This example is on the northwest dipping forelimb of the major Greasy Cove-Wills Valley anticline in the southern Appalachian fold-thrust belt. The regional dip of the forelimb of around 30° northwest is seen outside the map area. On the azimuth-dip diagram (Fig. 9.26A1), the dips from the map area show a vertical scatter trend along the dip direction of the forelimb, as expected for a fault parallel to regional strike. The T direction is 310 and the L direction is 220. The dip components are determined from the T and L directions (Table 9.3A).

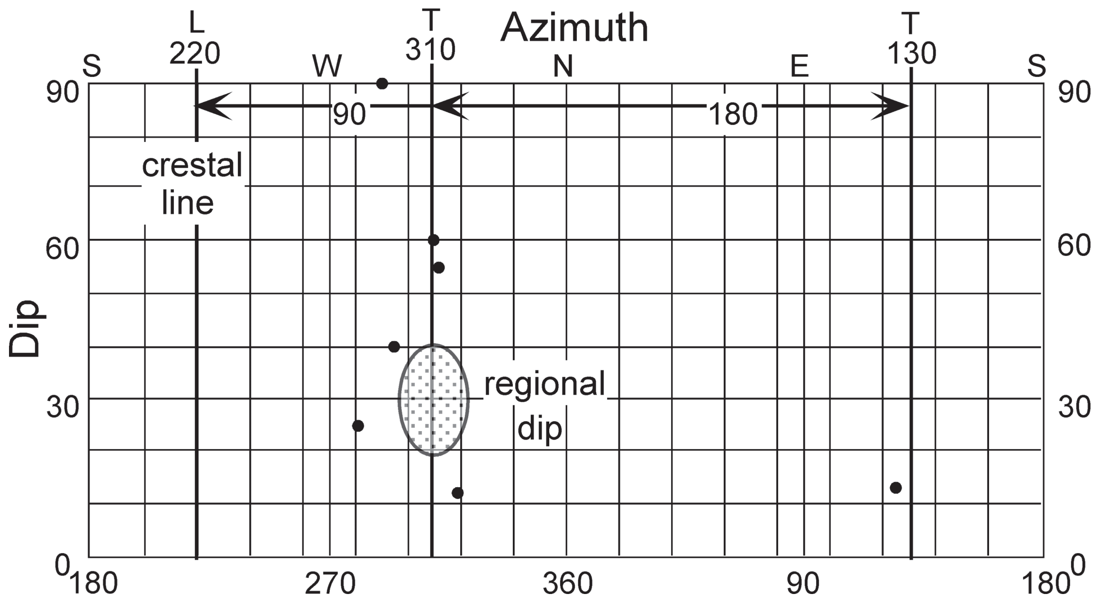

Fig. 9.26A1. Dip-Azimuth diagram for the Bald Hill map area

Table 9.3A. Dip traverse data from the Bald Hill map area. Dips of 90° are at infinity on the tangent diagram

Distance from the northwest (km)	Attitude Dip, azimuth	T component	L component
0.54	60, 310	60 NW	0
0.70	90, 289	NW	SW
0.90	55, 311	55 NW	2 NE
1.10	40, 295	38 NW	12 SW
1.30	14, 124	13 SE	4 NE
2.38	12, 319	12 NW	3 NE
2.68	26, 281	23 NW	15 SW

The azimuth distance diagram (Fig. 9.26A2a) shows the regional northwesterly dip with one aberrant point that dips to the southeast. The dip-distance diagram (Fig. 9.26A2b) shows a high degree of scatter that does not suggest any interpretation. The component plots significantly clarify the interpretation. Dips over about 80° are not practical to break into components because of their extreme magnitude, and so the 90° dip is shown on the component plots as an open circle at the edge of the diagrams. The T component plot (Fig. 9.26A2c) suggests the cusp pattern of a fault, with the fault being close to the fourth point (40, 295). The L component plot (Fig. 9.26A2d) shows moderate scatter around zero, indicating that the direction of the plunge was chosen correctly. The map as originally given by Burchard and Andrews (Fig. 9.26A3) shows a fault between dip measurements 4 and 5, in the predicted location. This fault runs nearly parallel to bedding and neither removes nor repeats a formation boundary. ▸

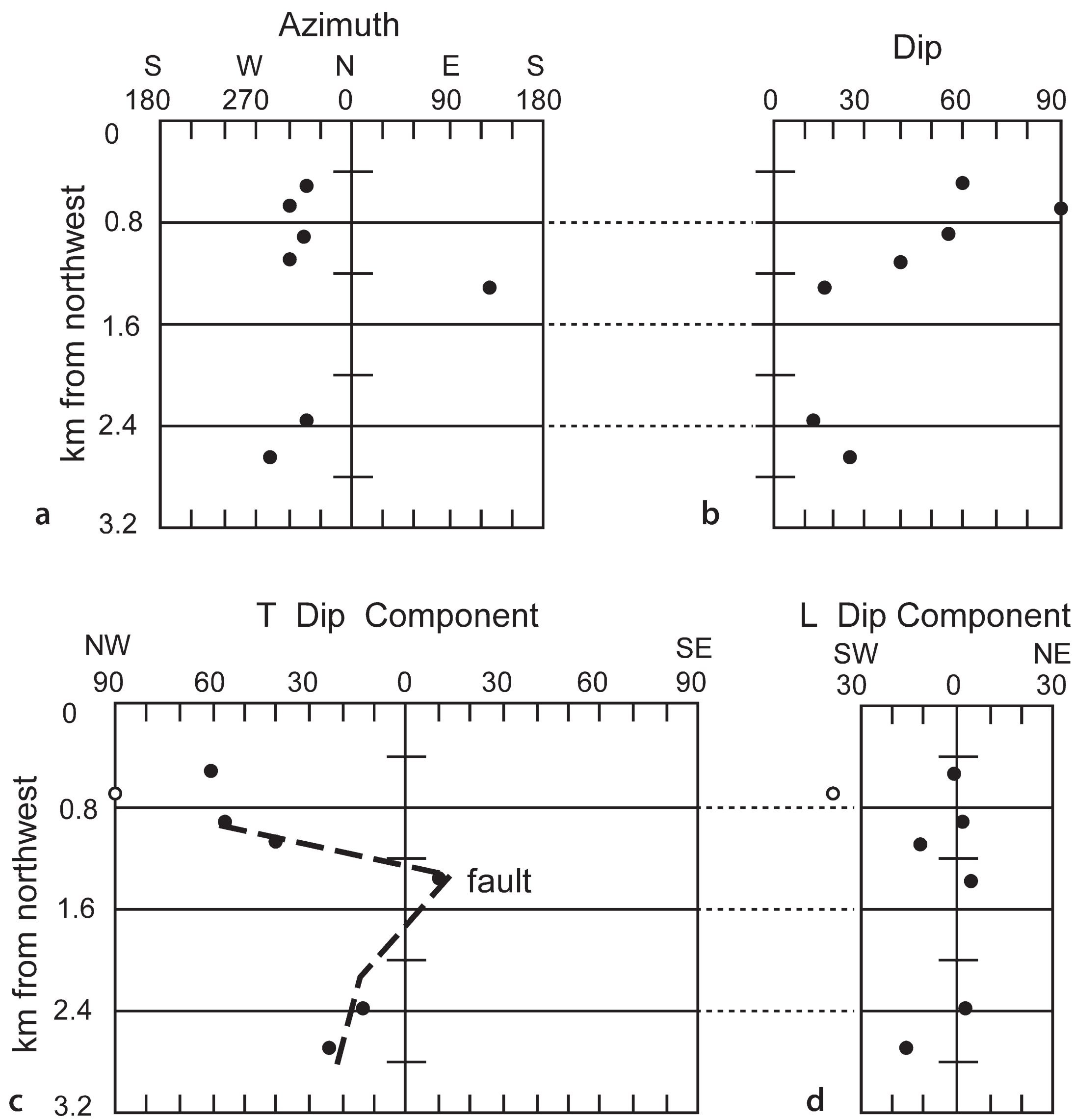

Fig. 9.26A2.
Dip sequence analysis of a portion of the Greasy Cove anticline. **a** Azimuth-distance diagram. **b** Dip-distance diagram. **c** T component dip-distance diagram. *Open circle* is the 90° dip which plots off scale. **d** L component dip-distance diagram. *Open circle* is the 90° dip which plots off scale

From the dip sequence analysis alone, the fault could be either normal or reverse. If the fault is normal it should dip in the direction that the cusp points on the T component plot, that is, to the southeast. If the fault is reverse, it should dip to the northwest, opposite to the direction of the cusp. Which is the more reasonable interpretation?

The best choice of the fault dip direction and sense of separation can be inferred from the local structural style. The first-order structure in the Bald Hill area is an anticline produced by northwest-southeast horizontal compression. A large reverse fault crops out in the forelimb of the anticline to the northeast along strike. This reverse fault dips to the southeast, as is usual for the major thrusts in the forelimbs of Appalachian folds. A preliminary hypothesis might be that the fault at Bald Hill is also a southeastward dipping reverse fault. The dip traverse analysis indicates, however, that the fault cannot both be southeastward dipping and have a reverse separation. If the dip is to the southeast, it should be a normal fault. Normal faults parallel to the strike are virtually unknown in Appalachian folds whereas second-order conjugate thrusts are relatively common. Thus, the favored interpretation would be that the fault is reverse and, from the dip traverse analysis, dips to the northwest (Fig. 9.26A4). Along strike to the southwest from the map area in Fig. 9.26A3, both the bedding and the fault dip to the northwest where they "V" across a valley, in agreement with the interpretation of Fig. 9.26A4.

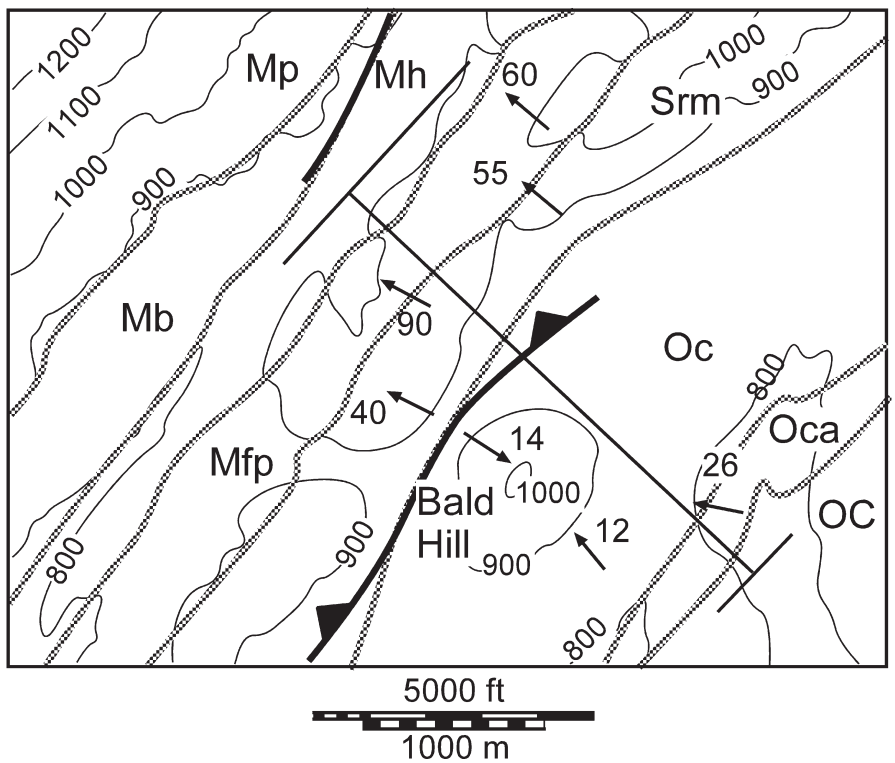

Fig. 9.26A3.
Geologic map of the Bald Hill area. Topographic contours (in feet) are *thin lines*; geologic contacts are *wide gray lines*; faults are *heavy solid lines*. The fault at Bald Hill is interpreted to be a thrust that dips to the northwest. (After Burchard and Andrews 1947)

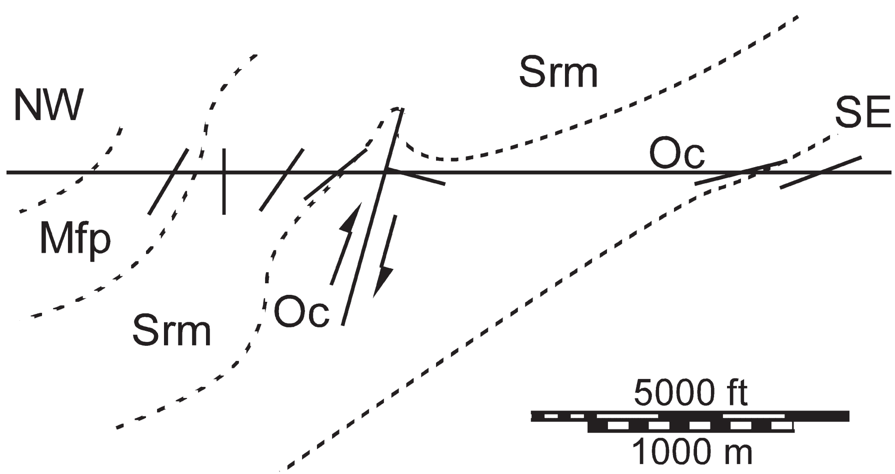

Fig. 9.26A4.
Speculative cross section along the dip traverse across Bald Hill showing the T component dips and the inferred fault. The fault dip amount and separation are unknown