The Fourth International Workshop
on GIS Technology and Application

GIS Technology for Land Use Evaluation

Mengyi Zhang

SuperMap Software Co., Ltd.

CONTENTS

PART 1 Case Introduction

PART 2 Evaluation Framework

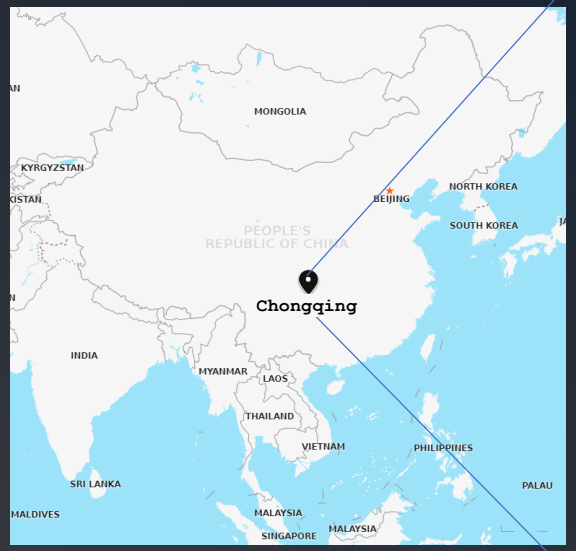
PART 3 Application

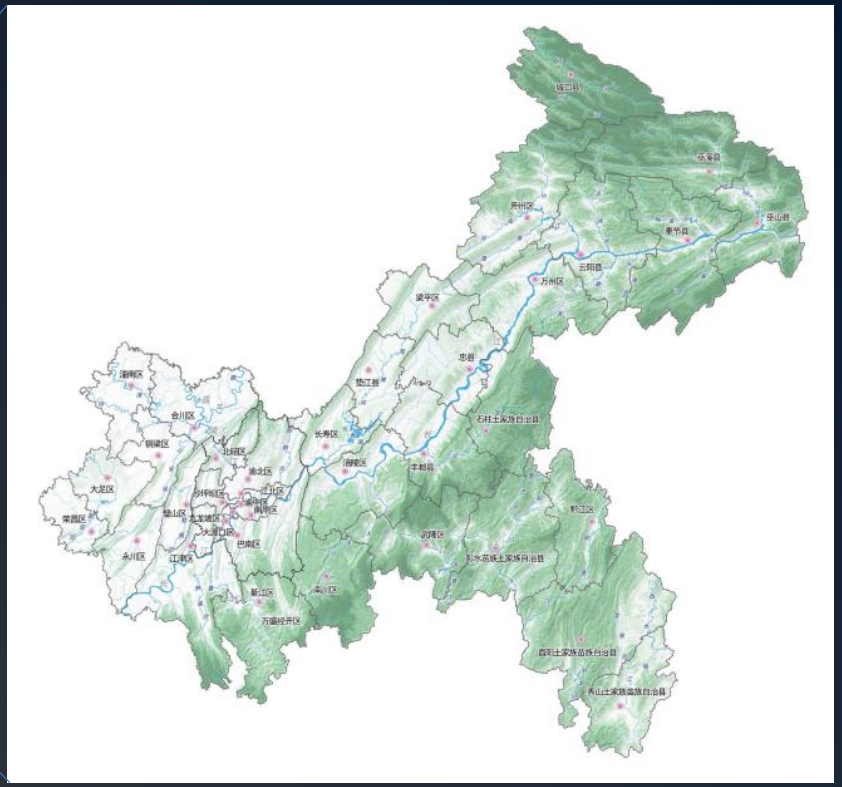
PART 4 GeoProcessing Automation

PART 1
Case Introduction

PART 1 Case Introduction

Study Area





- Chongqing is an economically important municipality in West China and is the biggest inland municipality of the country with plans for even more massive growth.

Problems in Land Use

- Poor quality of agricultural land
- Decrease in agricultural area
- Unbalanced expansion of urban land

PART 1 Case Introduction

Aims for Agricultural Land Use Evaluation

Protect Agricultural Land

Planning Based on Suitability

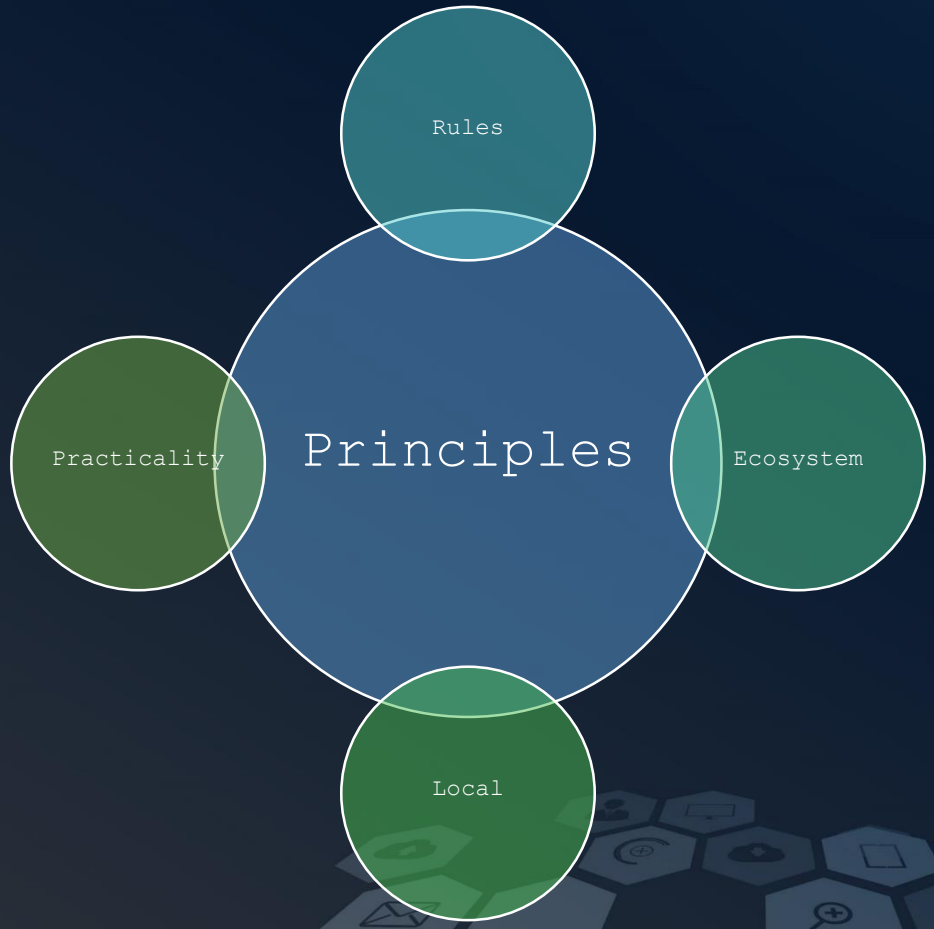
Sustainable Development

PART 2
Evaluation Framework

PART 2 Evaluation Framework

Two-criteria Land Use Evaluation

- According to *Evaluation Guide on Environmental Resource Capability and Spatial Planning Suitability*, land evaluation at town and larger scale will based on a two-criteria system considering resource capability and spatial suitability equivalently.



PART 2 Evaluation Framework

Environmental Resource Capability

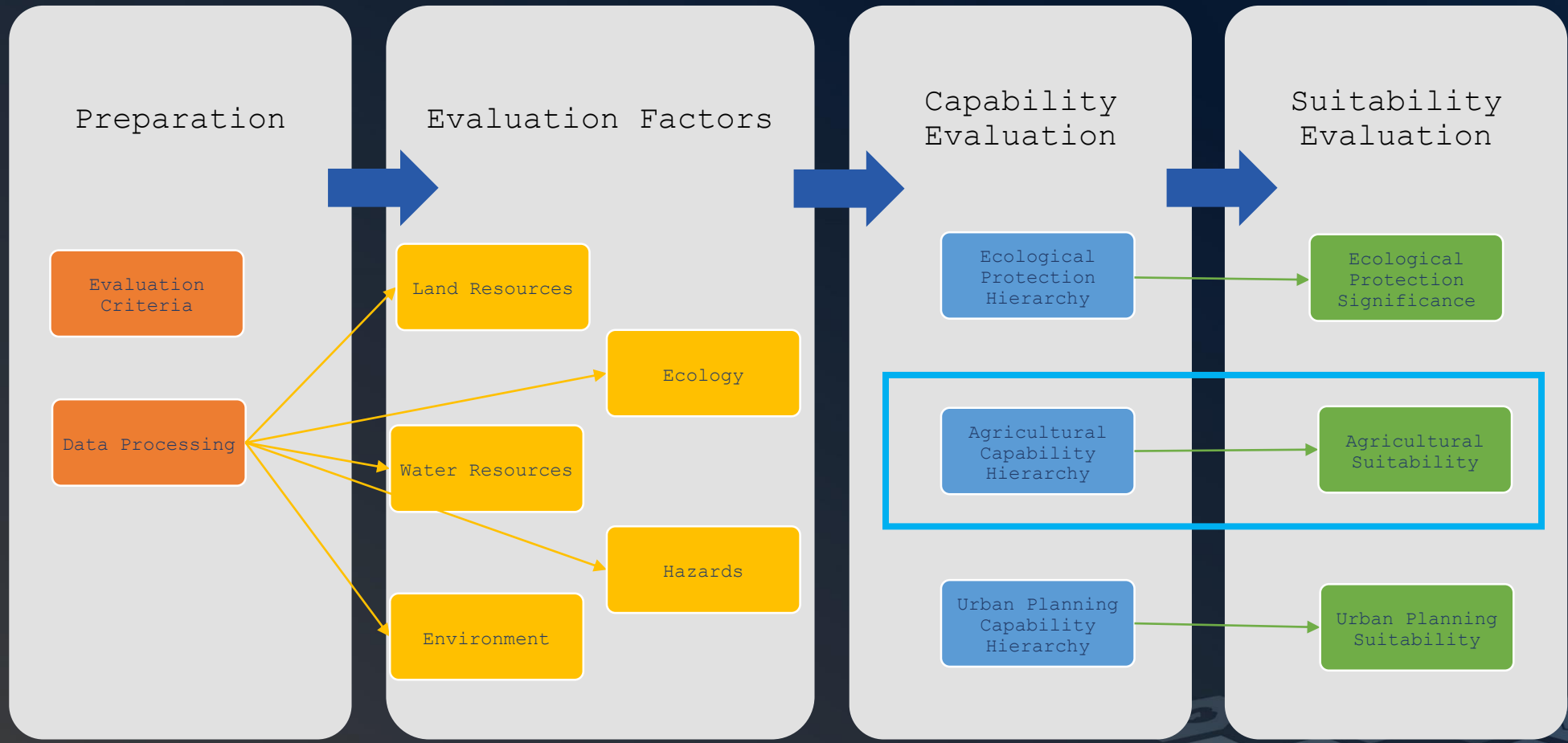
- It refers to the capability of certain land space to support human activities, based on its natural, environmental and ecological resources comprehensively.

Spatial Planning Suitability

- It is the suitability of certain land space for varied land use types, including ecosystem protection, agriculture and urban planning.

PART 2 Evaluation Framework

Evaluation Framework



PART 2 Evaluation Framework

Evaluation Factors

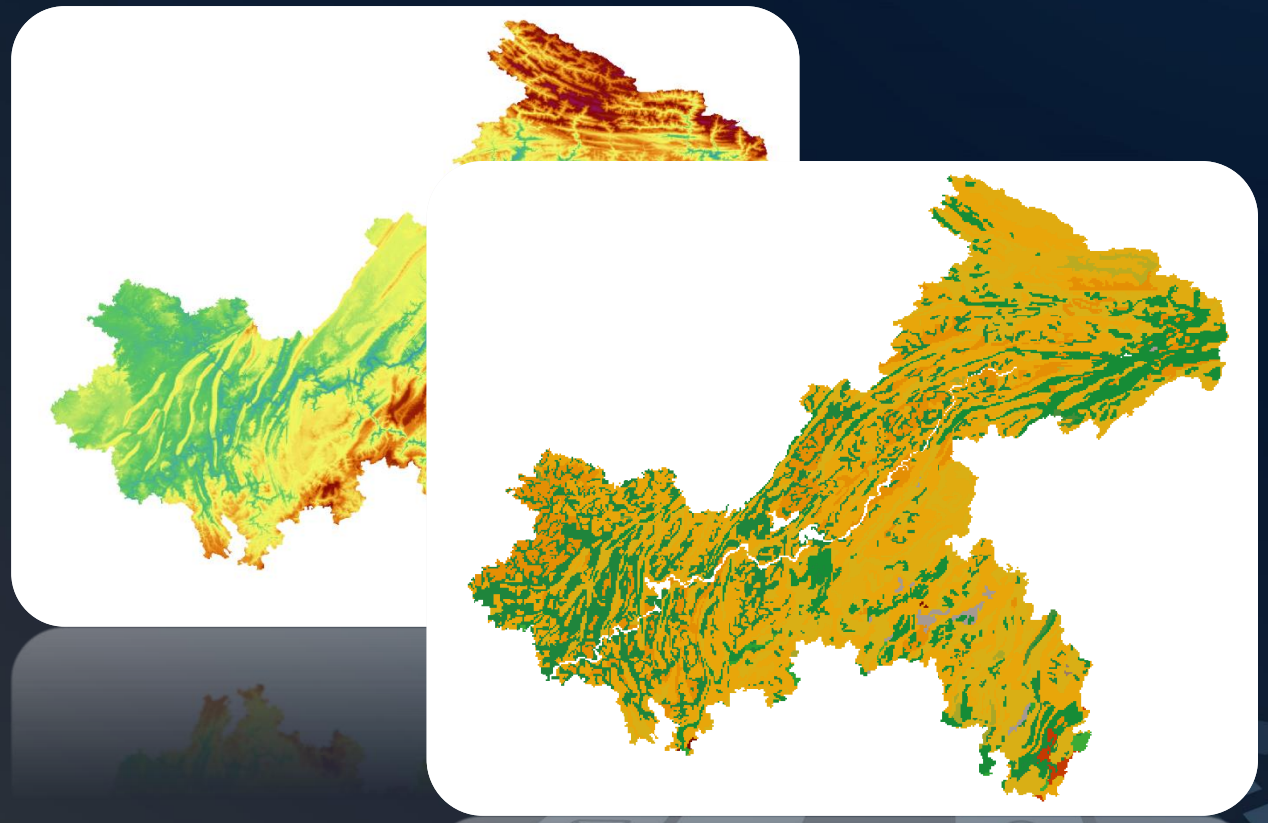
Land Use Type	Land Resources	Water Resources	Ocean Resources	Environment	Ecosystem	Hazards
Natural Reserve					Water Quality Biodiversity Erosion	
Agriculture	Slope Height Soil Composition	Precipitation Amount of Water	Productivity	Temperature Energy Soil Capability	Salinization	Drought Flood Wildfire
Urban Planning	Slope Height Terrain	Precipitation Amount of Water	Coastal Line Depth Wind Speed Flow Velocity	Air Quality Water Capability		Earthquake Landslide Tsunami

PART 3
Application

PART 3 Application

Data

- LandUseEvaluation
  - DEM
  - SoilSand



Evaluation Criteria

- Agricultural land resource evaluation is based on the value of slope

Slope (degree)	<3	3-8	8-15	15-25	>=25
Hierarchy	1	2	3	4	5

- Hierarchy of the region will be degraded based on the height and percentage of sand in soil

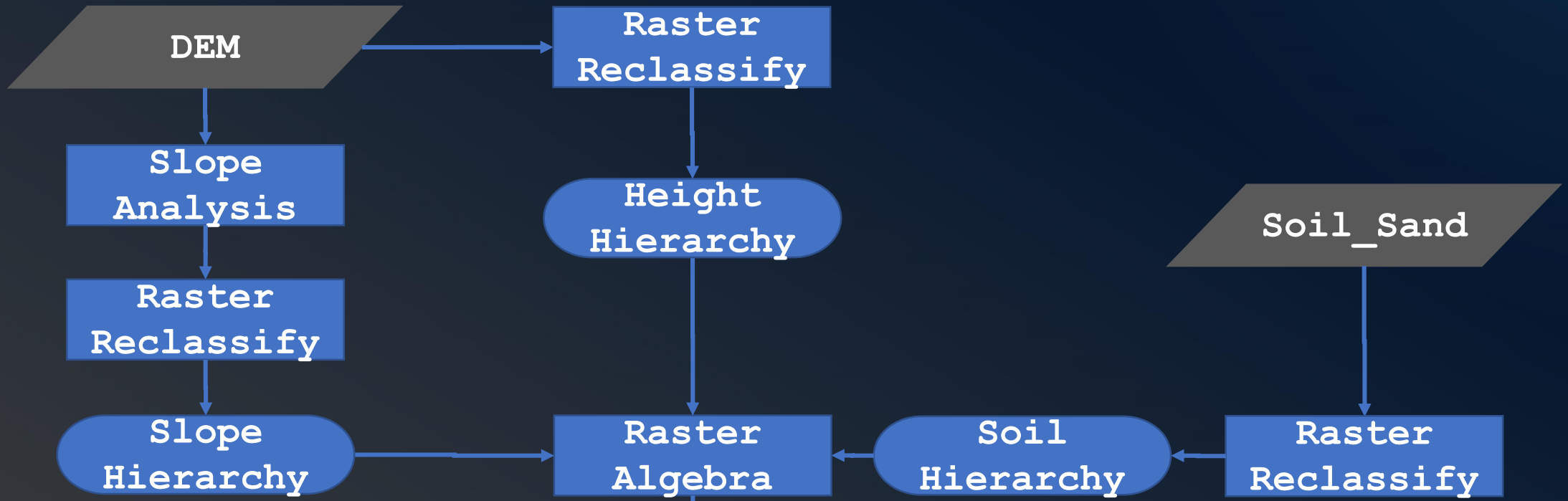
Height(m)	<2000	2000-3000	3000-4900	>=4900
Hierarchy	0	+1	+2	+5

% Sand	<45	>=45	>=60
Hierarchy	0	+1	+2

- Hierarchy larger than 5 should be regarded as 5, 1 is the highest hierarchy in evaluation

PART 3 Application

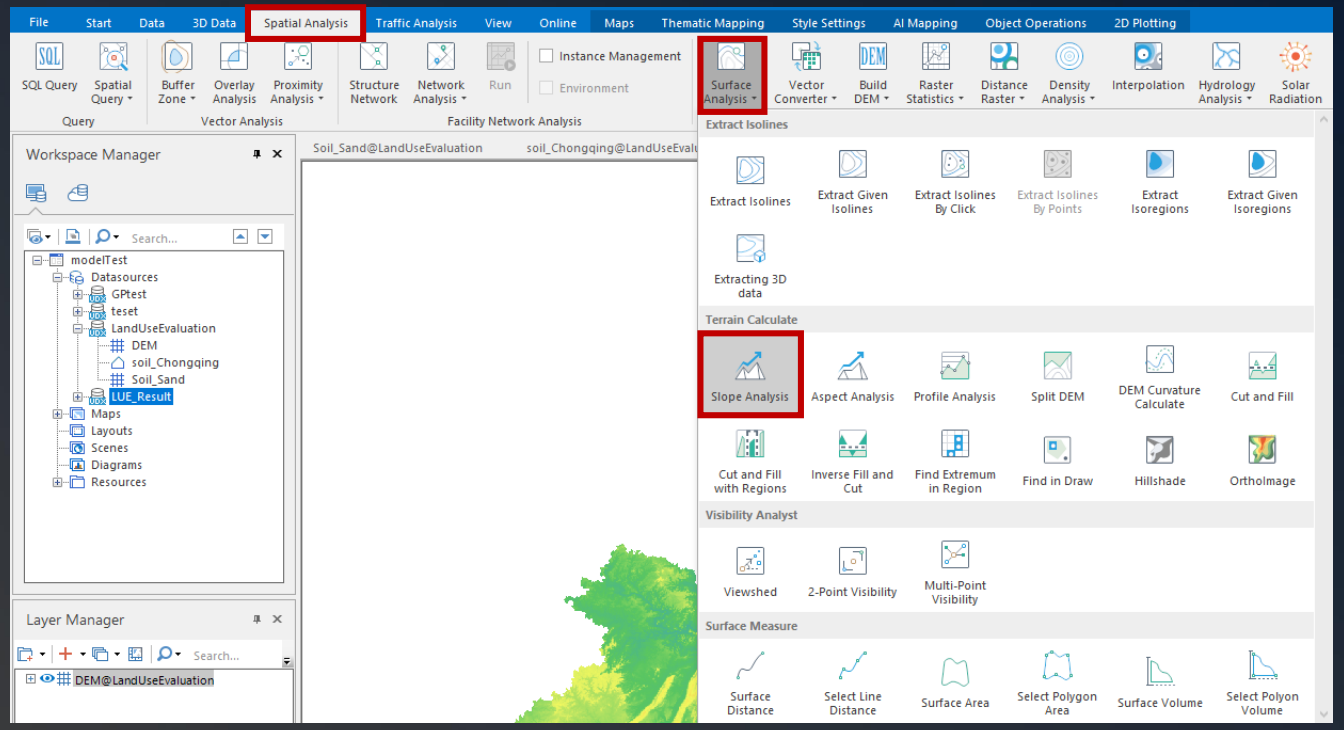
Workflow

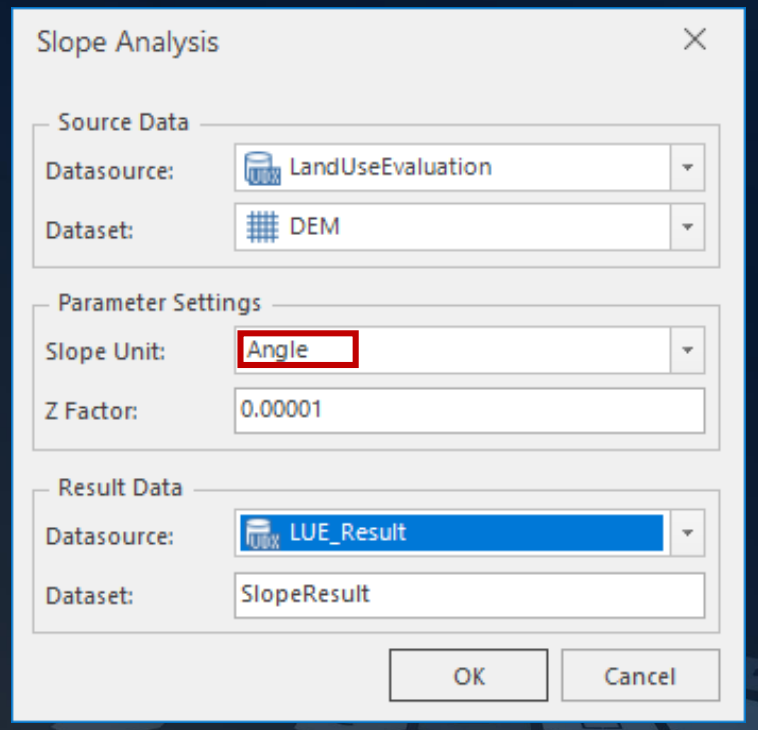


PART 3 Evaluation Case

Slope Analysis

- Spatial Analysis -> Raster Analysis -> Surface Analysis -> Slope Analysis

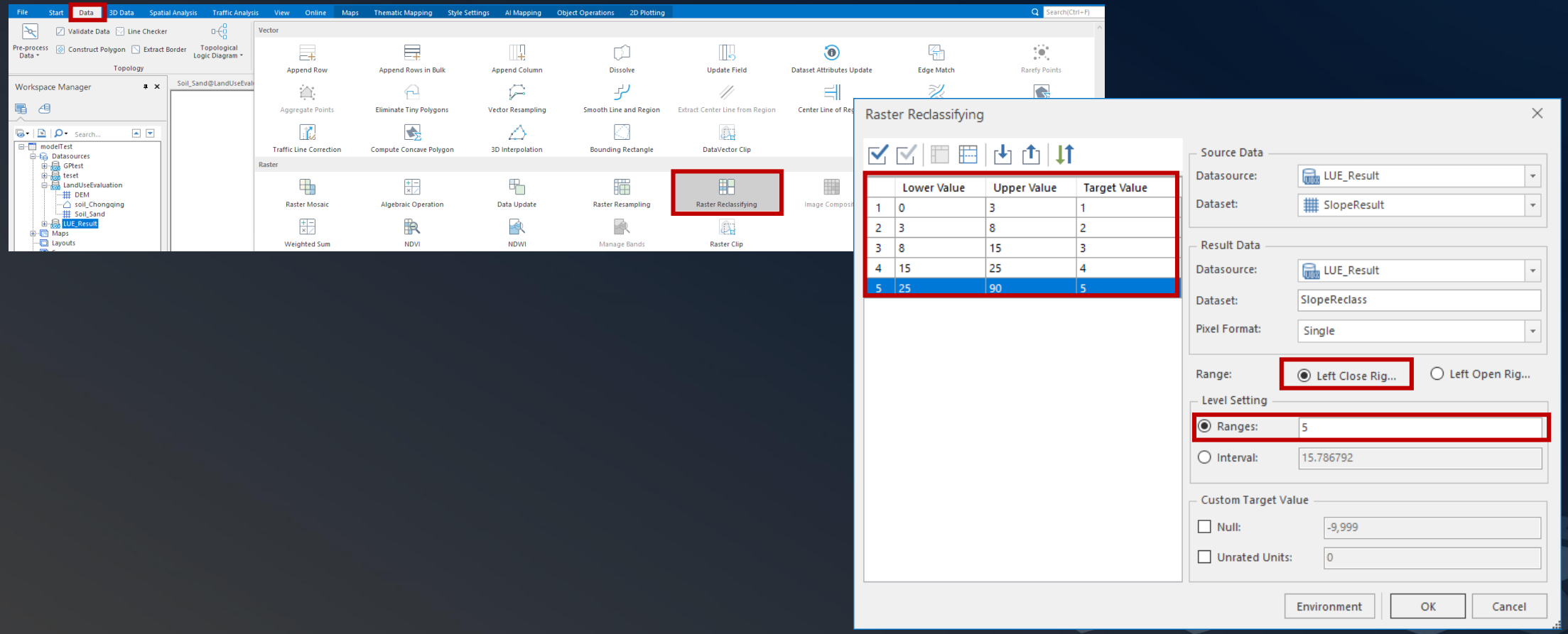




PART 3 Evaluation Case

Slope Raster Reclassify

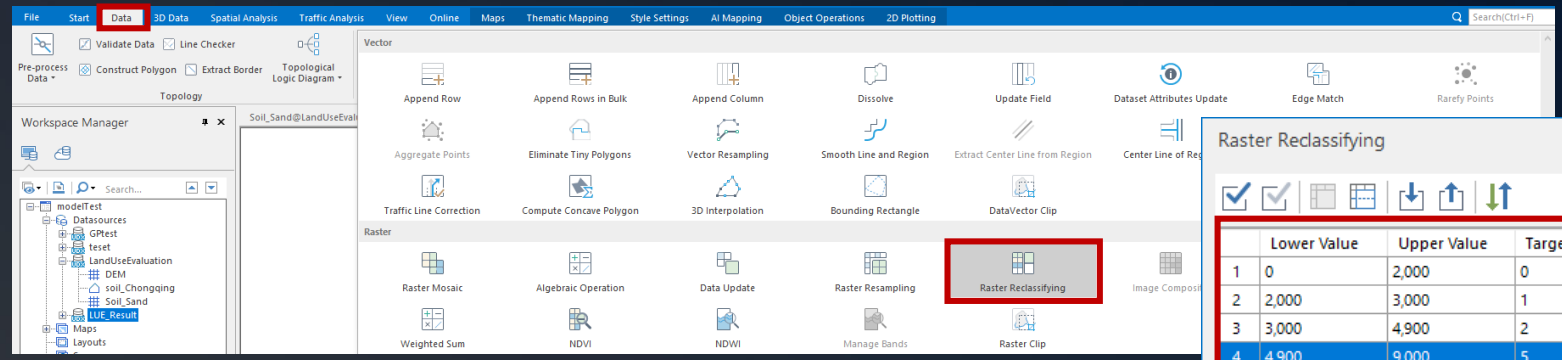
- Data -> Data Processing -> Raster Reclassify

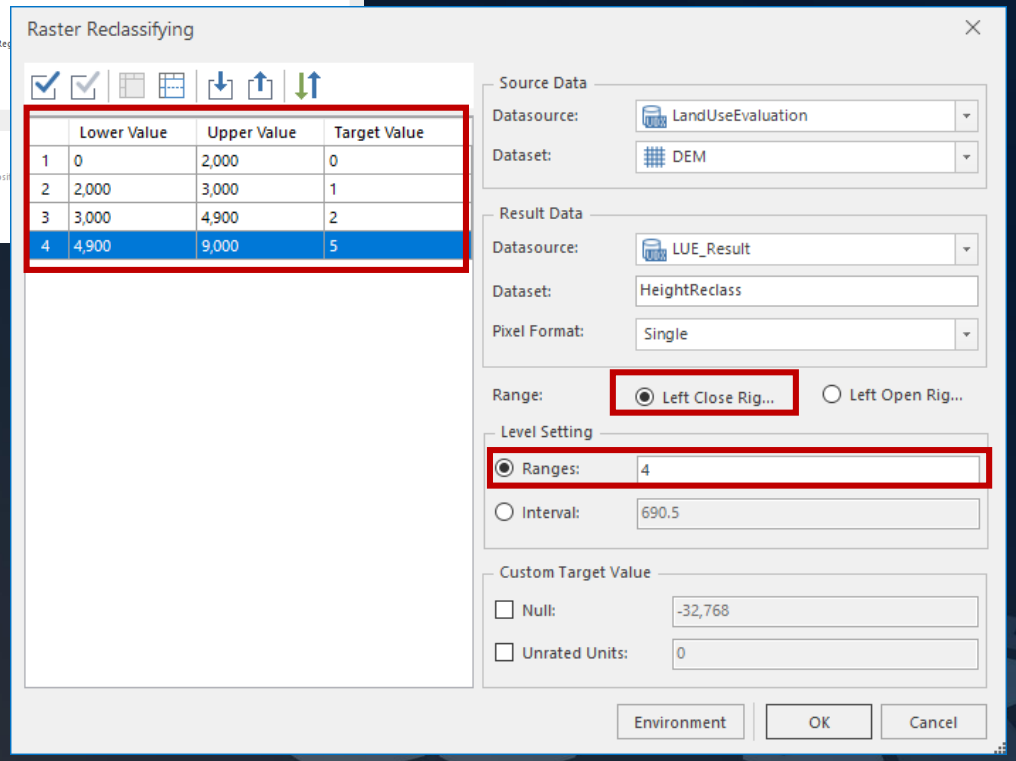


PART 3 Evaluation Case

Height Raster Reclassify

- Data -> Data Processing -> Raster Reclassify

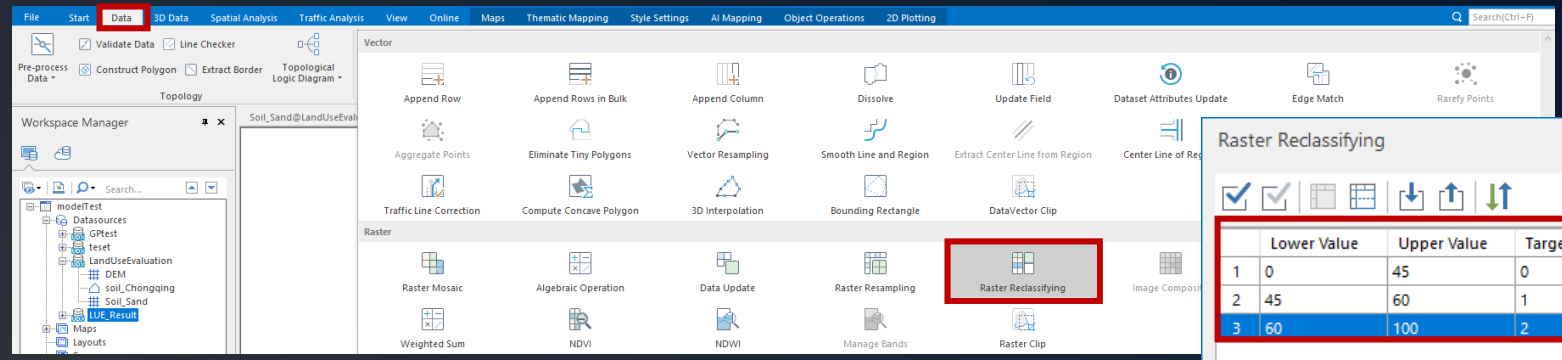


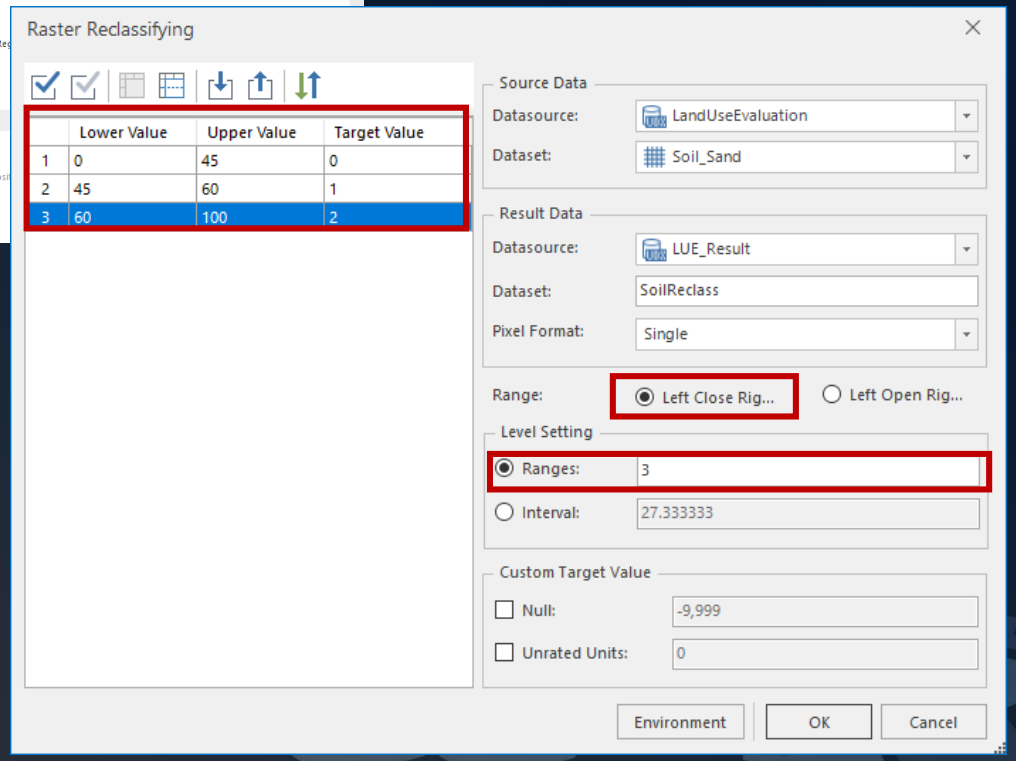


PART 3 Evaluation Case

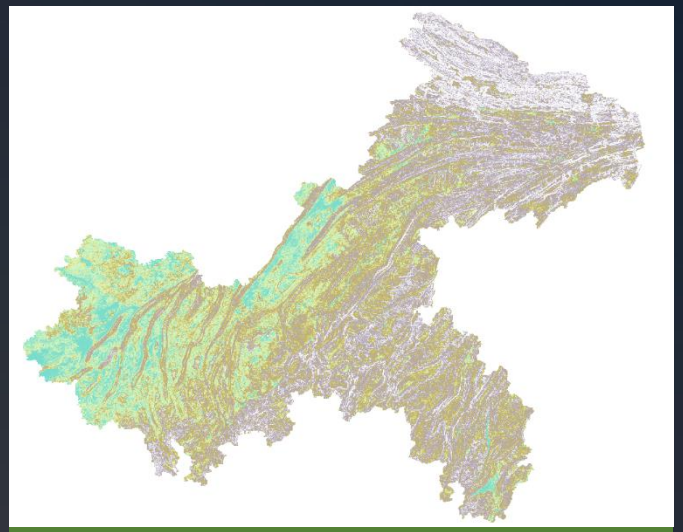
Soil Raster Reclassify

- Data -> Data Processing -> Raster Reclassify

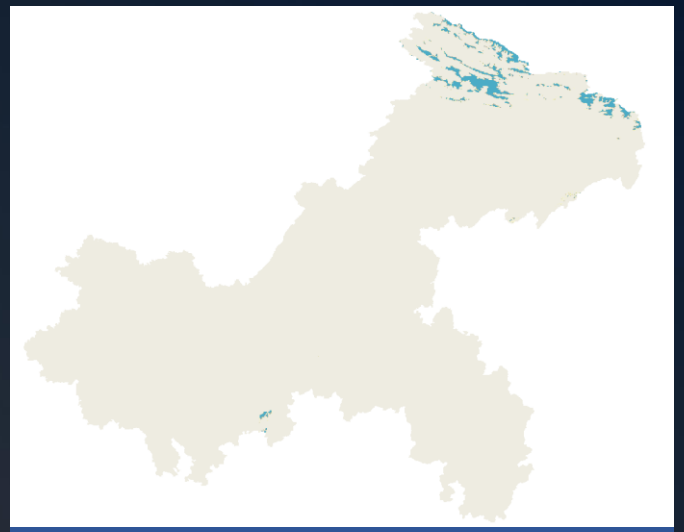




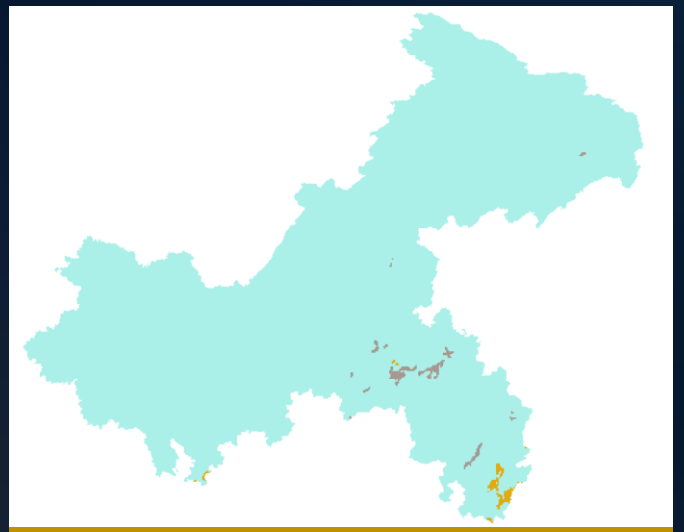
Factor Calculation Results



Slope Hierarchy



Height Hierarchy

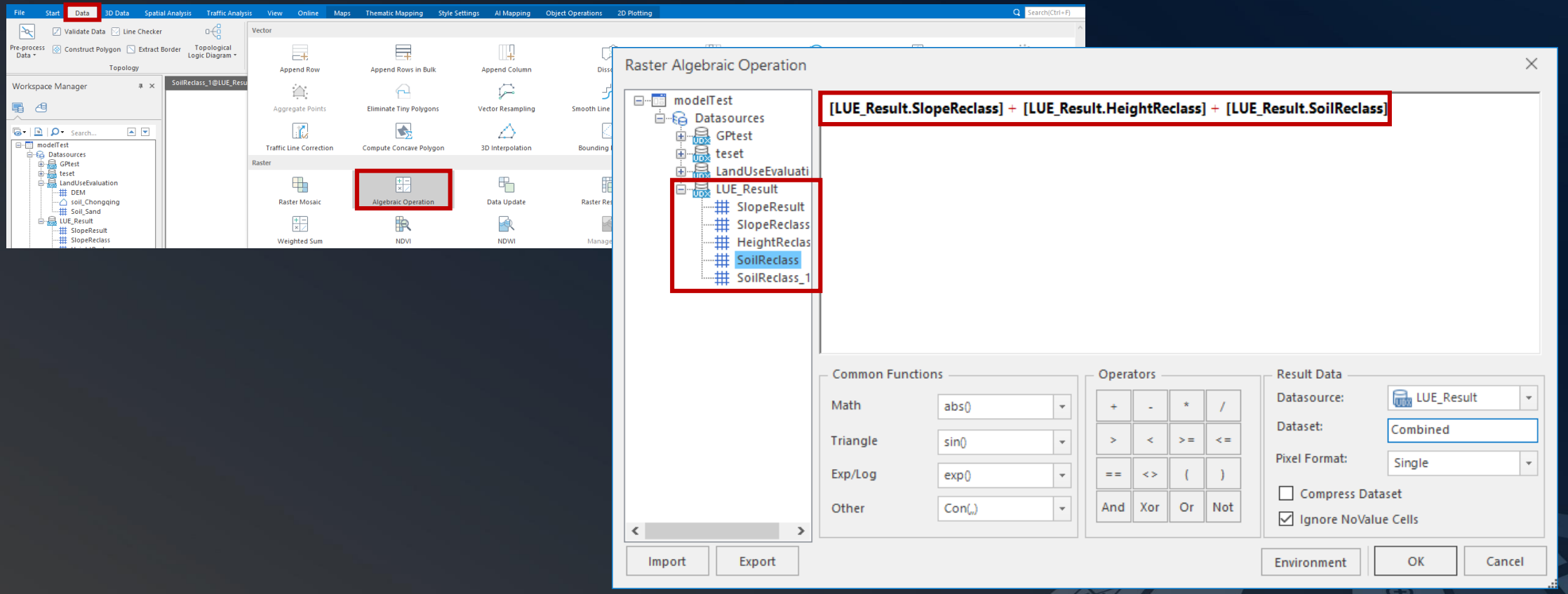


Soil Hierarchy

PART 3 Evaluation Case

Combine Factors

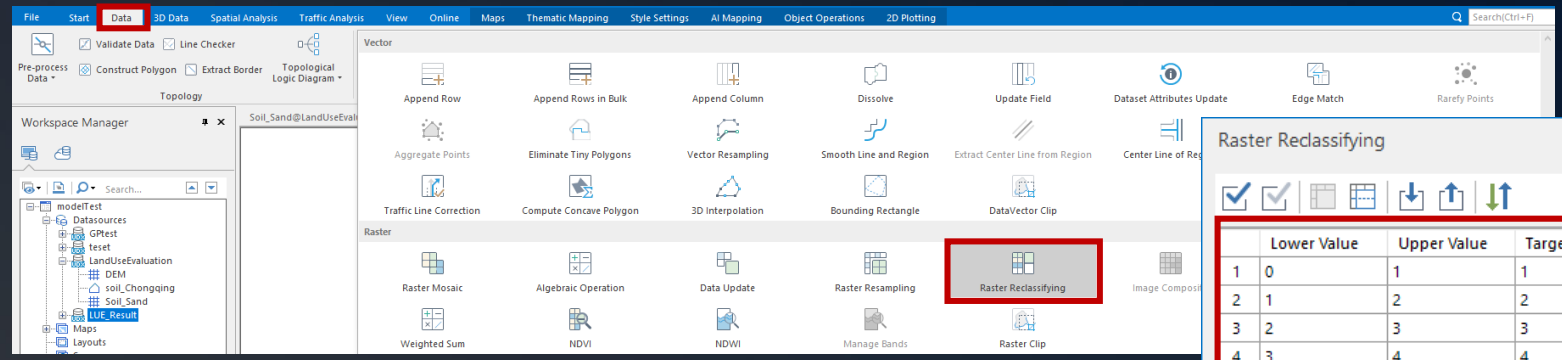
- Data -> Data Processing -> Algebraic Operation

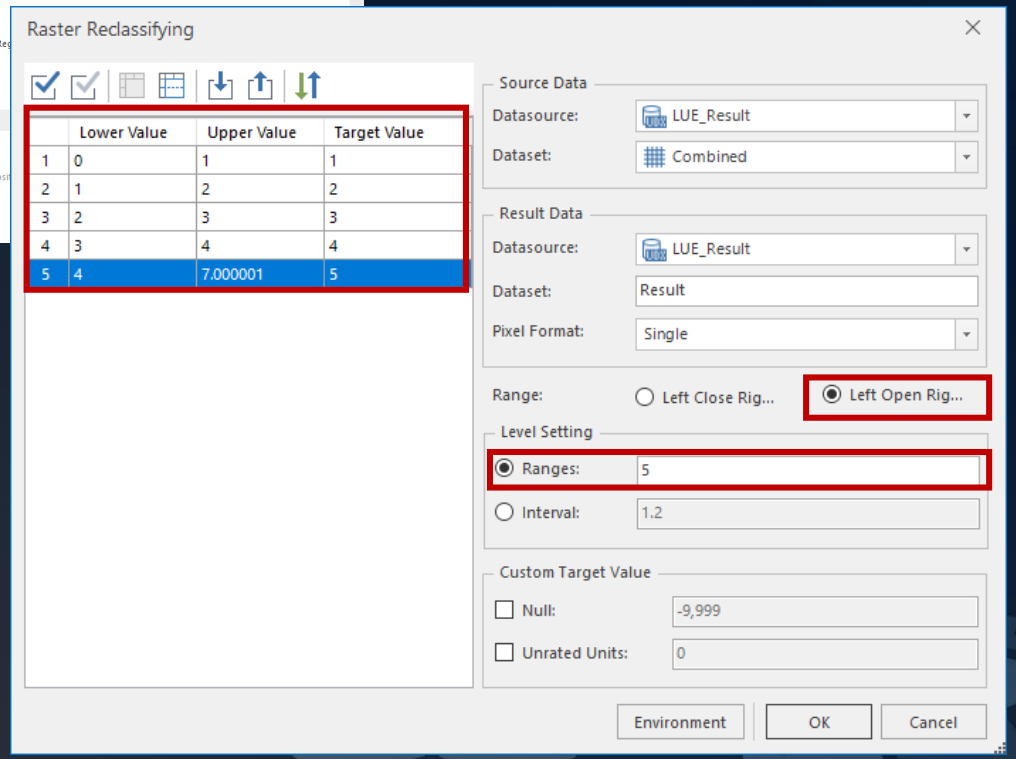


PART 3 Evaluation Case

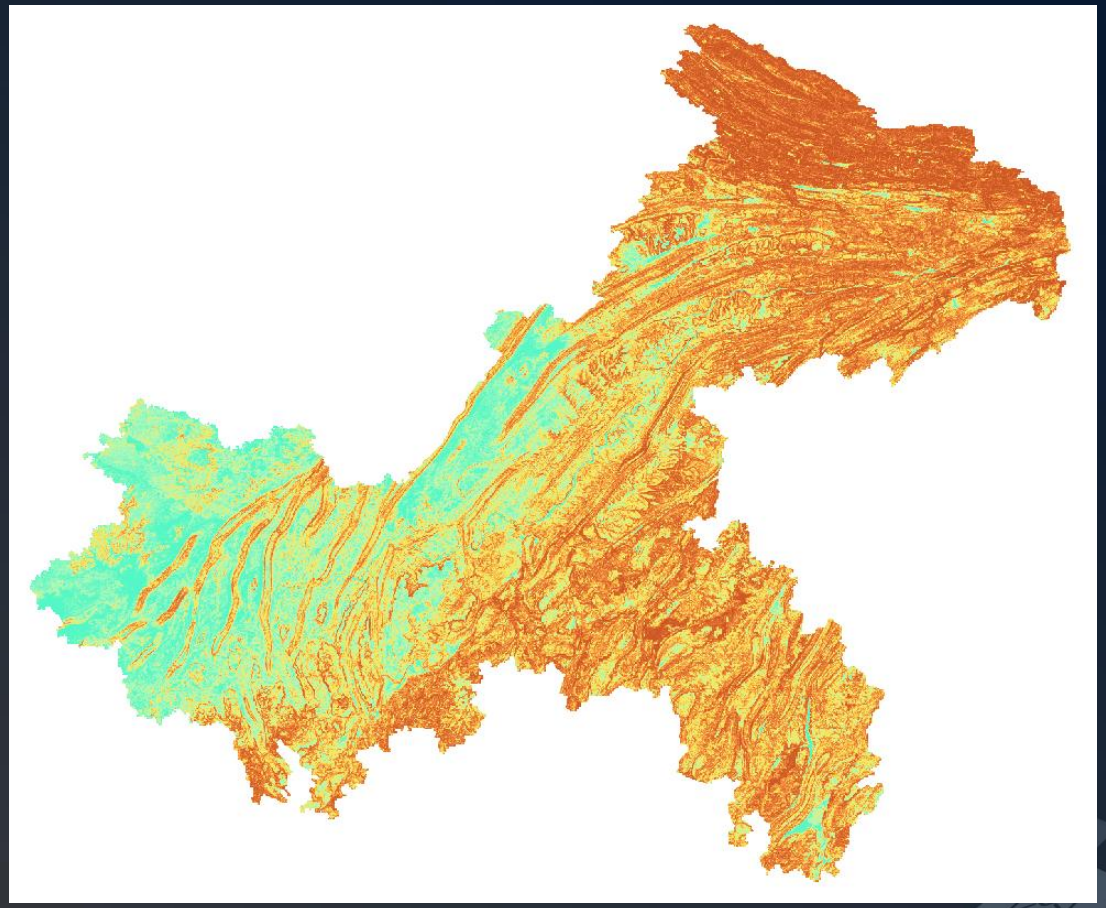
Hierarchy Reclassify

- Data -> Data Processing -> Raster Reclassify





Agricultural Land Resources Evaluation Result

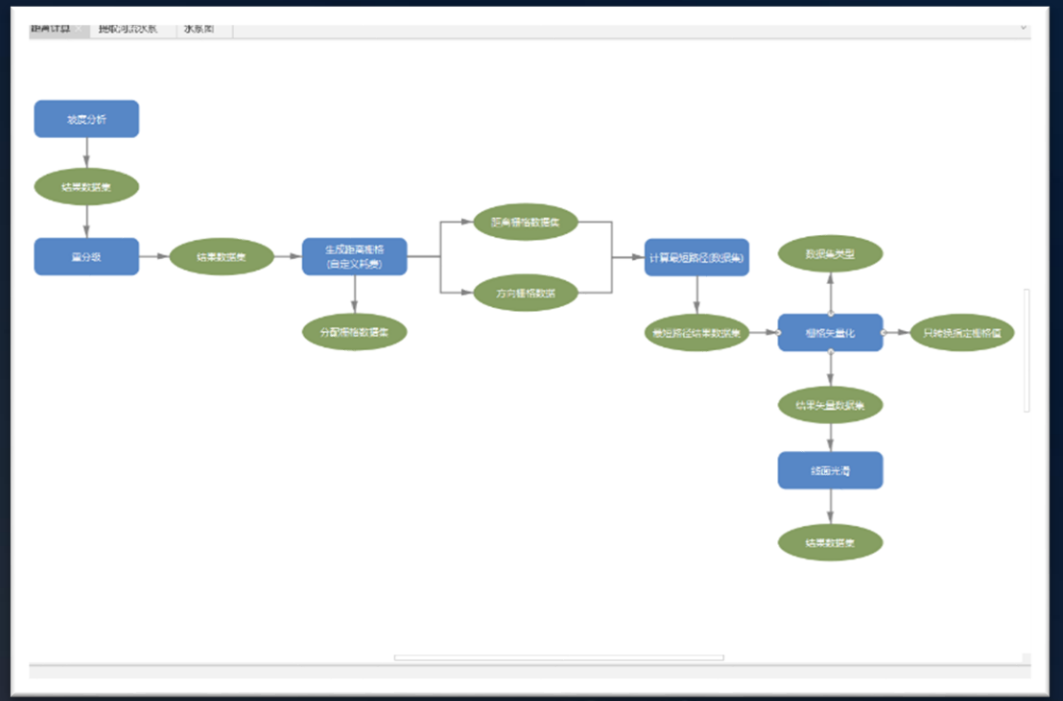


PART 4

GeoProcessing Automation

GeoProcessing Automation

- A model connects GIS processing and analysis tools based on logic, which can automatically work as the workflow designed.
- When two (or more) tools are connected in the model, the later could take the output of the former as input.



PART 4 GeoProcessing Automation

GPA Features

1. Visualization
2. Automatic Processing
3. Batch Processing
4. Reusability
5. Shareability

PART 4 GeoProcessing Automation

GPA in SuperMap Products

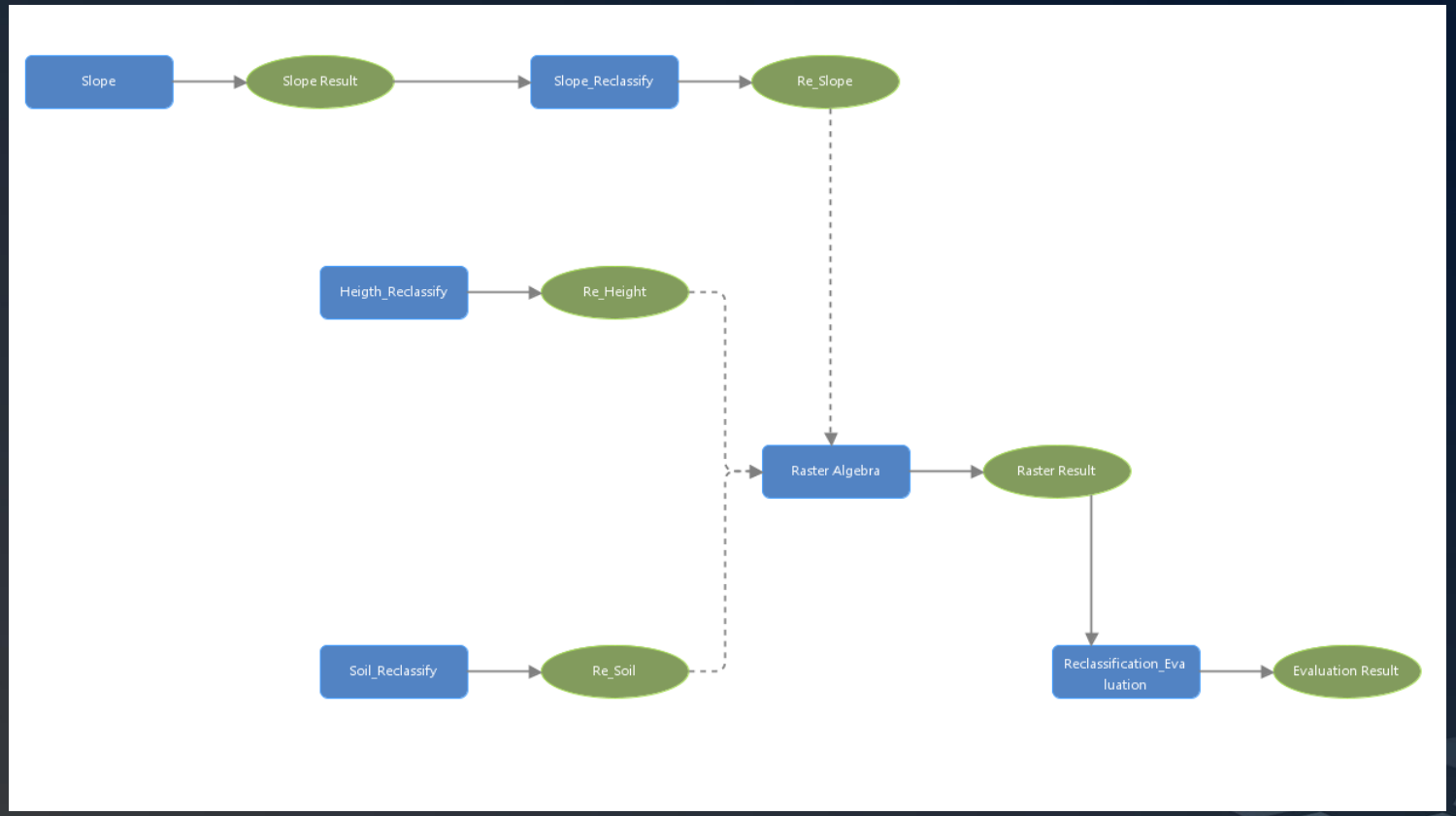
SuperMap iDesktopX

- For data scientists and researchers
- Data in local storage
- Model built and tested at local
- Analysis of relatively small-size data
- C/S, complicated processing

SuperMap iServer

- For user from varied fields
- Data in server storage
- Analysis of big data
- Model built and tested in server

GPA Model for Chongqing Case



THANK YOU