

### Exercise 3-3: Creating a prescription map ( $P_2O_5$ )

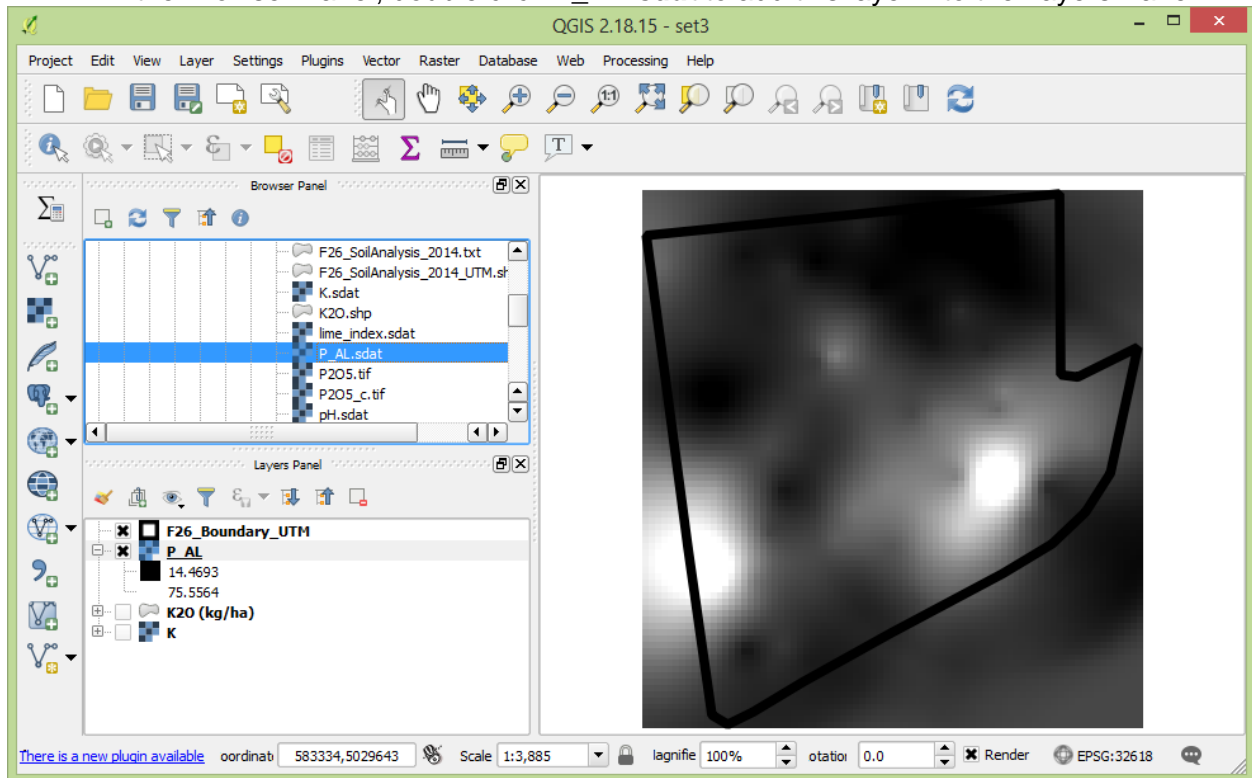
Mapping objectives:

- Create a  $P_2O_5$  prescription map based on the variability of the soil P/Al ratio

Data folder: Dataset3

Part 1: Add the interpolated soil P/Al ratio map to QGIS

1. Open the project **set3.qgs**
2. In the Browser Panel, double click **P\_AL.sdat** to add this layer into the Layers Panel



Part 2: Create a  $P_2O_5$  prescription map according to the soil P/Al ratio

1. The formula used to determine  $P_2O_5$  (kg/ha) prescription rate

$$P_2O_5 = \begin{cases} 0 & , \text{if } r_{P/Al} \geq 20 \\ (20 - r_{P/Al}) \cdot 4 & , \text{if } r_{P/Al} < 20 \end{cases}$$

$$r_{P/Al} = \frac{P}{Al} \cdot 112$$

where  $r_{P/Al}$  is the ratio of phosphorus to aluminum, P is the soil phosphorus content (ppm) and Al is the soil aluminum content (ppm).

2. **Creating a P205 raster layer using the above formula.** In Main Menu, go to Raster > Raster Calculator
  - a. Double click P\_AL@1 to add this layer to the expression area
  - b. Form the expression as:  $(20 - "P\_AL@1") * 4 * ("P\_AL@1" < 20)$

(In this expression, ("P\_AI @1" < 20) means all cell value small than 20 will be set to 1 and the rest will be set to 0)

- c. Output layer = **P205**
- d. Click OK

**Raster calculator**

**Raster bands**

K@1  
P\_AI@1

**Result layer**

Output layer: 23\_QGIS\_F26\_Tutorial/Data/dataset3/P205

Output format: GeoTIFF

Current layer extent

X min: 582900.10631, XMax: 583305.10631  
Y min: 5029568.62734, Y max: 5030003.62734  
Columns: 81, Rows: 87

Output CRS: Selected CRS (EPSG:32618, WGS 84 / UTM zone 18N)

☒ Add result to project

**Operators**

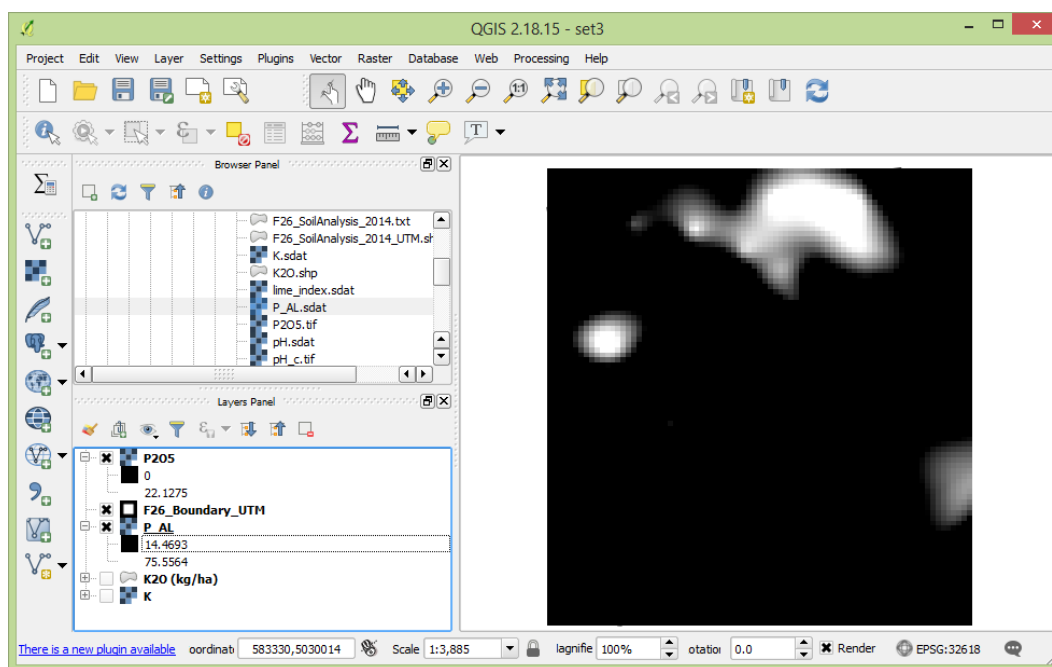
+ \* sqrt cos sin tan log10 (   
- / ^ acos asin atan ln )   
< > = != <= >= AND OR

**Raster calculator expression**

( 20 - 'P\_AI@1' ) \* 4 \* ( 'P\_AI@1' < 20 )

Expression valid

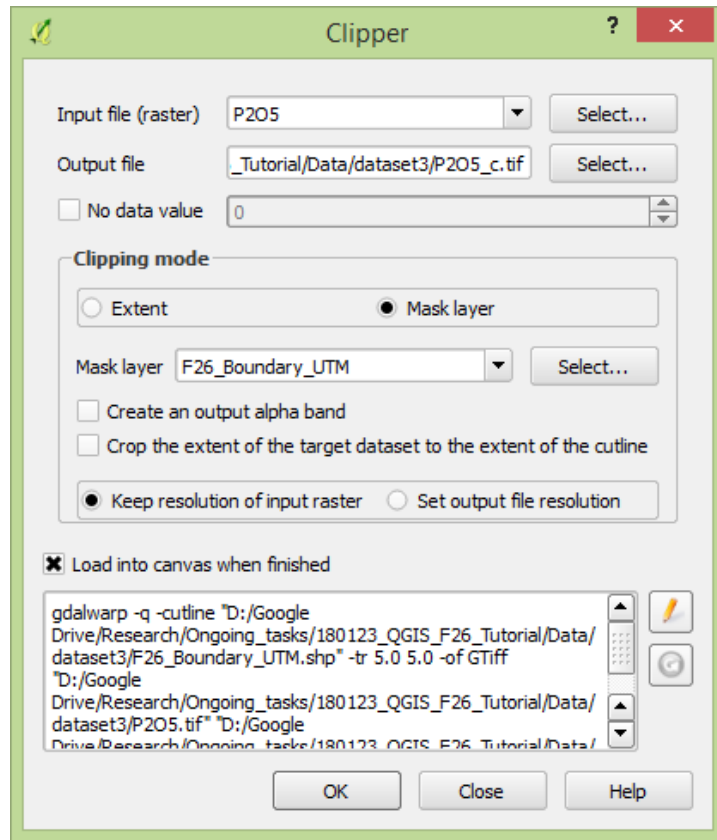
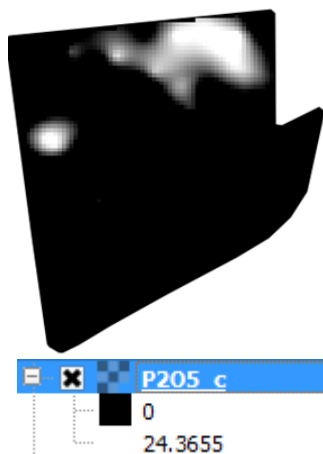
OK Cancel



3. **Clipping the raster data to the field boundary.** In Main Menu, go to Raster > Extraction > Clipper

- a. Input layer = **P2O5**
- b. Output file = **P2O5\_c**
- c. Clipping mode = Mask layer
- d. Mask layer = **F26\_Boundary\_UTM**
- e. Check Keep resolution of input raster

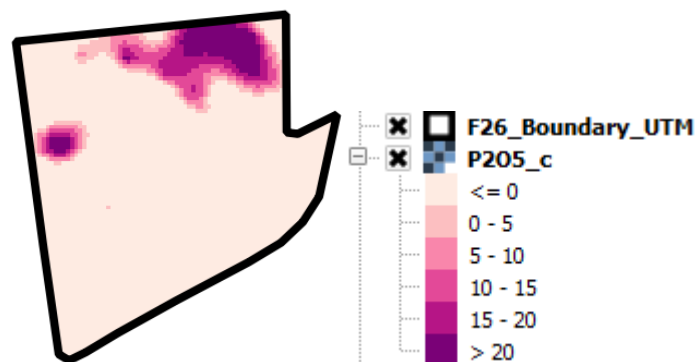
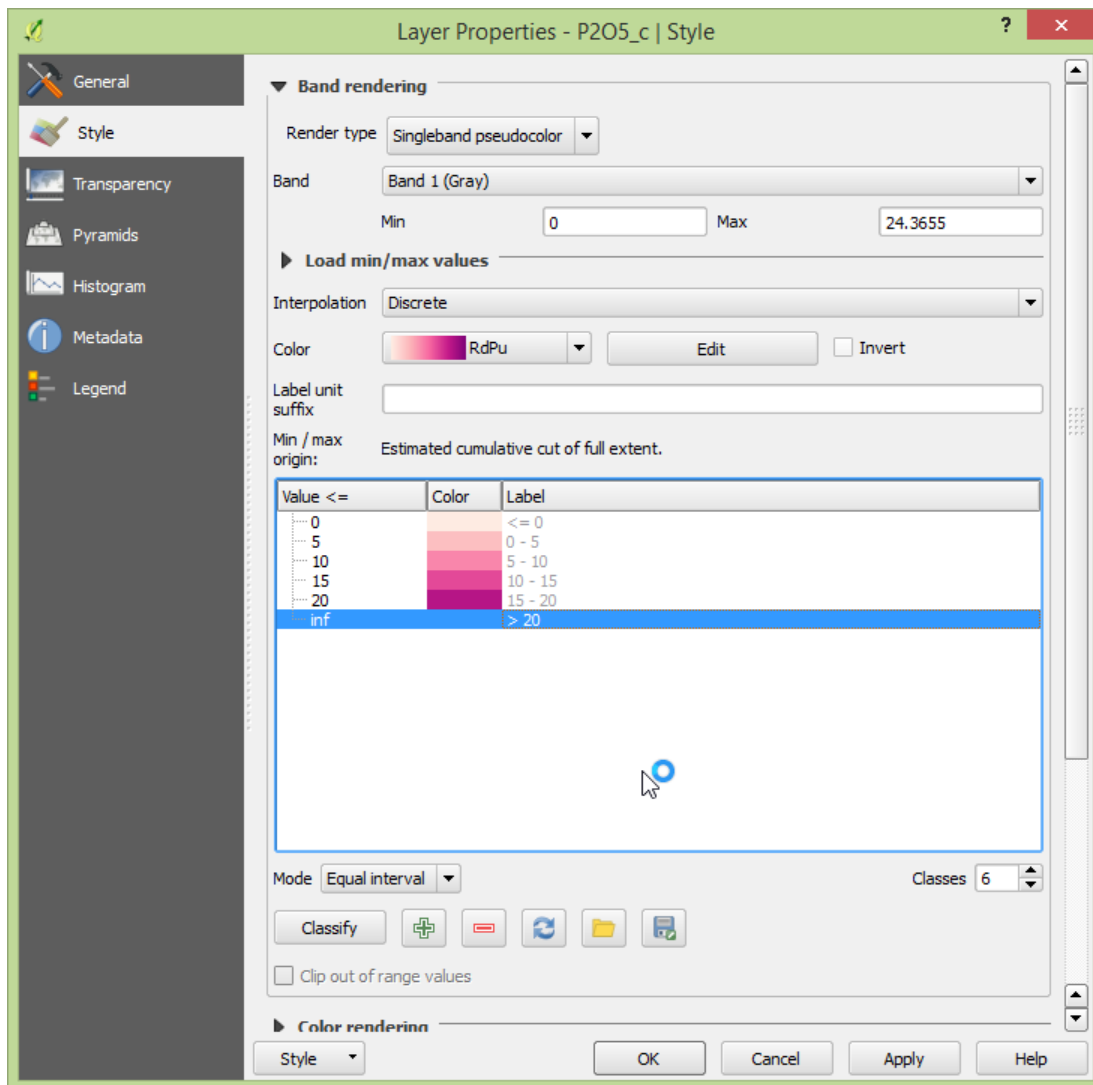
Click OK



4. **Viewing the raster layer in categorized color.** In the Layer Panel, right click **P2O5\_c** layer and click Properties

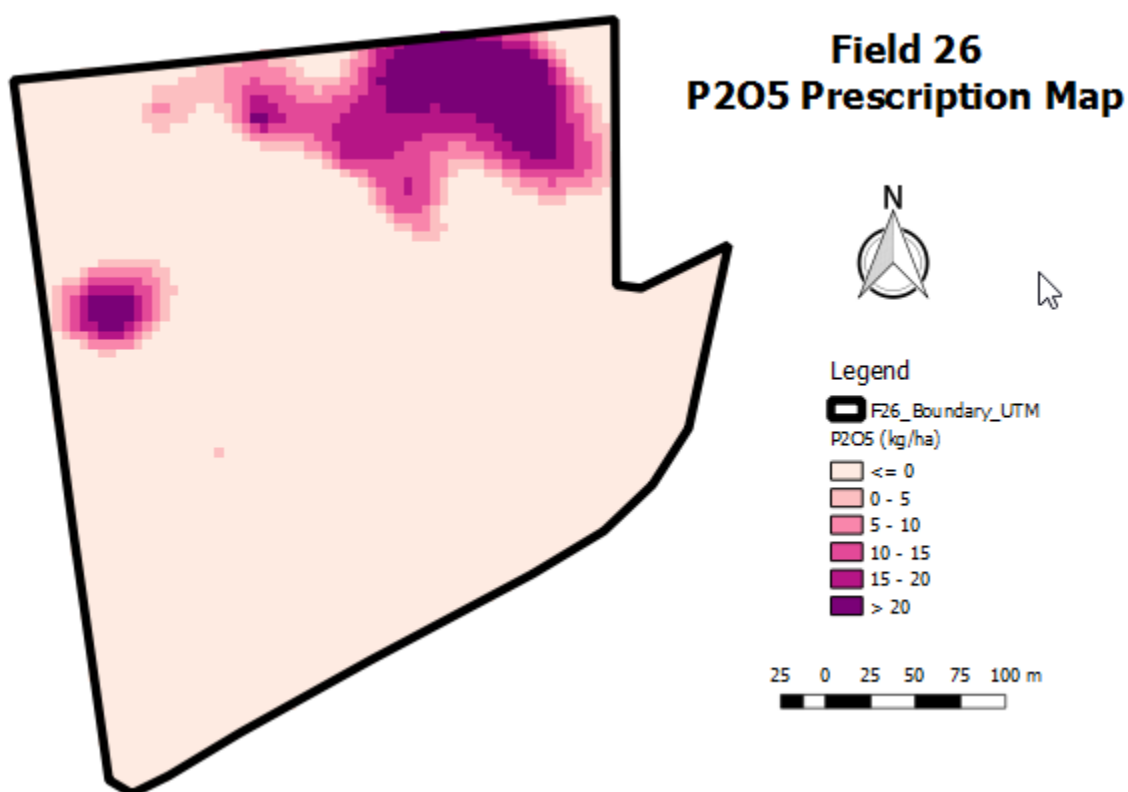
- a. Style = Singleband pseudocolor
- b. Load min/max values  
Interpolation = discrete  
Color = RdPu  
Value < =  
0  
5  
10  
15  
20  
Inf  
Classes = 5

Click OK



### Part 3: Produce a P<sub>2</sub>O<sub>5</sub> layout map

1. In the Layers Panel, rename **P2O5\_c** as **P2O5 (kg/ha)**
2. Create a P2O5 prescription layout map following the same steps as described in exercise 3-1.



3. Save the project