

Roland + Dueben doifer structural analyses + synthesis, 2nd edition

The map shows three groups of rocks: Mesozoic metabasalt, serpentine, and Tertiary sandstone. The serpentine occurs as a continuous band between the metabasalt and the sandstone in the southwestern part of the map and as a small patch within the sandstone in the northern part of the map. The original interpretation (Fig. 4.1b) accounts for the northern outcrop of serpentine as occurring in the core of a partially eroded anticline. Further field work has shown, however, that the northern patch of serpentine is more probably a large landslide block that long ago slid off the southern serpentine mass (Fig. 4.1c). Far from being a trivial difference, these two interpretations imply rather different styles of folding as well as predicting completely different stability and permeability characteristics for the entire length of the anticlinal axial trace.

When you are drawing structure sections remember that it should be geometrically possible to unfold the folds and recover the fault slip in order to reconstruct an earlier, less deformed or undeformed state. In other

words, your structure section should be *retrodeformable*. Structure sections in which great care is taken concerning retrodeformation are called *balanced structure sections*. An introduction to the construction and retrodeformation of balanced structure sections is presented in Chapter 15. For many situations, if you make sure that sedimentary units maintain a constant thickness (unless you have evidence to the contrary) and that the hanging walls of faults match the footwalls, you will be on the right track.

Drawing a topographic profile

The first step in constructing a geologic-structure section is drawing a topographic profile along the line of section. Topographic profiles show the relief at the earth's surface along the top of the structure section. Problems 4.1 through 4.3 in this chapter are relatively simple structure sections in which the topographic profile is provided. Problem 4.4 involves the construction of two structure

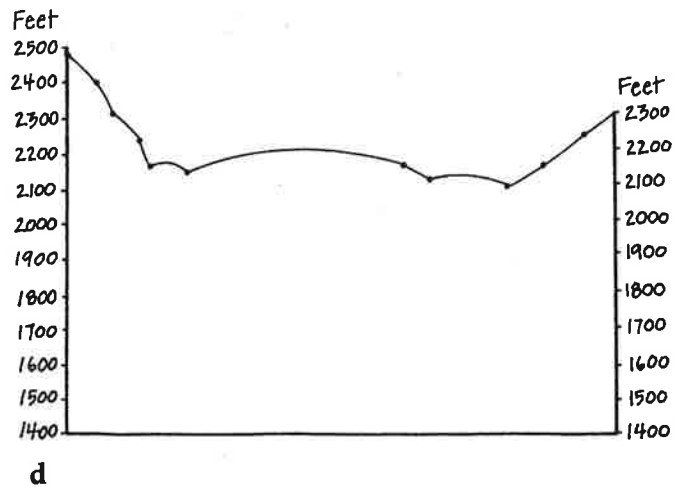
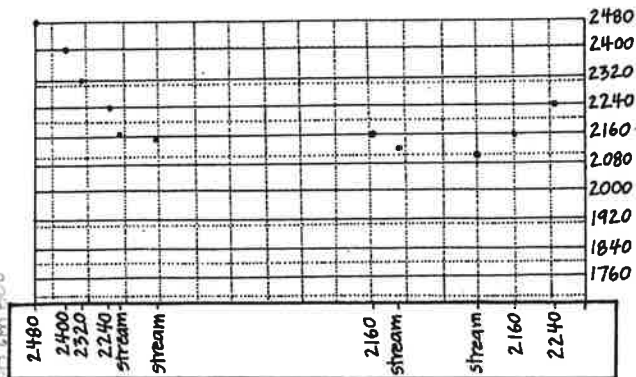
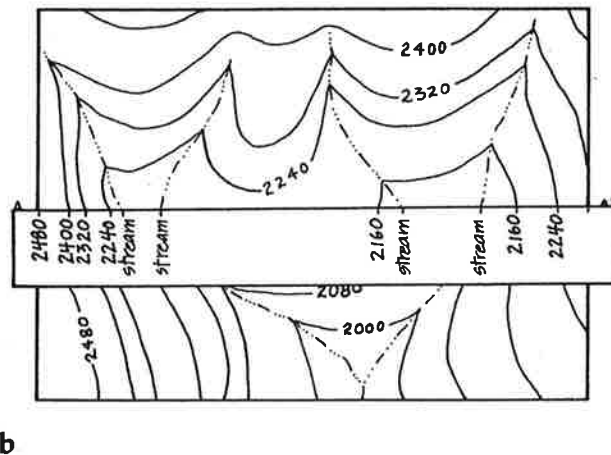
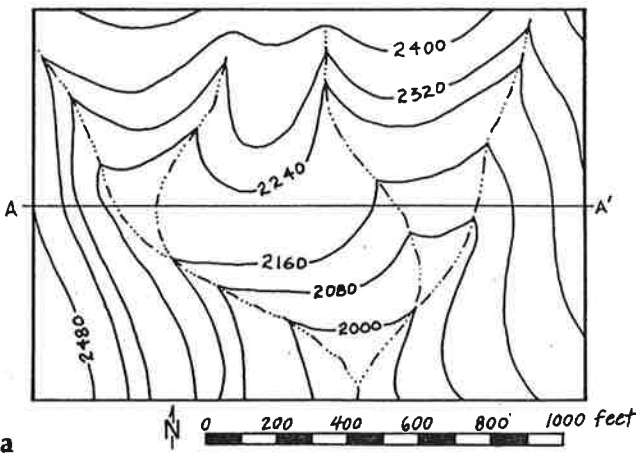


Fig. 4.2 Drawing a topographic profile. (a) Draw section line. (b) Transfer contour crossings, streams, and other features to paper. (c) Plot points on paper onto graph paper. (d) Connect points.