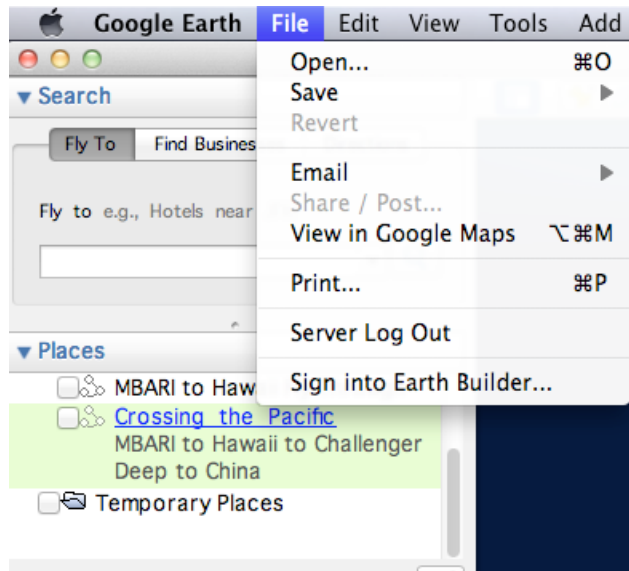


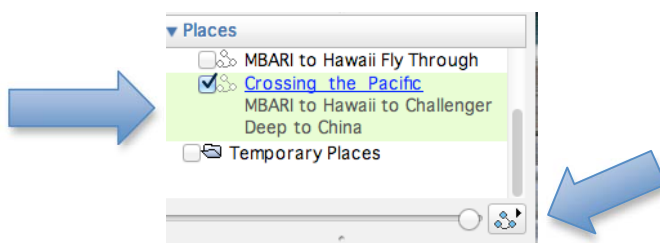
Google Earth Bathymetry Methodology

Requirements: Google Earth
Microsoft Excel

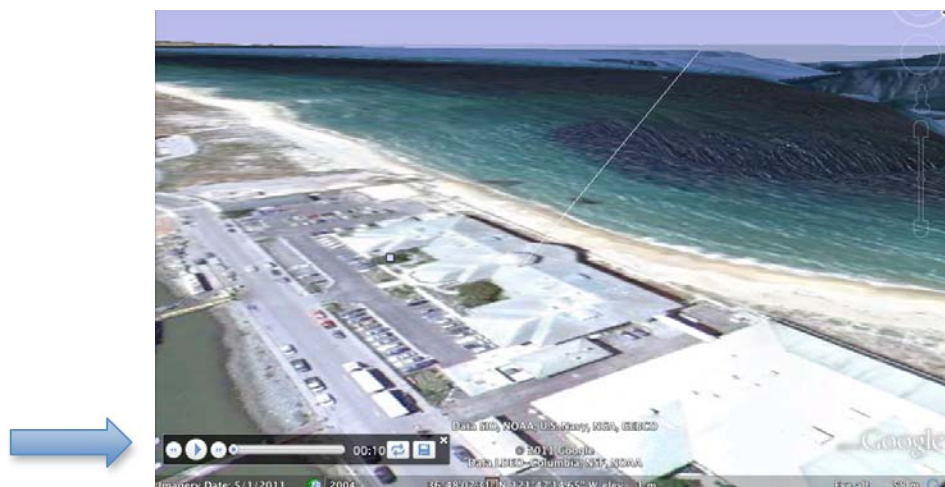
1. Download the *Crossing the Pacific .kmz file* from the MBARI website and open it in Google Earth.



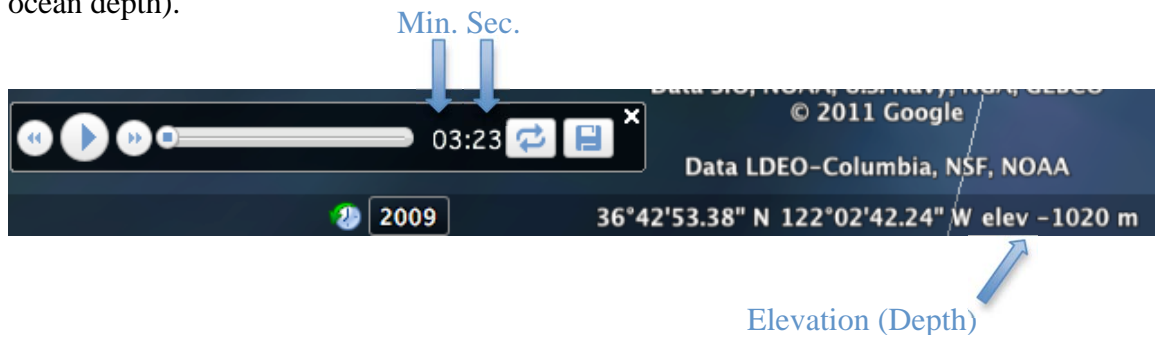
2. Play the *Crossing the Pacific* fly-through by checking the box to the left of the title and then clicking on the box with three circles in the lower right side of the places section.



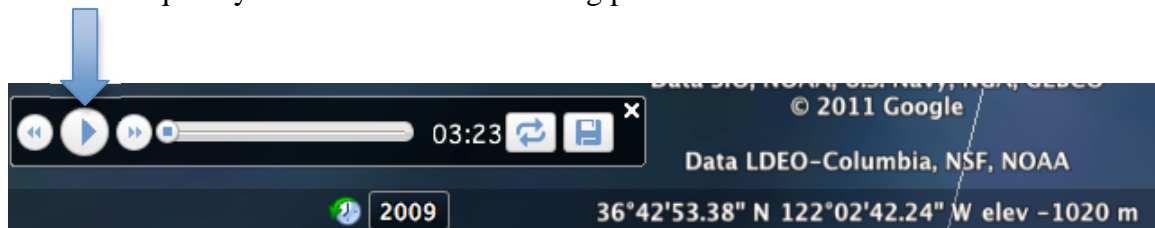
3. The control box will open in the map window and Google Earth will fly to the beginning of the trip.



- The time is located at the end of the play bar and is shown in minutes. Below the control bar is the latitude and longitude, as well as elevation in meters (a negative elevation is the ocean depth).

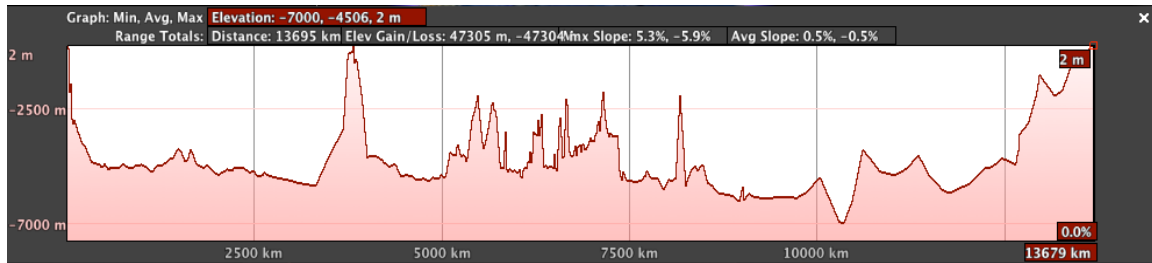


- The speed of the fly-through can be manipulated by clicking on the double arrow buttons. Each time they are clicked the speed will be increased. This can be very helpful for students to quickly move to the next recording point.



- Have students record the depths every fifty minutes as the virtual fly-through continues across the Pacific Ocean. As the fly-through is approximately 2,070 minutes (13,400 kilometers) long, recording a depth every fifty minutes will result in a very low resolution profile so it is recommended that a few additional depth points are recorded for the following major features (by fly-through time):
 - ✦ North American continental margin (00:00 → 10:00) record once per minute. (ten data points)
 - ✦ Hawaii (567:00 → 591:00) record every two minutes, but make sure students recognize the above sea level measurements of the land. (14 data points)
 - ✦ Mariana Trench (Challenger Deep) (1563 → 1582) record once per minute. (19 data points)
 - ✦ Southeast Asia continental margin (1900:00 → 2070:00) record every ten minutes. (17 data points)
- After students complete collecting data points on time and depth, they can create an Excel spreadsheet and make a line graph to show the profile of the Pacific Ocean.

8. Have the students compare their graph to the actual profile that can be seen by clicking *edit>show elevation profile* in Google Earth. This will show a detailed profile of the entire fly-through.



**Notes: To enhance the view of the fly-through in Google Earth, it is suggested that you turn off all other layers, as well as the water surface, which is found under the *view* menu.

9. Students can now begin to make their own fly-through across a different section of the Pacific Ocean or another ocean altogether.
 - a. Have them zoom in on their starting point and click the path button on the top of the Google Earth map screen. Then click the point on the map they would like to begin.



- b. Then, zoom to the ending point on the map and click again to finish the path. Multiple points may be clicked to follow contours of the ocean bottom if they wish.
 - c. On the Google Earth *New Path* box, the student should title their path
 - d. Click on the altitude tab and change the clamp to ground button to read clamp to sea floor.
 - e. Lastly, click on the measurement tab and change the units from miles to kilometers.
 - f. Save the path and watch the new fly-through.
10. Students can show the elevation profile of their new path and compare it to the trans-Pacific path they graphed earlier.