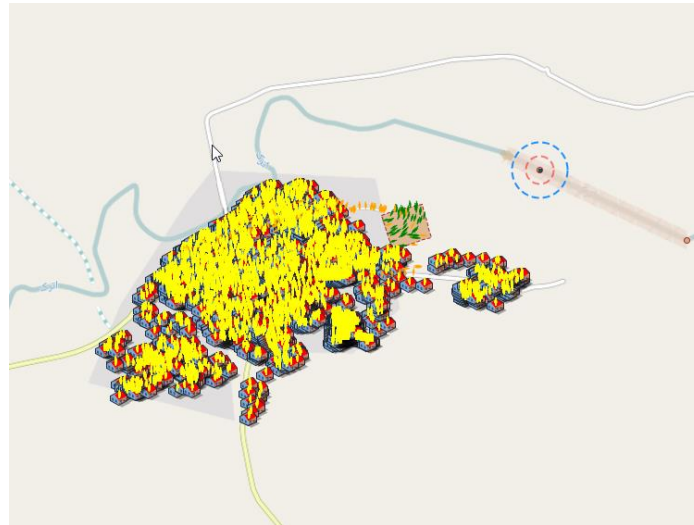


# Disaster Simulation: An AnyLogic Agent-Based Approach

**Example:**  
**Flood simulation and evacuation**  
**GIS Environment**



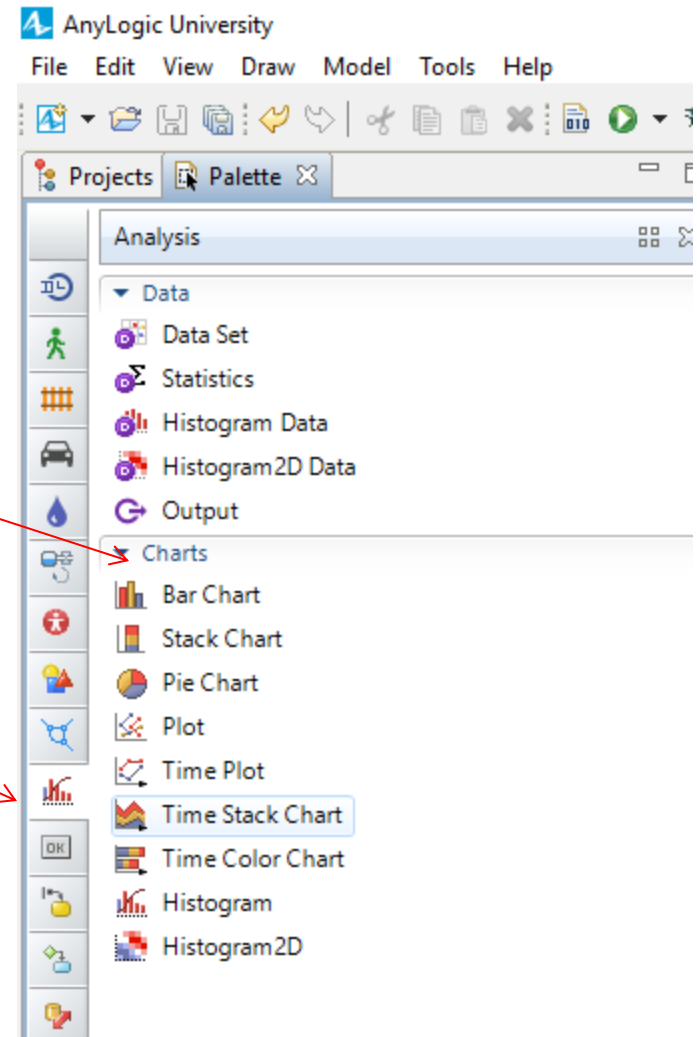
Ali Asgary  
ADERSIM  
York University  
2017

# Lesson 6: Extracting Simulation Results-Charts and Graphs- Part 1

- Creating Time Plot Chart for Person agent

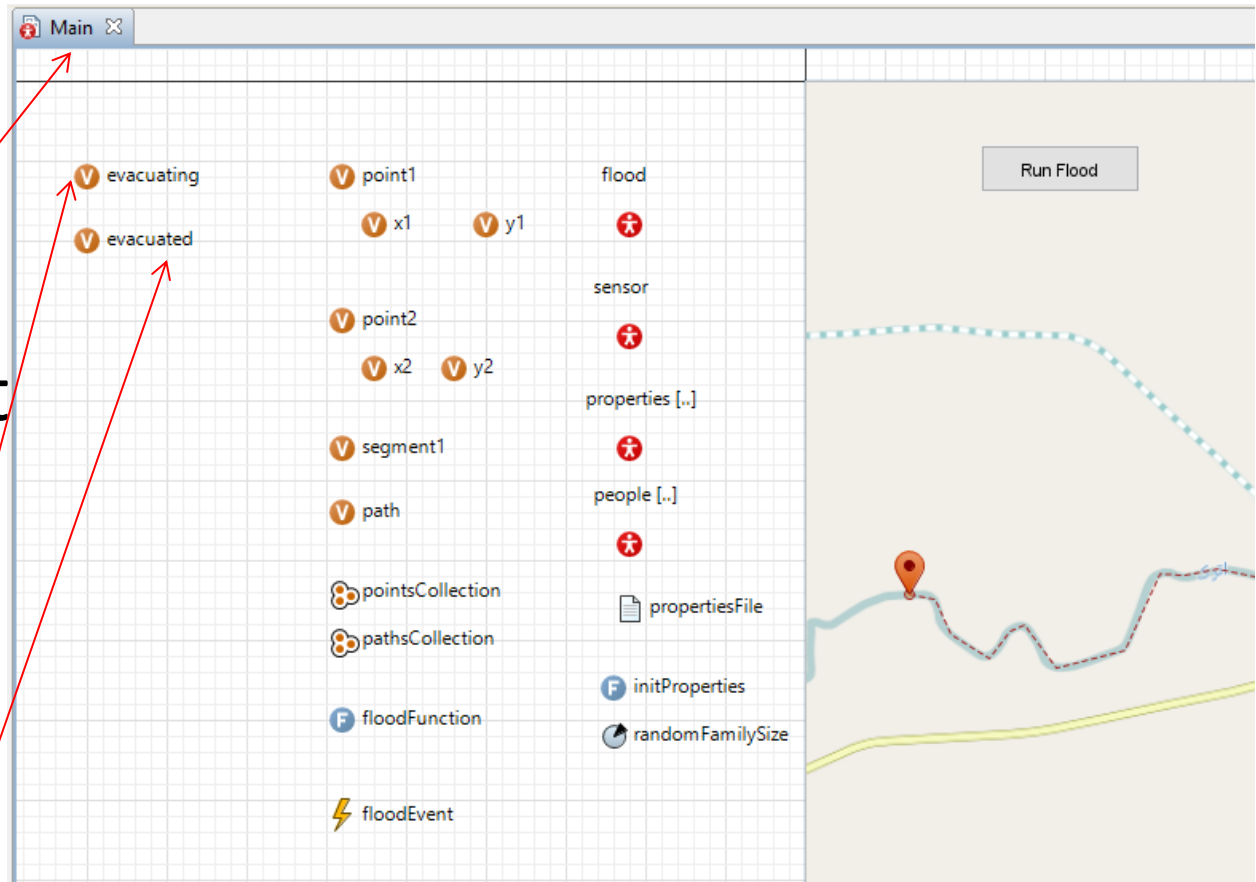
# Introducing Analysis and Chart Tools

- We want to create a graph that shows number of people in different states (normal, warning, evacuating, evacuated) at any given time.
- To do this we use Charts that exist in the Analysis tools in the Palette.
- There are various types of charts that we can use depending on our needs.
- Charts presents the values of variables that we have defined in our model.
- As our simulation runs the values of our variables may change and we can observe their changes in different graphs.
- In this lesson we will use different types of charts

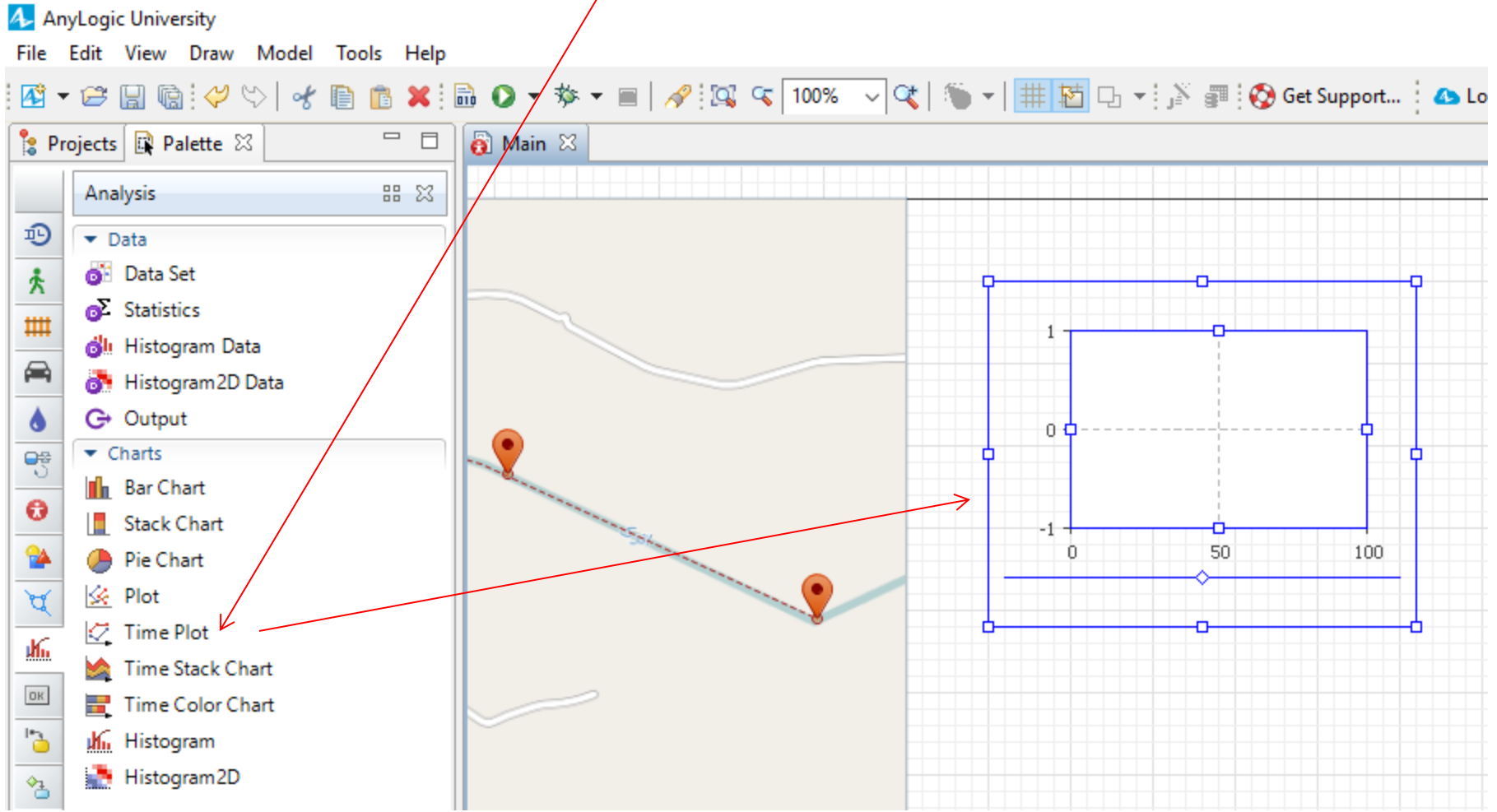


# Creating a chart for Person agent

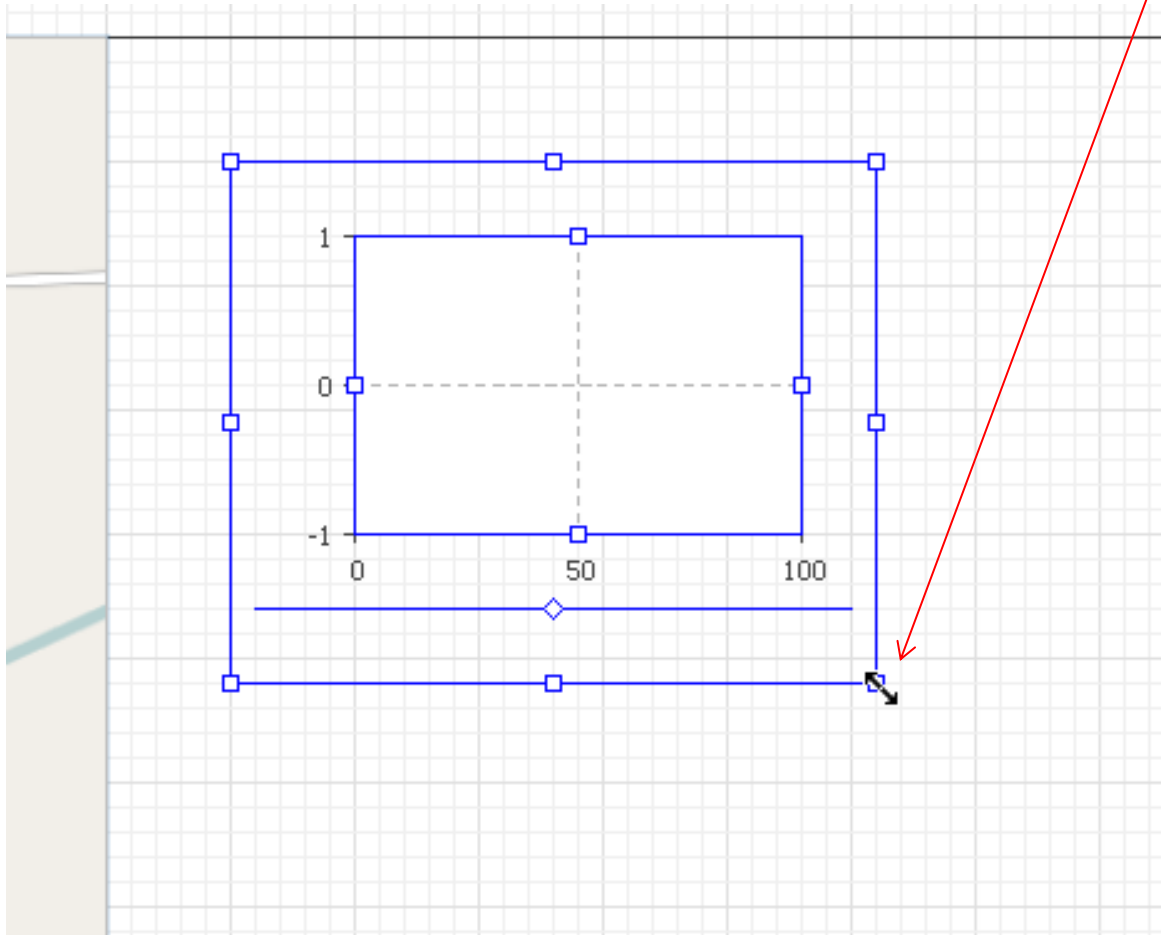
For Person agent we created two variables in the **Main** that show the number of people **evacuating** and **evacuated**.



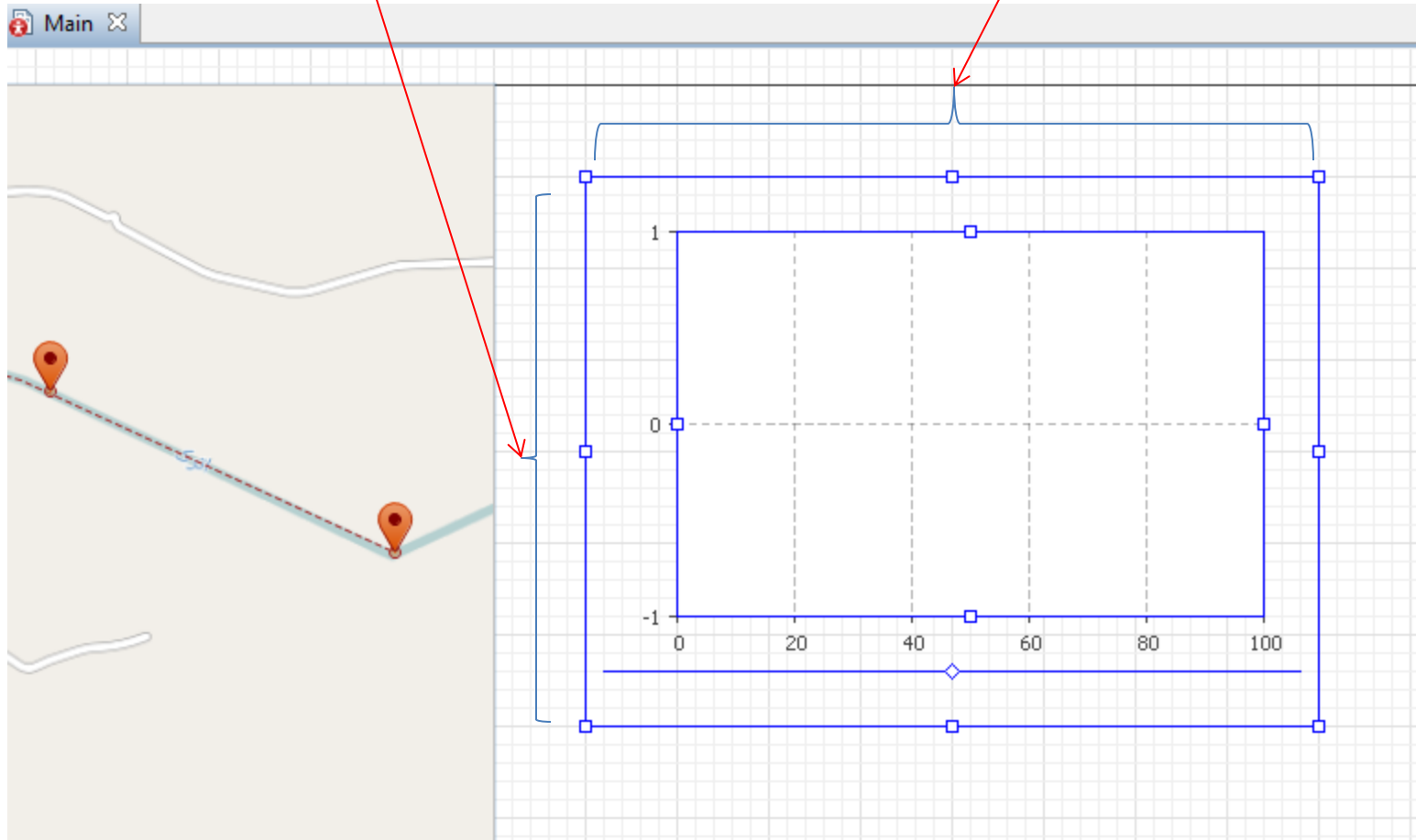
# Drag and drop a Time Plot chart to the Main



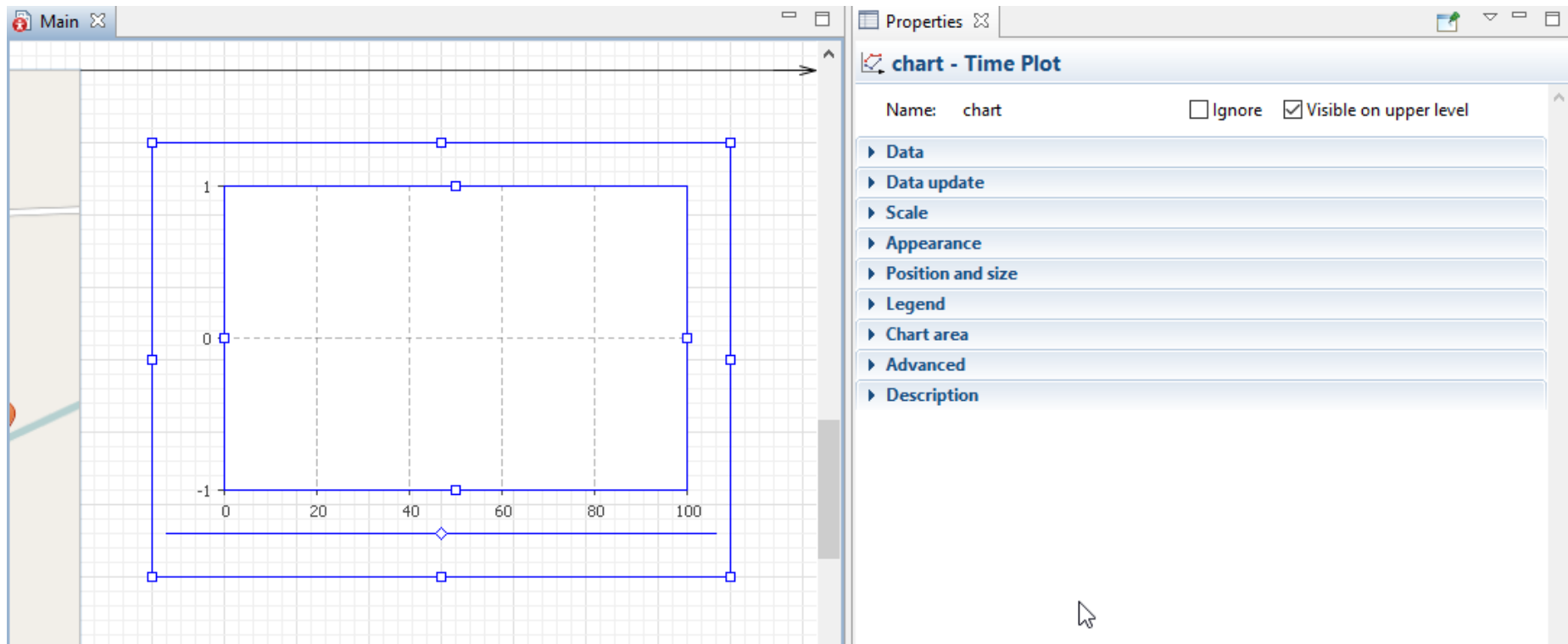
Hold the lower right corner of the graph and expand the graph.



# About 6 blocks high and 8 blocks wide.



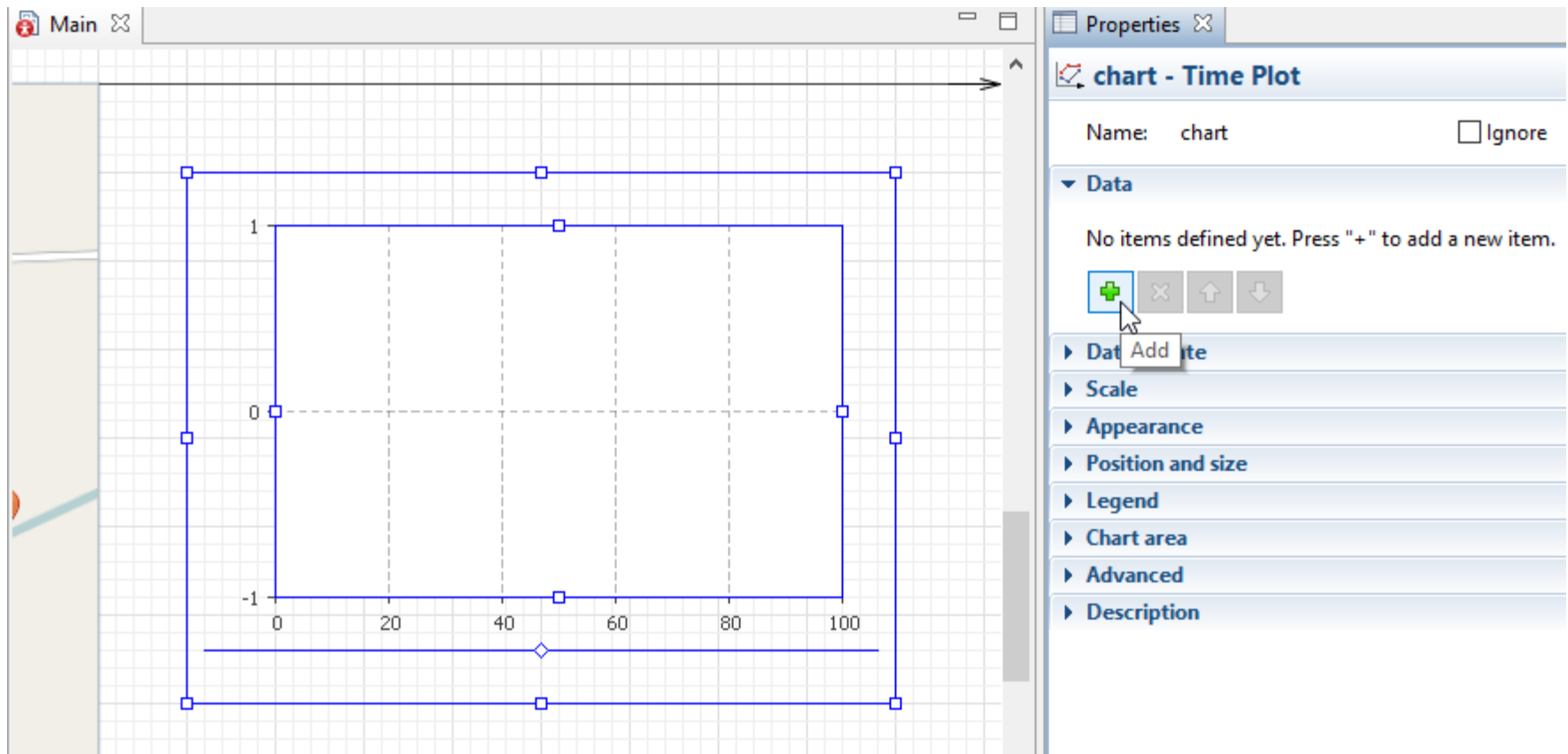
Each graph has a number of properties that you can use to define the data and how you want to present them in your graph. We will change properties of our graph in the next few slides





Click on your graph to see its properties on the right side.

Expand the Data property of your chart and click on the plus sign to add variable that represent your data.



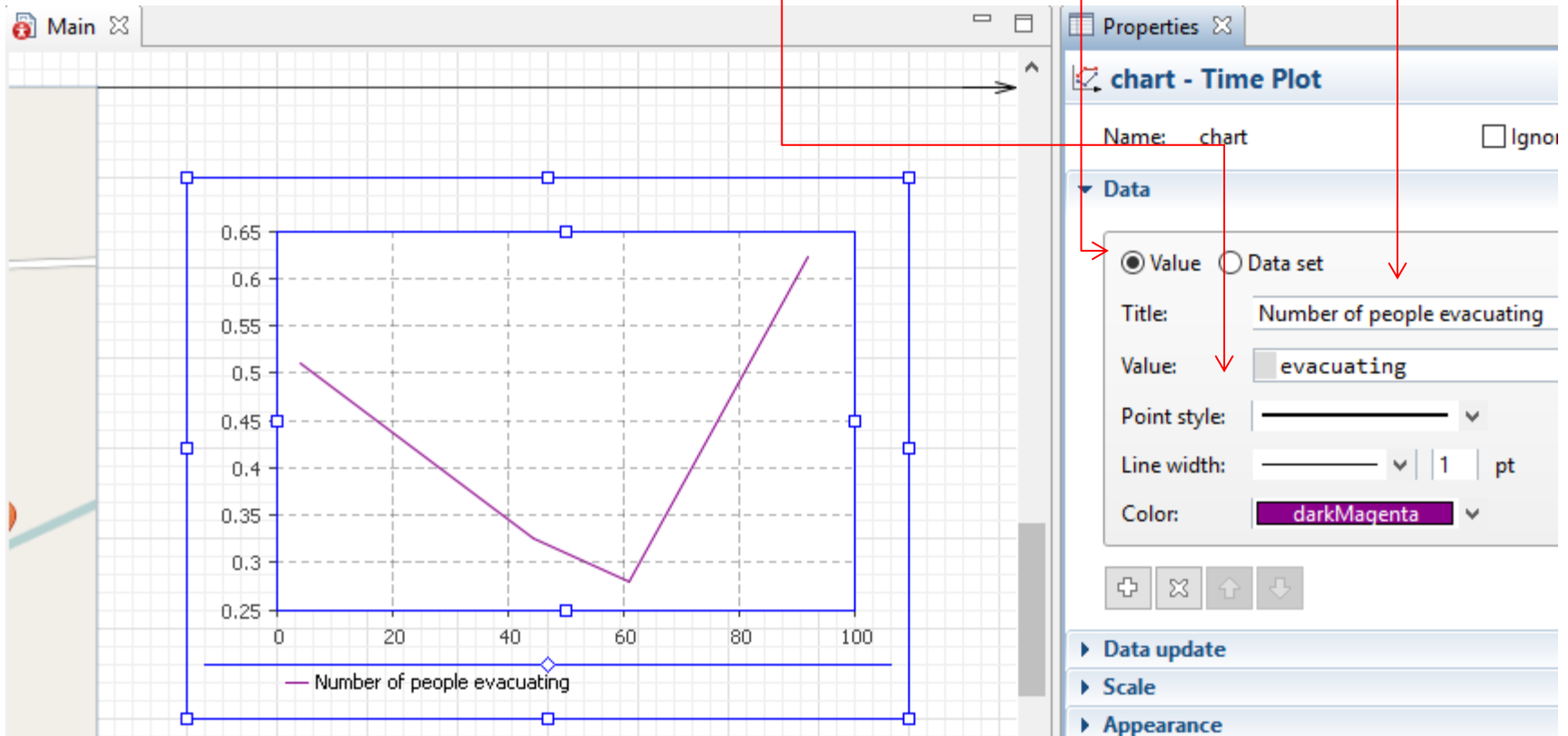
The screenshot displays a software interface with a main workspace and a properties panel on the right. The main workspace shows a grid with a blue-bordered chart area. The chart area has a vertical axis labeled from -1 to 1 and a horizontal axis labeled from 0 to 100. A blue rectangle is drawn within the grid, with small square handles at its corners and midpoints. The properties panel on the right is titled 'Properties' and contains a section for 'chart - Time Plot'. Under the 'Data' section, there is a text prompt 'No items defined yet. Press "+" to add a new item.' and a set of control buttons: a green plus sign, a grey minus sign, a grey up arrow, and a grey down arrow. A mouse cursor is hovering over the green plus sign button. Below these buttons are several expandable sections: 'Data Add item', 'Scale', 'Appearance', 'Position and size', 'Legend', 'Chart area', 'Advanced', and 'Description'.

Select Value.

Change the Title to: Number of people evacuating

Change the Value to: evacuating.

You can change the Point Style, Line Width and Color if you like.



Note that the evacuating here refers to the evacuating variable

The image shows a software interface with a grid-based workspace on the left and a properties panel on the right. In the workspace, two variables are listed: 'evacuating' and 'evacuated', each with a small orange circle containing a 'V' next to it. A red arrow points from the text above to the 'evacuating' variable. The properties panel, titled 'Properties' and 'chart - Time Plot', shows the following settings:

- Name: chart
- Ignore  Visible or
- Data**
- Value  Data set
- Title: Number of people evacuating
- Value: evacuating
- Point style: [dropdown]
- Line width: [dropdown] 1 pt
- Color: darkMagenta

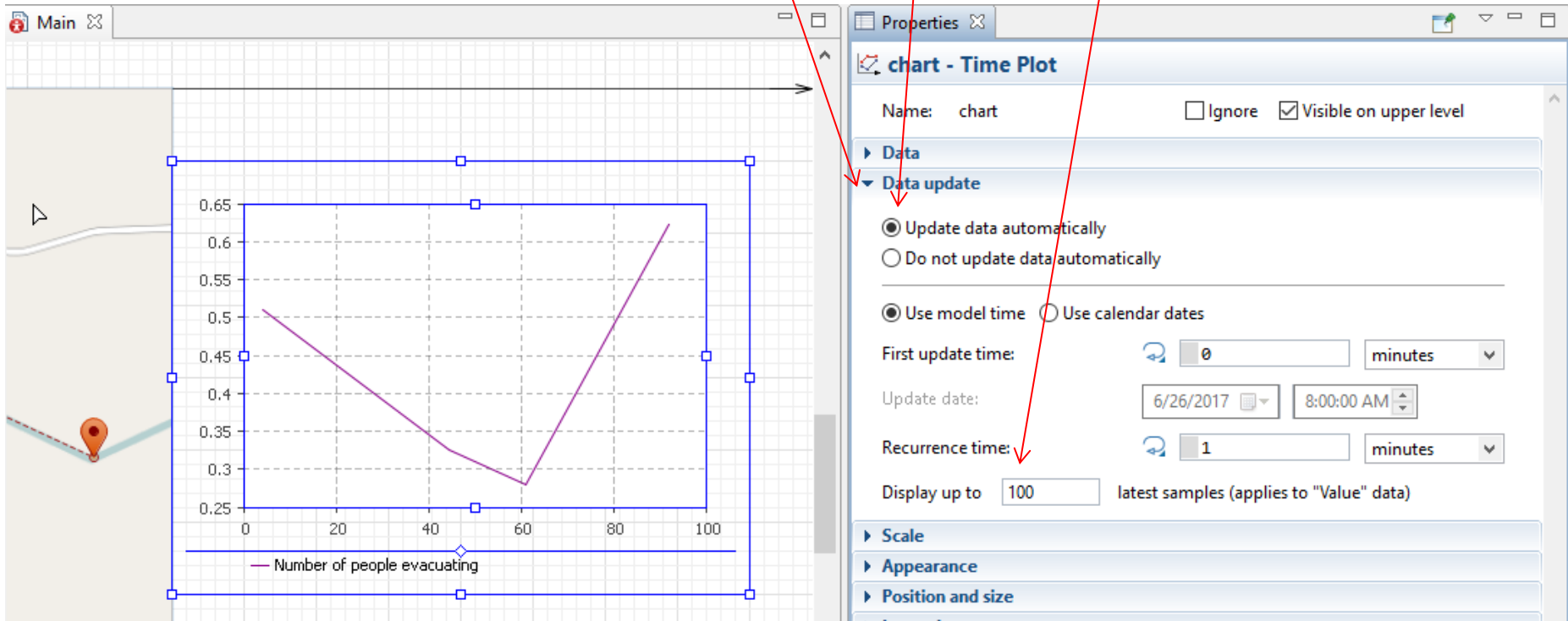
At the bottom of the properties panel are four icons: a plus sign, a cross, an up arrow, and a down arrow.

Now expand the Data update part.

Here you can define the starting time, time intervals, and the length of your chart in time.

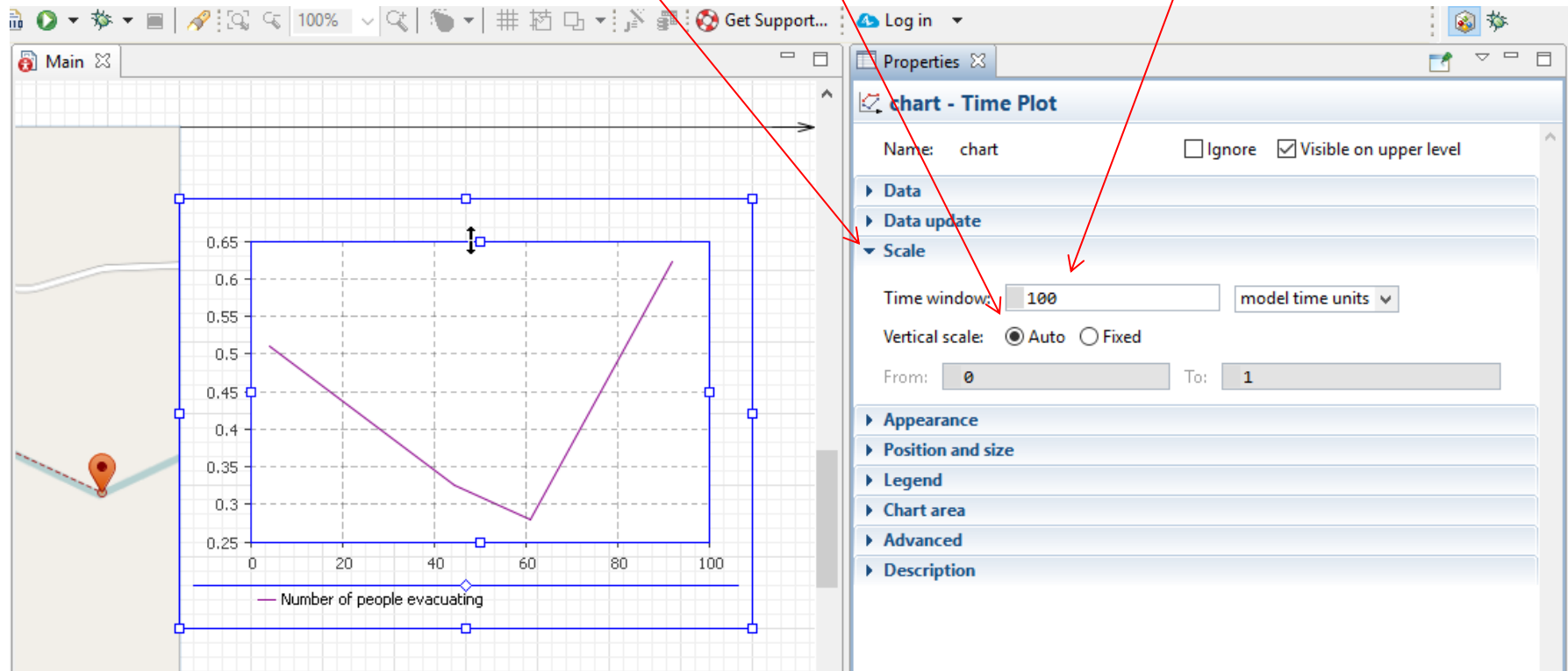
Select the Update data automatically.

We just change the Display up to 100

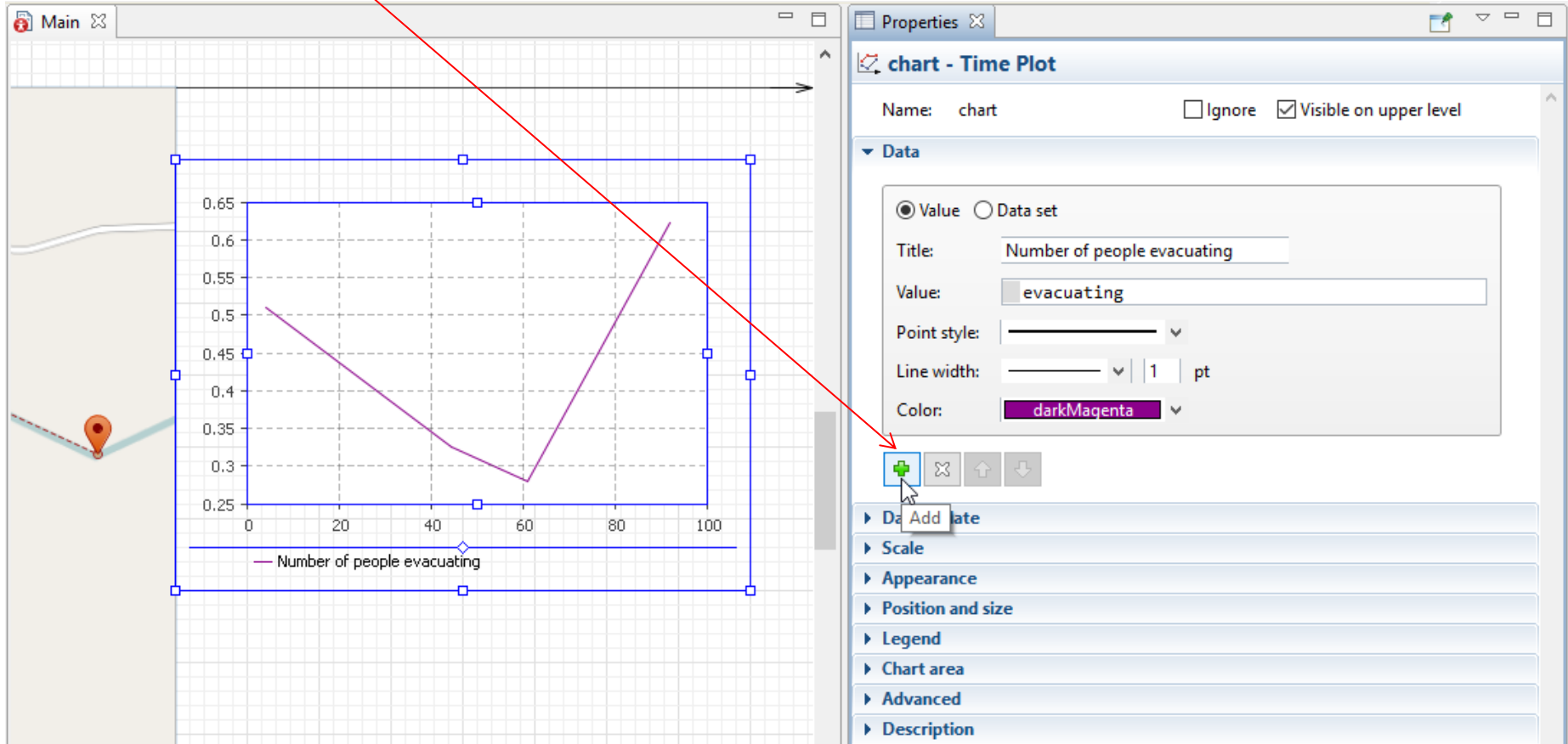


Expand the Scale section and change the Time window to 100.

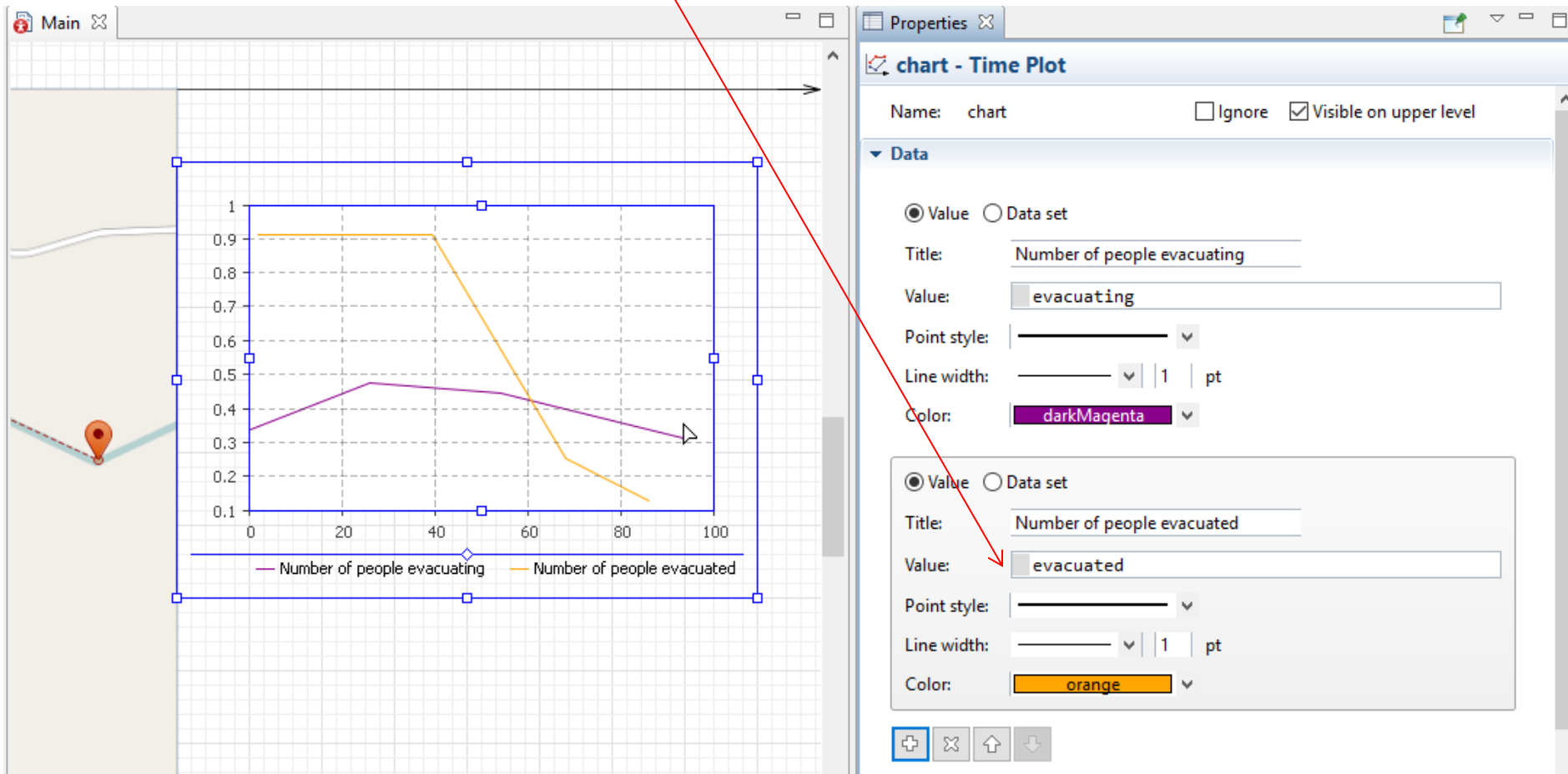
Depending on what you want to do with your chart you can set its Vertical scale to Auto or Fixed mode



# Add another variable to your chart



Add evacuated for the value.  
This will add another line for evacuated people  
in the chart



Before you run and see your chart, click on the Run Flood button and deactivate the `floodEvent.restart()`; by adding `//` before it.  
We do not need this event at this time.

The screenshot displays the AnyLogic University software interface. The main workspace shows a map with a 'Run Flood' button. The Properties panel on the right is open for the 'button - Button' object. The 'Action' section contains the following code:

```
//this line moves the flood agent;  
flood.moveTo(gisPoint1);  
//this line activates the eventFlood  
//floodEvent.restart();
```

The 'Appearance' section shows the following settings:

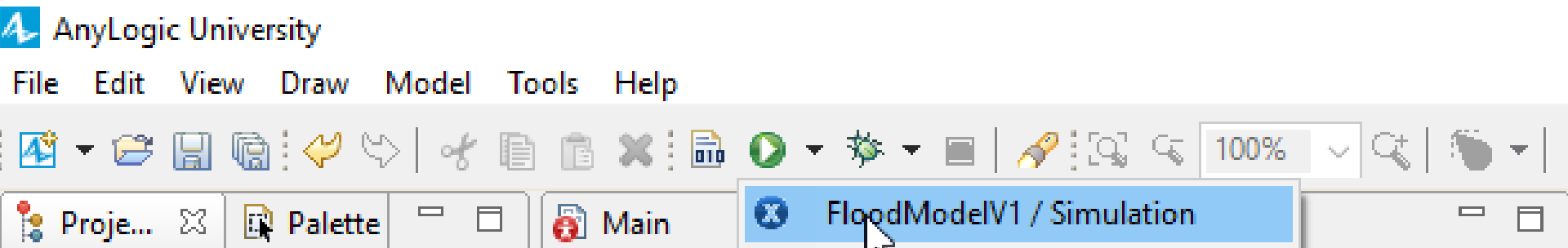
- Background color: Default
- Text color: Default
- Font: Dialog, size 11
- Italic:
- Bold:

The 'Position and size' section shows the following settings:

- X: 110, Width: 100
- Y: 40, Height: 30



# Run the model

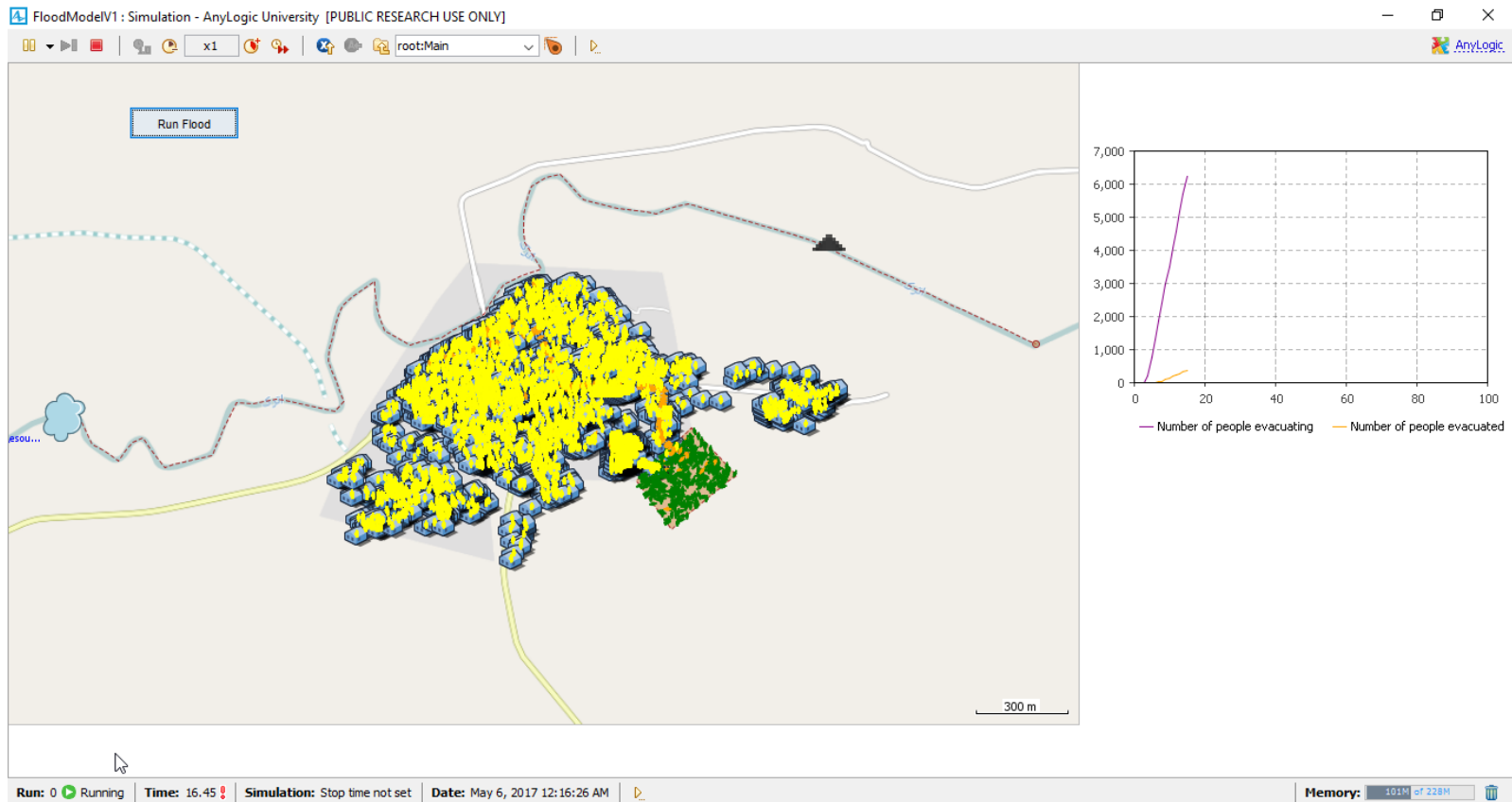


# Results

If there is no error, you will see your chart with the number of people evacuating and those evacuated.

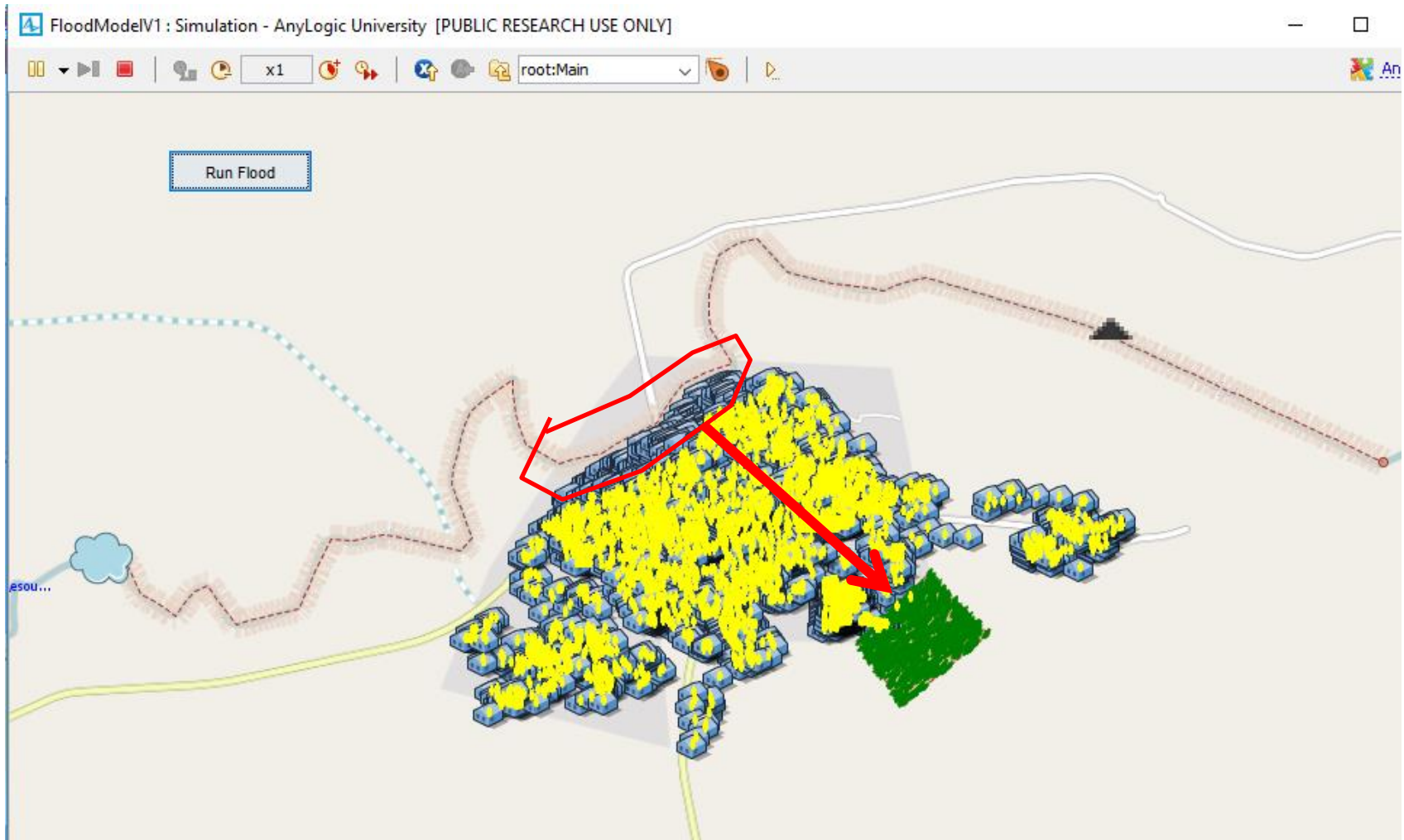
Please note that this is a simple process just to show you how agent based simulation works.

We will make this model more realistic as we go.



# Results

- People who are evacuating move to the evacuationArea



- Using Time plot is just one way of extracting numerical and graphical results from our simulation.
- In the next lessons we will show you more ways of extracting output from your simulation.