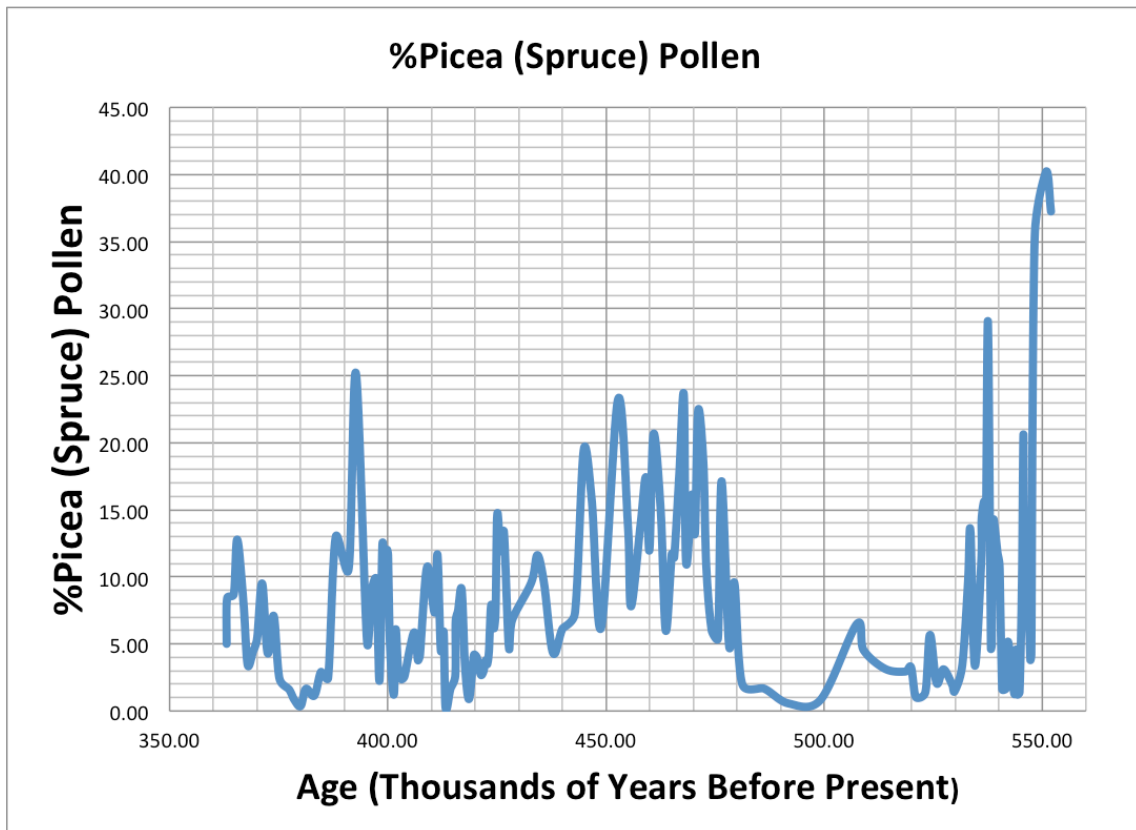
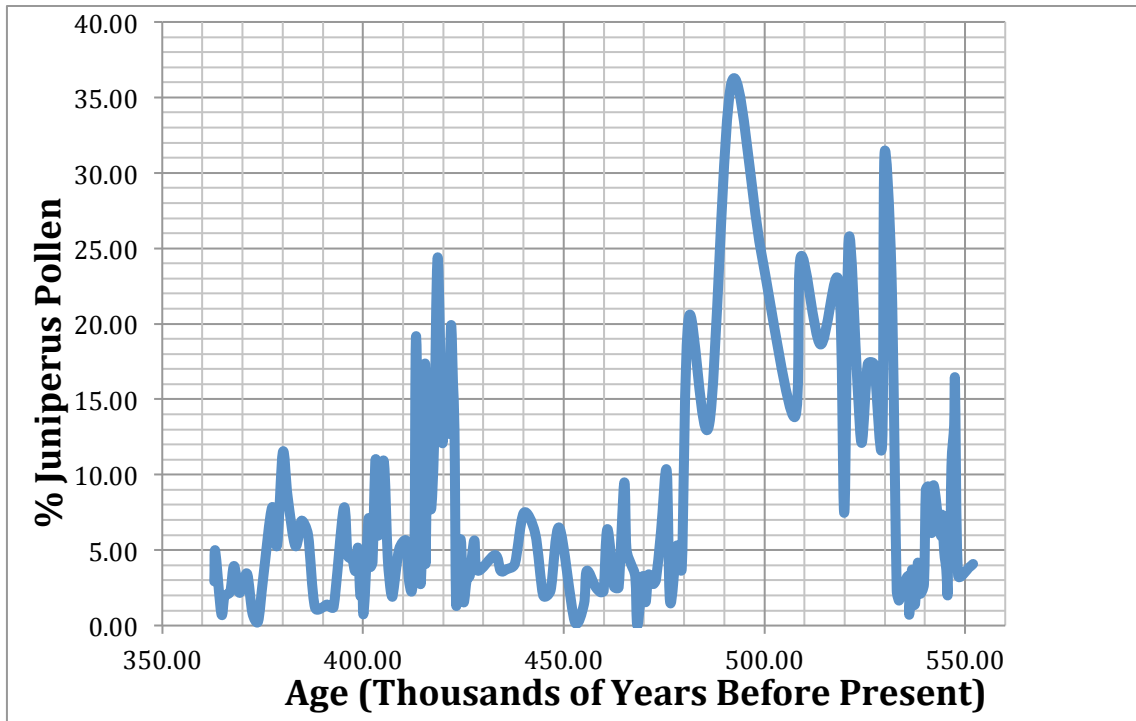


Student's Lab Sheet

What can *Juniperus* and *Picea* (Spruce) Pollen counts found in the Valles Caldera Cores tell us about Paleoclimates?



Graph created from data in the NOAA National Climatic Data Center
<http://www.ncdc.noaa.gov/paleo/pubs/fawcett2011/fawcett2011.html>

that was compiled by: Fawcett, P.J., J.P. Werne, R.S. Anderson, J.M. Heikoop, E.T. Brown, M.A. Berke, S.J. Smith, F. Goff, L. Donohoo Hurley, L.M. Cisneros-Dozal, S. Schouten, J.S. Sinninghe Damsté, Y. Huang, J. Toney, J. Fessenden, G. WoldeGabriel, V. Atudorei, J.W. Geissman, and C.D. Allen. 2011. Extended megadroughts in the southwestern United States during Pleistocene interglacials. *Nature*, Vol. 470, pp. 518-521, 24 February 2011. doi:10.1038/nature09839

The NOAA National Climatic Data Center provides a portal for researchers to share their data on climate. Dr Fawcett and his colleagues have analyzed sediment cores from the Valles Caldera to gain insights into past climates in order to compare and contrast with present day climate trends and to consider future climate changes. The graph of juniper pollen is only one tiny slice of the picture that proxy data can offer.

1. Go to the portal <http://www.ncdc.noaa.gov/paleo/pubs/fawcett2011/fawcett2011.html> and make a list of the different kinds of data Dr Fawcett and his colleagues have recorded.

2. In the pollens counts what were some of the other pollens? Describe the plant that produced the pollen? Do a web search to find out what the plant looks like and then decide if the plant would be an indicator of a warmer or cooler climate.

Picea

Abies

Juniperus

Quercus

Cyperaceae

Rosaceae

Artemisia

Using the pollen graphs of Picea (Spruce) and Juniperus (Juniper) answer the following questions.

3. Juniperus pollen was (on the rise or on the decline) 590 kyBP? Circle one

4. Picea (Spruce) pollen was (on the rise or on the decline) 590 kyBP? Circle one

5. List 3 times where Juniperus pollen was at a low point.

6. List 3 times when Picea (Spruce) pollen was at its lowest. How do the low points of Picea (Spruce) pollen compare to the Juniperus pollen?

7. When was Juniperus pollen the most abundant and record the approximate %?

8. Do a web search and see what you can find out about glacial period(s) during the Pleistocene. When was the glacial period that would have reached the Valles Caldera? List what you've discovered below.

9. Would you predict that the climate was colder or warmer at 550 kyBP than at 490 kyBP? Explain your answer.

10. You can see how paleontologist can use pollen as a proxy to "speak" for paleoclimate (old climate). Select another proxy from the data at

<http://www.ncdc.noaa.gov/paleo/pubs/fawcett2011/fawcett2011.html> and use Excel to graph the data.