

5. STRUCTURE CONTOURS AND MAP PATTERNS

I Main Topics

A Structure contours

B Strike of beds on a geologic map with a topographic base

C Appearance of planar beds on a geologic map

D Appearance of folded beds on a geologic map with a topographic base

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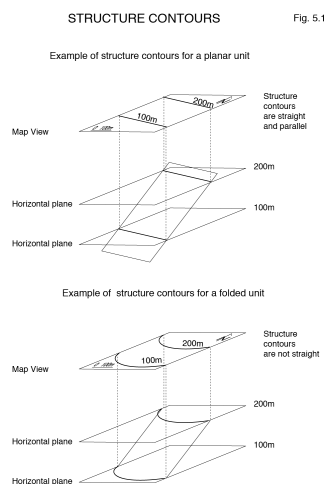
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5. STRUCTURE CONTOURS AND MAP PATTERNS

II Structure contours

A A line or curve (contour) that marks the intersection of a horizontal plane with some geologic surface; this surface need not be planar. Strike lines are tangent to structure contours (see Fig. 5.1).



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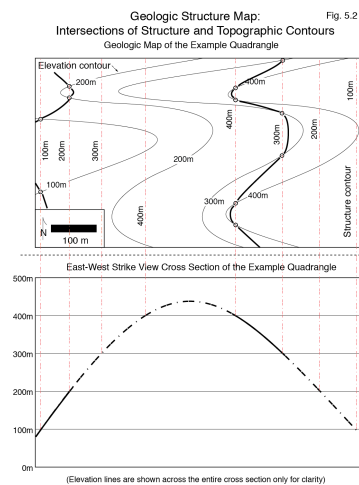
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II Structure contours (cont.)

- B A geologic map can be thought of as the collection of points marking the intersections between structure contours (red) and the corresponding black topographic contours.
- C See the “html help desk” for Matlab functions `surf` and `contour3`.



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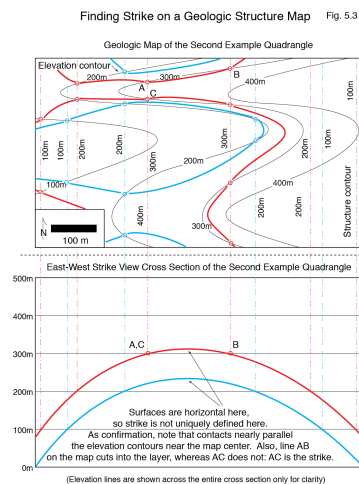
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III Strike of beds on a geologic map with a topographic base

- A Lines of strike are horizontal (i.e., a series of points of equal elevation). For a surface (or layer) of constant strike, a line of strike (i.e., a traverse at equal elevation) lies along the surface (or layer) rather than cutting across the surface (or layer); (see Fig. 5.3).
- B Lines of strike can be determined by locating where a contact intersects a given contour line in more than one point; these points of intersection lie along strike. This is easiest where a contact is steep.



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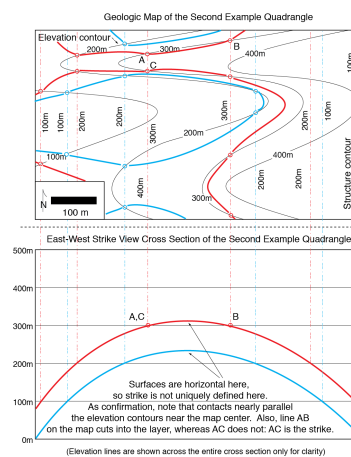
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Finding Strike on a Geologic Structure Map Fig. 5.3



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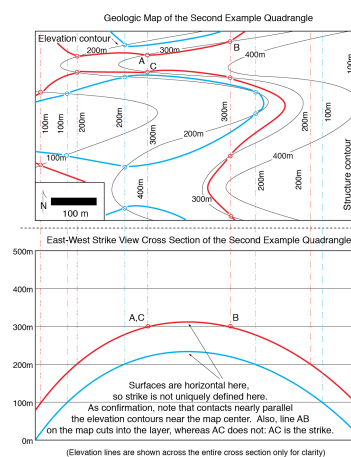
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III Strike of beds on a geologic map with a topographic base (cont.)

- B Lines of strike can be determined by locating where a contact intersects a given contour line in more than one point; these points of intersection lie along strike. This is easiest where a contact is steep.

Finding Strike on a Geologic Structure Map Fig. 5.3



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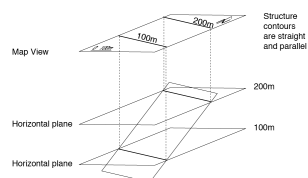
IV Appearance of planar beds on a geologic map

- A **Planar beds have a constant strike and a constant dip**
- B Strike lines along structure contours are parallel and straight
- C Strike lines along structure contours are evenly spaced
- D Dip direction is constant

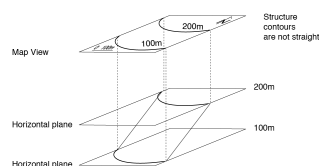
STRUCTURE CONTOURS

Fig. 5.1

Example of structure contours for a planar unit



Example of structure contours for a folded unit



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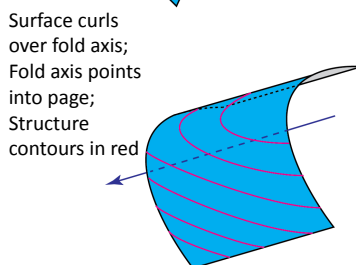
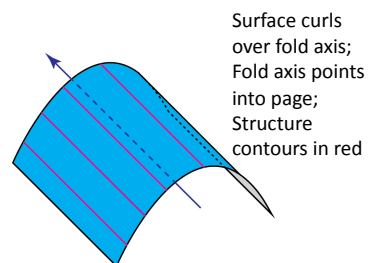
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V Appearance of folded beds on a geologic map

- A **The strike and/or dip of a folded bed varies with position**
- B Strike lines along structure contours might or might not be parallel; the strike of folded layers does not necessarily change.
 - 1 If strike lines are parallel, then the strike is constant ($\pm 180^\circ$) and the axis of the fold is horizontal
 - 2 If strike lines are not parallel, then the strike is not constant and the axis of the fold plunges (e.g., fold with a vertical fold)



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- V Appearance of folded beds on a geologic map (cont.)
- C If a folded layer changes dip, then strike lines along structure contours with a uniform contour interval will not be evenly spaced.
- D Dip direction and magnitude may or may not be constant (e.g., fold with a horizontal fold axis).
- E Cross sections and maps together are powerful 3-D visualization tools, whether on paper or on a computer.

