OMISSION AND REPETITION

Purpose

To show how faulting causes omission and repetition of strata on the surface and in boreholes and to discover how dip direction and type of fault determine whether omission or repetition occur.

Each set of boards (3 pieces) represents a vertical section through the rocks, the top edge represents the surface of the ground.

Instructions

Activity I Outcrop data

1 Make out a table as follows with 16 empty rows:

Set no	Outcrop or borehole	Fault and strata have same or opposite dip directions	Normal or reverse fault	Omission or repetition of strata

2 Take one set and fill in first three columns.

3 Move the side with two parts upward so that the cut is level with the top of the other side and "erode" upthrown side so that the "ground surface" is level see diagram a.

4 Look at the beds outcropping and fill in the last two columns.

5 Replace the "eroded" piece, turn the pieces together through 180°

6 Fill in the first three columns and then do instructions 3 and 4

7 Choose another set and repeat instructions 2 to 6

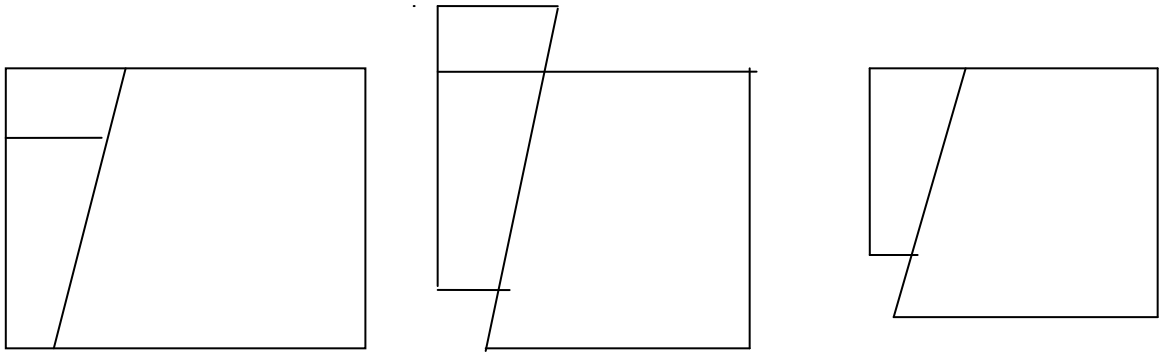
Activity II Borehole data

Imagine a borehole drilled vertically downwards so that it passes through the fault. Would the core recovered from the borehole show repetition or omission?

1. Take one set and fill in the first three columns.
2. Move the side with two pieces upwards.
3. Place a ruler vertically so that it cuts through the fault plane the edge of the ruler represents the borehole. Decide whether there is repetition or omission along the edge of the ruler and fill in the last two columns.
4. Do all the sets both ways up.

Using your results draw up a list the circumstances when you can expect repetition and when omission of strata.

Diagram a



original shape | after movement along fault | after erosion

Teacher's Section

Requirements

Eight pieces of A5 size hardboard cut and painted as in diagrams b and c. Each layer should be a different colour. The boards should be cut before being painted. Do not number or letter the beds as they will be used both ways up. The beds should have a variety of dips. If you paint 16 boards then they could be lettered which would make it easier for students. Two hours to make.

Notes

This can also be done as a scissors and paper exercise with the students copying the diagrams, cutting the faults and folding behind to "erode". Reverse and thrust faults have the same effect providing the beds have a shallower angle of dip than the thrust plane. Students find that detecting repetition is more difficult than the omission for surface outcrops because they have to imagine the outcrop will extend beyond the edge of the board.

Results

Normal faults with the strata and the fault having the same dip direction cause omission in outcrop and repetition boreholes.
Normal faults with the strata dipping in the opposite direction cause repetition in outcrop and omission in boreholes.
Reverse faults with strata dipping in the same direction cause repetition in outcrop and repetition in boreholes.
Reverse faults with the strata dipping in opposite directions cause omission in outcrop and repetition in boreholes

Time

20 minutes for four sets.

diagrams b and c