Post processing of CARFFGS products with QGIS

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

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World Meteorological Organization
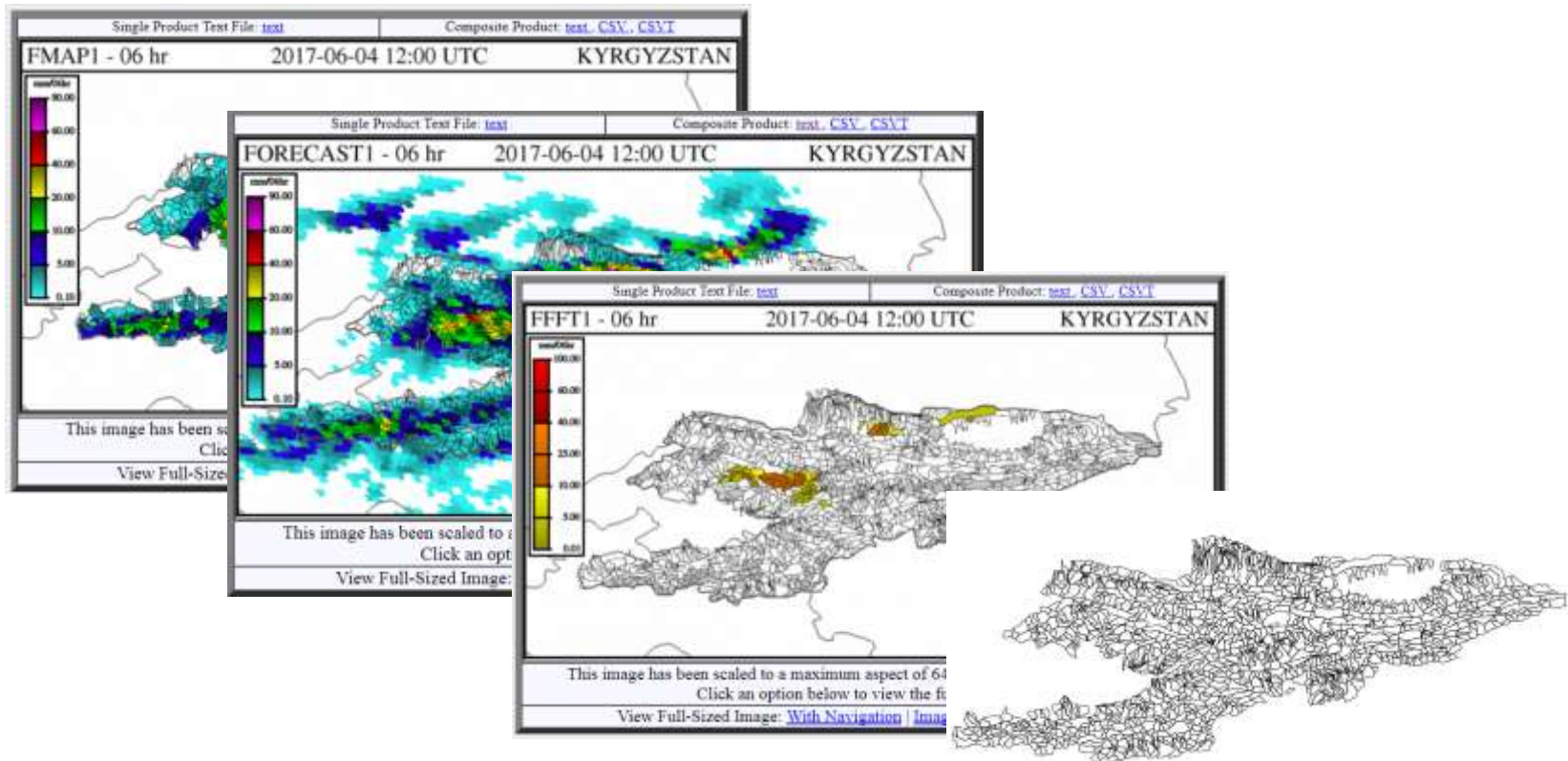Organisation météorologique mondiale

Post-processing of products with GIS

- GIS is designed to support spatial decision-making, which is also very important for issuing flash flood warnings.

- The CARFFGS Product console displays products for each sub-basin but does not provide any geographical information (e.g. topography, cities, rivers, roads, administrative boundaries, etc.)

- Using GIS software and CARFFGS products, forecaster can determine the precise flash flood location, produce maps for flash flood bulletins, studies, etc.

- Based on experience, the in-country forecaster can also use GIS to make adjustments to FFGS products for various subbasins and time durations.
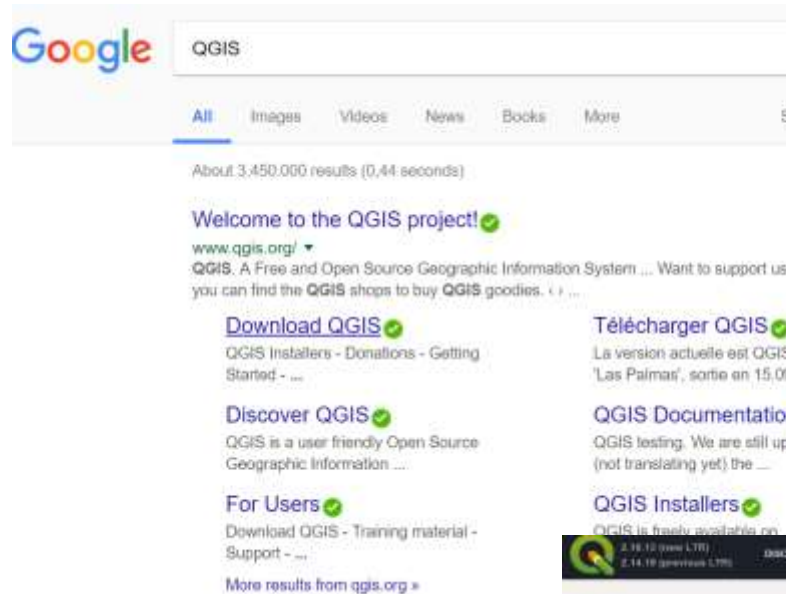
Introduction

- This presentation will guide you, step-by-step, how to join CARFFGS data to a sub-basin shapefile so that you can quickly start making basic maps for flash flood bulletins, using free, open-source QGIS software.

Downloading and Installing QGIS

CARFFG System Forecaster Console
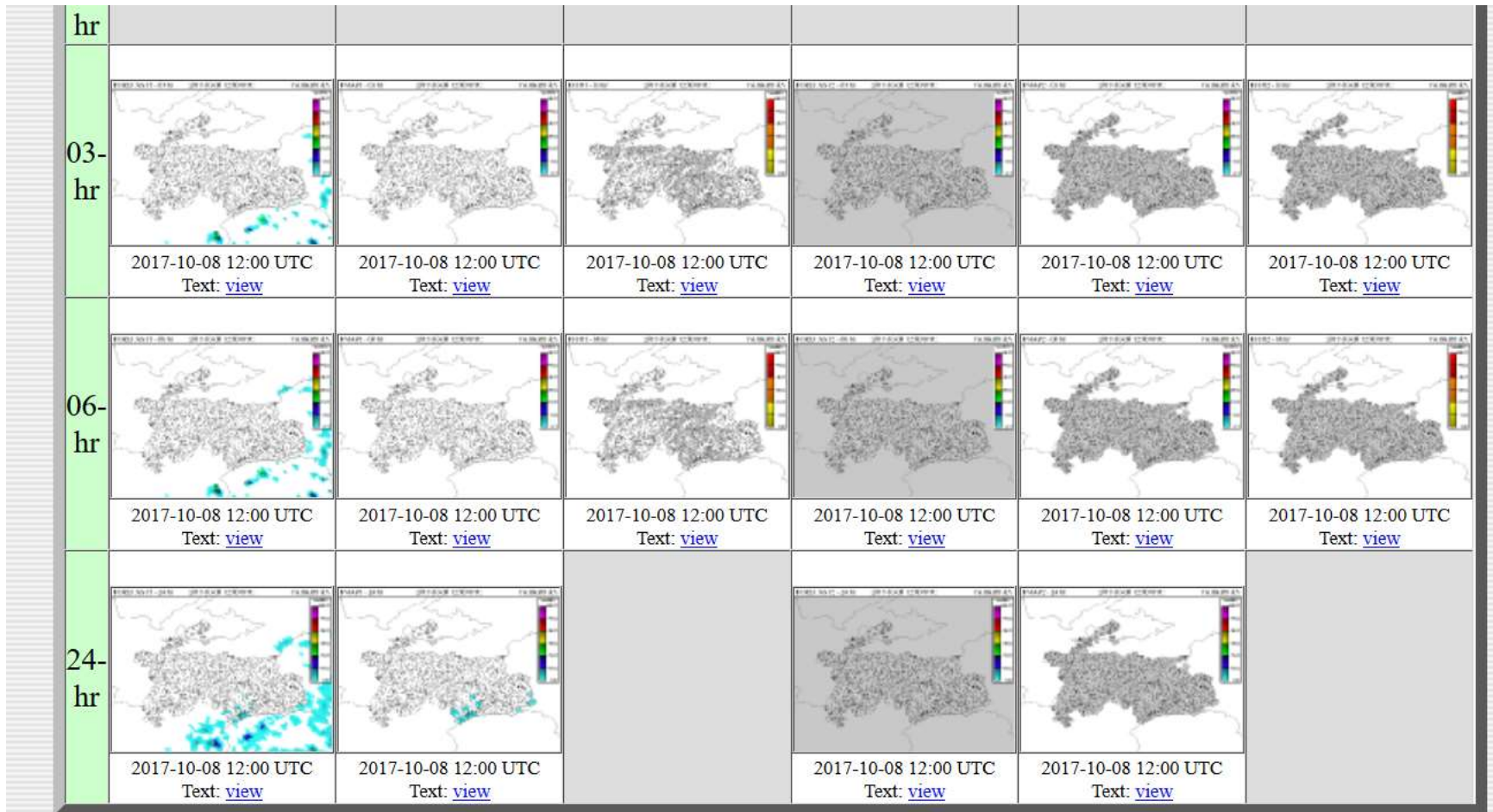
CARFFG System Static Resources

CARFFG - Central Asia Regional Flash Flood Guidance System

The CARFFG System is presently being prepared for on-site deployment. During this preparation, the interface and displayed data contents availability may be occasionally interrupted.

Return to Main

Static Resources and Reference Materials

Category	Item	Resource Link	Description
GIS Data Layers	CARFFG Sub-Basin Shapefiles **All Layers** (58M)	CARFFG All Shapefiles	A zipped archive (*.zip) of the component files for all shapefile layers from boundaries for all CARFFG export regions. **This is a single download file that includes *all* of the individual archives offered below.**
GIS Data Layers	REGIONAL Sub-Basin Shapefiles (30M)	CARFFG REGIONAL Shapefile	A zipped archive (*.zip) of the shapefile component files that provide basins boundaries for the REGIONAL export region.

Software Download	Quantum GIS (129MB)	QGIS v.1.8.0-2	A free, GUI-based GIS software package available for Windows (available for Linux platforms too). **This GIS package may be used to visualize FFGS reference shapefiles and to merge FFGS CSV composite product files to those shapefiles for interactive forecaster review and modification. QGIS may also be used for visual overlay of additional GIS resources, if available, such as stations, roads, cities, populations, provincial boundaries, etc.** For more information about this software, visit the QGIS web site.

Free Geospatial Data

ESRI OPEN DATA
https://hub.arcgis.com/pages/open-data

Free Geospatial Data

NATURAL EARTH DATA
http://www.naturalearth data.com/downloads/

Free Geospatial Data

USGS Earth Explorer
https://earthexplorer.usgs.gov/

Free Geospatial Data

United Nations Environment Programme
http://geodata.grid.unep.ch/

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Country

Kazakhstan ▼

File format

ESRI file geodatabase ▼

ESRI file geodatabase
Shapefile
Geopackage (SpatiaLite)
R (SpatialPolygonsDataFrame)
Google Earth .kmz
ESRI personal geodatabase

is longitude/latitude and theWGS84 datum.

Global Administrative Areas
http://www.gadm.org/

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Country: Kyrgyzstan
Format: shapefile

ADDING SUB-BASIN SHAPEFILE

1. Once in QGIS, first load the shapefile by clicking the Add Vector Layer button
2. Click Browse and then find your shapefile (sub-basins) and Open it (3 & 4).

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Guidance for Preparation of Flash Flood Warnings
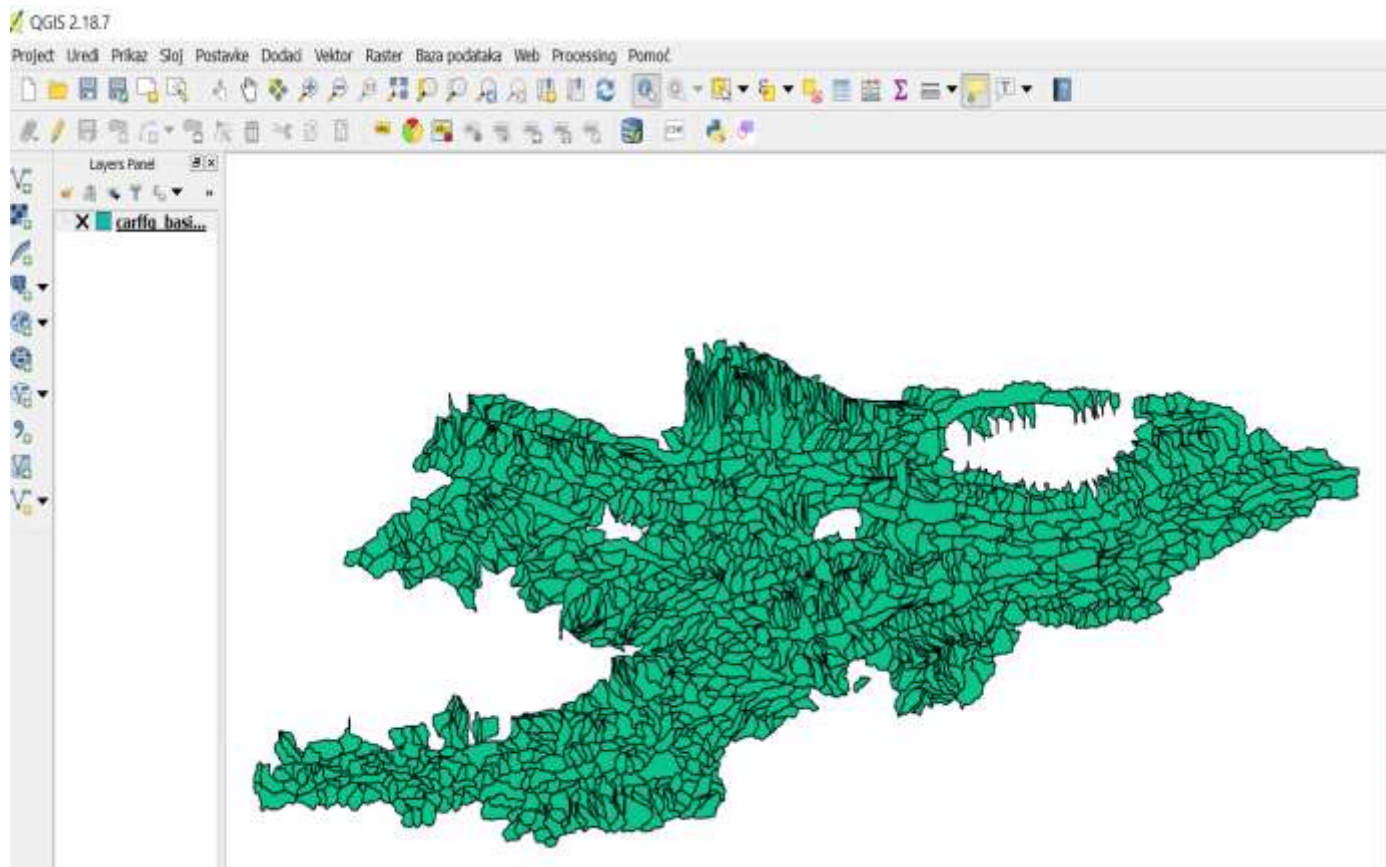
You should now see the geometry of the sub-basins displayed in the map window and the filename in the Layers panel.

FFGS Products

Product	01 hr	03 hr	06 hr	24 hr	4 day	Numerical Data
MWGHE Precipitation	+	+	+	+		+
GHE Precipitation	+	+	+	+		+
Gauge MAP			+	+		+
Merged MAP	+	+	+	+		+
ASM			+			+
FFG	+	+	+			+
IFFT	+	+	+			+
PFFT	+	+	+			+
ALADIN Forecast	+	+	+	+		
FMAP	+	+	+	+		+
FFFT	+	+	+			+
Gauge MAT			+			+
Latest IMS SCA				+		+
SWE			+			+
Melt				+	+	+

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CARFFGS Data Transfer

1. Click on the Single product text
2. On the following page, copy data by pressing Ctrl + A (Select all data) and Ctrl + C (Copy)
3. In Excel sheet – right click and paste the values (or hold Ctrl + V to paste the values)

CARFFGS Data Transfer
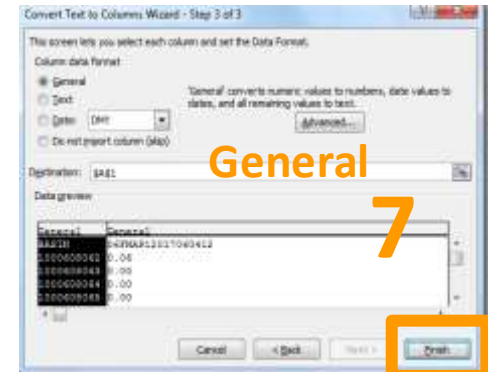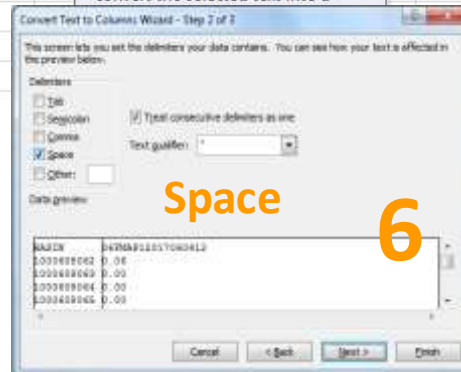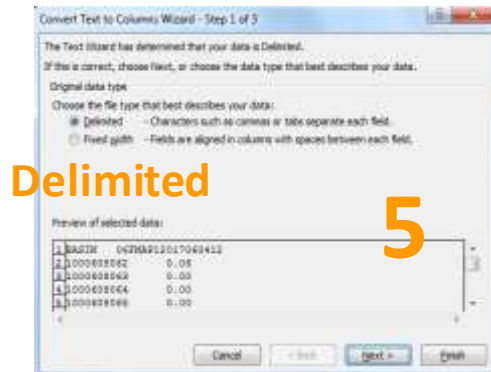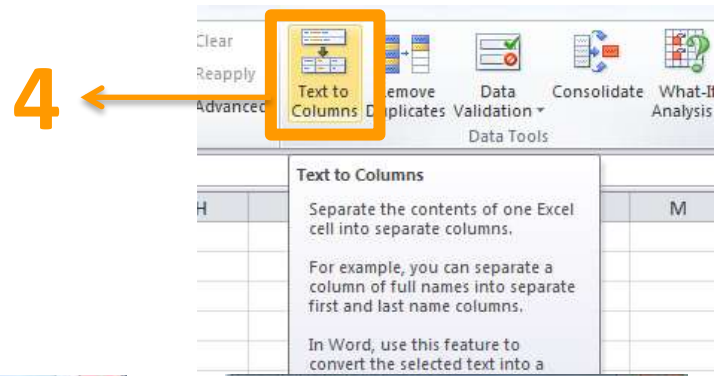
4. Convert text to columns (3 steps)
5. At the end, we will have 2 columns: Sub-basin's ID and CARFFG product`s values

CARFFGS Data Transfer
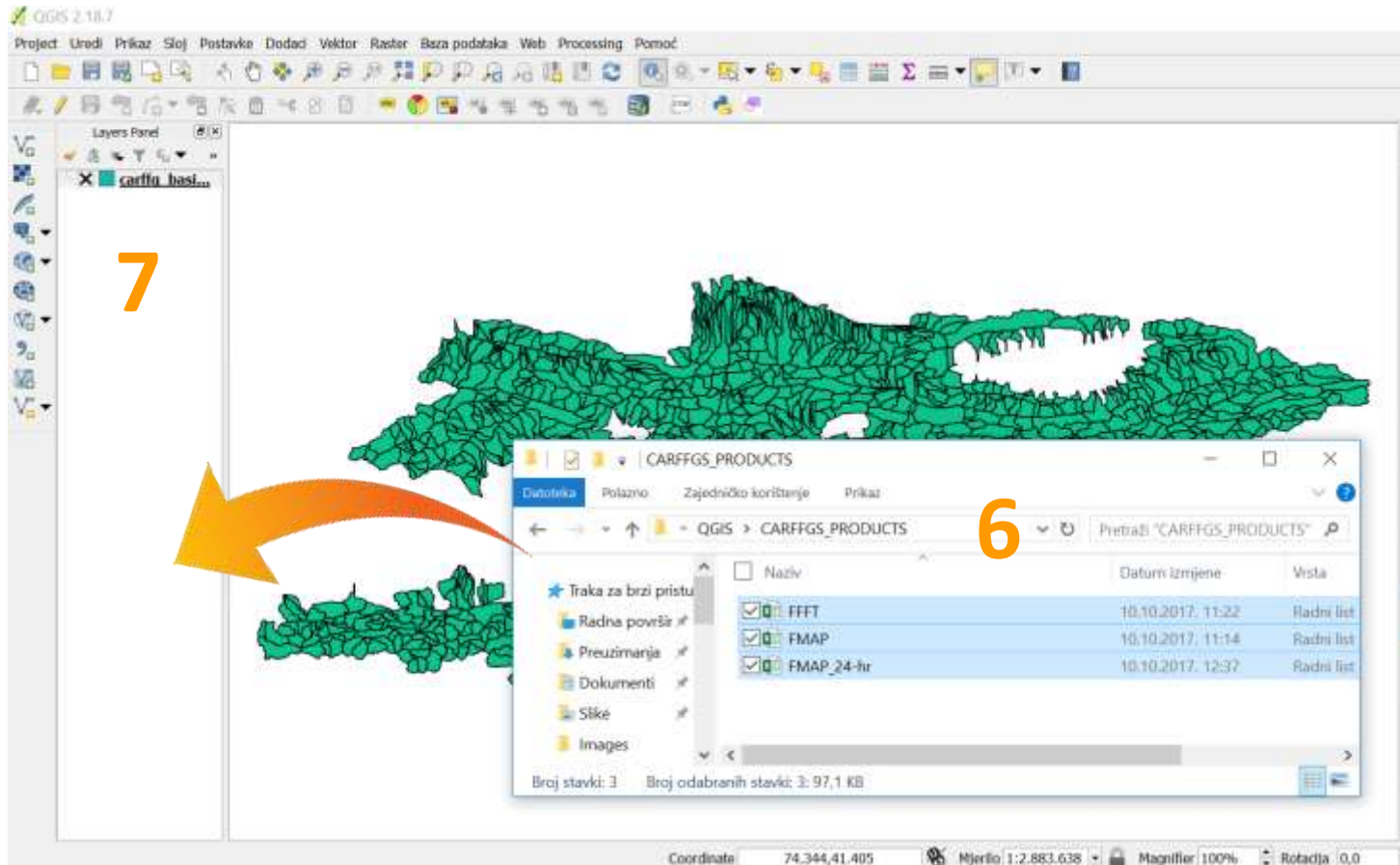
6. Drag and drop excel files into the QGIS Interface

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Joining data to shapefiles

Joining works by adding fields from data table to the shapefile's attribute table based on matching values found in the key columns (Sub-basin's ID).

8

Look at the shapefile's attribute table by right clicking on the layer name (Sub-basins) and selecting **Open attribute table.**

9. Here you can view your shapefile's data table and determine which field should be used for the join. The **VALUE** field is what we want in this example.
10. Close the attribute table.

Joining data to shapefiles

11. Open the shapefile's Properties by double-clicking on the layer name.
12. Go to the Joins tab.
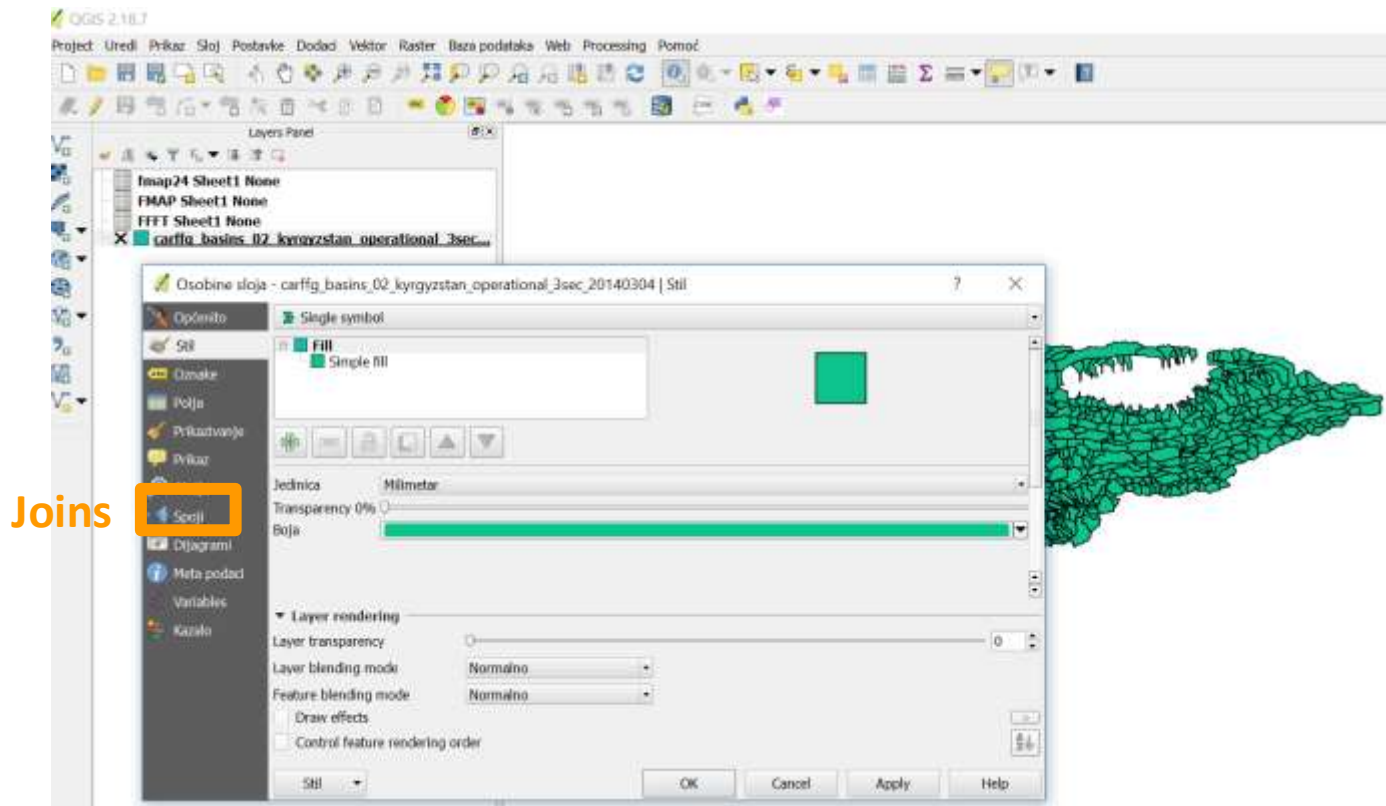
Joining data to shapefiles
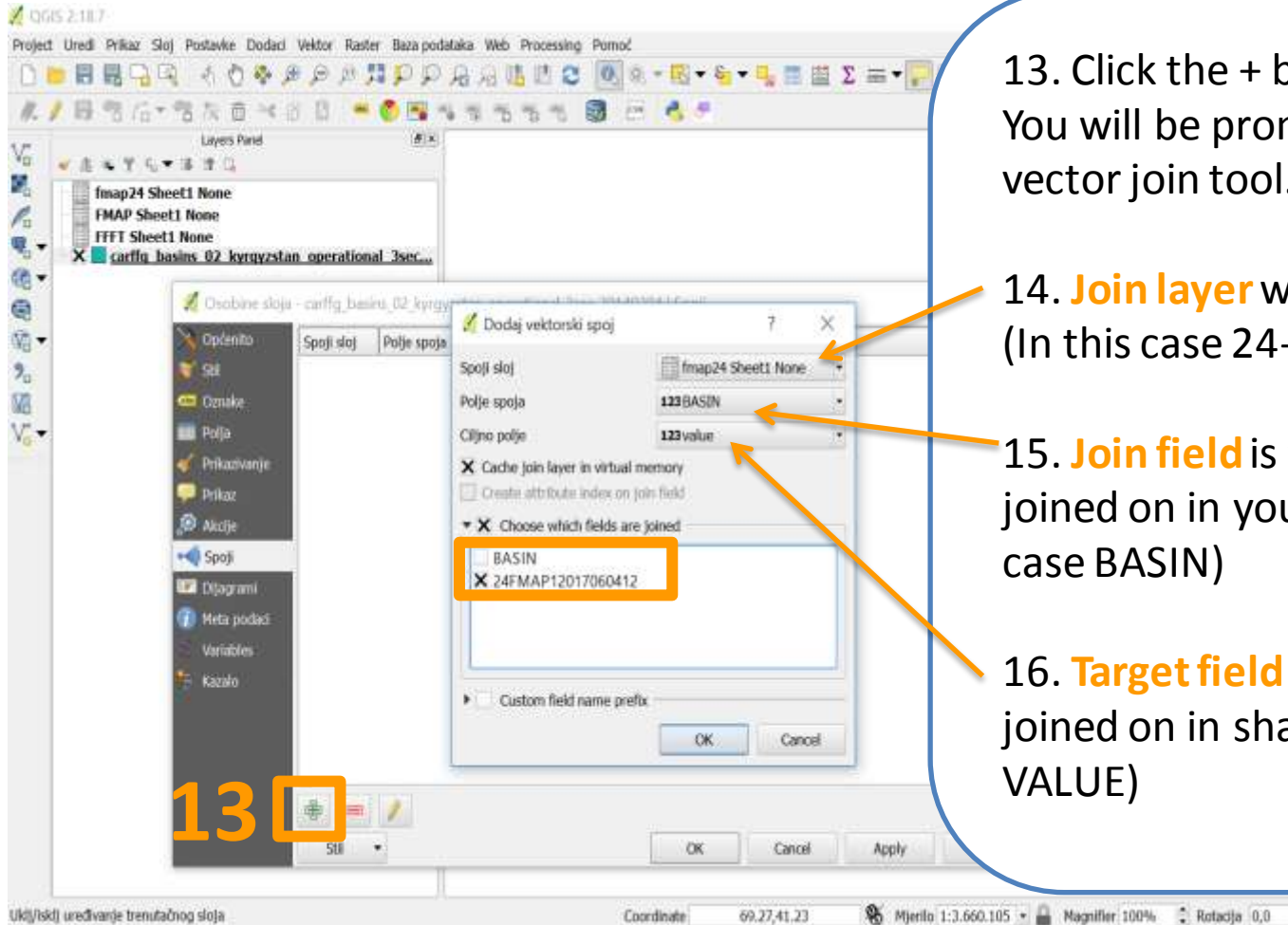
13. Click the + button to add a join. You will be prompted with the Add vector join tool.
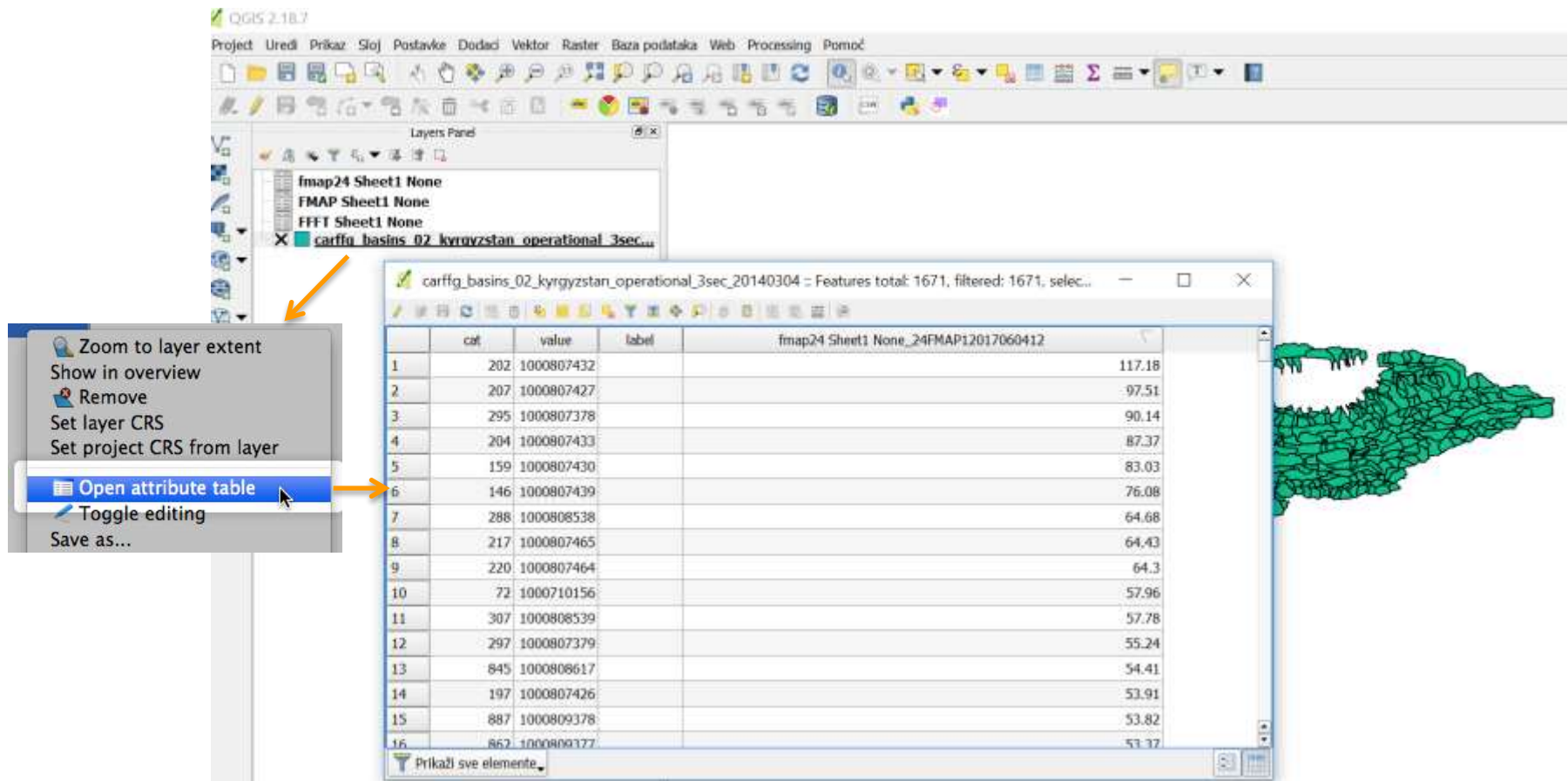
14. **Join layer** will be your data table (In this case 24-hr FMAP table)

15. **Join field** is the key field to be joined on in your Excel table (In this case BASIN)

16. **Target field** is the key field to be joined on in shapefile (In this case VALUE)

Joining data to shapefiles

17. Open the shapefile's attribute table once again and check that your data has been properly joined (Right click on Shapefile).

*Note that this join is temporary for now. To make a permanently joined shapefile you must save a new copy.

Exporting joined shapefile

18. Right click the shapefile and select Save as

19. Format should be ESRI Shapefile. Everything else can be left as is.

20. Choose a filename and location for your new shapefile and click OK.

This newly created shapefile now has both the geometry and the data. It should consist of at least four files with the same name but different extensions (.shp, .shx, .dbf, .prj)*.
These must remain together.

* Shapefile shape format (.shp)
 Shapefile shape index format (.shx)
 Shapefile attribute format (.dbf)
 Shapefile projection index format (.prj)

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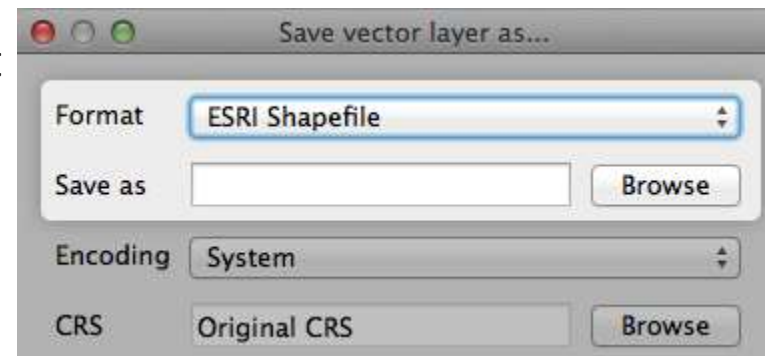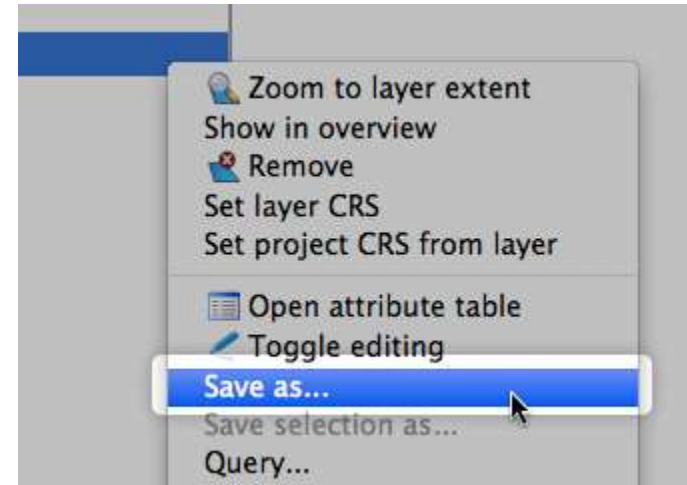
Classification
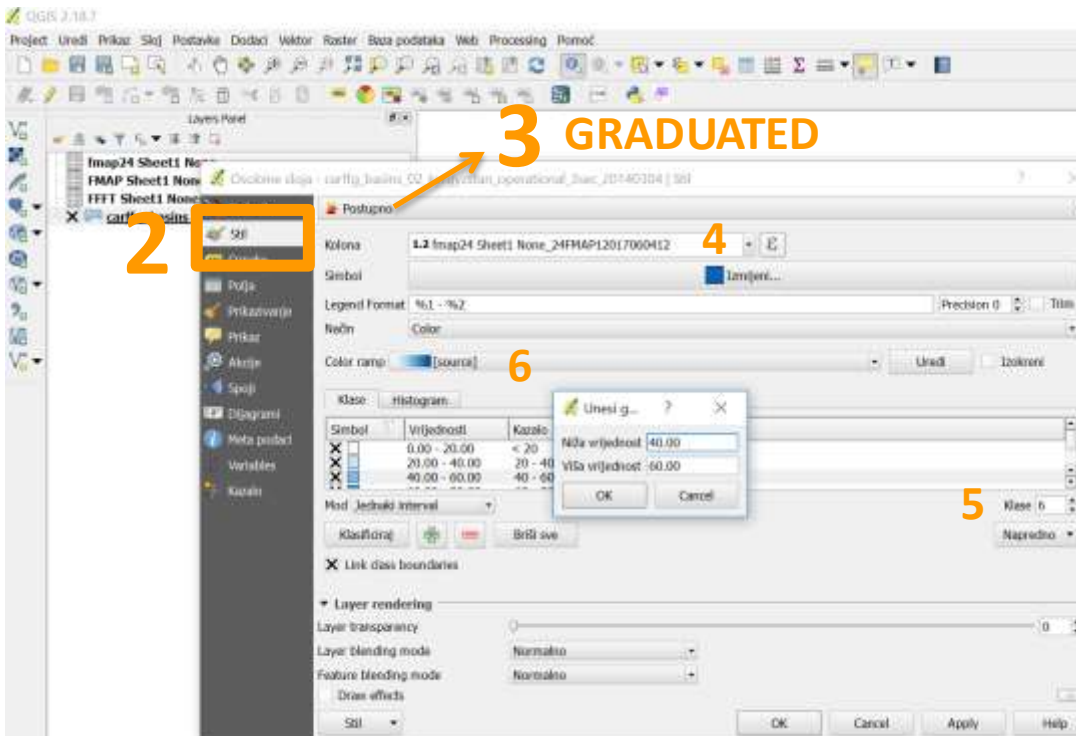
1. Right click on the layer again and choose Properties.

2. Go to Style tab.

3. Click on the dropdown that says Single Symbol and change it to **Graduated**.

Graduated symbology type allows you to break down the data in a column in unique classes and choose a different style for each of the classes.

4. Choose **24-hr FMAP** values as the Column

5. Choose 6 as the classes and clicking on values you can modify class bounds.

6. Choose a color ramp of your choice and click Classify at the bottom.
7. Click OK.

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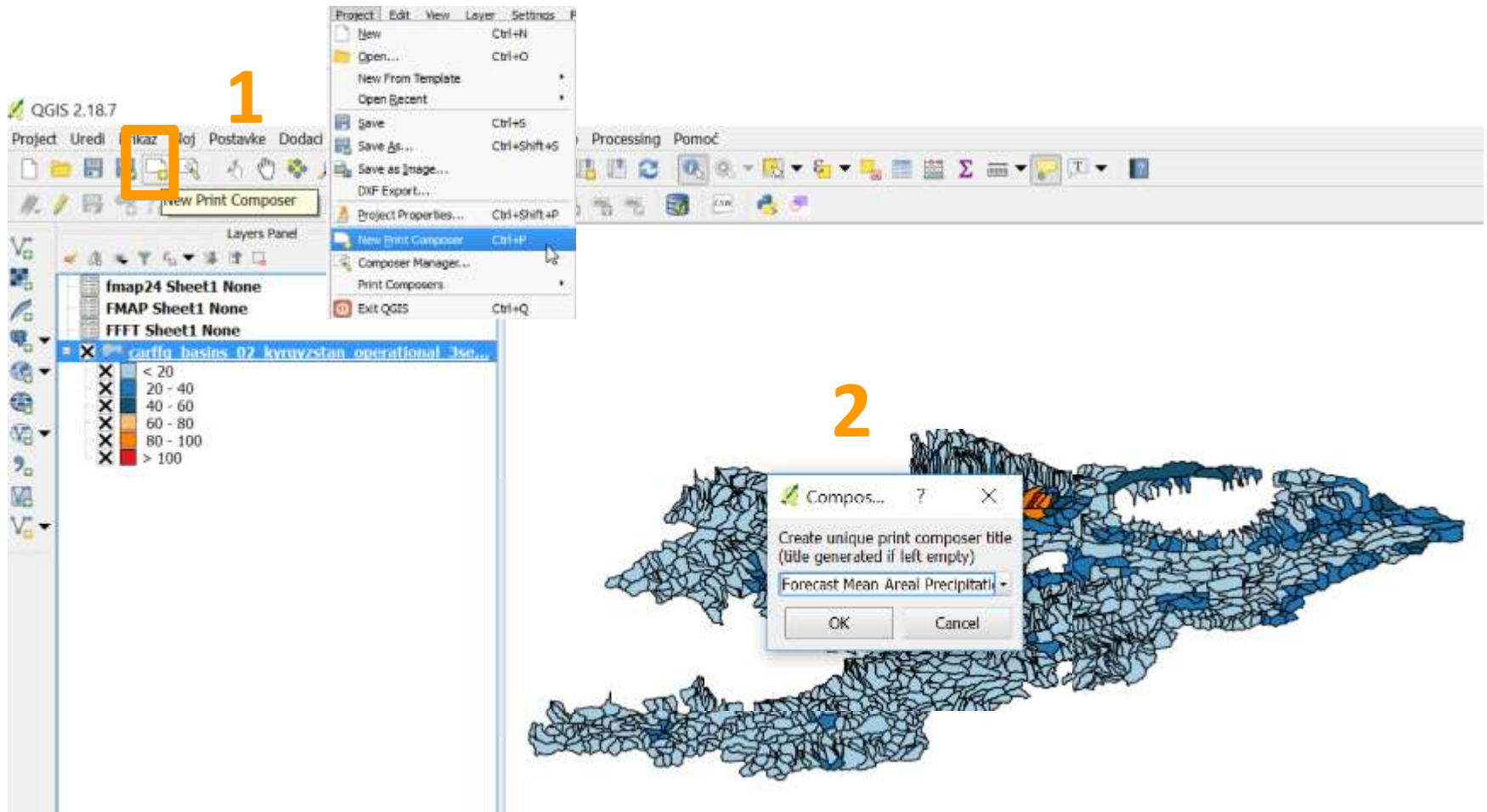
Making a Map

1. Go to Project ‣ New Print Composer
2. You will be prompted to enter a title for the composer

Making a Map

3. In the Print Composer window, click on Zoom full to display the full extent of the Layout.

4. Now we would have to bring the map view that we see in the QGIS Canvas to the composer. Go to Layout ‣ Add Map.
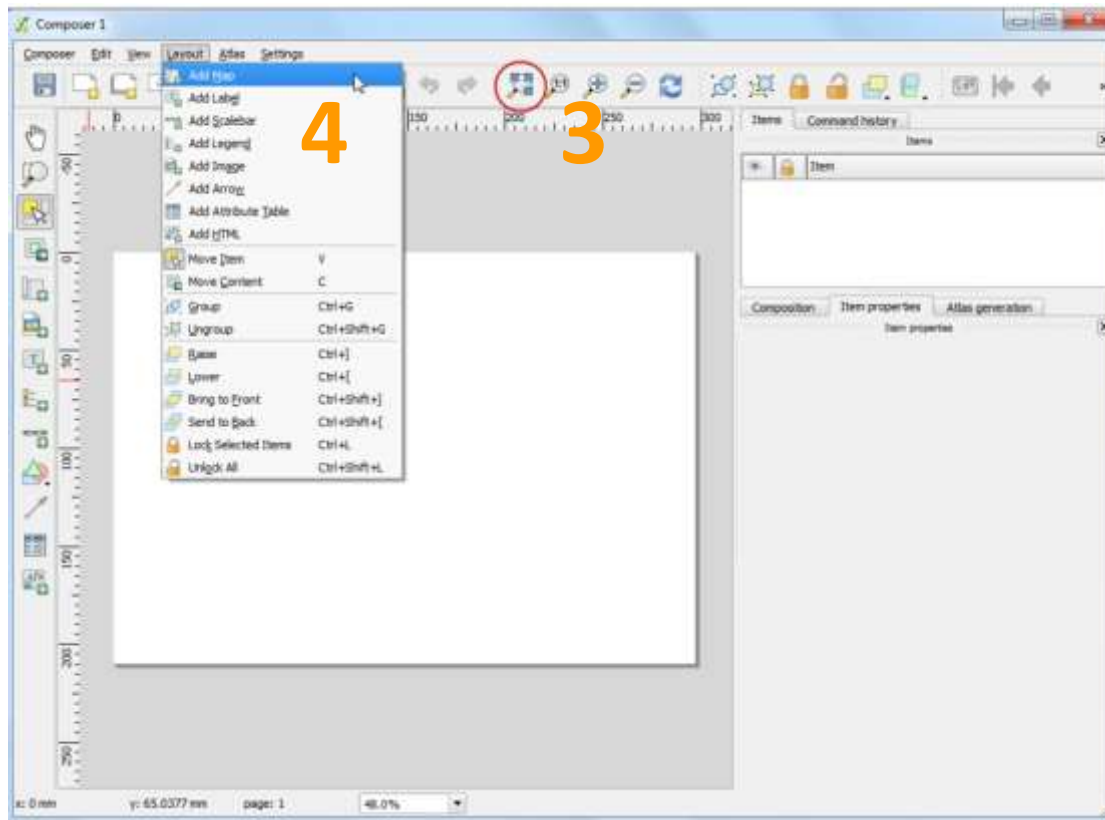
Making a Map

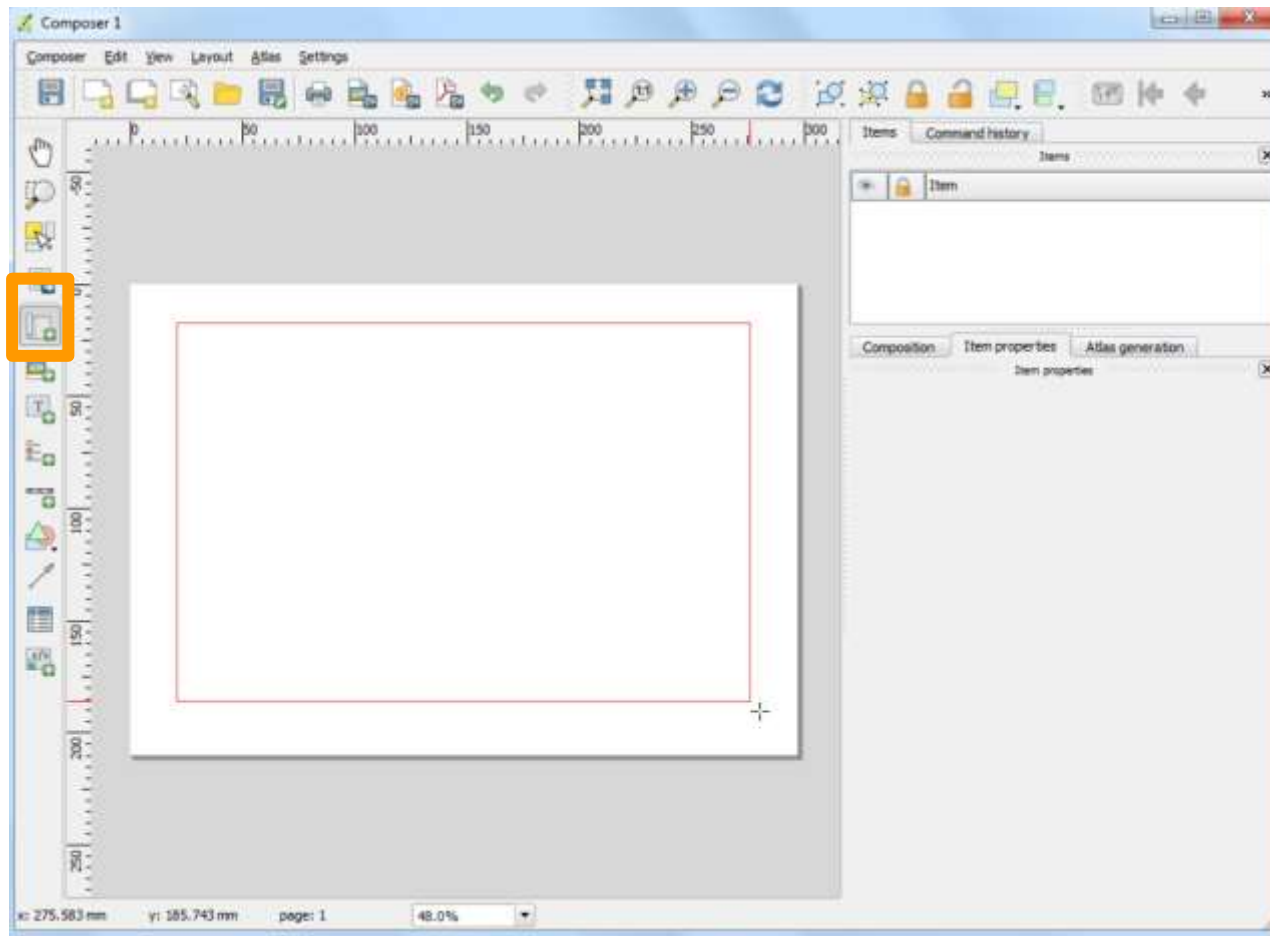5. Once the Add Map button is active, hold the left mouse button and drag a rectangle where you want to insert the map.
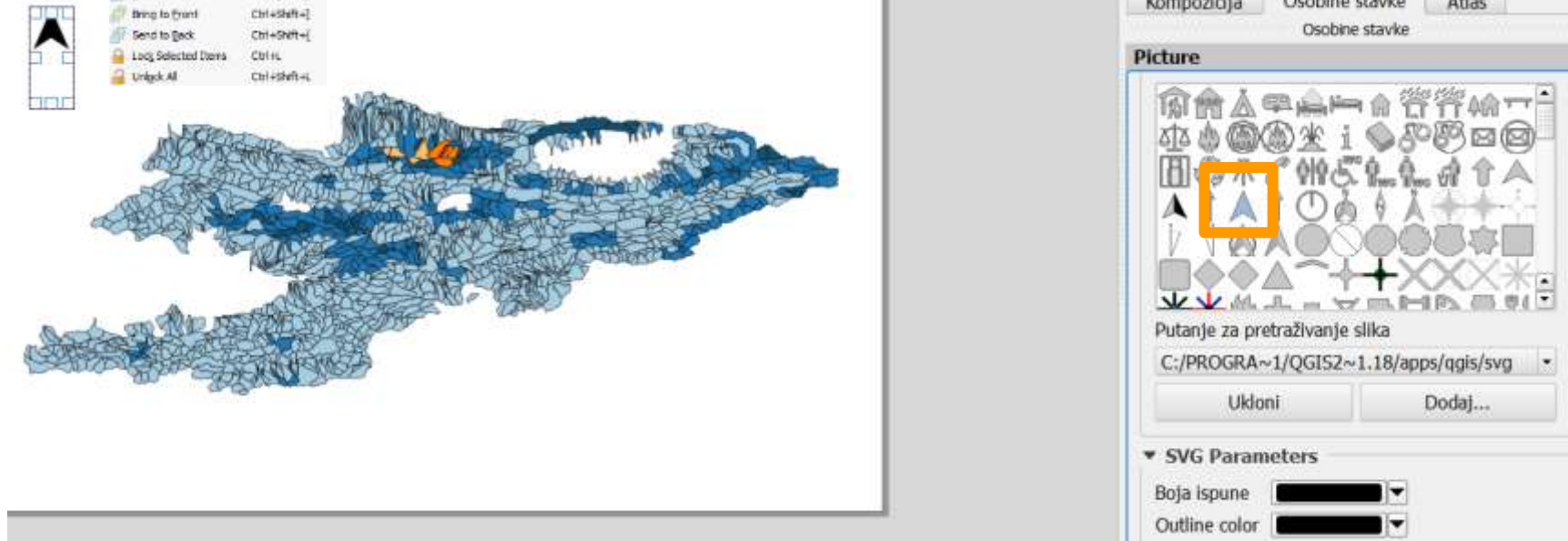
5

Making a Map

6

To put North the arrow Click Layout ‣ Add Image.

ITEM PROPERTIES

Holding your left mouse button, draw a rectangle on the top-right corner of the map canvas.
On the right-hand panel, click on the Item Properties tab and expand the Search directories section
and select the North Arrow image of your liking.

Making a Map

7. To add a map legend, click the **Add new legend** icon, place the element with the left mouse button on the Print Composer canvas and position and customize the appearance in the legend Item Properties tab.
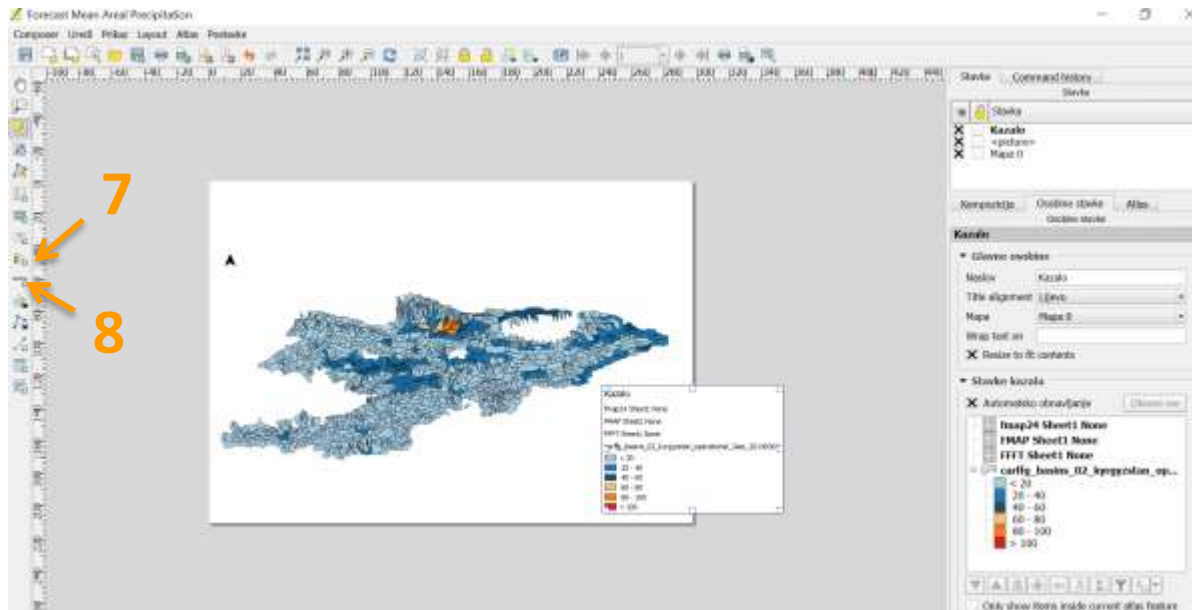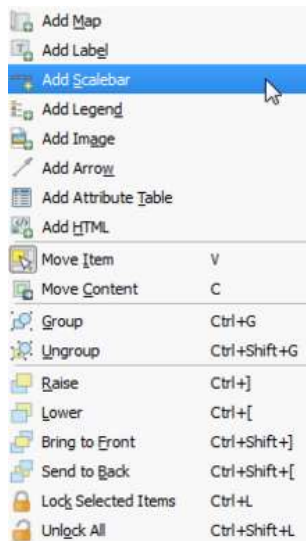
8. To add a scale bar, click the **Add new scalebar** icon (or Click on Layout ‣ Add Scalebar), place the element with the left mouse button on the Print Composer canvas and position and customize the appearance in the scale bar Item Properties tab.

Making a Map
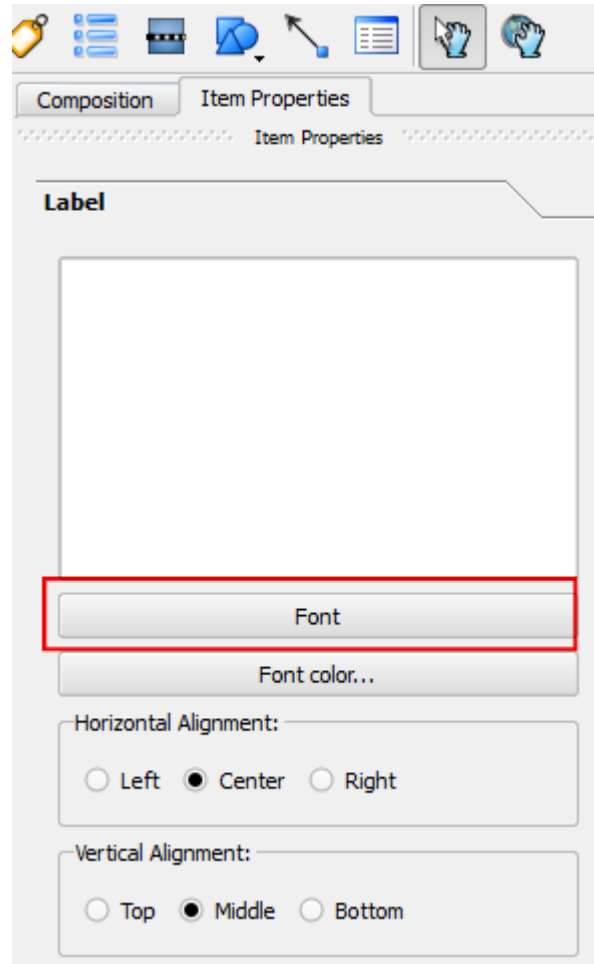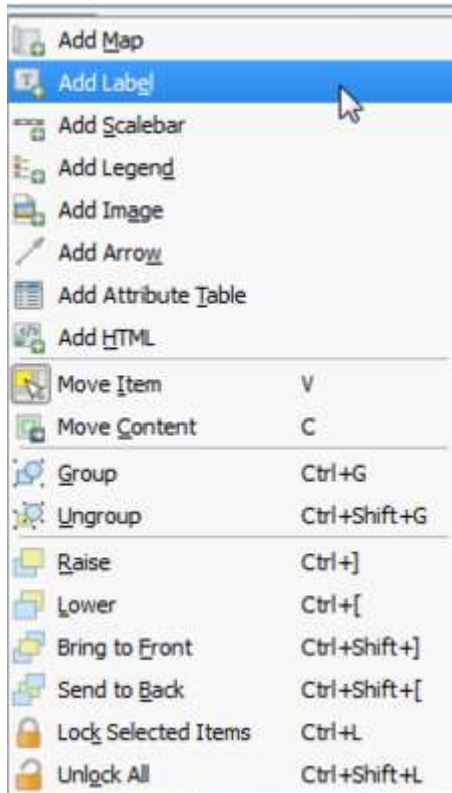
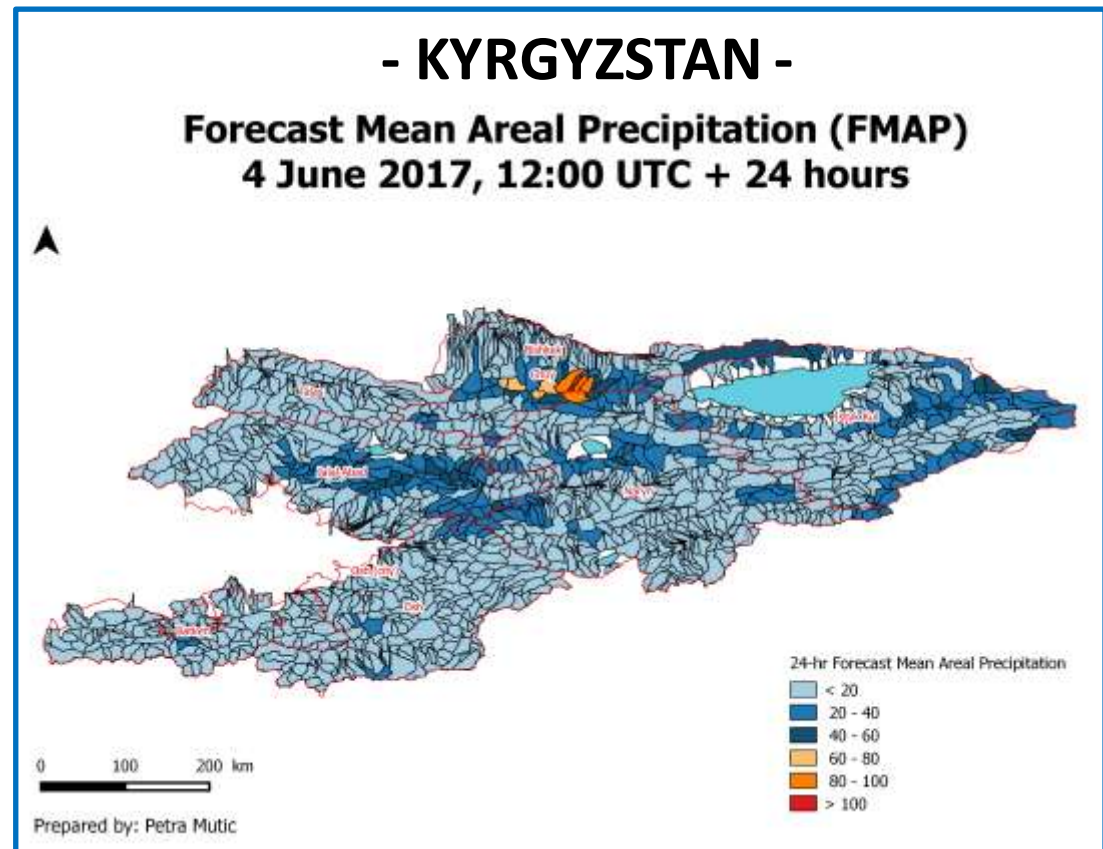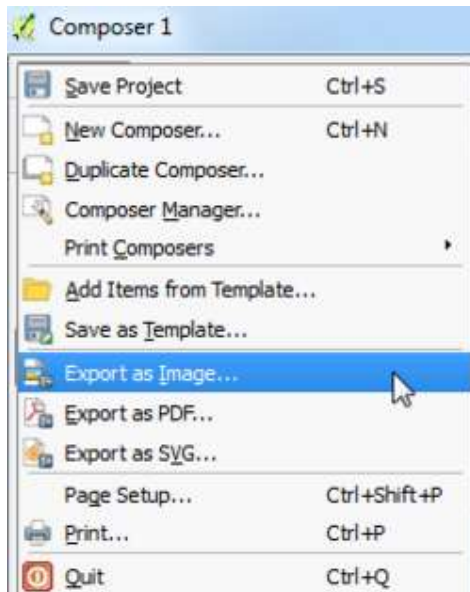9. To add label on a map, click on Layout ‣ Add Label.

Click on the map and draw a box where the label should be. In the Item Properties tab, expand the Label section and enter the text.

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Making a Map

10. Once you are satisfied with the map, you can export it as Image, PDF or SVG. For this tutorial, let's export it as an image. Click Composer ‣ Export as Image

Shapefile to KML

Shapefile is ESRI based Vector file, while KML or Keyhole Markup Language is file which models and stores geographic features for display in Google Earth or Google maps.

To convert .shp to KML:

Right click on the name of shapefile layer and select save as (or You can select layer from the menu, and click on save as).

In the **Save vector layer as** window, select the format from the drop down box as **Keyhole Markup Language (KML)** and browse the folder in which you want to save the KML file .

Name it and Press OK.
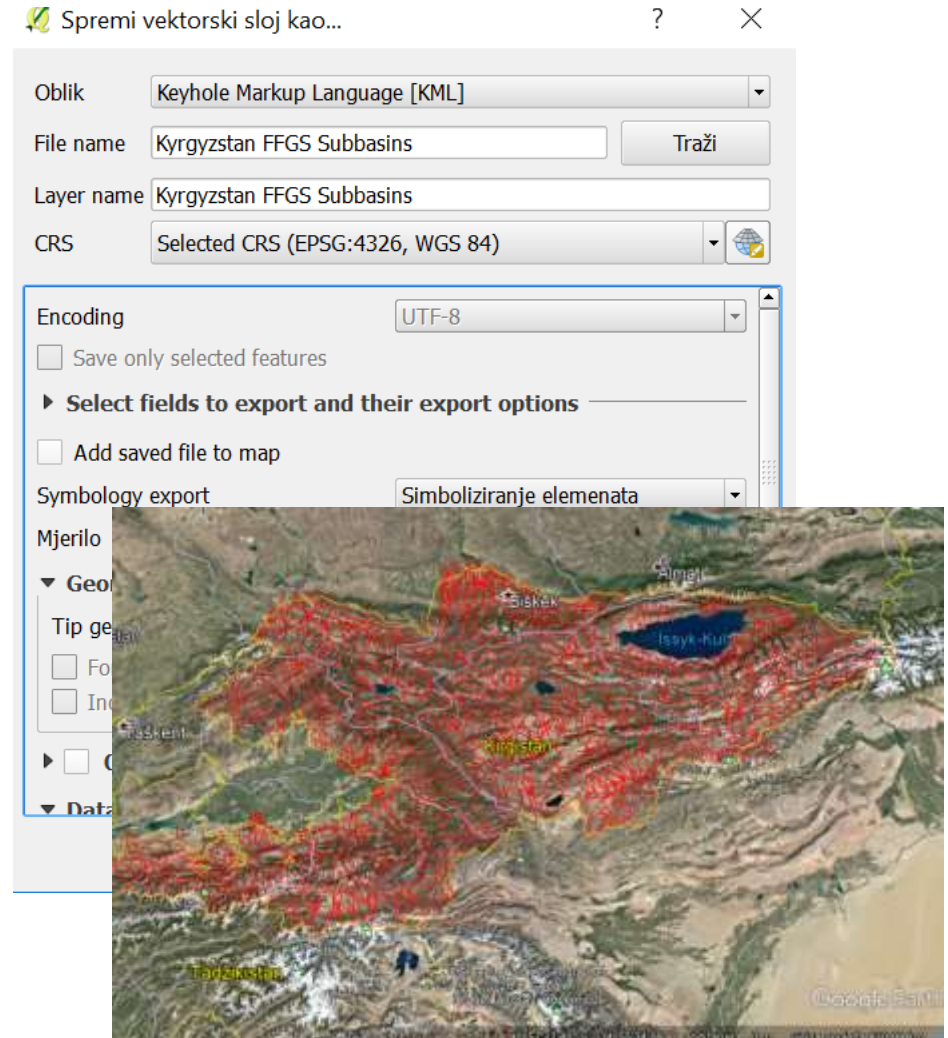
Thank you

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| **For more information please visit:** | **http://www.wmo.int/ffgs** |
| | **http://www.hrcwater.org** |

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