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Aerial views in color of the San Andreas fault, California

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Geomorphic features characteristic of the San Andreas fault zone are exceptionally well displayed in central California between about latitudes 35° and 36°N, about 100 to 200 km (60-120 mi.) northwest of Los Angeles, California. The accompanying forty color slides are selected to illustrate some of these geomorphic features, including offset stream channels, sags, linear valleys and troughs, shutter ridges, linear scarplets, side-hill benches and saddles.

All of the sites included in the oblique aerial photographs are on the map of the San Andreas fault by Vedder and Wallace (1970). The photographs are arranged in order from northwest to southeast; the northernmost eighteen views are in the Palo Prieto Pass area and the remainder are in the Carrizo Plain area.

A selected list of references is provided for the student of faulting and geomorphology who might wish to relate the aerial photographs to geologic interpretations that have been published.

NOTE: Standard 2" by 2" color slides are available through the U. S. Geological Survey Photo Library, MS-914, Box 25046, Federal Center, Denver, CO 80225. Telephone (303) 234-4004.

### Selected references

- Dibble, T. W., Jr., 1973, Regional geologic map of San Andreas and related faults in Carrizo Plain, Temblor, Caliente and La Panza Ranges and vicinity, California: U.S. Geological Survey, Misc. Geol. Invest. Map I-757.
- Sieh, K. E., and Jahns, R. H., 198\_, Holocene activity of the San Andreas fault at Wallace Creek, California: Geological Society of America Bull. (in press).
- Vedder, J. G., and Wallace, R. E., 1970, Map showing recently active breaks along the San Andreas and related faults between Cholame Valley and Tejon Pass, California: U.S. Geological Survey, Misc. Geol. Invest. Map I-574, 2 sheets.
- Wallace, R. E., 1968, Notes on stream channels offset by the San Andreas fault, southern Coast Ranges, California: in Proceedings of Conference on Geologic Problems of San Andreas fault system, Dickinson, W. R., and Grantz, Arthur [eds.]; Stanford University Publ. Geological Sciences, vol. XI, p. 6-21.
- Wallace, R. E., 1975, The San Andreas fault in the Carrizo Plains - Temblor Range region, California: in San Andreas fault in southern California: A guide to San Andreas fault from Mexico to Carrizo Plain, Crowell, J. C. [ed]. California Division of Mines and Geology, Special Report 118, p. 241-250.

1. S-7-21 Parallel strands of the San Andreas fault show as lines of vegetation and linear depressions.  
Sag ponds along fault traces are also characteristic. View south.  
Location: Palo Prieto Pass - Choice Valley area, Secs. 10, 11, 14, 15, T26S, R16E.
2. S-7-18 A side-hill bench and lineament in upper third of picture marks trace of the San Andreas fault.  
View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 24, T26S, R16E.
3. S-7-17 Side-hill bench, lineament and diverted channels mark trace of the San Andreas fault. Note stream diverted in an apparent left-lateral sense at left of picture. Uplift of block on the downstream side of fault can divert drainage either to the left or right despite right-lateral displacement on fault. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 24, T26S, R16E.

Index to file numbers, for authors' use only:  
S - Photograph by Sandra Schulz  
W = Photograph by Robert E. Wallace  
Middle Number - roll  
Last Number - frame

4. S-7-14 Channels are offset by right-lateral displacement on the San Andreas fault. Trace of the fault is in lower part of picture just above the base of the hill slope. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 31, T26S, R17E.
5. S-7-9 Side-hill bench, lineament and offset channels mark the San Andreas fault. Fault trace is on the hillside above the road. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 5, T27S, R17E.
6. S-7-8 Stream channel is offset by right-lateral slip on San Andreas fault. Fault parallels road on side hill above road. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Secs. 4 & 5, T27S, R17E.
7. S-7-7 Two stream channels are offset by right-lateral displacement on the San Andreas fault. Fault parallels road on side hill just above road. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 4, T27S, R17E.

8. S-7-6 Stream channel is offset by right-lateral displacement on the San Andreas fault. Fault parallels the road on the side hill just above road. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Secs. 4 & 9, T27S, R17E.
9. S-7-3 Alined saddles and offset channels are along the San Andreas fault. Most channels are offset in a right-lateral sense, but complexities can be observed. Fault zone parallels the road and is on the side hill above road. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 9, T27S, R17E.
10. W-4-14 Parallel branches or strands of the San Andreas fault offset stream channels. Lower building is on western strand. Upper building is on eastern strand. Channel offsets are predominately right-lateral, but some complex drainage patterns have developed. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 31, T26S, R17E.

11. W-4-18 Saddles on ridge spurs and offset streams mark the trace of the San Andreas fault. Deep gullying and landsliding has been stimulated by increased gradient in channel in left part of picture. View northeast.  
Location: Palo Prieto Pass - Choice Valley area, Sec. 31, T26S, R17E.
12. W-3-23 Channel is offset by right-lateral displacement on the San Andreas fault. Offset is about 130 m. Average-long-term slip rate is about 3.4 cm per year (Sieh and Jahns, in press), but some slip and possibly much, occurred in sudden displacements of from 9-12, as it did during a single earthquake in 1857. No fault creep has been noted here. View west.  
Location: Carrizo Plain area, Sec. 33, 34, T30S, R20E. (See also figs. 13, 14, 15 and 16)

13. W-6-35 View northeast across the San Andreas fault showing several offset stream channels. Main channel in middle of picture is offset about 130 m. and channel farther to left on near side of fault has been displaced 380 m and has been beheaded. Small gulches at right display about 9.5 to 12.5 m offset from 1857 and earlier earthquakes. Average long-term slip rate is about 3.4 cm per year (Sieh and Jahns, in press). No fault creep has been noted here, and this section is considered to be locked. Location: Carrizo Plain, Sec. 33, T30S, R20E. (See also figs. 12, 14, 15 and 16)

14. W-6-36 View northeast across the San Andreas fault showing several offset stream channels. Main channel in middle of picture is offset about 130 m. Channel at left or near side of fault is offset 380 m from upstream segment and is beheaded. Location: Carrizo Plain area, Sec. 33, T30S, R20E. (See also figs. 12, 13, 15 and 16)



15. W-3-30 View east across the San Andreas fault showing offset stream channels. Large channel at right is offset about 130 m. Channel at left on near side of fault has been offset 380 m from the upstream segment and has been beheaded.  
Location: Carrizo Plain area, Sec. 33, T30S, R20E. (See also figs. 12, 13, 14 and 16)
16. W-6-30 View northeast across the San Andreas fault showing offset stream channels. The large channel is offset about 130 m. Small channels at right have been successively offset by between 9.5 and 12.5 meters during the 1857 and earlier earthquakes.  
Location: Carrizo Plain area, Sec. 33, T30S, R20E. (See also figs. 12, 13, 14 and 15)

17. W-3-36 View southwest across the San Andreas fault. The pair of stream channels in the middle of the picture is offset by right-lateral displacement on fault. Left-hand channel is offset about 23 m. At far right of picture can be seen a pair of beheaded channels which are interpreted as having once connected with the channels in the middle of the picture. The faint trace of another beheaded channel can be seen between the existing channels and the prominent beheaded channel at the right. Differential upwarping and downwarping of blocks on opposite sides of the fault and along the trend of the fault greatly effect the drainage patterns. For example, at the left a shutter ridge on the far side of the fault truncates drainage. Stream flow is away from viewer. Location: Carrizo Plain area, Sec. 3, T31S, R20E. (See also figs. 18 and 19)
18. W-3-25 View northeast across the San Andreas fault. Successive offsets of a pair of channels in the middle of the frame have caused a sharp jog in the channel, and beheading of downstream channel segments shown at left of frame. Right-lateral offset of main channel is about 23 m. Location: Carrizo Plain area, Sec. 3, T31S, R20E. (See also figs. 17 and 19).

19. S-3-22    The San Andreas fault can be seen as a horizontal line passing through the center of the picture. The two channels, in which flow of water is toward the observer, are offset by the San Andreas fault; the main channel is offset about 23 m. View northeast.  
Location: Carrizo Plain area, Sec. 3, T31S, R20E. (See also figs. 17 and 18).
20. W-6-5    The San Andreas fault can be seen as a nearly horizontal line through the center of the picture. Along the fault trace is a sag pond at left, offset stream channels in the middle, and beheaded channels at the right. View west.  
Location: Carrizo Plain area, Sec. 3, T31S, R20E.
21. W-3-35    View southwest across the San Andreas fault showing sag block and drainage interrupted by relative uplift of block on southwest side (far side) of fault.  
Location: Carrizo Plain area (check??), Sec. 3, T31S, R20E.

22. W-3-24    Lineament and scarplet along the San Andreas fault showing uplifted block on right (northeast side) giving way to uplifted block on left in the distance. View to northwest.  
Location: Carrizo Plain area, Sec. 2, T31S, R20E.
23. W-6-6    View southwest across the San Andreas fault showing offset stream channel. Supplemental gullying developed on near side of fault as downstream segment (far side of fault) of channel moved relatively to the right (northwest).  
Location: Carrizo Plain area, Sec. 19, T31S, R21E.
24. W-6-9    Multiple strands of the San Andreas fault. A complex of blocks has moved both laterally and differentially upward and downward between the two main strands of the fault. View southwest.  
Location: Carrizo Plain area, Sec. 29, T31S, R21E.

25. S-3-16 View northeast across the San Andreas fault showing displacement of stream channel. Note that alluvium on the downstream side of fault (near side, above road) of the fault is spread to the north (left) of channel.  
Location: Carrizo Plain area, Sec. 3, T32S, R21E.
26. W-6-10 The San Andreas fault is seen here as a linear valley extending from left to right across the picture. The Z-shaped pattern of the channel was caused by a combination of right-lateral slip on the fault, capture of the channel by an adjacent channel on the left, and further right-lateral displacement. View to west and downstream.  
Location: Carrizo Plain area, Sec. 3, T32S, R21E.
27. W-3-14 The San Andreas fault extends from the lower left to the center of the right-hand edge of the frame. The angular pattern of the stream channel resulted from a combination of stream capture and right-lateral slip on the fault. View to southeast.  
Location: Carrizo Plain area, Sec. 3, T32S, R21E.

28. W-6-26 Channel offset by right lateral displacement on the San Andreas fault. Offset is about 96 m. Parallel fault at base of hill apparently has predominately vertical displacement. The elongate ridge on the near side of the fault can be termed a shutter ridge. View northeast across fault. Location: Carrizo Plain area, Sec. 11, T32S, R21E.
29. W-3-13 A bench and lineament mark the trace of the San Andreas fault. Small gulch near center of picture is offset about 7-9 m as a result of displacement during the earthquake of 1857. View east across fault. Location: Carrizo Plain area, Sec. 11, T32S, R21E.
30. S-3-13 Stream channel offset by right-lateral displacement on the San Andreas fault which lies at the base of the hills. Uplift of the hills represent a component of vertical displacement on fault. View northeast toward Panorama Hills. Location: Panorama Hills, Carrizo Plain, Sec. 11, T32S, R21E.

31. W-6-12 As many of five subparallel strands of the San Andreas fault can be seen. The most recently active fault strand has displaced channels in a right-lateral sense and has diverted other drainage in a left-lateral sense. View to west toward Carrizo Plain.

Location: Carrizo Plain area, Sec. 13, T32S, R21E.

32. W-6-13 Valley deeply eroded along the San Andreas fault. The downstream segment of the channel on west side (far side) of fault has been displaced a kilometer or more from the upstream segment (to left out of view of photograph). View southwest.

Location: Carrizo Plain area, Sec. 19, T32S, R22E.

33. W-6-22 View west across the San Andreas fault. Uplift of block beyond fault has dammed and ponded alluvium on near side of fault.

Location: Carrizo Plain area Sec. 19, T32S, R22E.

34. W-6-31 View southeast along the San Andreas zone. A linear valley has been eroded along the main trace of the fault. Black line at right is not a fault but a fence line against which tumbleweed has collected.

Location: Carrizo Plain area, Sec. 19, T32S, R22E.

35. W-6-19 View northwest along the San Andreas fault. Block on west (left side of picture) has been raised relative to block on right damming drainage from the hills to the east.

Location: Carrizo Plain area, Sec. 19, T32S, R22E.

36. S-4-20 View southeast along the San Andreas fault. Fault zone has localized drainage and right-lateral displacement on fault has moved mouth of stream in mid-distance about 1 km from upstream parts of the drainage.

Location: Carrizo Plain area, Sec. 19, T32S, R22E.



37. W-6-15 View southeast along the San Andreas fault.  
Linear valley has been eroded along the main trace of the fault.  
Location: Carrizo Plain area, Sec. 29, T32S, R22E.
38. W-6-24 View south along the San Andreas fault. Erosion along the fault zone has produced a linear valley.  
Location: Carrizo Plain area, Sec. 33, T32S, R22E.
39. W-6-18 View southeast along the San Andreas fault. The most recently active trace of the fault is marked by a small ridge and interrupted drainage. This trace probably marks the site of movement in the great earthquake of 1857.  
Location: Carrizo Plain area, Sec. 33, T32S, R22E.
40. W-6-33 View southeast along the San Andreas fault. In the foreground the block on the west side of fault (right side of picture) has been raised relative to block on east side damming drainage from the hills to the east.  
Location: Carrizo Plain area, Sec. 19, T32S, R22E.