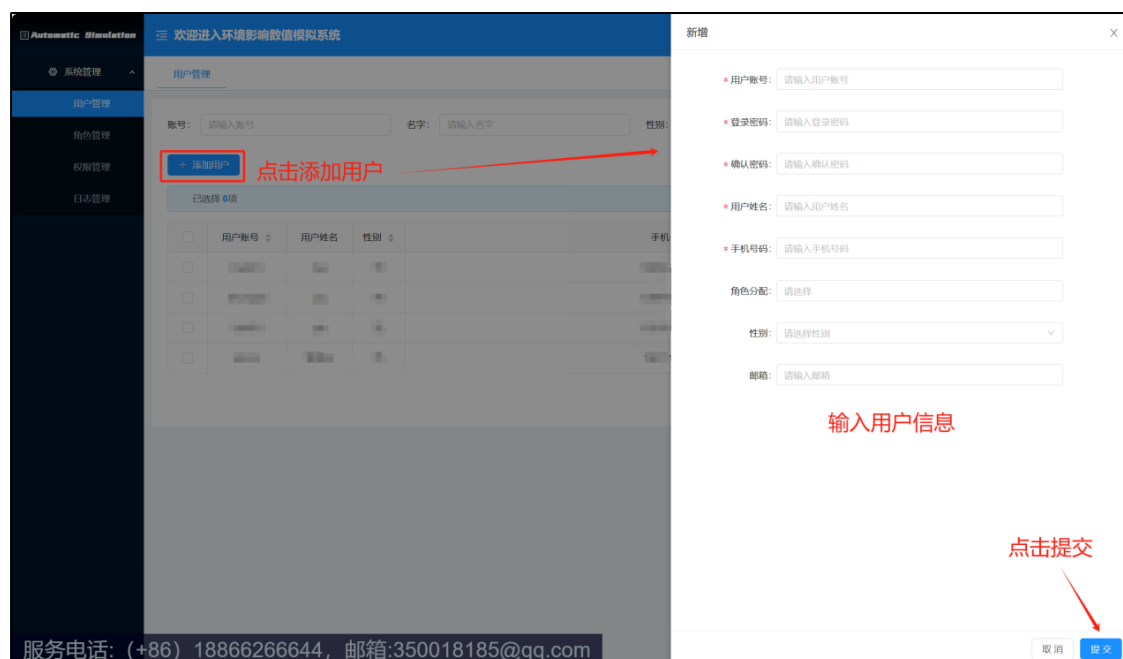


图 2.1-4 新增用户界面

2.1.3 User management

Users with **【Administrator】** right can edit accounts in the **Options** column, including deleting or freezing users.

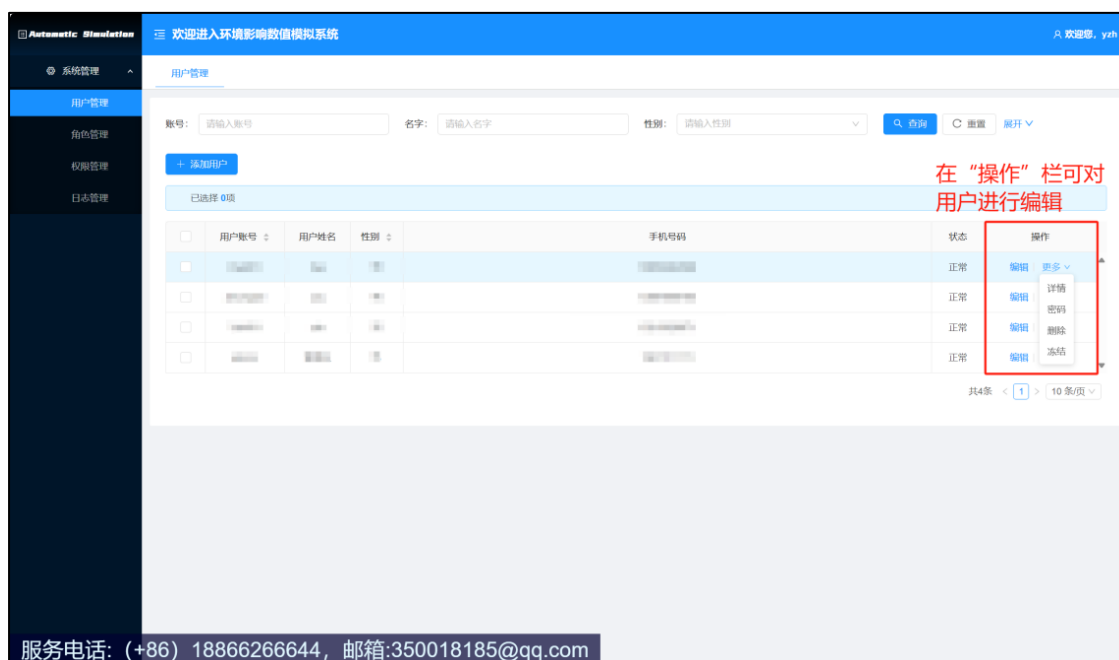


图 2.1-5 用户管理选项

At the top of this page, users can be queried by account name, name, gender, mobile number and user status.

账号: 请输入账号	名字: 请输入名字	性别: 请输入性别	手机号码: 请输入手机号码查询
用户状态: 请输入用户状态 查询 重置 收起 ^			

图 2.1-6 查询用户搜索栏

2.2 System Home Page

The homepage consists of module-switching navigation, a function operation list, a base map, a scale bar, coordinate picking, and layer management. The right side includes features such as start/stop simulation and real-time logs.

2.2.1 Switch map

Hovering over the 【Switch Map】 button, a “Base Map” options list will appear. Left-clicking the "  " button in front of a map name will switch to that map image (single selection only). If layers (such as mesh, interpolation, or drawn patterns) are loaded, a “Layers” options list will also be displayed. Left-clicking the "  "checkbox in front of each layer name will show/close the layer (multiple layers can be selected).

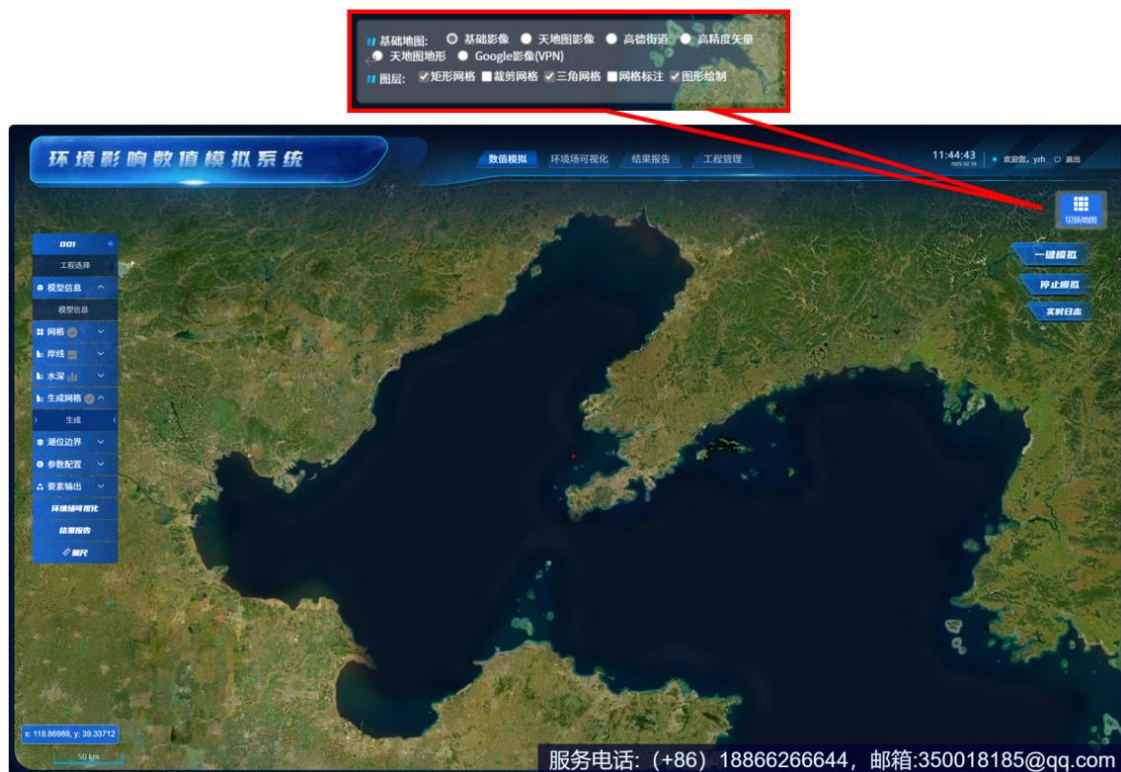


图 2. 2-1 系统首页和地图选项

If the user is accessing the system for the first time or has not set up a Auto Simulation project, the following prompt will appear:

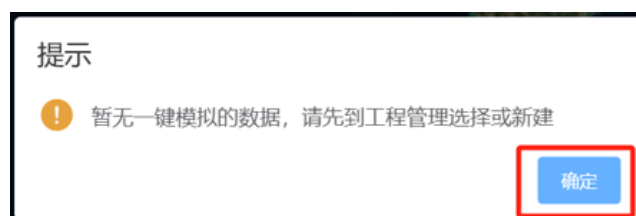


图 2. 2-2 无“一键模拟”提示弹窗

Click **【Confirm】** will automatically jump to the **【Project】** module.

2.2.2 Map operations

On the homepage, users can perform zoom in/out, pan, rotate, and change view angle operations on the map.

If the browser supports mouse gestures (e.g., Microsoft Edge), it is recommended to disable this feature in advance to avoid interference with map operations.

① **Zoom in/out:** Scroll up/down the mouse wheel to zoom in/out the position of the mouse pointer.

② **Move:** Hold down the **left** mouse button to drag the map around.

③ **Rotate:** Hold down the **right** mouse button and drag from right to left in the bottom half of the screen to rotate the map clockwise; Drag from left to right to rotate the map counterclockwise.

④ **Change View:** Hold down the **right** mouse button at any point on the map and swipe up to reduce the viewing Angle. Swipe down to raise the viewing Angle.

2.3 Project Management Module

2.3.1 New project

Click **【Projects】** in the upper function bar of the home page to enter the project list page.



图 2.3-1 点击“工程管理”按钮

Click the **【New Project】** button in the upper left corner to open the model information settings window. If clicking the button does not respond, please refresh the page in your browser and try again.



图 2.3-2 刷新浏览器页面

In the model information setting window, you can edit and modify “model type”, “start and end time”, “time step”, etc.

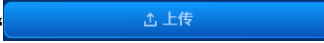


图 2.3-3 新建工程参数设置 (1)



图 2.3-4 新建工程参数设置 (2)

2.3.1.1 File upload

Click the “ 上传” button on top of window can upload an existing project file in csv format.

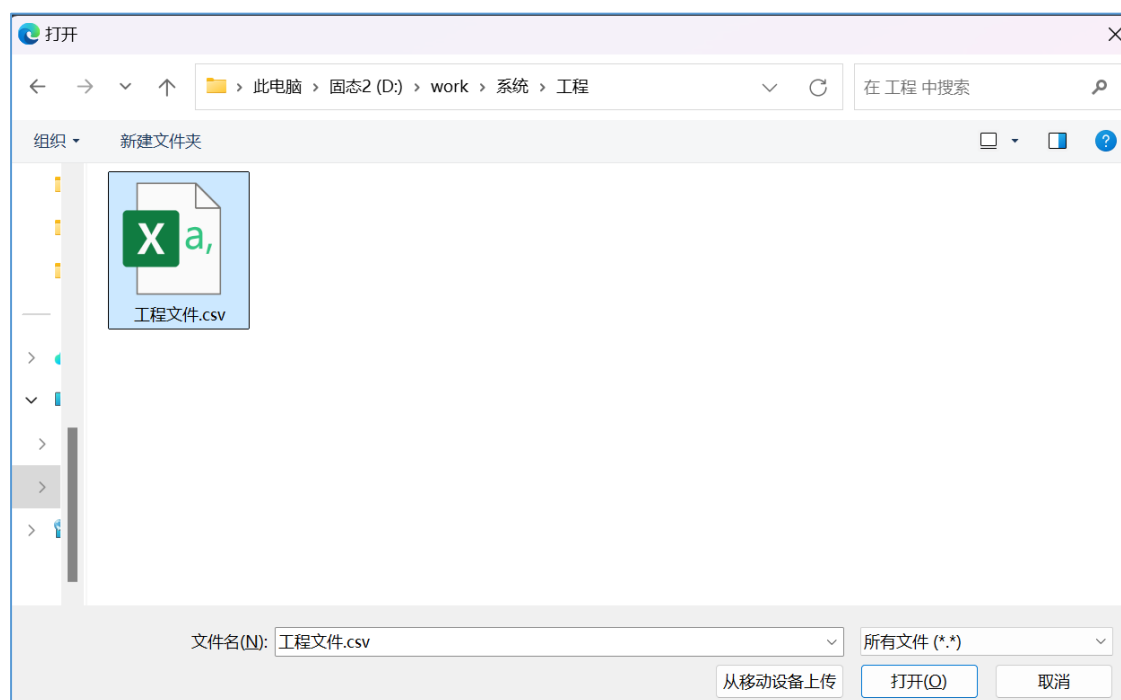


图 2. 3-5 上传 csv 格式工程文件

Click the "Download template" button to get the content format reference of the project file, or you can directly modify parameters in the template and upload the file, and the corresponding parameters in the model information will be automatically modified.

*** Note: For coding reasons, it is recommended to open this csv file using WPS***

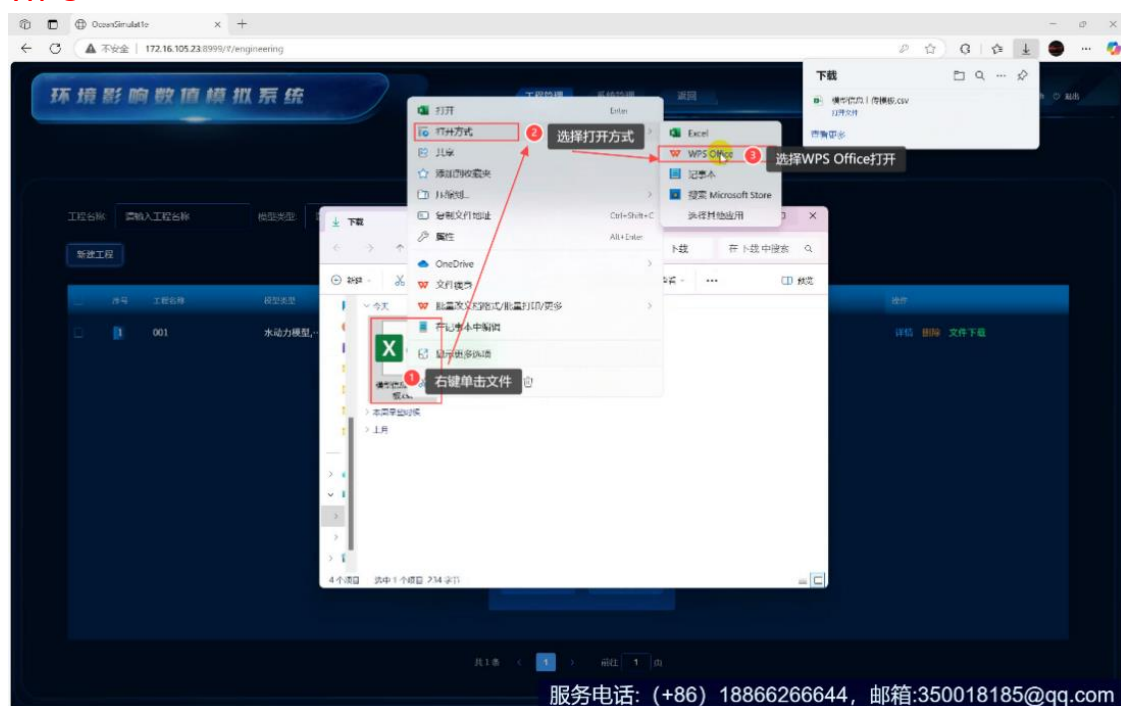


图 2. 3-6 查看工程文件模板

- ① Right-click the template file
- ② Select the opening method
- ③ Select "WPS Office" to open the file

	A	B	C	D	E	F	G	H	I	J	K	L
1	工程名称	起始时间	终止时间	时间步长	中心点坐标(经度)	中心点坐标(纬度)	经度范围	纬度范围	网格尺寸	算力选择	sigma分层	
2	Test	2024/9/2 0:00	2024/9/4 0:00	3600	119.9	39	560	440	10	4	3	

图 2. 3-7 工程文件模板内容

2.3.1.2 Model type

Click the selection box under "Model Type" to open the models list. There are 5 models to choose from. If one or more of the 【hydrodynamic model】 , 【pollutant diffusion model】 , 【particle tracking model】 and 【Suspended sediment Model (4.0)】 are selected, 【suspended sediment model (2.0)】 will not be selected. On the contrary, when 【suspended sand Model (2.0)】 is selected, other models cannot be selected.



图 2. 3-8, 2. 3-9 模型选择界面

2.3.1.3 Start/End time

Click the input box to directly select the date and time.

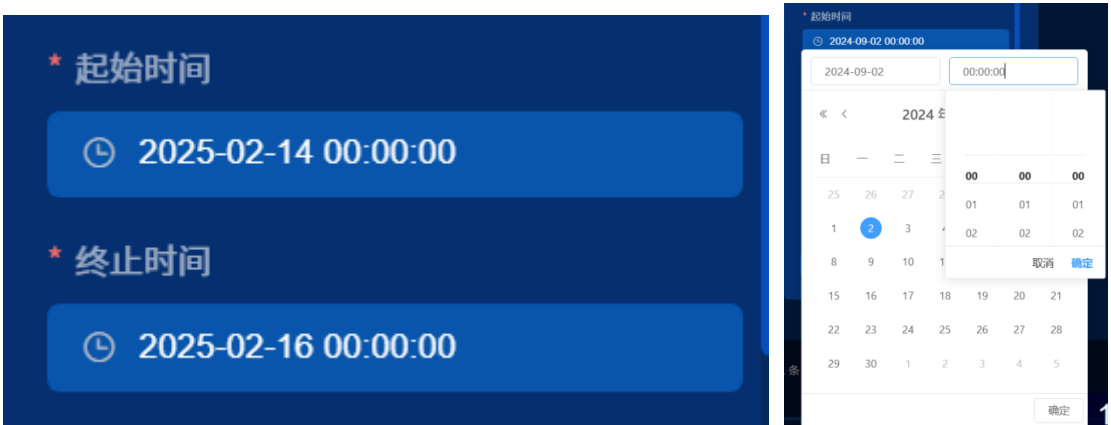


图 2. 3-10, 2. 3-11 起止时间选择界面

2.3.1.4 Time step



图 2.3-12 时间步长调整

Left-click the input box to type the simulated time step in seconds (s), or click the arrow to the right of the input box to increase/decrease by 1 second. The value must be a positive integer greater than or equal to 1. A smaller time step will improve the simulation accuracy, but it will increase the amount of computation and increase the time required for simulation. A larger time step will reduce the simulation accuracy, but the calculation amount is small and the simulation time is short.

2.3.1.5 Center point coordinates

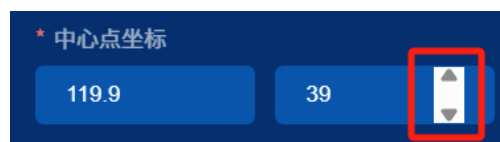


图 2.3-13 中线点坐标调整

Left-click the input box to type the coordinates of the project center point in degrees ($\pm x.xxxxx^\circ$) or click the arrow to the right of the input box to increase/decrease by 1 degree. The left side is longitude, and the right side is latitude.

2.3.1.6 Simulation range

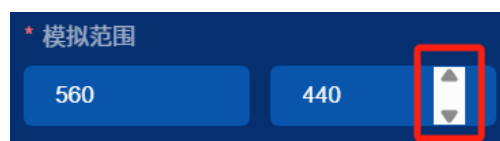


图 2.3-14 模拟范围调整

The range is the size of a rectangle centered on [center point coordinates], left click on the input box to type the range in kilometers (km), or click on the arrow to the right of the input box to increase/decrease by 1 km. The left side is the longitude direction (east-west), and the right side is the latitude direction (north-south). **Users need to consider the map projection effect on the longitude direction (east-west), usually the higher the latitude, the more**

obvious the length compression of the longitude direction.

2.3.1.7 Mesh size



图 2.3-15 网格尺寸调整

Left-click the input box to type the appropriate mesh size in kilometers (km). The smaller mesh size will improve the simulation accuracy, but it will increase the calculation amount and increase the time required for simulation. The larger mesh size will reduce the simulation accuracy, but the calculation amount is small, and the simulation time is short. The default value is 10km.

2.3.1.8 Clip based on shoreline



图 2.3-16 选择是否根据岸线裁剪

Left-click “” button can turn on/off shoreline clip. Default is “No” (Do not clip), the simulation range will now include land areas, which may affect the results. If you select the “Yes”, the mesh will be automatically clipped using the system's default global shoreline database.

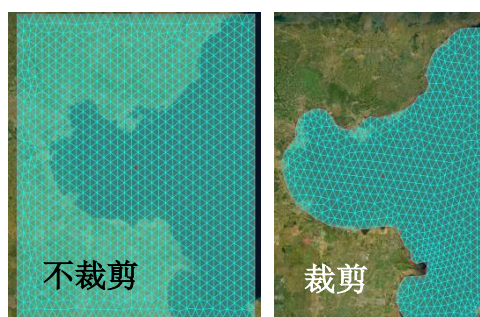


图 2.3-17, 2.3-18 岸线裁剪与不裁剪对比

2.3.1.9 Computing power



图 2.3-19 算力选择调整

Left click the input box to enter the number of computation cores (unit: "core") or click the arrow on the right side of the input box to increase/decrease by 1 core. The input must be a positive integer greater than or equal to 1. A higher core count reduces computation time. The default value is 4 cores.

2.3.1.10 Sigma layering



图 2. 3-20 sigma 分层调整

Left click the input box to enter the number of sigma layers, which must be a positive integer greater than or equal to 1. Increasing the number of layers can improve the vertical resolution and stability of the simulation, but will also increase computational load and simulation time. The default value is 3.

After completing the settings, click **【Confirm】** to finalize the project creation. The system will automatically redirect to the homepage upon processing completion.



图 2. 3-21 系统首页

2.3.2 Query project



图 2. 3-22 查询工程功能，可按照模型类型查询

You can query already created projects that meet the criteria based on the project name or model type. Left-click to select a model type from the drop-down menu under **【Model Type】**, and Left-click again or click the "🕒" button next to the model to deselect. Multiple selections are allowed. Click the **【Search】** button to display projects that meet all query conditions (including project name and model type) simultaneously. Clearing the input box and selections before clicking **【Search】** will display all projects.

2.3.3 Project management

Users can manage created projects on the **【Project Management】** page.



图 2. 3-23 管理工程界面

① **【Auto Simulation】**: Left-click this button to set the corresponding project as

the auto simulation project. The next time the user logs into the system, the project set for Auto Simulation will automatically load on the homepage.

*** Only one 【Auto Simulation】 project can exist at a time. ***

When a 【Auto Simulation】 project is already set, clicking the button for another project will trigger a popup “ 当前用户存在一键模拟工程 ” at the top of the screen, and the button will automatically revert to its “” state. To set a different project as 【Auto Simulation】, the existing one must be turned off first.

② 【Details】: Left-click the 【Details】 button to automatically navigate to the homepage and load the selected project.

③ 【Delete】: Left-click the 【Delete】 button to remove the corresponding project.



图 2.3-24 删除数据确认弹窗

④ 【Download File】: Left-click the 【Download File】 button to open the file download options.

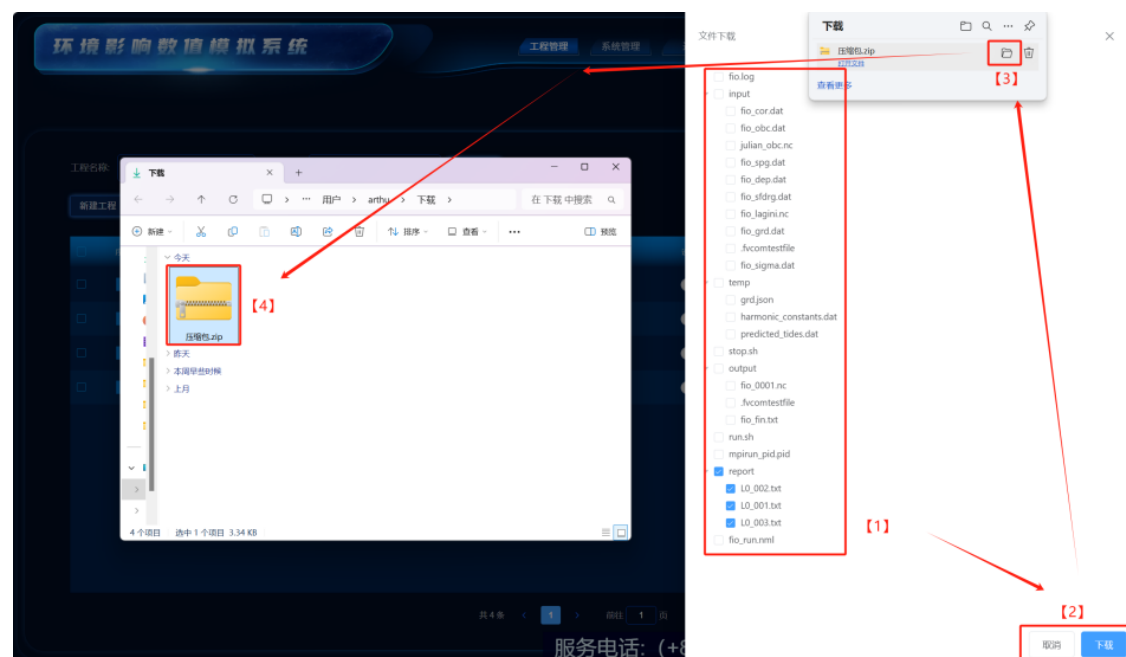


图 2.3-25 工程文件导出界面及操作流程

【1】 Left-click the "□" on the left side of each project to select it.

Left-click the **【Download】** button to begin downloading the selected projects.

【2】 After the download is complete, a window will appear in the top right corner of the screen, containing the recently downloaded folder named " zip file.zip".

【3】 Double-click the folder to view its contents. The "input", "output", "report", and "temp" folders will be automatically downloaded, regardless of whether they are selected. Only when the corresponding sections are selected on the “Download File” page will the files appear in the respective folders; otherwise, the folders will be empty.



图 2. 3-26 四个常驻文件夹名称

2.4 Function Operation List

2.4.1 Project selection

Clicking the **【Project Selection】** button will open a selection popup. Click the selection box to choose from the dropdown menu of already created projects. After selecting the project name, press the Enter key to load the selected project



图 2. 4-1 “工程选择” 按钮及菜单页面

2.4.2 Mesh operations

Clicking the **【Mesh】** button on the left-side function navigation will open a selection popup, where you can choose between the **【Upload Mesh】** and

【Custom Mesh】 features.

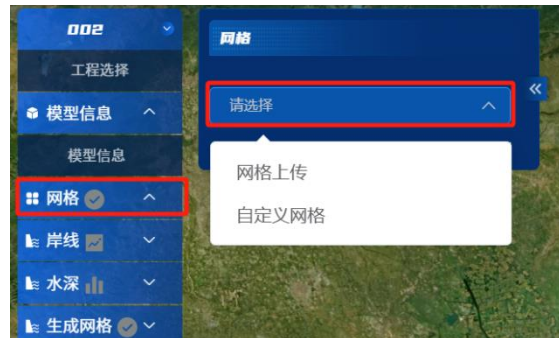


图 2.4-2 “网格” 按钮及菜单页面

2.4.2.1 Mesh upload



图 2.4-3, 2.4-4 网格上传页面及坐标类型选择

- ① When click 【Mesh upload】 , The upload window will popup.
- ② Left-click the selection box under 【Coordinate Type】 to choose whether to upload a mesh file in the “WGS84” or the “UTM” coordinate system. When selecting the “UTM” coordinate system, you must manually enter the corresponding zone number. The default zone number is “50”.
- ③ Click the 【Add Mesh】 button will open the upload window.
- ④ Select mesh file.
- ⑤ Left-click the **Open** button to complete the upload.

After the upload is complete, click the button next to “Mesh” to display. In the “Mesh Tools” section, you can store the mesh into the database. Left click the “<<” on the right edge of the window to collapse it.

2.4.2.2 Custom mesh

Select **【Custom Mesh】** to open the corresponding panel, where you can define the custom mesh range. Meanwhile, the left-side function navigation will display options such as **【Shoreline】** and **【Water Depth】**.



图 2.4-5 “自定义网格”功能，可选择“矩形范围”或“非规则范围”

You can customize the center point coordinates, enter the longitude and latitude range (unit: km), or click the icon next to “Center coordinate of project” to select the center point on the map, with the corresponding coordinates automatically filled in. Enter the mesh size (unit: km) and choose whether to clip based on the shoreline. The default range is Bohai Sea. Click **【Confirm】** to generate the mesh range.



图 2. 4-6 可以点击“工程中心坐标”旁的图标在地图上自选位置

When multiple mesh regions exist, right-click the desired region and select Set as Mesh Area to designate it for mesh generation.



图 2. 4-7 右键目标区域后可选择该区域为网格生成区

After completing the selection, choose the **【Generate Mesh】** function from the left-side navigation and click the **【Generate】** button to create the mesh within the selected area. The generated triangular mesh will automatically update the mesh index, refresh water depth values, and compute open boundaries and land boundaries.



图 2.4-8 点击【生成】按钮开始生成网格

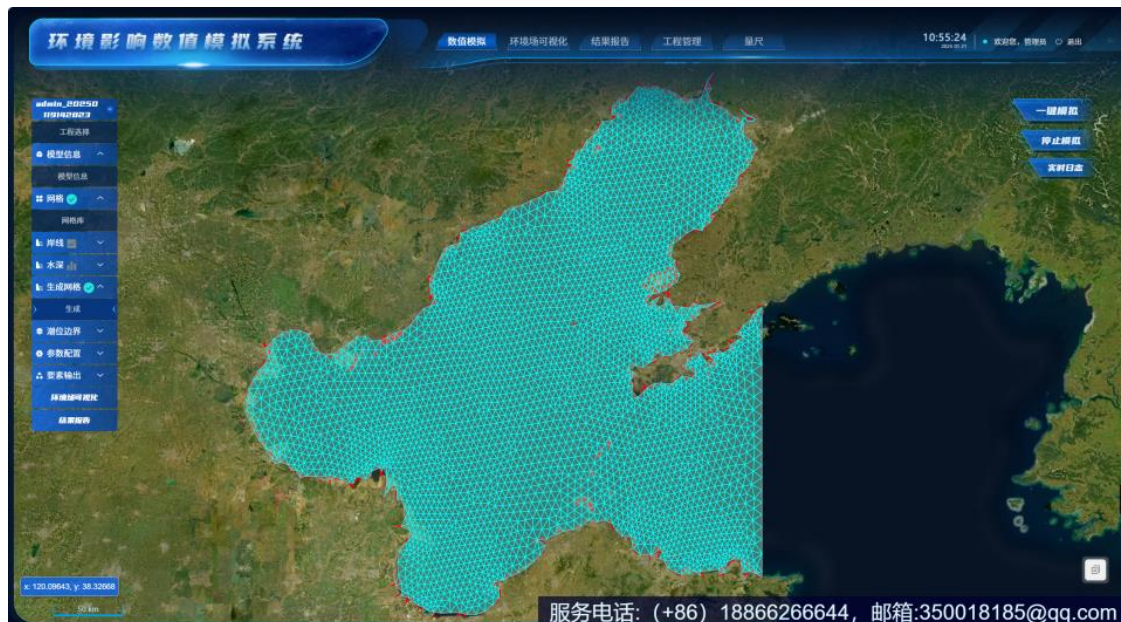


图 2.4-9 网格生成完成

2.4.2.3 Mesh refinement

This feature can be used for mesh **refinement** and **thinning**, as well as removing internal mesh units. This feature can be used after generating a range in 【Custom mesh】. In the 【Shoreline】 module, click 【Draw polygon】 to draw the refinement area. Once drawing is complete, a corresponding panel will appear, where you can input parameters such as the minimum mesh spacing and whether to generate the mesh. After configuring the parameters, click 【Confirm】 on the panel, then go to 【Generate Mesh】 and click

【Generate】 to generate the refined mesh.



图 2.4-10 绘制用于网格加密/抽稀的多边型区域

The generated mesh is as follows: certain areas have been refined, resulting in a denser triangular mesh. Additionally, internal triangular mesh elements can be removed, such as for islands.

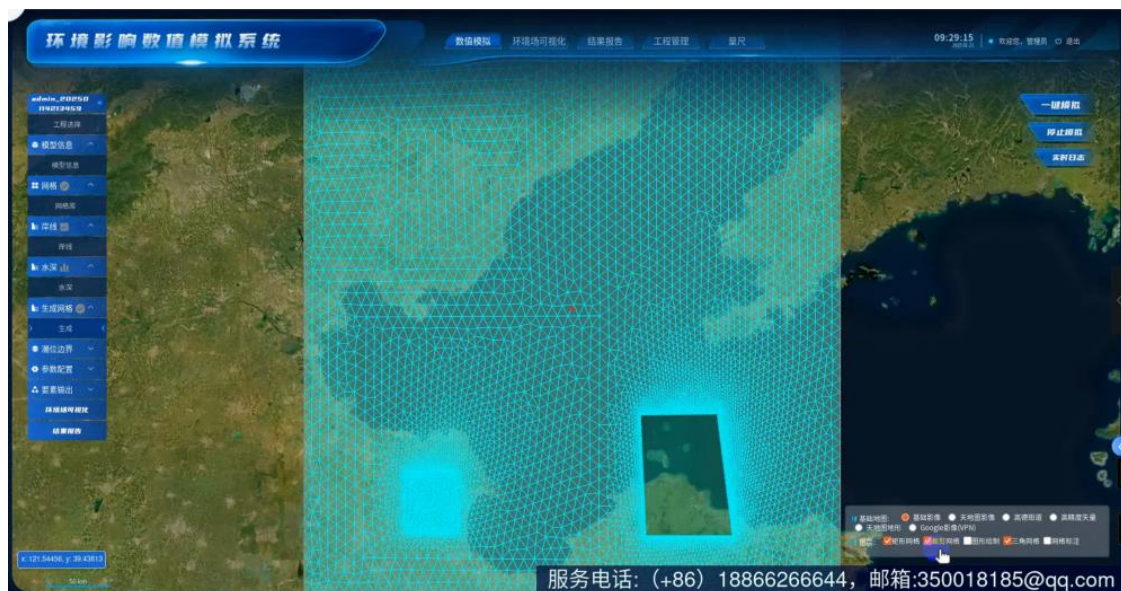


图 2.4-11 抽稀/加密效果

2.4.2.4 Edit mesh

When the mesh is used as input for the model, the quality of the triangular elements must meet certain requirements. Therefore, the system provides

mesh editing functionality. When a mesh is present on the map, right-click the triangle you want to modify, and blue nodes will appear on that triangle.

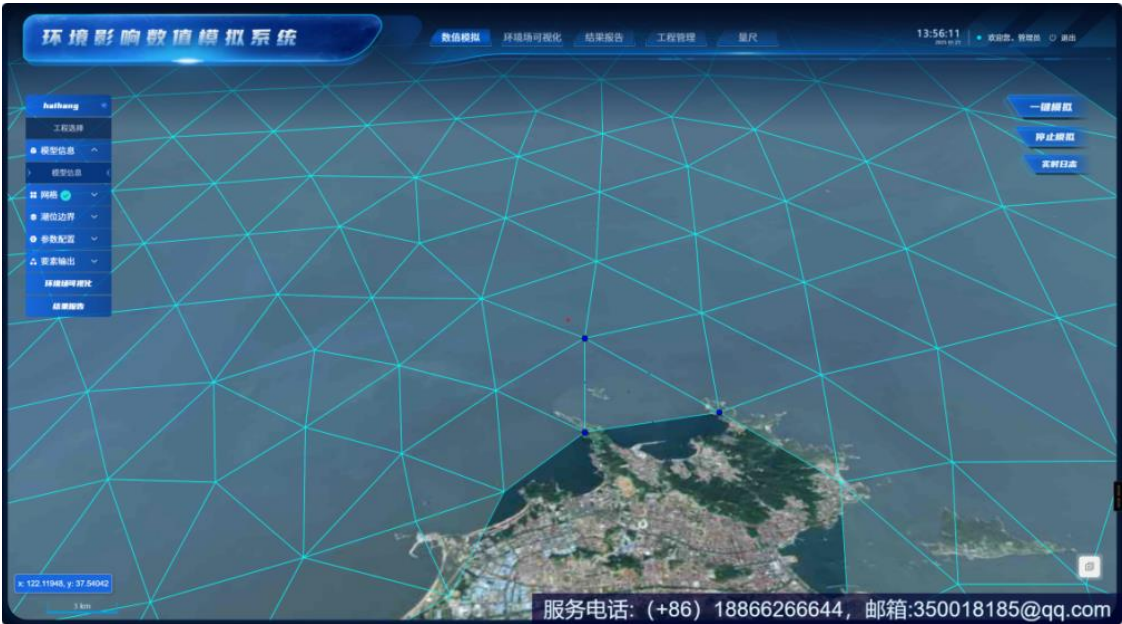


图 2.4-12 选中三角网格时出现蓝色顶点

Hold down the left mouse button and drag a blue node to modify the shape of the triangular mesh. The system will also update the index of adjacent nodes accordingly. If an error occurs, you can use **【Generate】** → **【Undo】** to undo the last mesh operation, restoring the previous state.



图 2.4-13 调整后的网格

2.4.3 Shoreline operations

2.4.3.1 Shoreline upload

Shoreline upload supports “XYZ format files” and “ZIP-compressed SHP files”.

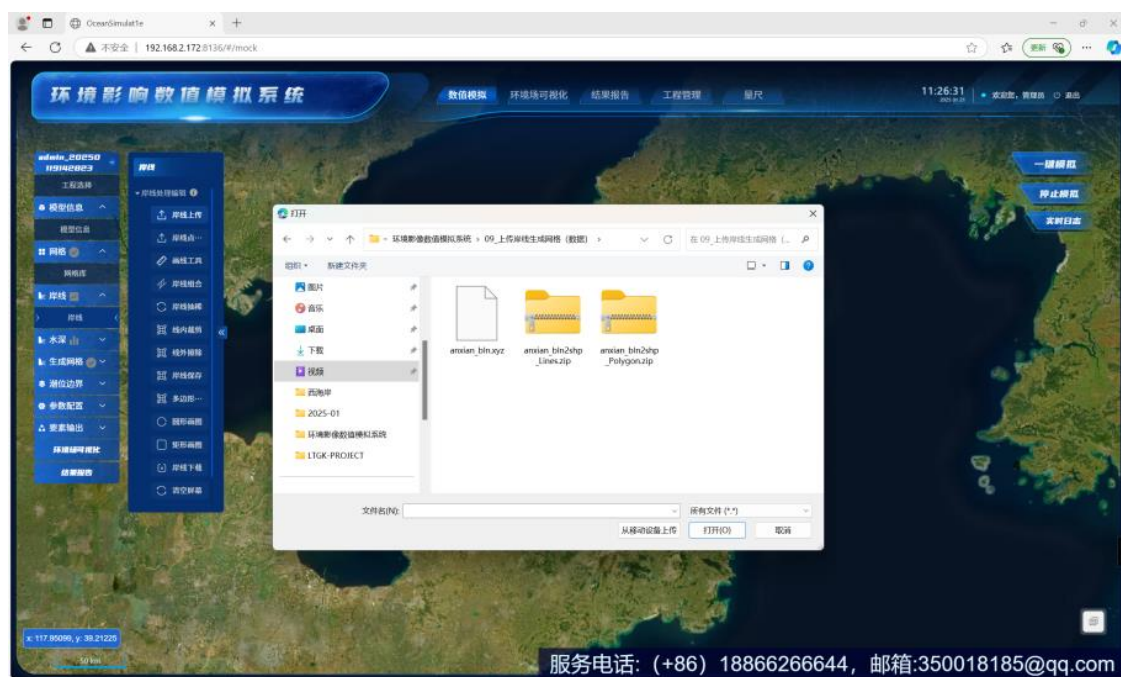


图 2.4-14 岸线上传文件格式示意

When uploading an XYZ file, if the coordinates form a closed shape, it will be automatically parsed as a polygon; if not, it will be loaded as a line. A success message will be displayed after the upload.



图 2.4-15 上传 xyz 文件后的闭合岸线示意

SHP files contain line and polygon types. After uploading, the system will automatically parse them as either lines or polygons accordingly.



图 2.4-16 上传 SHP 面类型文件后的示意图，加载为面



图 2.4-17 上传 SHP 线类型文件后的示意图，加载为线

2.4.3.2 Shoreline drawing and combination

In **【Shoreline】**, click **【Drawing tools】**, then left-click to start drawing a polyline. Double left-click to finish drawing, and the line will turn blue. Left-click the blue line to select it, when it turns red, it indicates the line is selected. After selecting all necessary shorelines, click the **【Shoreline combination】** button. The selected red lines will be automatically combined

into a closed region through an algorithm.

This region can be used for mesh clipping or mesh generation operations.



图 2. 4-18 未选中的零散岸线片段（蓝色）



图 2. 4-19 选中的零散岸线片段（红色）



图 2. 4-20 选中的零散岸线片段组合为完整闭合的岸线

2.4.3.3 Edit shoreline

Right-click the shoreline area and select 【Start editing】 to display the line nodes. Left-click and drag a node to start editing.



图 2. 4-21 编辑岸线时显示的岸线点

After completing the edits, right-click and select 【End editing】 to finalize the modified shoreline.



图 2.4-22 修改后的岸线示意图

2.4.3.4 Clip mesh inside the line

When it is necessary to retain external shapes, such as removing internal islands from the mesh, you can use 【Clip mesh inside the line】. The modified triangular mesh will automatically update the mesh index, refresh water depth values, and compute open boundaries and land boundaries.

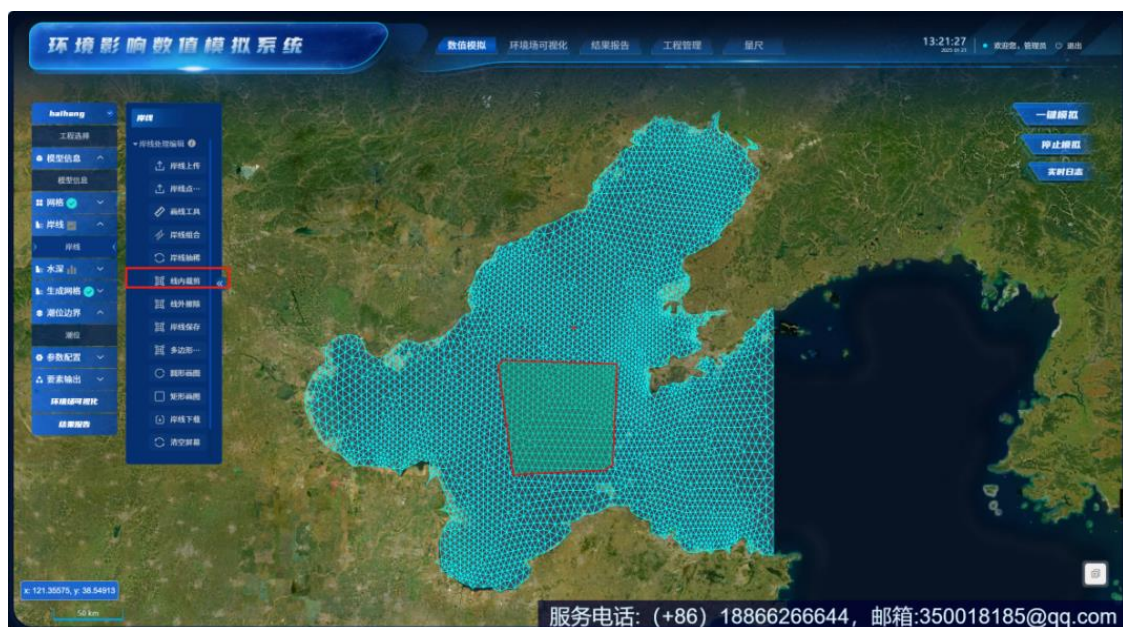


图 2.4-23 绘制用于线内裁剪的多边形区域

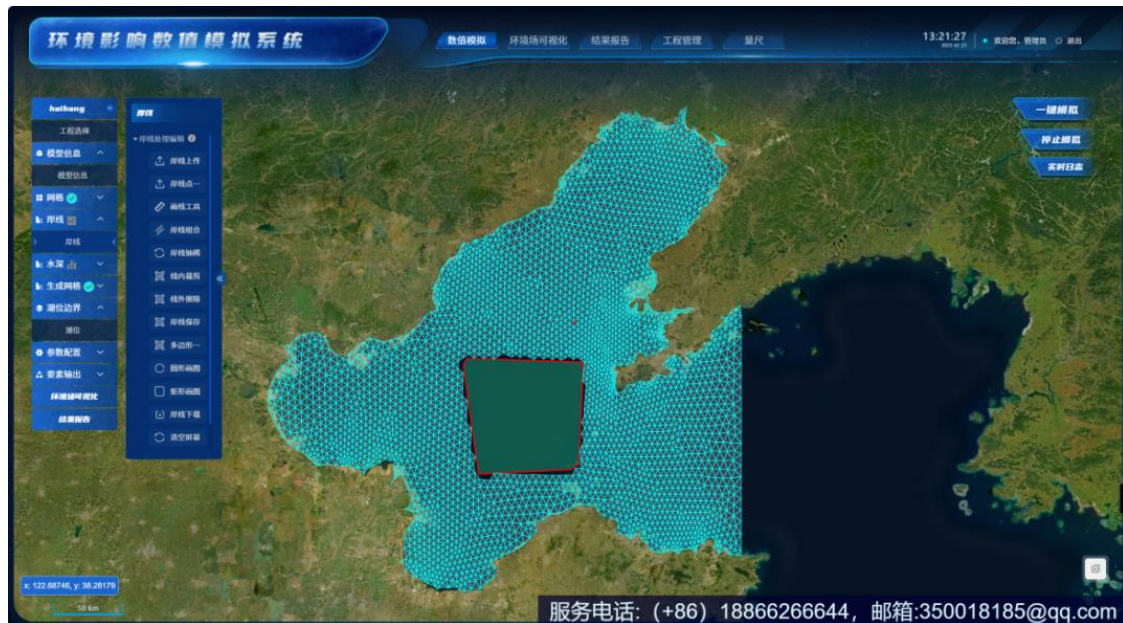


图 2.4-24 线内裁剪效果示意图

2.4.3.5 Erase mesh outside the line

When you want to retain only the internal shapes of a region, clicking **【Erase mesh outside the line】** will spatially erase the shapes and mesh outside the selected area, keeping only the internal triangular mesh. The modified triangular mesh will automatically update the mesh index, refresh water depth values, and compute open boundaries and land boundaries.

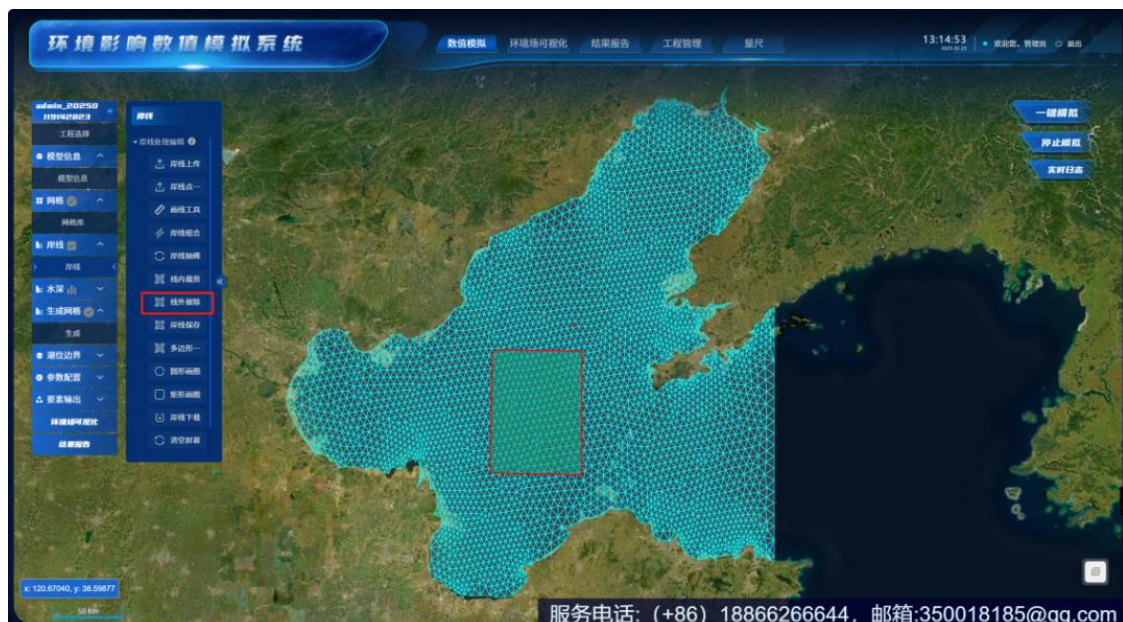


图 2.4-25 绘制用于线外擦除的多边形区域

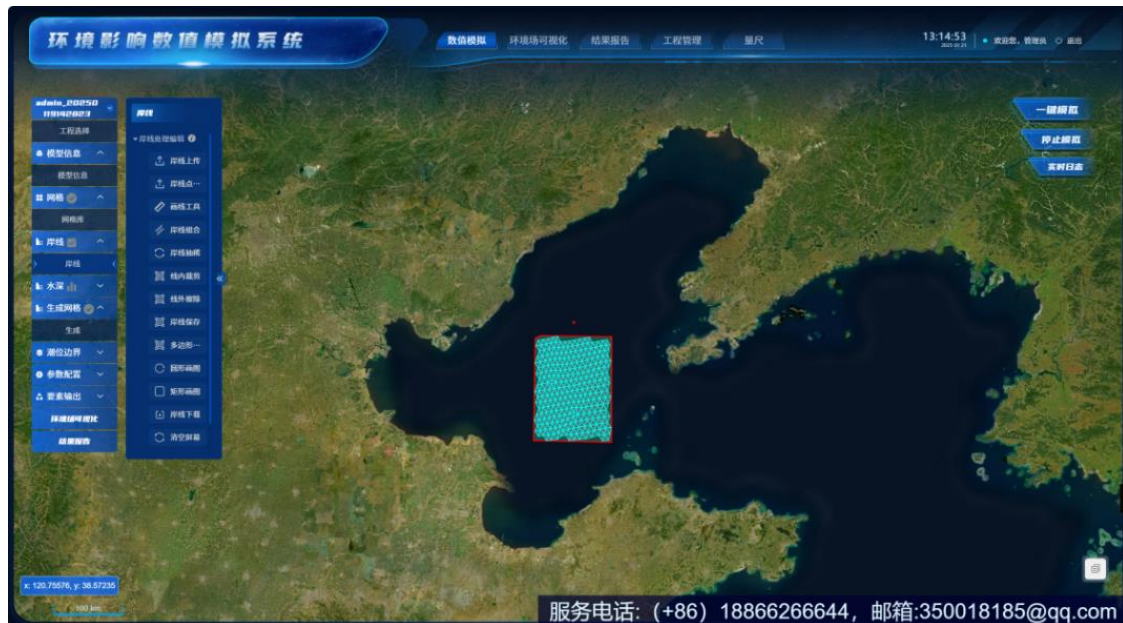


图 2.4-26 线外擦除效果示意图

2.4.3.6 Boundary computing and editing

The mesh has boundary attributes, where:0 represents internal points,1 represents land boundaries,2, 3, 4, 5, etc. represent open boundaries. In

【Generate】, click 【Load boundary】 to view the mesh boundary attributes, which are automatically calculated by the system.

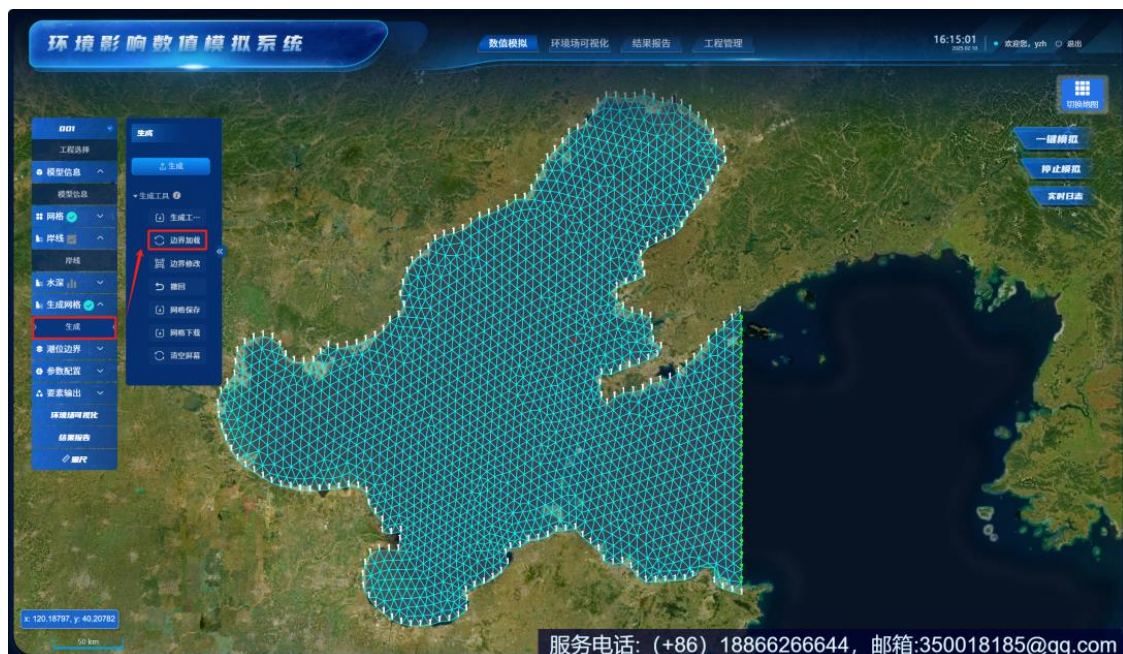


图 2.4-27 显示的边界值

Currently, the system supports calculating **land boundary (1)** and a **single open boundary (2)**. If additional open boundary types are needed,

they must be manually modified. Click 【Edit boundary】 to open the modification panel, enter the desired boundary value, and click 【Confirm】. Then, draw a **polygon area** on the map, boundaries within this area will be updated and display the new values.

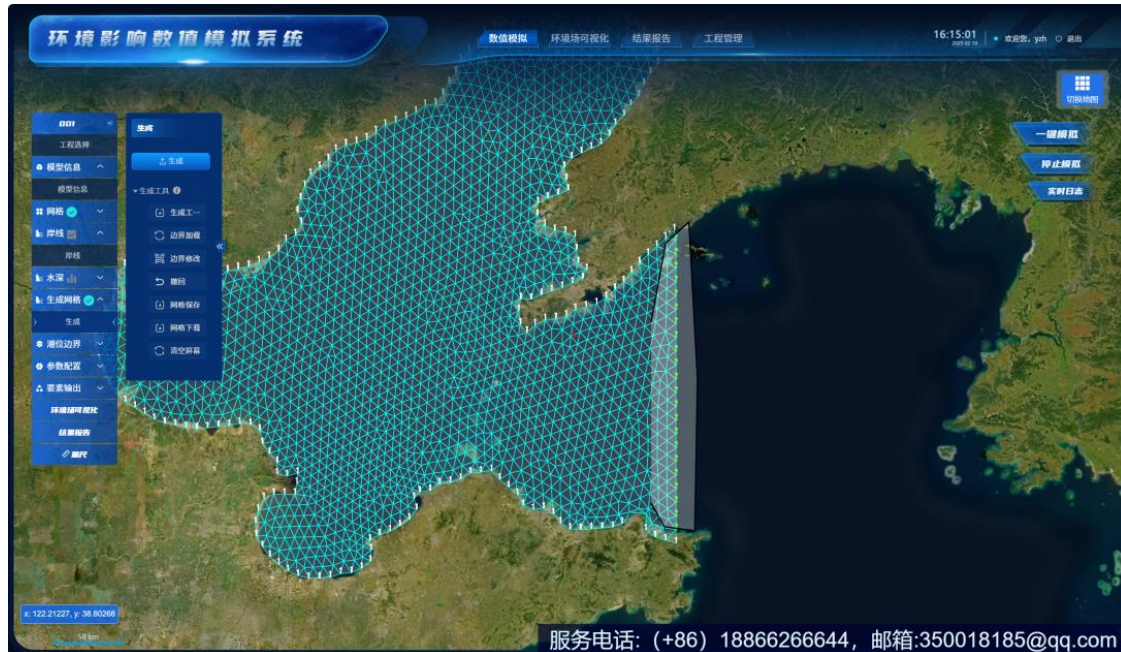


图 2. 4-28 绘制想要修改的边界值的范围

In the upper right corner 【Switch Map】 button, hide the mesh layer and only keep the mesh's boundary values, so you can more clearly see the open boundary updated to "3".



图 2. 4-29 修改后的边界值

2.4.4 Water depth operations

2.4.4.1 Default water depth

The mesh includes water depth values, and when performing operations on the mesh, the depth values are automatically updated based on the global bathymetry database. To view the water depth distribution, click the **【Depth】** button in the function bar to open the depth panel. Check the **【Default water depth】** option and click **【Confirm】**. The water depth data within the mesh will then be displayed automatically, as shown in the figure:

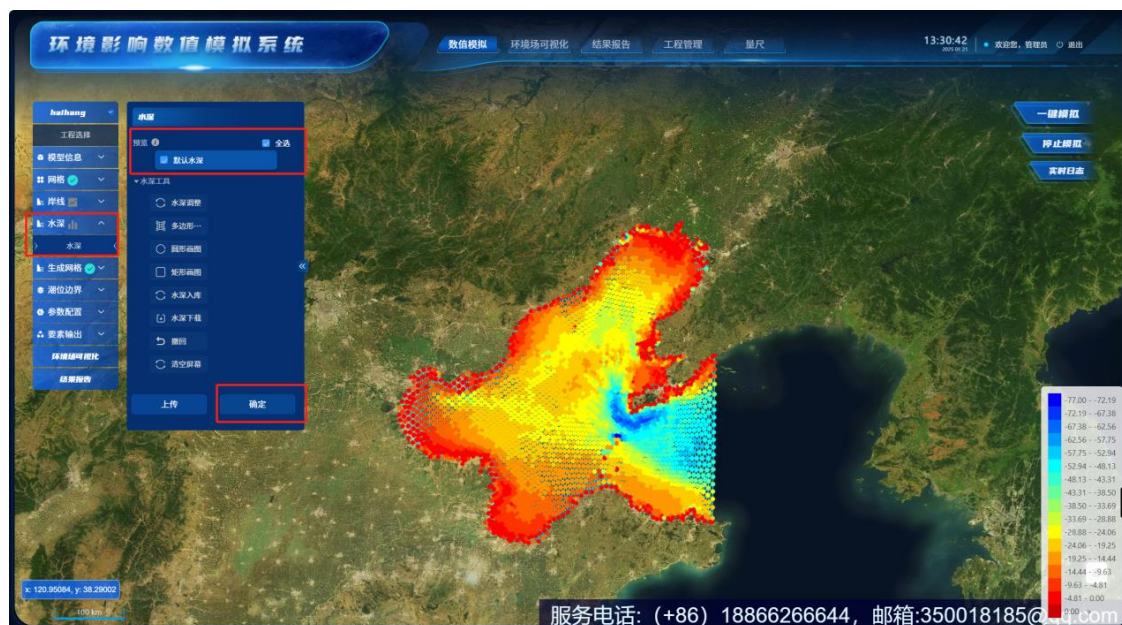


图 2. 4-30 显示默认水深值

2.4.4.2 Manual depth adjustment

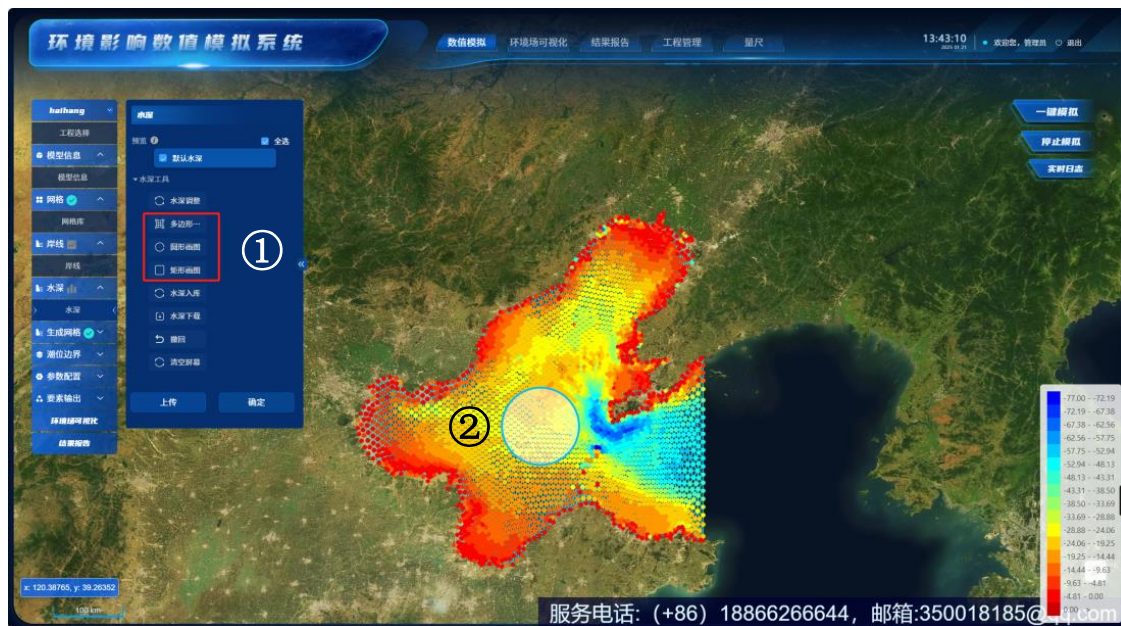


图 2.4-31 绘制水深值修改的范围

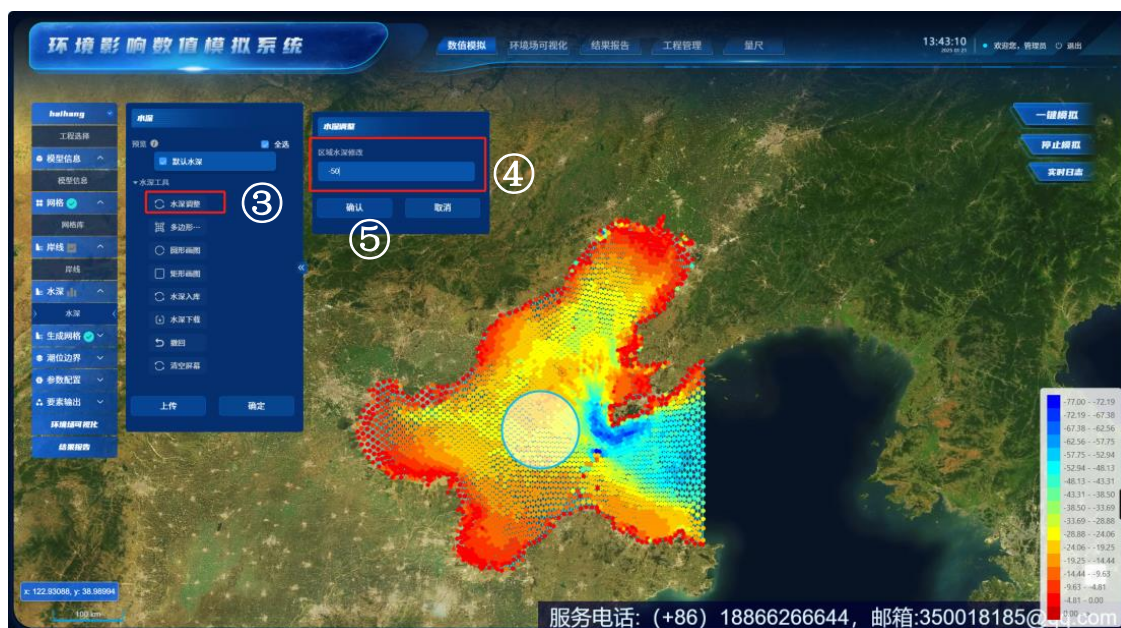


图 2.4-32 修改水深值

① When adjusting water depth values in a specific mesh area, you can use polygon-drawing, circle-drawing, or rectangle-drawing tools to select the mesh nodes that need modification.

② Left-click and drag to define the adjustment area.

③ Left-click the **【Depth Adjustment】** button to open the depth modification panel.

④ Enter the desired adjustment value in the input field, a positive value

indicates an increase from the **original value**; a negative value indicates an decrease from the **original value**.

⑤ Click **【Confirm】** to update the depth values of nodes within the drawn area. The numerical distribution can be viewed in the legend on the right.

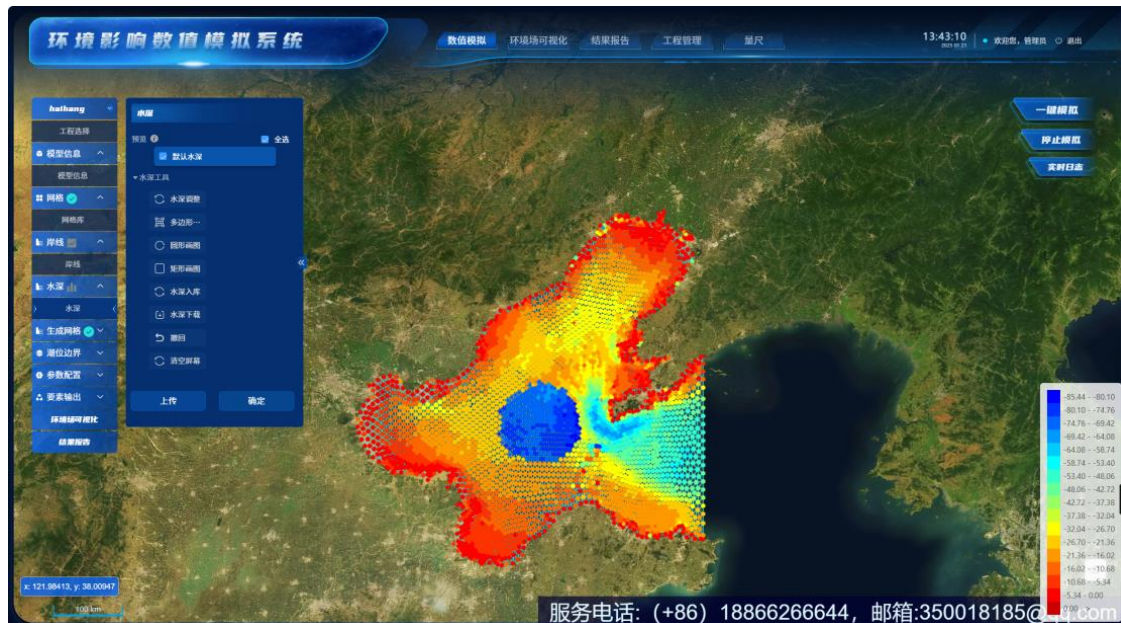


图 2.4-33 修改后的水深值示意图

2.4.4.3 Update depth files

If measured depth data is available, you can update depth values by uploading CSV files. As shown in the figure, click the **【Upload】** button in the panel to open the dialog box, where you can select multiple depth point files.

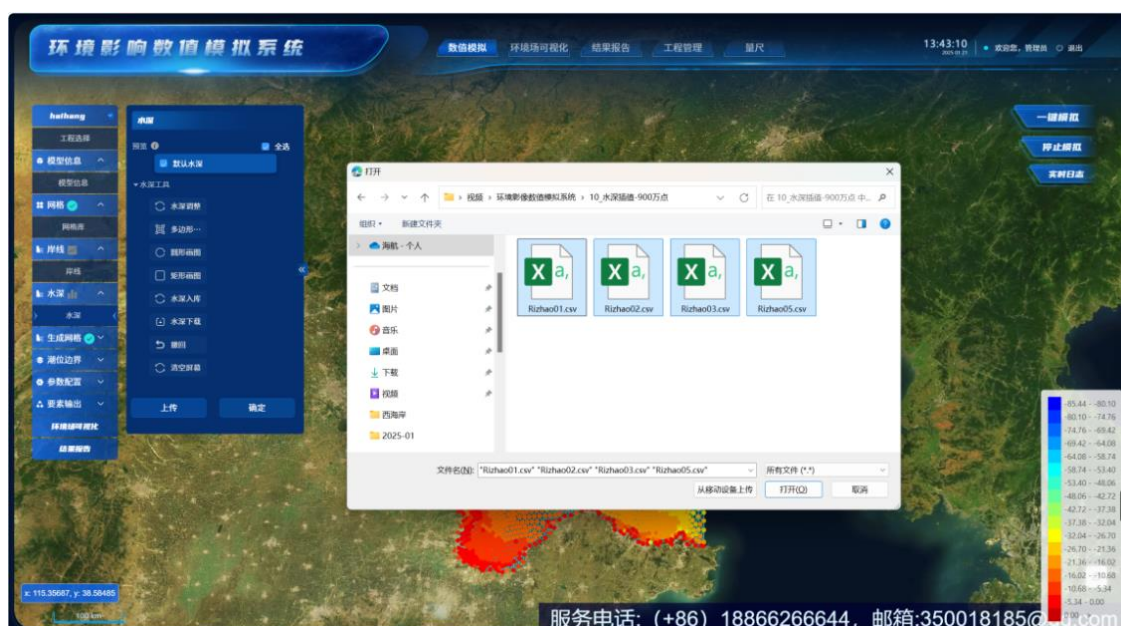


图 2.4-34 csv 格式水深文件上传，可同时上传多个文件

The uploaded files will be displayed in a list. You can left-click and drag each item to rearrange their priority order.

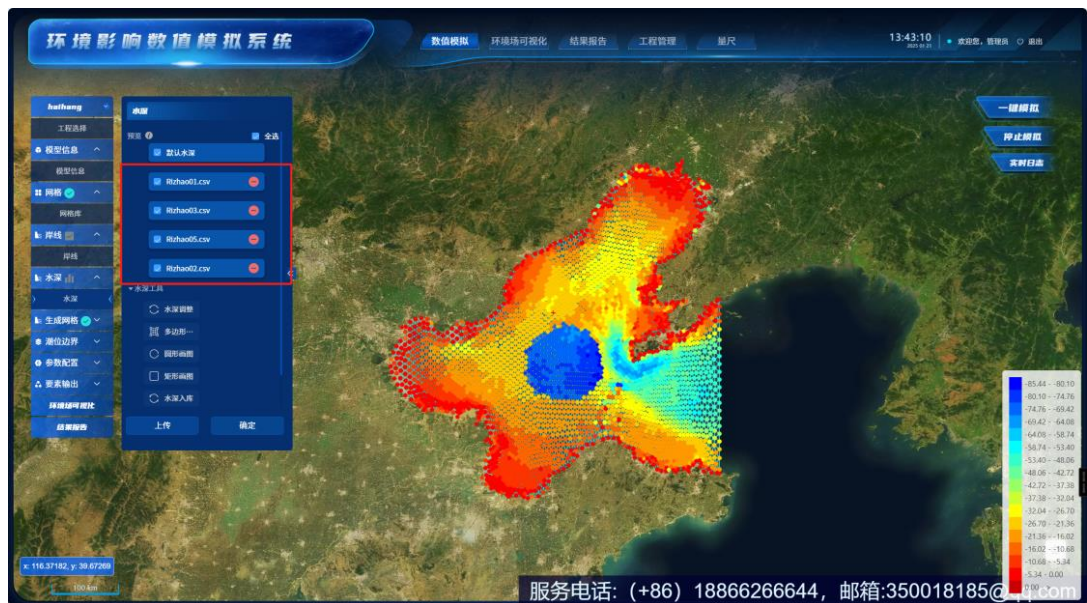


图 2. 4-35 上传的多个水深文件会按顺序排序

After sorting, click **【Confirm】** to update the depth values. The system uses an R-tree optimized algorithm to efficiently process large point datasets. The example depth points uploaded are simulated data. The coverage of each depth file will be updated on the map, allowing visualization of how the depth distribution aligns with the mesh.

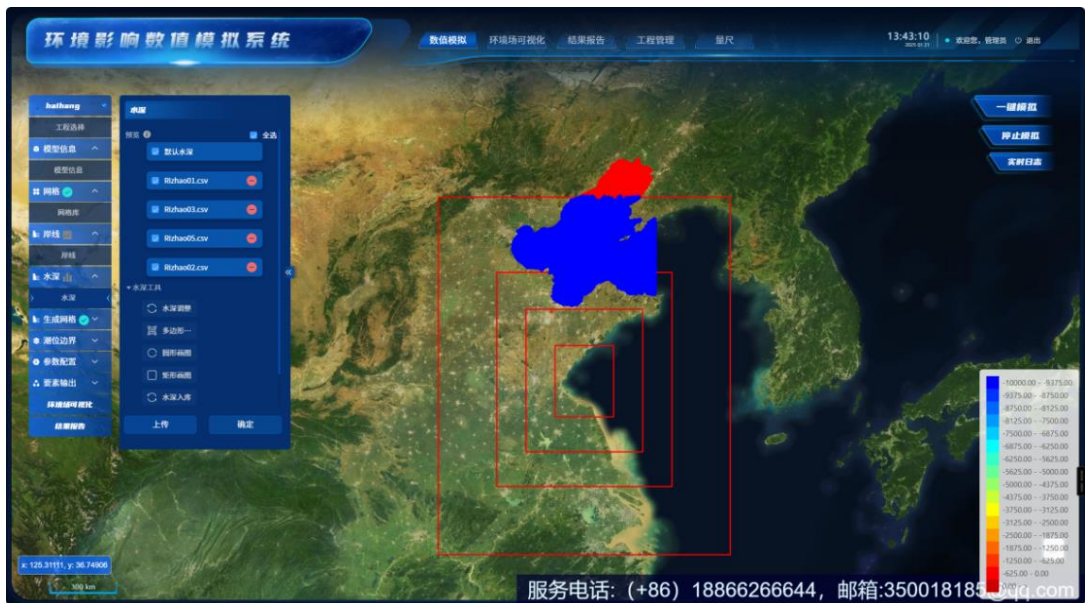


图 2. 4-36 同时显示多个水深文件范围

Continue adjusting the file sorting to observe changes in the updated depth

values.



图 2. 4-37 调整水深文件顺序

2.4.5 Tidal boundary



图 2. 4-38 潮位边界配置面板

Tidal boundary represents a boundary condition or reference value indicating the extent of tidal influence. You may either select the default tidal model or upload a custom model file.

- ① Click the 【Tide Level】 option to open the tide level settings window.
- ② Default is TPXO.8 model.

- ③ You may upload your own tide level dat file.
- ④ Click **【Confirm】** to load the tidal model
- ⑤ Left-click the **【Download】** button to download the tide level dat file. A pop-up notification will appear in the upper-right corner of the browser upon completion. The filename will be "predicted_tides.dat".

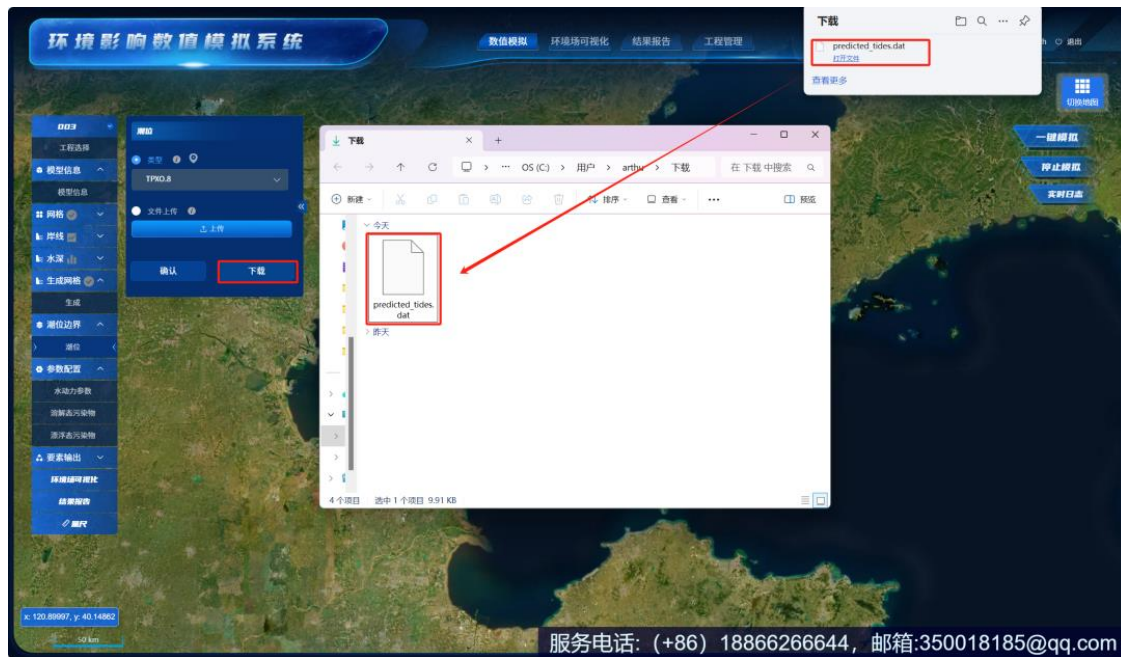


图 2. 4-39 下载潮位文件

The dat file can be opened with Notepad, and its content format is as follows:

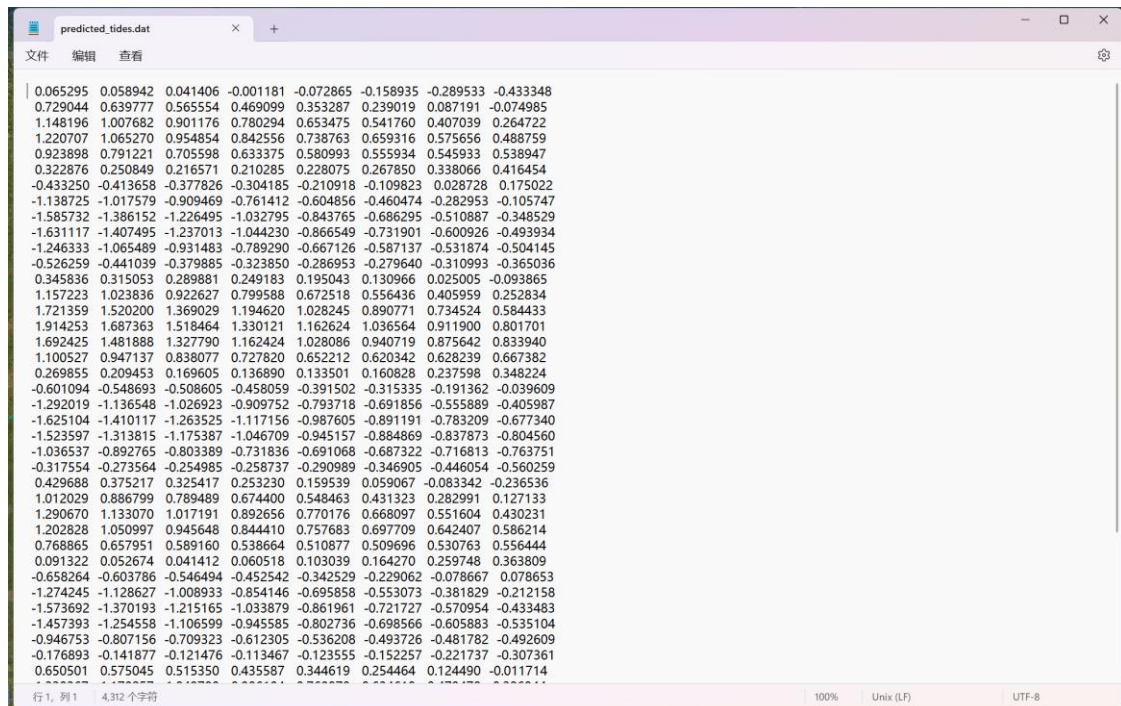


图 2. 4-40 下载的潮位文件内容示例

2.4.6 Parameter configuration

2.4.6.1 Hydrodynamic parameters



图 2. 4-41 水动力参数配置面板

- ① Click the 【Hydrodynamic Parameters】 button under 【Parameter Configuration】 to open the parameter settings panel.
- ② Click the 【Download Template】 button to download the hydrodynamic parameters template for reference.

	A	B	C	D	E	F	G	H	I
1	最小水深	水平扩散系数	静态海面高度调整	水平PRANDTL参数	垂向扩散系数	内模与外模时间步长比	垂向PRANDTL参数	底部粗糙度	最低摩擦系数
2	0.05	0.2	0.8	1	1	1	1	0.001	0.005

图 2. 4-42 水动力参数模板内容

- ③ Click the 【Upload】 button to upload hydrodynamic parameters, and the corresponding parameters will be automatically updated. Alternatively, adjust the parameters directly in the 【Hydrodynamic Parameters】 panel.
- ④ Click the 【Confirm】 button to apply changes, or click the 【Cancel】 button to retain default parameters.

2.4.6.2 Dissolved pollutants



图 2. 4-43 溶解态污染物参数配置面板

- ① Click the **【Dissolved Pollutants】** button under **【Parameter Configuration】** to open the parameter settings panel.
- ② Modify the parameters, where the **【Dye layer】** parameter allows selection of up to 3 layers. Left-click the dropdown menu to enable multiple selections.
- ③ Click **【Select All】** to choose all 3 layers.



图 2. 4-44 上传或输入溶解态污染物位置

- ④ Click the **【Upload】** button to upload the pollution source location file.

⑤ Click the 【Download Template】 button to download the pollution source location file template for reference.

经度	纬度	类型	浓度
120	32	生活污水	3
128	36	污水	4

图 2.4-45 溶解态污染物源坐标模板

⑥ Click the 【Select on Map】 button to choose pollution source locations on the map. Left-click to confirm the position, and the corresponding coordinates will be auto-filled. Manually enter the pollutant type and concentration.

⑦ Click “+” button to add new pollution source.

⑧ Click 【Confirm】 to finalize changes, or click 【Cancel】 to revert to default parameters.

2.4.6.3 Floating pollutants

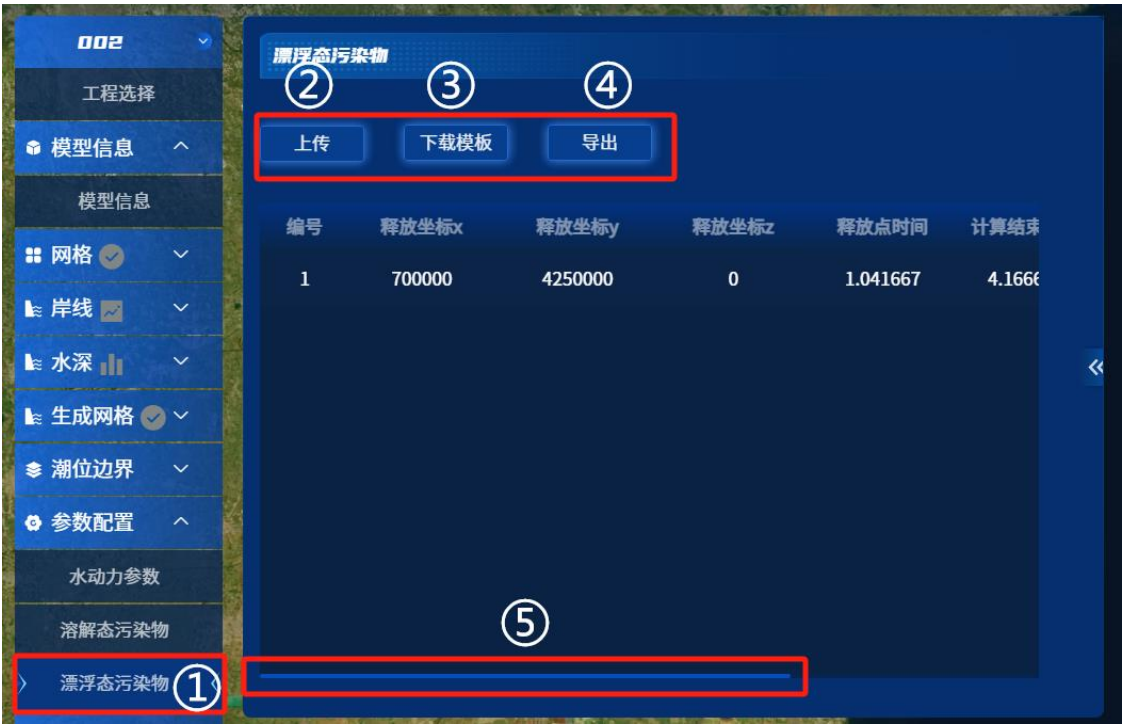


图 2.4-46 漂浮态污染物参数操作面板，可上传/导出参数文件，下载模板

① Click the 【Floating Pollutants】 button under 【Parameter Configuration】 to open the parameter settings panel.

- ② Click **【Upload】** to upload floating pollutant parameters.
- ③ Click the **【Download Template】** button to download the pollution details file template for reference.

粒子编号	释放点位置x	释放点位置y	释放点位置z	释放点时间(d)	计算结束时间(d)	标记	最远距离(m)
1	700000	4250000	0	1.041667	4.166667	1	10000000

图 2.4-47 漂浮态污染物参数模板

- ④ Click the **【Export】** button to export the current parameters.
- ⑤ Left-click and drag the horizontal scroll bar left or right to view additional parameters.

2.4.6.4 Suspended sediment parameters (Suspended Sediment Model 4.0)



图 2.4-48 悬浮沙（4.0）参数配置面板

- ① Click the **【Suspended Sediment Parameters】** button under **【Parameter Configuration】** to open the settings panel.
- ② Click **【Upload】** to upload suspended sediment parameters.
- ③ Click the **【Download Template】** button to download the suspended sediment parameters file template for reference.
- ④ Click **【Confirm】** to finalize changes, or click **【Cancel】** to revert to default parameters.



图 2.4-49 悬浮沙（4.0）坐标操作面板，可上传/导出参数文件，下载模板

- ⑤ Click the **【Suspended sediment details】** to open the coordinate parameters panel.
- ⑥ Click **【Upload】** to upload suspended sediment coordinates.
- ⑦ Click the **【Download Template】** button to download the suspended sediment coordinates file template for reference.
- ⑧ Click the **【Export】** button to export the current coordinates parameters.

2.4.6.5 Suspended sediment parameters (Suspended Sediment Model 2.0)



图 2.4-50 悬浮沙（2.0）水动力参数配置面板

- ① Click the **【Suspended sediment hydrodynamic Parameters】** button under **【Parameter Configuration】** to open the parameter settings panel.
- ② Click the **【Upload】** button to upload hydrodynamic parameters.
- ③ Click the **【Download Template】** button to download the hydrodynamic parameters template for reference.

最小水深	水平扩散系数	水平PRANDTL参数	垂向扩散系数	垂向PRANDTL参数	内模与外模时间步长比	底摩擦系数	底部粗糙度	静态海面高度调整
1	2.000E-1	1.000E+0	1.000E-4	1.000E+0	1	0.005	0.003	0.8

图 2.4-51 悬浮沙（2.0）水动力参数文件模板

- ④ Click **【Confirm】** to finalize changes, or click **【Cancel】** to revert to default parameters.



图 2.4-52 悬浮沙（2.0）参数配置面板

- ⑤ Click the **【Suspended pollutants】** button to open the pollutant parameter configuration panel.
- ⑥ You can choose to upload various parameters or download corresponding templates, including "Pollution source coordinates", "Discharge layer position", and "Pollution source intensity and discharge duration", etc. Also, you can modify these parameters directly in the configuration panel.

⑦ Click **【Confirm】** to finalize changes, or click **【Cancel】** to revert to default parameters.

2.4.7 Other operations

2.4.7.1 Save mesh

This tool appears in multiple locations and serves the function of saving the mesh to the project information.

2.4.7.2 Download mesh

The tool downloads the project mesh data with optional coordinate systems of either **WGS-84** or **UTM**. When selecting the **UTM** coordinate system, users need to manually enter the corresponding **zone number** (default: Zone 50). Upon completion, a notification window will pop up in the upper-right corner of the browser, and the downloaded mesh file will be named "output.mesh".

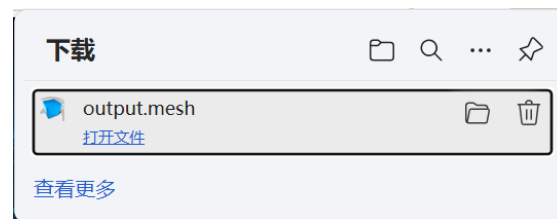


图 2. 4-53 网格下载文件名称示例

2.4.7.3 Clear Screen

Left-click **【Clear Screen】** to remove all elements from the display.

2.4.7.4 Ruler

This tool is used to measure the total length of user-defined continuous line segments directly on the map, with units displayed in "kilometers (km)". Click the **【Ruler】** button at the bottom of the left function panel on the homepage, and a "Start Distance Measurement" prompt will appear at the top of the screen.

Left-click at any location to set the measurement starting point. The second point will follow the mouse movement while continuously displaying its distance from the "starting point". Left-click again to place the second point.



图 2.4-54 量尺单段测距示意图

You can continue placing additional nodes by left-clicking, and double-left-click to set the end point. The cumulative total length of continuous line segments from the starting point will be displayed to the right of each node. A “” button will appear to the right of the last node, click it to remove the entire measurement path. Multiple measurement paths can coexist simultaneously.



图 2.4-55 量尺连续多段测距示意图

Click the **【Ruler】** button again to turn off it. All undeleted measurement paths will remain displayed on the map.

2.5 Start simulation

After completing all parameter settings, click the **【Start simulation】** button on the right side of the homepage. Upon seeing the "Model Successfully Started" prompt at the top of the screen, the system will automatically proceed with the corresponding numerical simulation.



图 2.5-1, 2.5-2 点击**【一键模拟】**按钮开始模拟及弹窗提示

Now you can click **【Logs】** to check the simulating status.

- ① Click the **【Stop】** button in the upper-left corner to immediately terminate the current simulation, or click **【Back】** to go back to the homepage.
- ② The red box continuously displays the remaining simulation time in the format "Days:Hours:Minutes:Seconds". The simulation will complete when the countdown reaches zero.



图 2.5-3 实时日志界面，可查看模拟状态及剩余模拟所需时间

2.6 Results

After the simulation is completed, click the **【Results Report】** button at the top of the homepage.



图 2.6-1 点击上方功能栏【结果报告】按钮

The default display shows “01-Large Range Mesh Map”.

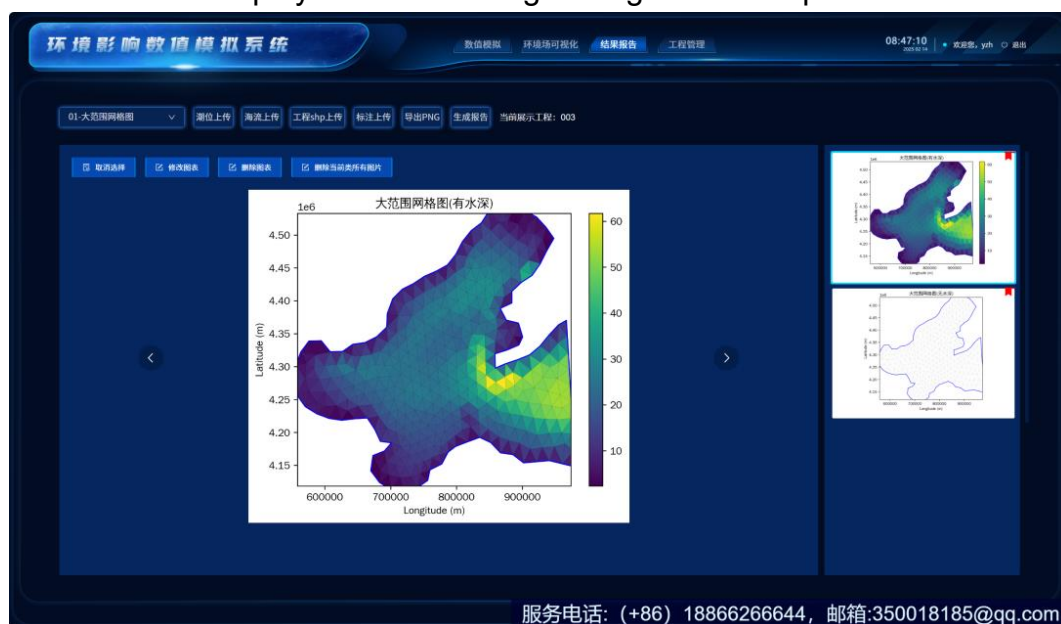


图 2.6-2 打开结果报告页面，默认显示“01-大范围网格图”

2.6.1 Thematic maps

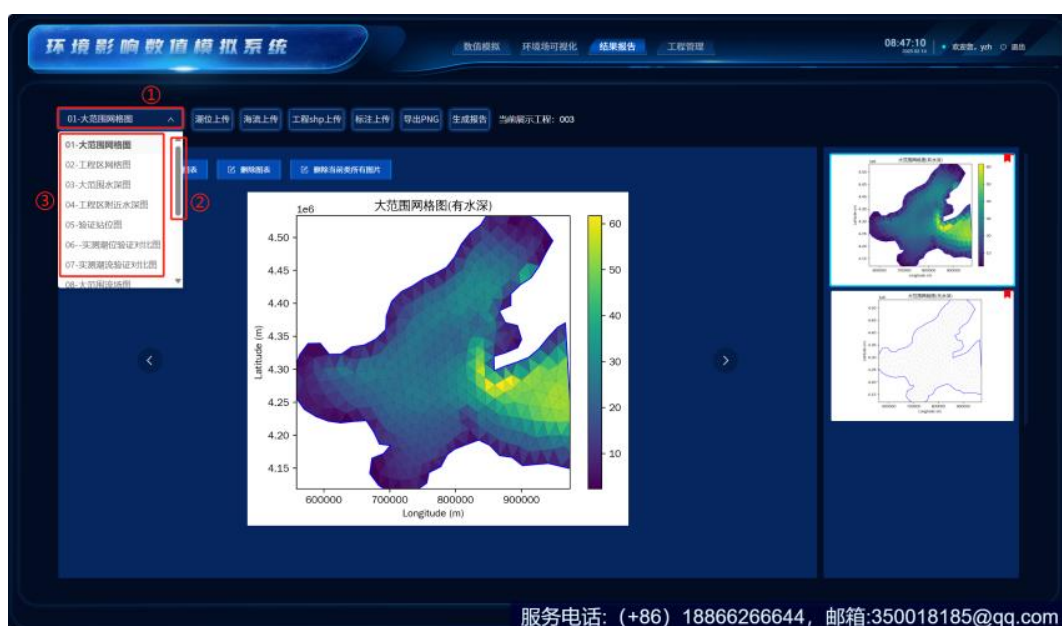


图 2.6-3 点击专题图下拉菜单可查看不同的专题图

Multiple thematic maps can be generated and viewed.

① Left-click the thematic map selection box in the upper-left corner to open the dropdown menu.

② Hold left-click to drag the gray vertical scrollbar, or scroll the mouse wheel within the dropdown menu to browse available thematic maps.

③ Left-click a thematic map name to select it. Only generates maps related to the model type selected during project creation. Maps for unselected models will not be available.

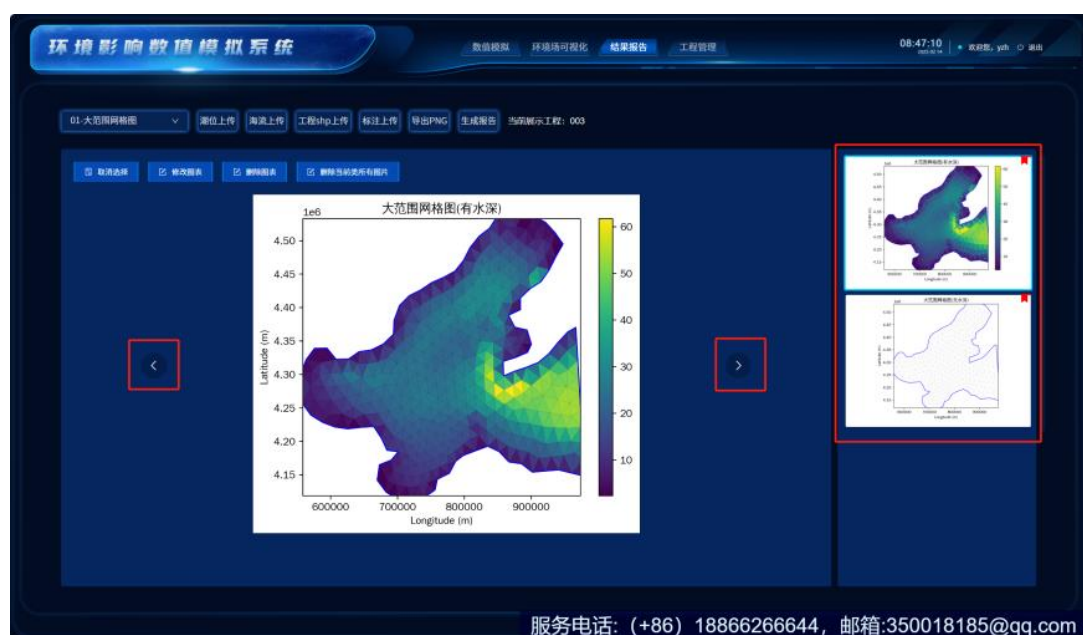


图 2. 6-4 点击左右两侧的箭头可查看同一专题图不同版本

Certain thematic maps may have multiple versions (e.g., "01-Large Range Mesh Map" may include both "with depth" and "without depth" versions). All versions will be displayed in the right-hand panel of the screen. Left-click the "<" or ">" buttons on either side of the thematic map, or directly left-click the images in the right-hand panel to browse different versions of the same thematic map. The currently displayed version will be highlighted with a blue border in the right panel.

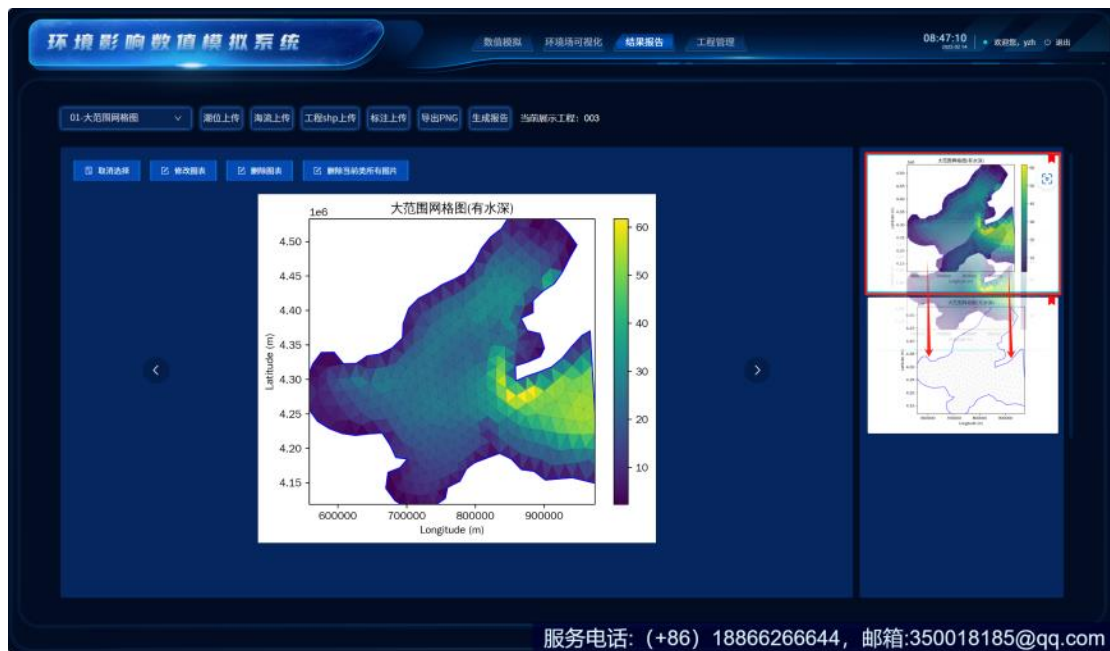


图 2. 6-5 按住左键拖动右侧缩略图栏的图片可进行排序

In the right-hand thumbnail panel, press and hold the left mouse button to drag images upward or downward.

2.6.1.1 各类文件上传



图 2. 6-6 文件上传按钮条，包含潮位上传，海流上传，工程 shp 上传和标注上传

This section allows uploading four types of files: 【Upload Tide】，【Upload Current】，【Upload Project shp】，and 【Upload Labels】.

① Upload Tide: Click the 【Upload Tide】 button to open the upload interface. You may either drag and drop tide-level files in xlsx format into the dashed-line box or click anywhere inside the dashed-line box to open the file selection dialog. Click the 【Download Template】 button below the dashed-line box to obtain a tide level file template for reference.



图 2. 6-7 潮位文件上传选项界面，可上传文件或下载模板

A	B	C	D	E	F	G	H	I	J
站位坐标经度	120.5867285	站位坐标纬度	40.00144042	站号	A16	观测层数	3	时区	Asia/Shanghai
日期	时间	潮位							
	2022/11/9 10:00	42							
	2022/11/9 11:00	107							
	2022/11/9 12:00	163							
	2022/11/9 13:00	212							
	2022/11/9 14:00	224							
	2022/11/9 15:00	200							
	2022/11/9 16:00	146							
	2022/11/9 17:00	81							
	2022/11/9 18:00	21							
	2022/11/9 19:00	-34							
	2022/11/9 20:00	-74							
	2022/11/9 21:00	-93							
	2022/11/9 22:00	-84							
	2022/11/9 23:00	-51							
	2022/11/10 0:00	-8							
	2022/11/10 1:00	31							
	2022/11/10 2:00	51							
	2022/11/10 3:00	46							
	2022/11/10 4:00	13							
	2022/11/10 5:00	-42							
	2022/11/10 6:00	-104							
	2022/11/10 7:00	-156							
	2022/11/10 8:00	-180							
	2022/11/10 9:00	-169							
	2022/11/10 10:00	-129							

图 2. 6-8 潮位文件模板

② Upload Current: Click the 【Upload Current】 button to open the upload interface. You may either drag and drop tide-level files in xlsx format into the dashed-line box or click anywhere inside the dashed-line box to open the file selection dialog. Click the 【Download Template】 button below the dashed-line box to obtain a tide level file template for reference.



图 2. 6-9 海流文件上传选项界面，可上传文件或下载模板

A	B	C	D	E	F	G	H	I	J
站位坐标经度	120.5867285	站位坐标纬度	40.00144042	站号	A16	观测层数	3	时区	Asia/Shanghai
日期	时间	水深	流速(cm/s)	流向(°)	流速(cm/s)	流向(°)	流速(cm/s)	流向(°)	
2022/11/9	10:00	0.42	52.2	32.2	53.2	74.8	37.9	77.9	
2022/11/9	11:00	1.07	76.4	32.9	51.3	71.1	39.6	64.4	
2022/11/9	12:00	1.63	49.8	31.4	15.9	76.2	8.4	42.7	
2022/11/9	13:00	2.12	14.3	50.3	16.8	227.1	16.6	239.9	
2022/11/9	14:00	2.24	26.1	235.9	50.4	248.7	43.1	242.3	
2022/11/9	15:00	2	52.6	236.4	78.9	249.7	53.7	241.6	
2022/11/9	16:00	1.46	70.3	238.6	96.6	246.5	54.1	245.9	
2022/11/9	17:00	0.81	74.0	234.5	98.5	256.0	46.7	243.3	
2022/11/9	18:00	0.21	61.7	234.8	80.5	261.9	23.1	236.6	
2022/11/9	19:00	-0.34	43.5	256.2	43.8	264.9	5.1	169.5	
2022/11/9	20:00	-0.74	22.2	287.8	13.9	324.8	14.8	74.0	
2022/11/9	21:00	-0.93	21.5	9.2	30.7	35.1	26.2	62.6	
2022/11/9	22:00	-0.84	38.6	39.2	57.1	49.5	47.2	74.7	
2022/11/9	23:00	-0.51	44.1	48.4	62.2	64.2	40.8	89.2	
2022/11/10	0:00	-0.08	39.5	59.5	55.0	68.8	32.8	99.4	
2022/11/10	1:00	0.31	20.1	73.1	32.0	91.1	8.7	45.6	
2022/11/10	2:00	0.51	9.8	182.4	21.0	139.1	6.3	269.2	
2022/11/10	3:00	0.46	36.1	221.5	40.0	211.8	17.1	250.1	
2022/11/10	4:00	0.13	43.6	229.2	47.4	242.8	29.6	272.9	
2022/11/10	5:00	-0.42	56.2	241.8	64.1	252.8	23.7	297.7	
2022/11/10	6:00	-1.04	60.5	254.5	47.6	263.9	14.1	320.4	
2022/11/10	7:00	-1.56	34.5	270.1	21.9	288.9	5.2	266.8	
2022/11/10	8:00	-1.8	21.8	325.5	29.6	12.7	10.5	5.9	
2022/11/10	9:00	-1.69	34.9	25.2	53.0	44.7	27.3	50.0	
2022/11/10	10:00	-1.29	59.8	46.7	68.4	52.2	39.1	81.6	

图 2.6-10 海流文件模板

③ Upload Project shp: When hovering the mouse over the 【Upload Project shp】 button, a 【Download Template】 button will appear below it. Click the 【Upload Project shp】 button to open the upload interface, where you can submit compressed project files. Alternatively, click the 【Download Template】 button to download the file template.

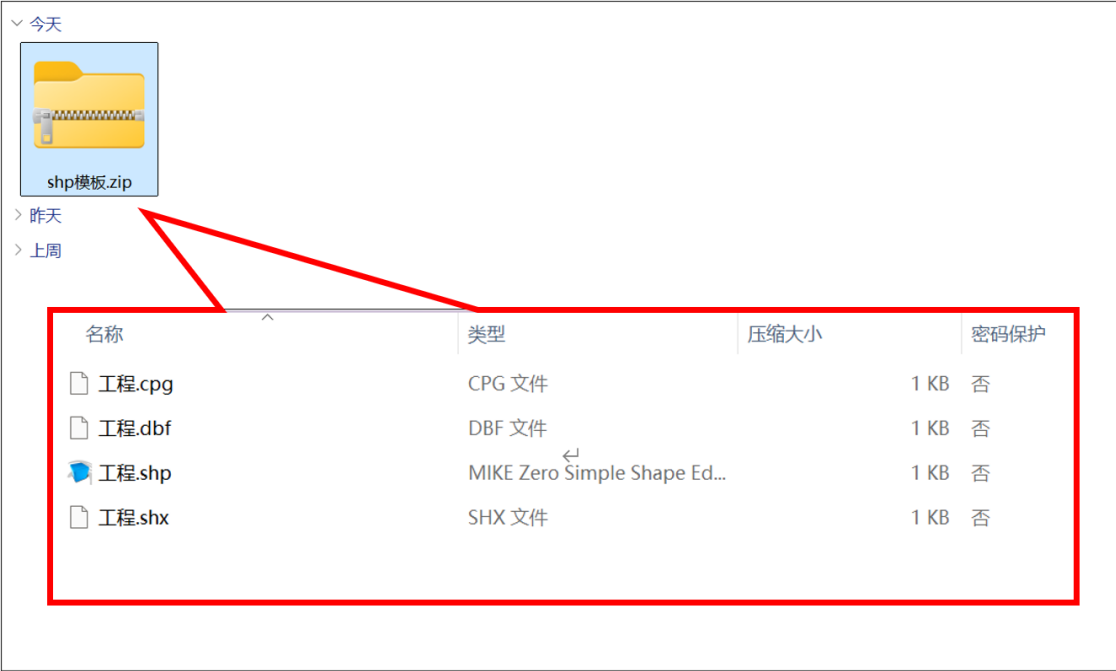


图 2.6-11 工程 shp 文件模板压缩包及内含文件

④ Upload Labels: When hovering the mouse over the 【Upload Labels】 button, a 【Download Template】 button will appear below it. Click the 【Upload Labels】 button to open the upload interface, where you can upload various point location data to the map. Only txt format files can be uploaded.

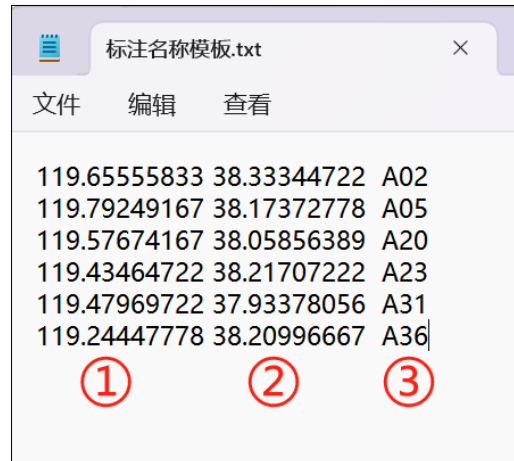


图 2.6-12 标注名称模板示例。①为经度栏，②为纬度栏，③为点位标注名称栏。栏之间用一个空格隔开

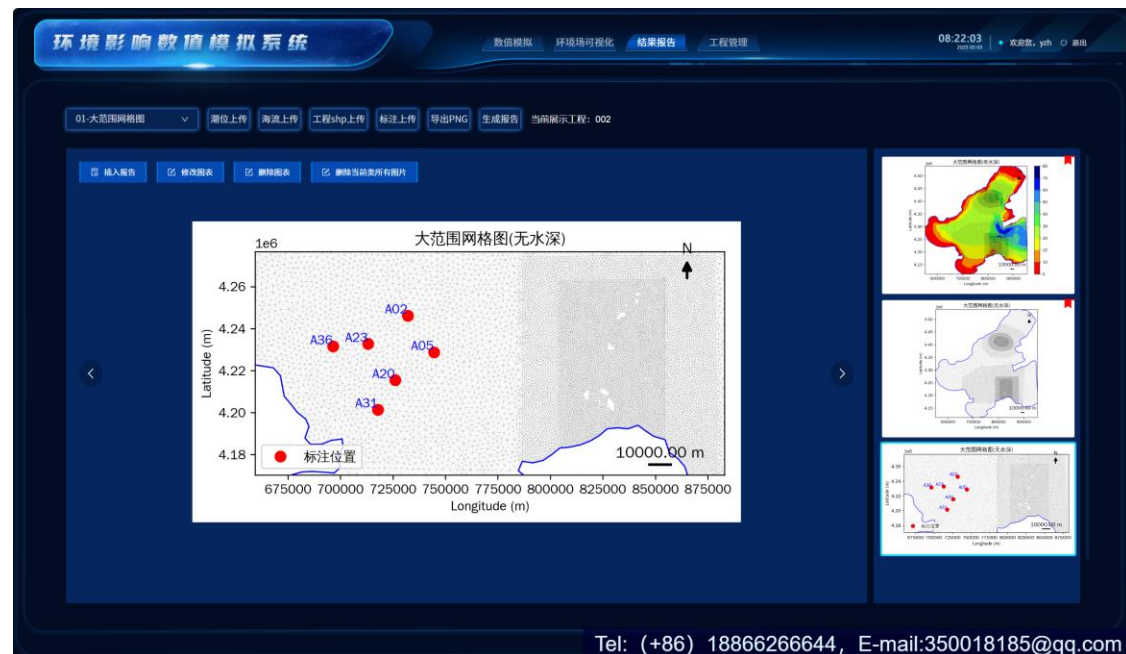


图 2.6-13 导入模板点位示例

2.6.1.2 Edit maps

This section allows modifying chart information based on the original image, including adjusting the display range, uploading label points, modifying

mesh line width, etc.



图 2. 6-14 图表修改面板。所示范围为自定义输入，所示点位为【标注上传】部分所下载的模板点位。

① Click the 【Upload】 button to submit chart data files in CSV format, the corresponding parameters in the chart editing panel will update automatically. Alternatively, click the 【Download Template】 button to obtain a reference template.

A	B	C	D	E	F	G	H	I	J	K	L
三角网线宽	岸线线宽	经度最小值	经度最大值	纬度最小值	纬度最大值	图片像素	名称	标注颜色	标注大小	标注点颜色	标注点大小
0.01	1	751815.73	766732.21	4313329.43	4333807.97	600	大范围网格图(有水深)				

图 2. 6-15 图表信息模板内容示例

- ② Enter the target area range here. Must use **UTM** coordinates with units in meters.
- ③ To control the display of project labels, you must first upload an label points file (see Section 2.6.1.1). Once labels are enabled, you can modify the label text as well as the color and size of the points.

After adjusting all parameters and options, click the 【Confirm】 button to generate a new chart (the original chart will not be overwritten). The newly created chart will automatically pin to the top of the right-hand thumbnail panel.

2.6.1.3 Export

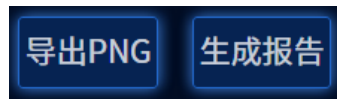


图 2. 6-16 导出选项按钮条，包含导出 PNG 和生成报告

① **【Export PNG】**： Left-click this button to export the currently displayed single image in PNG format.

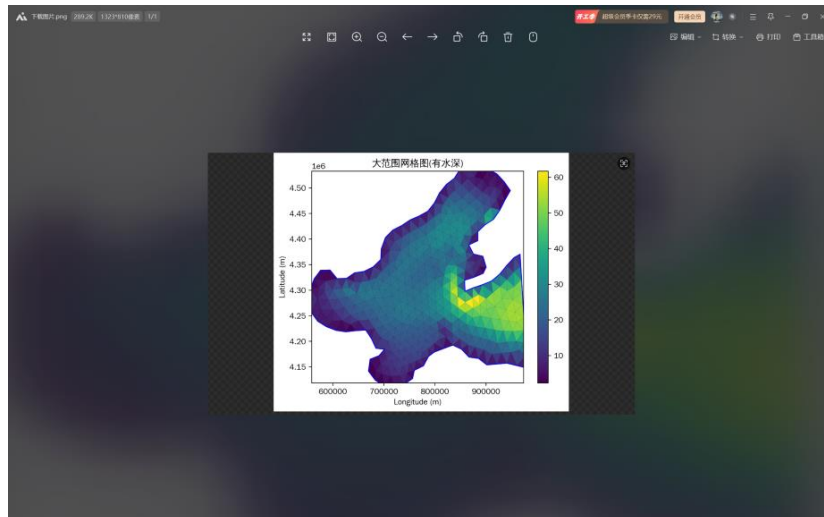


图 2. 6-17 导出的“01-大范围网格图（有水深）” PNG 示意图

② **【Generate report】**： Select the thematic maps to include in the report file.
By default, all maps are selected.

① Selected images will display a “” mark in the top-right corner, while unselected images (without this mark) will not appear in the report file.

② For images you wish to exclude from the report file, left-click the **【Deselect】** button.

③ The checkmark in the top-right corner of the image will disappear, and the **【Deselect】** button will change to **【Insert into Report】**. Click this button to reinclude the image in the report.

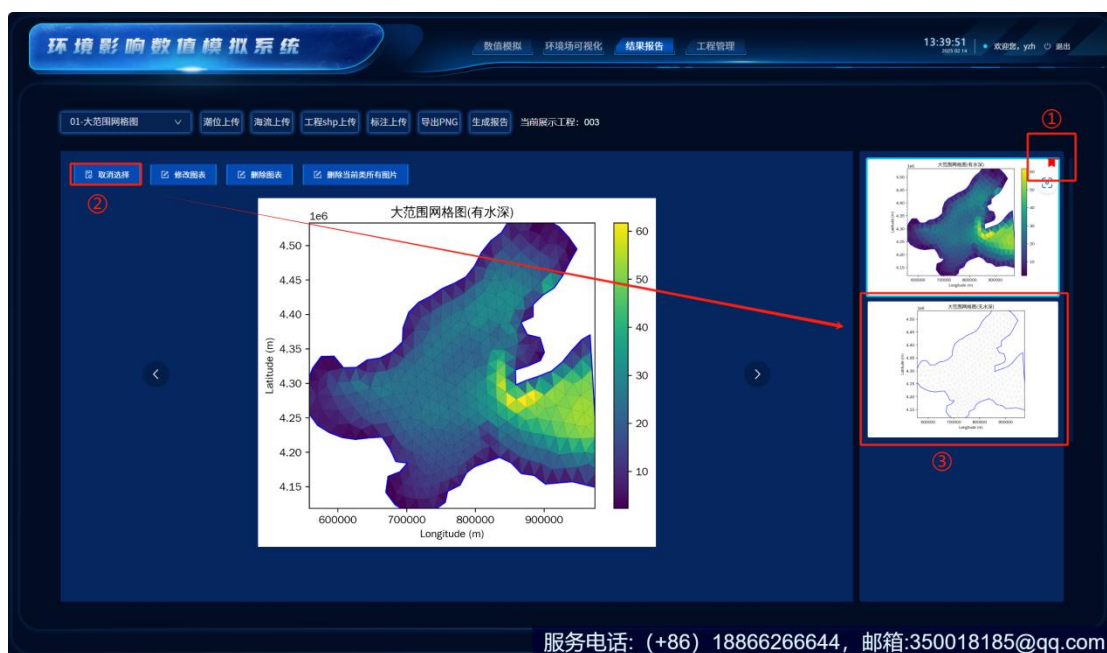


图 2.6-18 取消图片标记选项，取消后该图片将不会出现在生成的报告中

After completing thematic map selection, left-click the **【Generate Report】** button to automatically create and download the project results report in Word format, which can be further edited as needed. Partial report content is shown in the figure below:

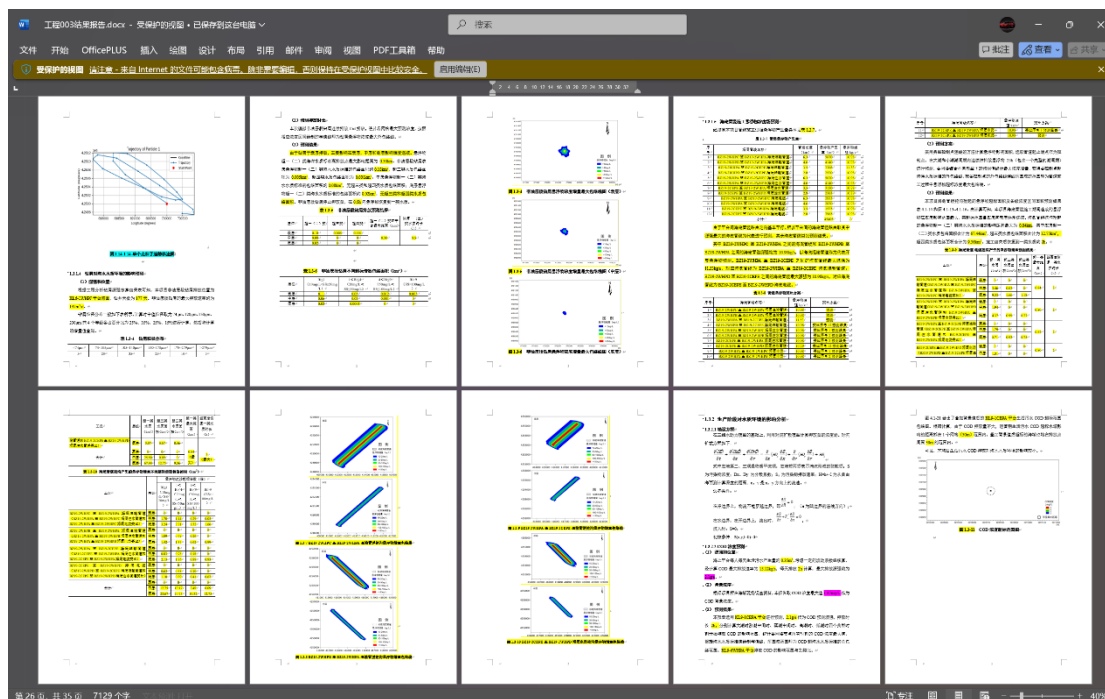


图 2.6-19 生成的模拟结果报告示例

The yellow, blue, and purple highlighted sections display data automatically filled from the simulation results.

2.7 Environmental Field Visualization

After completing the simulation, click the **【Visualization】** button located at the top of the homepage or in the left function panel.



图 2.7-1 **【环境场可视化】**按钮位置示意图

Enter the environmental field map page, the **【Currents】** and **【Pollutants】** options will appear on the right side. The **【Switch Map】** button has been relocated to the lower-right corner.



图 2.7-2 环境场可视化界面概览

2.7.1 Current visualization



图 2. 7-3 海流可视化相关功能，可按时间步查看海流，以及点击查看具体点位的海流参数

- ① Left-click the [Currents] option in the right element panel to display the timeline at the bottom of the page.
- ② Click any time step node on the axis to view the current direction within the grid at that moment.
- ③ Below the timeline are three buttons: **【Previous Step】** , **【Auto-Play】** and **【Next Step】** .
- ④ The white bands moving across the mesh range represent both the direction and speed of currents, the faster their motion, the higher the local current velocity. To check precise values, simply left-click any mesh location to display its current velocity (in m/s) and direction.

2.7.2 Pollutant visualization



图 2. 7-4 污染物可视化相关功能，可按时间步查看污染物扩散情况

Left-click the **【Pollutant】** option in the right-hand panel, a timeline will appear at the bottom of the page. Clicking any time step node on the axis allows viewing the pollutant dispersion range within the mesh at that specific moment. The timeline and button operations are identical to those described in the **【Current Visualization】** section.