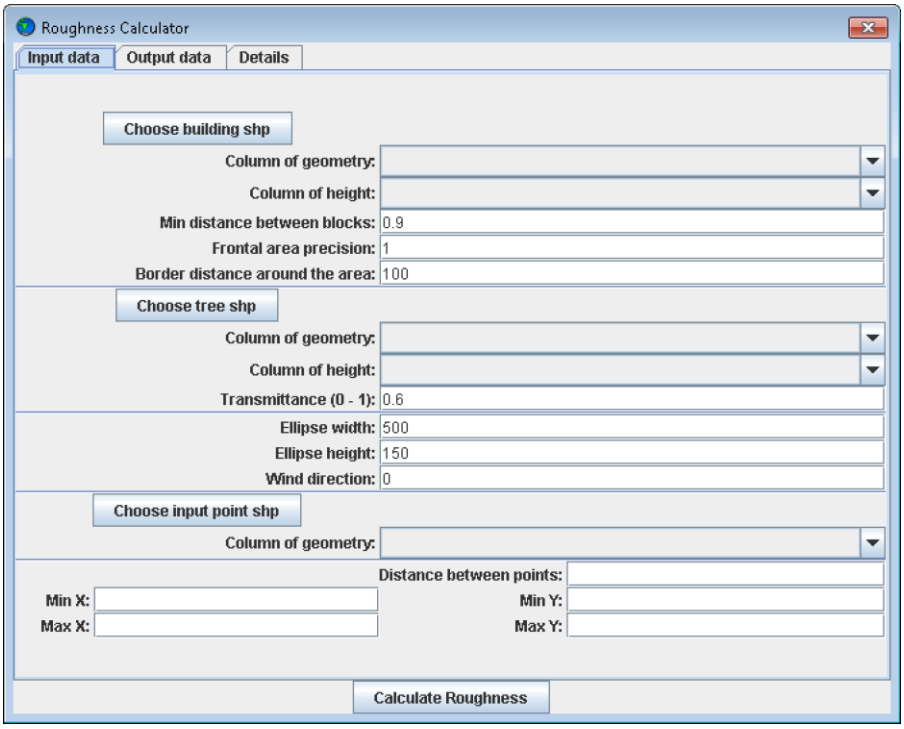
Roughness Mapping Tool – Users Guide

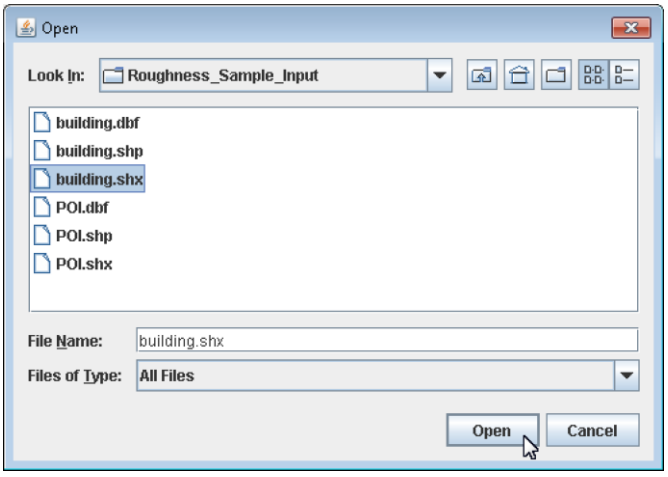
The method is described in Gál and Unger 2009, 2014 and in Unger et al 2014. It is free to use for any purpose, but please cite these papers.

The program do not needs installing, but it needs Java runtime environment to run:
http://www.oracle.com/technetwork/java/javase/downloads/java-se-jre-7-download-432155.html

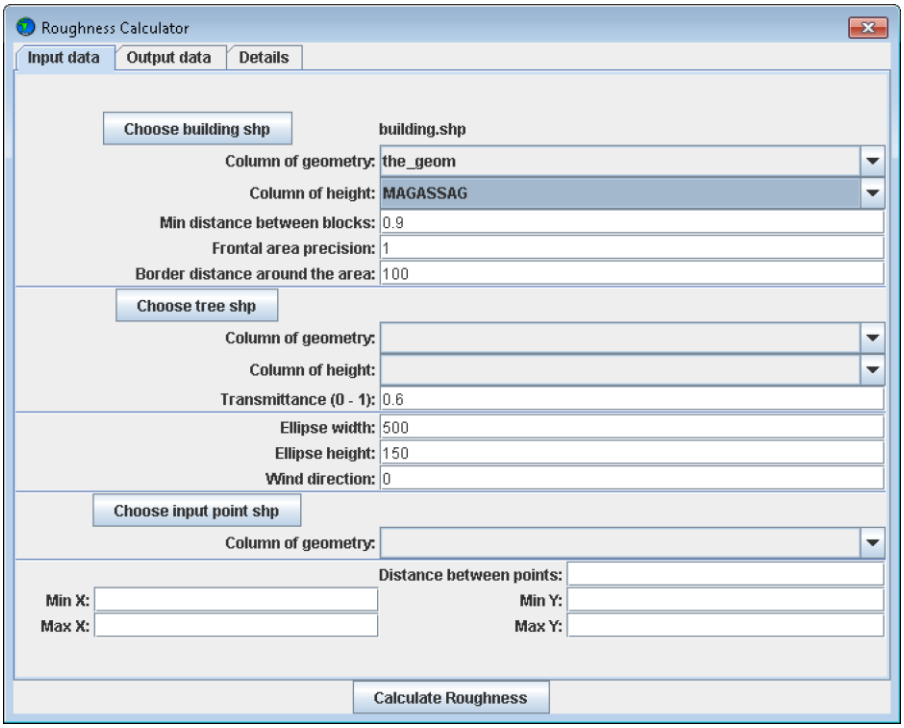
The program starts with RoughnessMappingToolV1.1.jar. Befor the start of the program the folder of the input and output files have to be defined in config.properites (normal text file). First the input data have to be defined.



First step is the input building data. It containes building footprints and heights values and it have to be stored in ESRI shapefile format.



The geometry is the shape column in the shapefile. All times it called here the_geom. Height is the height of the buildings above the ground in meters. Min distance between block is in meter and when two building footprints are closer than this value than they will considered as connected buildings (=building blocks). Frontal area precision is in meters and it defines the distance between the projection lines laid over the buildings for the frontal area calculation. The border distance around the area is in meters and it defines the maximum size of the plot area around the buildings.

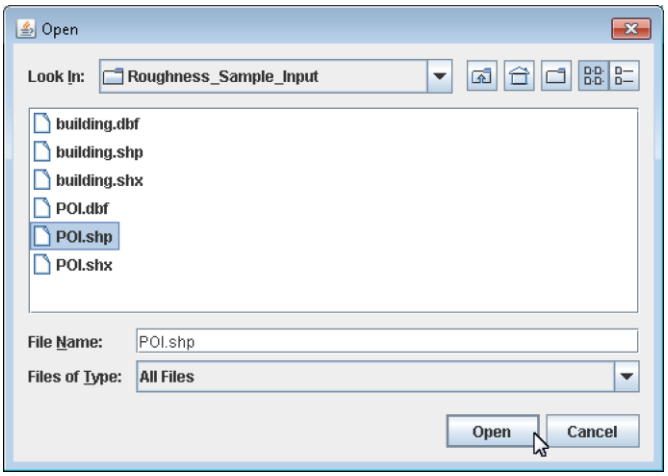


Tree shp contains the footprints and heights of the tree crowns. It is optional, and the setup is same to the buildings. Transmittance is the porosity of the tree crowns.

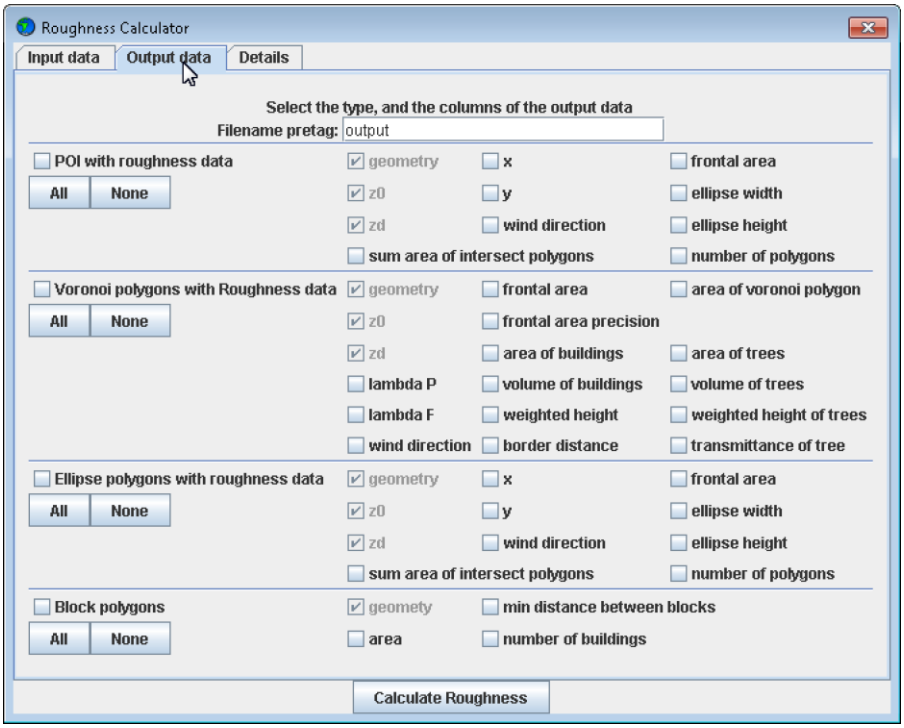
The software calculate the roughness parameters for plot polygons (around building blocks) and after that it calculates the average roughness parameter in an elliptical shape area (Gál and Unger 2014). ellipse width is the longer and ellipse height is the shorter axis of this ellipse.

Frontal area is depend on wind direction, this direction can be setup in wind direction field.

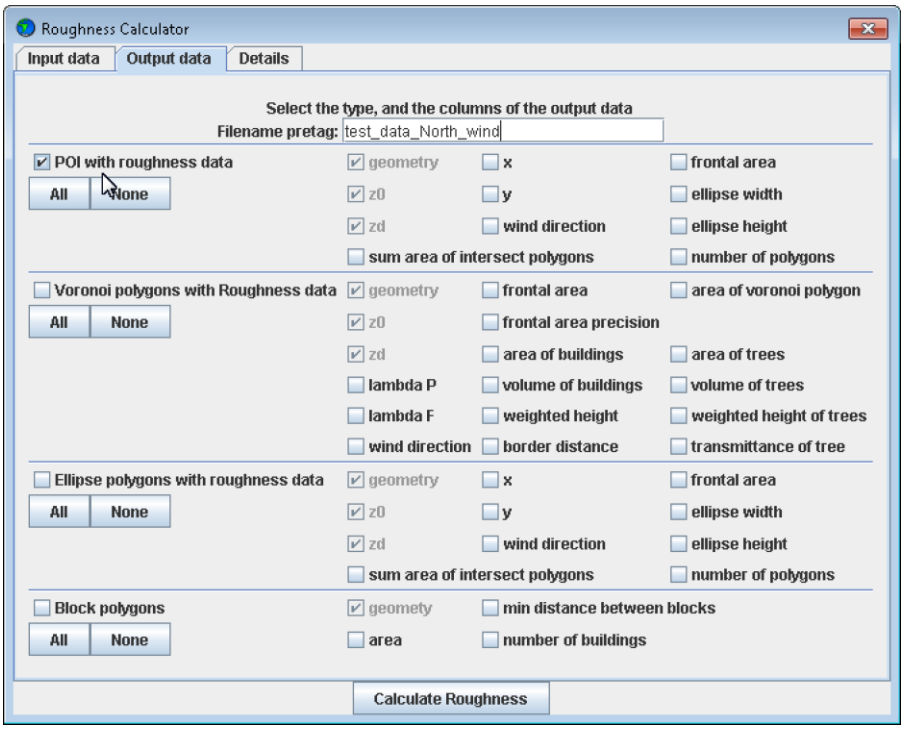
Next part is the definition of the point of interest, where we want to calculate the roughness. It can be defined by a point shape file or by the coordinates of the boundary of the study area and a resolution for the points. If you use shape file than you have to select is using Choose input point shp button.



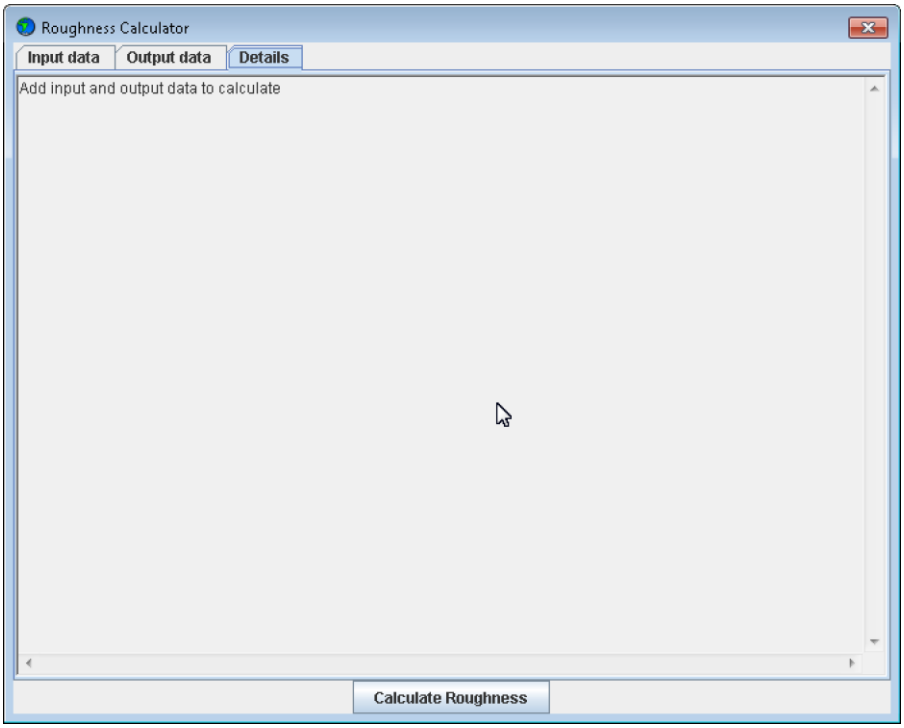
Next we have to define the outputs of the calculation.

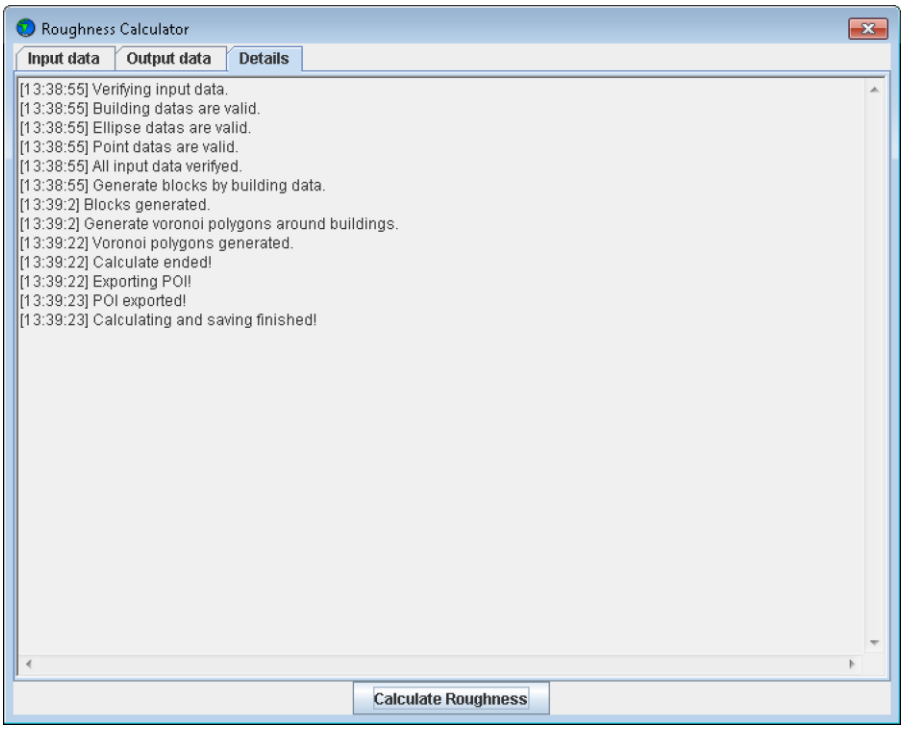


Default outputs are grey. If only the roughness is important for us than we have to check the POI with roughness data. And also we should modify the Filename pretag (e.g. wind direction, area, etc)



Than before starting the calculations it is useful to click on Details. In this screen we can follow the process of the calculation. The calculation starts with Calculate Roughness button.





In config.properties all of these options can be defined. The program can be started without GUI if useGui=true is changed to useGui=false. In this case all of the options will be to the same to config.properties, and only the calculation will done (it is useful e.g. if we use the program in a Linux server, and we started it from a script).

Unger J, Gál T, Csépe Z, Lelovics E, Gulyás Á, 2014. Development, data processing and preliminary results of an urban human comfort monitoring and information system. Időjárás (accepted).

Gál T, Unger J, 2014: Calculation of the sky view factor and roughness parameters in a medium sized city. Environmental Engineering and Management Journal, (accepted).

Gál T, Unger J, 2009: Detection of ventilation paths using high-resolution roughness parameter mapping in a large urban area. Building and Environment 44, 198-206.