

## Fox Module 5: Multivariate displays

### *Practice problems: Conditioning plots*

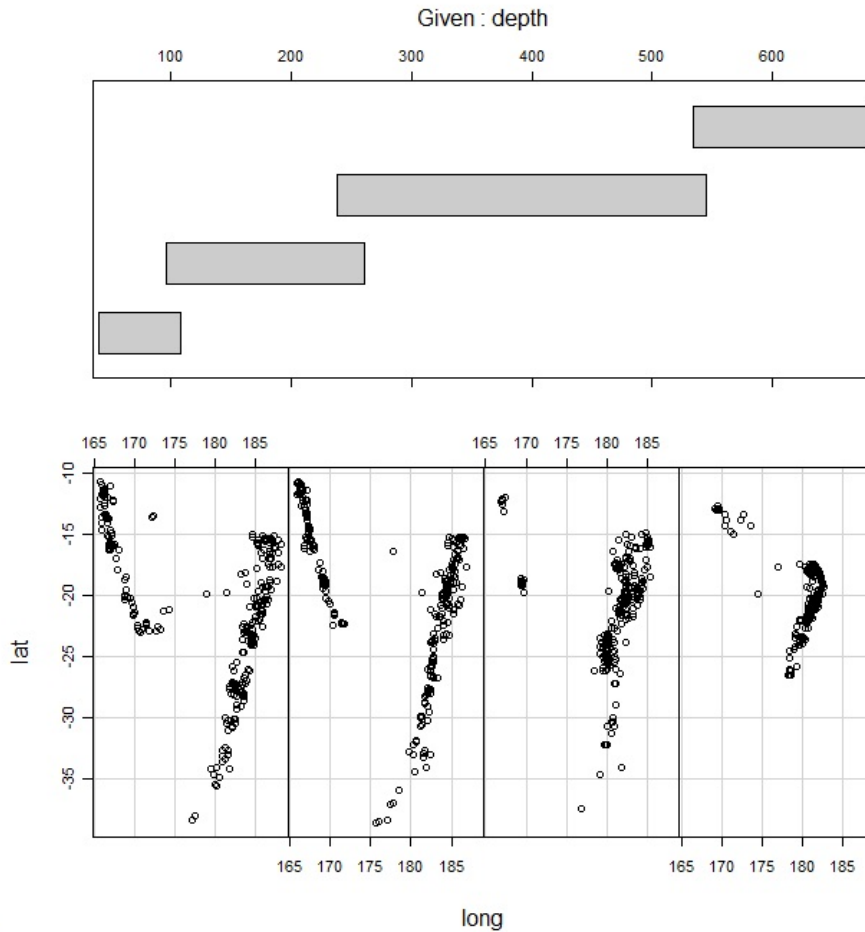
For Section 3.3.4, “Conditioning plots,” on pages 46-47.

Conditioning plots are scatterplots conditioned on values of one or more other variables. The conditioning plot below is from a book by William Cleveland. It shows the number of Tonga Trench earthquakes by latitude and longitude conditioned on the depth of the quake.

The depth values overlap 10%. The depths are chosen so that each group has about the same number of earthquakes.

- Earthquakes are common at depths of 0 to 100, so this depth has the smallest range.
- Earthquakes are rare at depths of 250 to 550, so this depth has the largest range.

Look at the latitudes and longitudes carefully. You can see how the depths change along the Tonga Trench. Depths of 250 to 550 are not common, so a greater range is needed. The size of the range reflects both the area at that depth and earthquake frequency.



Question 1.1: Conditioning plots

The graphic below shows Tonga Trench earthquakes by longitude (horizontal axis) and latitude (vertical axis), conditioned on depth (below sea level) and magnitude.

Which of the following is true?

- A. Low magnitude (4.0 to 4.3) earthquakes are more likely at depths of 0-100; high magnitude (5.0 to 6.5) earthquakes are more likely at depths of 600.
- B. High magnitude (5.0 to 6.5) earthquakes are more likely at depths of 0-100; low magnitude (4.0 to 4.3) earthquakes are more likely at depths of 600.
- C. All earthquakes are more likely at depths of 0-100.
- D. All earthquakes are more likely at depths of 600.
- E. One can not relate depth to magnitude from this conditioning plot.

Answer 1.1: B

