

Written Homework – Module 5

Name:

- 1) Paleoclimate data reveal that ice ages in the high latitudes of the Northern Hemisphere coincide with colder summer temperatures that would inhibit the melting of ice. Which orbital extremes of the Earth would be most conducive in producing colder summers in the Northern Hemisphere?
- When the obliquity is at its maximum (24.5°) or minimum (22.1°) value?
 - When aphelion or perihelion occurs during summer?
 - When the eccentricity is at its largest (0.058) or smallest value (0.0034)?
- Explain your answers in terms of radiative equilibrium and deviations from it. There is a 600-character limit for each question.

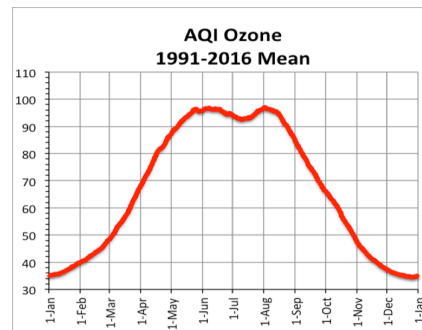


[Glacial maximum 15,000 years ago](#)

- 2) As noted in question #1, glacial growth in the higher latitudes of the Northern Hemisphere tends to occur with colder summers but not necessarily with colder winters. In fact, it turns out that glacial growth can be somewhat enhanced when winters are warmer. Explain how warmer temperatures during winter in high latitudes of the Northern Hemisphere could contribute to the growth of glaciers.

- 3) The graph to the right shows the daily average value of the Air Quality Index (AQI) for ozone in Phoenix, Arizona. Describe the two primary meteorological reasons why ozone levels are higher during the four calendar months (May-June-July-August) than the four months (Nov-Dec-Jan-Feb). Be certain that you explain how each factor contributes to the buildup. (Neglect any seasonal differences in the input of primary pollutants, the ultimate reason for photochemical smog, since such difference are not a meteorological reason.)

What is a likely meteorological reason for the dip in AQI in July? Sensible answers only please.



Air Quality Index (AQI) for ozone at Phoenix, Arizona. Data are from the Environmental Protection Agency.