Final project for Micro credentials

We consider the data of American pikas in the Great Basin, USA from the article “Distribution, climatic relationships, and status of American pikas (Ochotona princeps) in the Great Basin, USA”. The main data set is contained in “Appendix 3: Master Database -- Extant Great Basin Pika Sites, Published and Unpublished Sources.” This file contains the following information about the extant sites of pikas:

This data file contains the following variables: ID, Mountain_Range, Location, State, Elevation site specific, elev_low, elev_high_, aspect, surveyyear, citation.

The variables that we are interested in are the following:

1) Mountain Range,
2) Location: Specific location of the extant site in the Mountain range,
3) State: where the extant is located,

and the following quantitative data:

1) Coordinates: latitude and longitude of the extant site.
2) Elevation site Specific (in meters): elevation (specific or mean) of the extant site.
5) Aspect (in degrees): the direction (angle) of the location of the extant site measure from North.

Due to climate change, it is possible that pikas moved to higher elevations. Hence, in this project, we ask the following question:

1. Does the elevation of extant site of pikas has increase during the period from 2005 to 2016?

In order to answer this question, we consider the variable ‘Elevation site Specific’ and we compute its minimum, maximum, and mean for each year in the ‘surveyyear’ variable. We focus on data from Sierra Nevada range. We plot this new data with respect to time (given in years). We also perform a t-test in order to see if there is a significant difference between the means of elevation in 2011 and 2017.

Also, we would like to see if there is a correlation between the ‘Elevation’ variable and the ‘Aspect’ variable, specifically,

2. Does the elevation of the extant site of pikas depend on the aspect?

To try to answer this question, we perform a linear regression in by using lm(), and additionally we plot out data to see if the linear model follows a linear pattern.