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“PULL-APART” ORIGIN OF THE CENTRAL SEGMENT OF DEATH VALLEY, CALIFORNIA

Abstract: The deep central segment of Death Valley, California, may be related to strike-slip faulting along the Death Valley fault zone. The trend of the fault zone along the central segment of Death Valley

is slightly oblique to the fault trend elsewhere, and strike-slip movement may have caused a “pulling apart” of the two sides of the valley along this obliquely oriented segment of the fault.

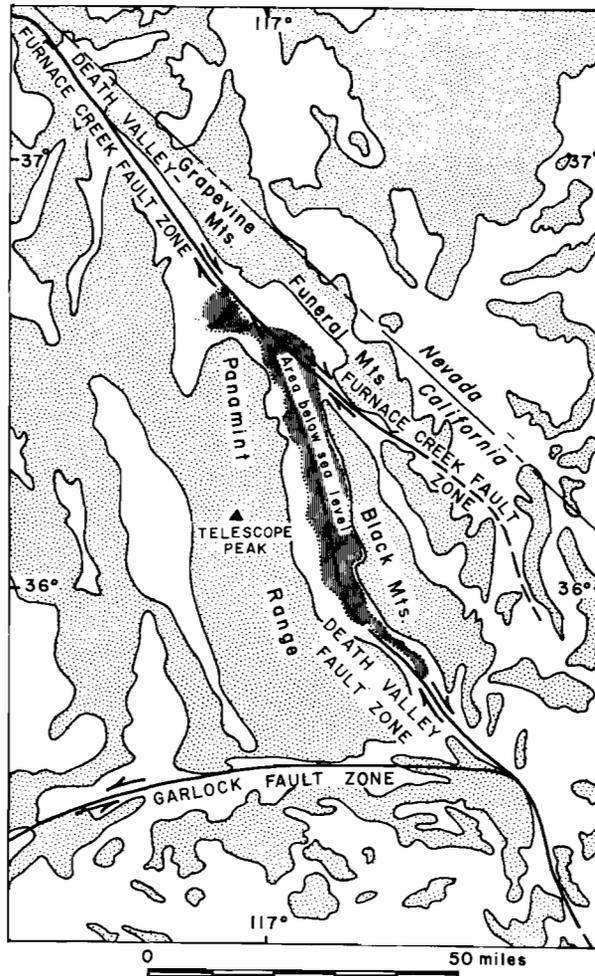


Figure 1. Map showing major fault zones in Death Valley area, California

The significance of strike-slip faulting in the Death Valley area of California has recently been discussed by Hill and Troxel (1966), Wright and Troxel (in press), and Stewart (in press). Hill and Troxel (1966) have suggested that much of the tectonic history of the area may be related to this strike-slip movement, although they do not indicate how this movement produced the valley. We suggest that the central part of Death Valley is related to tension along a segment of a strike-slip fault that is slightly oblique to the main trend of the fault zone. If this idea is correct, the two sides of Death Valley have been pulled apart and a graben produced between.

Death Valley (Fig. 1) is a deep topographic feature that extends for about 125 miles in a generally north-northwest direction. It is divided into three segments. The southern segment is about 25 miles long, trends northwest, and is below sea level in its deepest part. The central segment is about 45 miles long, trends north, and is entirely below sea level. The lowest point in Death Valley, 282 feet below sea level, is within the central segment and lies only 15 miles northeast of Telescope Peak (elev. 11,049 feet), the highest point in the mountains flanking Death Valley. The northern segment of Death Valley is about 55 miles long, and ranges in elevation from below sea level at the south to about 4000 feet at the north. Death Valley is also a deep structural trough in which locally about 10,000 feet of Cenozoic rocks have accumulated (Mabey, 1963).

The main strike-slip features in the Death Valley area are the Death Valley fault zone and the Furnace Creek fault zone (Hill and Troxel, 1966; Stewart, in press; Wright and Troxel, in press). These fault zones join in the northern part of Death Valley (Fig. 1). Faulting related to these zones has been traced for over 200 miles, the entire length of Death Valley and beyond. The amount of right-lateral offset along these fault zones may be as much as 50 miles in places (Stewart, in press), although elsewhere much of this displacement may be taken up in gigantic "oroclinal" folds associated with the

fault. Where the folds occur the movement on the fault zones may be only a few miles. In places, fairly recent strike-slip movements have been reported along the faults.

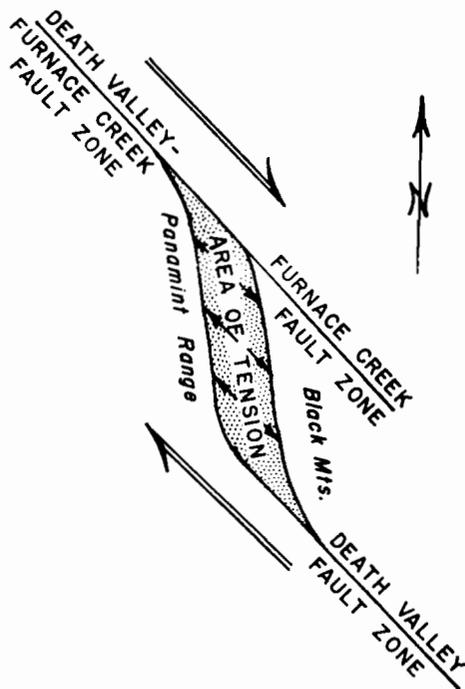


Figure 2. Diagrammatic map showing interpretation of strike-slip movement and area of tension in Death Valley area, California

Right-lateral movement on the northwest-trending faults in the Death Valley area would tend to cause tension, and thus a "pull-apart" along the north-south trend of the central segment of Death Valley (Fig. 2). The area and shape of the "pull-apart" diagrammatically shown on Figure 2 is similar to the area below sea level (Fig. 1) in Death Valley. In this area of tension, downfaulting could produce the deep trough of Death Valley.

References Cited

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