Geog 172
Lab 4

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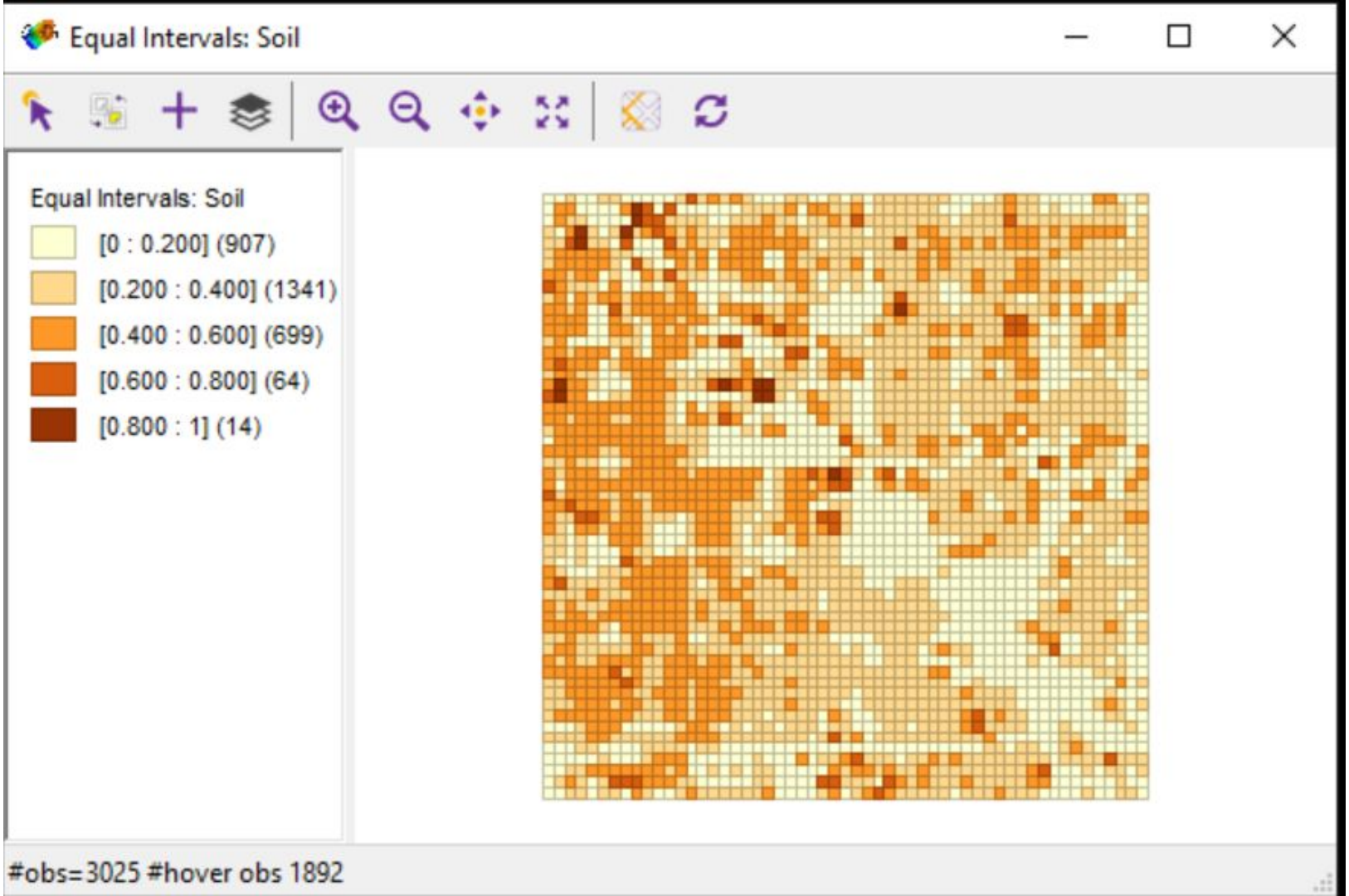
Lab 4

- Data: Phoenix, AZ land surface temperature and land cover type (raster grid)
- Continuing ot using GeoDa
- Exploring regression - discussed this week & next week in lecture
  - Create maps of dependent and independent variables
  - Carry out simple and multiple linear regression analyses (aspatial)
  - Carry out spatial autocorrelation and spatial regression analyses

- Dependent variable: land surface temperature
- Independent variables: percentage of land covered by buildings, roads, trees, grass, lakes


Equal Intervals: Soil
Equal Intervals: Soil
[0 : 0.200] (907)
[0.200 : 0.400] (1341)
[0.400 : 0.600] (699)
[0.600 : 0.800] (64)
[0.800 : 1] (14)
#obs=3025 #hover obs 1892

Simple regression

- Studies the causal relationship between a dependent variable (y) and one independent variable (x)
- Fit a straight line through a set of observed points
- Important components of regression report (refer to lecture for details):
  - Slope of the regression line: used to predict dependent variable value for an inputted independent variable value
  - R-squared: variation in observed values of the dependent variable which is explained by the regression line
  - F-test: has a significant proportion of variation in the dependent variable been explained? (assessing quality of R-squared) - look up critical F-statistic value based on number of observations

Regression Report

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>>08/26/20 21:44:16
REGRESSION
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SUMMARY OF OUTPUT: ORDINARY LEAST SQUARES ESTIMATION
Data set            :  Temp_LC
Dependent Variable  :        Temp  Number of Observations: 3025
Mean dependent var  :     56.5698  Number of Variables   :    2
S.D. dependent var  :     2.57059  Degrees of Freedom    : 3023

R-squared           :    0.000004  F-statistic           :   0.0113173
Adjusted R-squared  :   -0.000327  Prob(F-statistic)     :    0.915158
Sum squared residual:     19988.9  Log likelihood        :    -7148.29
Sigma-square        :     6.61226  Akaike info criterion :     14300.6
S.E. of regression  :     2.57143  Schwarz criterion     :     14312.6
Sigma-square ML     :     6.60789
S.E of regression ML:     2.57058

--------------------------------------------------------------------------------
      Variable      Coefficient      Std.Error    t-Statistic    Probability
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      CONSTANT        56.5612      0.0937573        603.273      0.00000
          Soil     0.0299135       0.281187       0.106383      0.91516
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REGRESSION DIAGNOSTICS
MULTICOLLINEARITY CONDITION NUMBER   3.743601
TEST ON NORMALITY OF ERRORS
TEST                 DF           VALUE             PROB
Jarque-Bera           2        15529.9498          0.00000
```

Looking forward to multiple & spatial regression...

- Regression is easier to visualize with only 1 independent variable
- Realistically, we usually want to include several independent variables
- If we find evidence of spatial autocorrelation, we also want to correct for spatial relationships in the data
- This will be covered in detail in lecture