

# San Andreas Fault (Carrizo Plane) Bakersfield College Field Trip October 24, 2009

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## Study Area:

We will explore the Carrizo Plane section of the San Andreas Fault located at the Highway 166 – Soda Lake Road junction and traverse north to the city of Parkfield.

The field trip caravan will depart from the northeast Bakersfield College parking lot **PROMPTLY at 8:00 a.m.** The northeast parking lot is located at Mt. Vernon/Panorama corner. **Please be prepared to carpool !**

**Students are responsible for:**

- Vehicle **FILLED** with gas (there is only one gas/bathroom stop)
- Layered clothing—it will be cool in the morning and warming to the possible low 80's by mid-afternoon
- Camera, binoculars, sunscreen
- Good tennis shoes or light hiking shoes
- Note taking materials (notepad, pencil, pen, etc....)
- Lots of water – there is no water available for most of the trip
- Bagged lunch/snacks

You can pick up something edible before stop 1 – in Maricopa  
You can eat at the Parkfield café – after stop 9 (last stop)

Attendance on the San Andreas Fault (SAF) field trip appreciation day is optional for students enrolled in ERS lecture, GEO lecture, and ERS/GEO lab classes. Extra credit of 100 points will be awarded to students who attend the entire field trip and complete the various exercises outlined in the field trip guide packet. All field trip guide packets will be due no later than Wednesday, October 28, 2009.

**Itinerary/directions/activities:**

Depart BC and travel south on Mt. Vernon to Hwy. 58. Head west on Hwy. 58 to Hwy. 99 and head south. Take the Taft Hwy. off ramp (Hwy 119) and head west to Old River Road. Turn left (south) on Old River Road and head to Hwy. 166 (approx. 15 miles). Turn right (west) on Hwy. 166 toward Maricopa.

We will stop at the Subway Food Mart in Maricopa. Gas, food, and bathroom facilities are available. We will only be there for about 20 minutes. There are no gas stations, food stops, or bathroom facilities until we reach Parkfield (no gas), which is the last stop of the day. Please get prepared.

**47.6 total miles**

Continue west on Hwy. 166 approximately 9.0 miles toward Santa Maria. Turn right (north) onto Soda Lake Road (SLR). You will see an abandoned service station on the right-hand side. Head approximately 1 mile along Soda Lake Road to SAF stop 1.

**SAF Stop #1 – Welcome to the Carrizo Plane – San Andreas Fault**  
**57.5 total mi / 1.0 mi SLR / 45 minute stop**

Soda Lake Road traverses approximately 6.5 miles paralleling the fault. To the east (right) approximately 100 feet from SLR, the fault can be observed as a “linear slice” with uplifted hills and fault scarps. Adjacent (west) to the fault lie various small depressions known as sag ponds.

**Questions**

1. In what direction does the SAF trend?

2. What mountain ranges lie to the immediate east and west of the fault?
3. What prominent features are evident at this stop suggesting the presence of the SAF?
4. What type of mineral deposit is most likely found in the sag pond, and how did these mineral deposits get there?
5. What does the “fig-newton cookie” analogy tell you about the SAF and what you will be observing about the fault during the day?

### **SAF Stop #2 – Carrizo Information Board-Don’t fault the board!**

#### **59.2 total mi/ 2.7 mi SLR/ 15 minute stop**

Continue north on SLR for approximately 1 mile to the information board. Here you can pick a map outlining the Carrizo Plane area; however, there is an exact map included in your field trip packet.

### **Questions**

1. What major features lie just left of the information board adjacent to the SAF?
2. What features do you observe indicating the presence of the SAF?

### **SAF Stop #3 Pipeline road intersection– This is not my fault!**

#### **59.9 total mi / 3.4 mi SLR / 15 minute stop**

Continue north on SLR approximately .7 miles. Here you will observe the linear geometry of the SAF and how extensively this fault trace traverses. As you depart from stop 3, continue paralleling the SAF for the next mile. Note at approximately 4.4 miles during your traverse, answer question #4.

1. Which tectonic plate are you standing on as you observe the extensiveness of the fault?
2. What various processes are acting along the fault as it continues to creep?
3. What features do you observe that indicate the presence of the SAF?

4. What “geological observations” can you make regarding the farm house to the right as you traverse SLR?

### **SAF Stop #4 - Soda Lake – So, whose fault is it anyway?**

#### **90.6 total mi / 34.1 mi SLR / 30 minute stop**

After stop 3, you will drive approximately 30.7 miles to stop 4. During the drive, SLR will meander progressively to the west of the fault where the fault trace lies approximately 2-3 miles away from SLR. 5.1 miles along SLR, you will drive on a dirt road with occasional “rills,” so drive slowly. At the 5.9 mile mark, the road will become paved for the next 1.3 miles and return to dirt for the next 13 miles ---- drive slowly and cautiously and enjoy the scenery the Carrizo Plane offers!!!!

At stop 4, you will observe one of the largest features in the Carrizo Plane created by the movement of the SAF. In fact, the road you are traveling on is named after this feature. Note the distance between this feature and the SAF trace to the east.

### **Questions**

1. What is the prominent feature between the fault trace and your observation point?
2. Given what we learned so far, what mineral type has most likely been deposited in this feature?
3. What characteristics can you observe to the east that show the presence of the SAF?

### **SAF Stop #5 – Wallace Creek – It’s all your fault!**

#### **105.0 total mi / 50.1 mi from stop 1 / 1 hour stop**

Continue approximately 2 miles north on SLR. Turn right (east) onto 7-Mile Road (dirt road – but very well-maintained) and drive eastward approximately 6.0 miles, reaching Elkhorn Road. Turn right (south) onto Elkhorn Road (dirt road- natural surface) and slowly drive approximately 4 miles to the Wallace Creek Interpretive Trail.

The Wallace Creek area of the SAF is so famous that many (including yours) textbooks show surface and aerial photographs of the creek, which depicts the offset and lateral movement of the SAF. In fact, you will traverse the 1500-foot interpretive trail to the actual famous and world-renowned Wallace Creek. Before hiking to the creek, please read the SAF information at the trailhead in addition to the SAF information at the actual creek.

### **Questions**

1. What type of feature is the Wallace Creek ravine, and why is it important to folks that study the SAF?

2. What type of strike-slip fault is the SAF – and how do scientists determine the “direction” of horizontal slip using Wallace Creek?
3. Besides interpreting the horizontal movement of the SAF, what other SAF information can be gathered using offset drainages?
4. After reading the various information boards around the Wallace Creek area, write down at least 5 interesting “things” that piqued your curiosity.

### **SAF Stop #6 – Mass wasting / slumping – What a faulty situation!**

#### **131.9 total mi / 76.9 mi from stop 1 / 30 minute stop**

You will leave Wallace Creek by heading north approximately 4 miles to 7 Mile Road. Turn right (east) on 7 Mile Road, driving approximately 1 mile toward Hwy. 58. Turn very very carefully left onto Hwy. 58 heading west. You will drive west approximately 15.5 miles along Hwy. 58, reaching Bitterwater Road. Turn right (north) onto Bitterwater Road. Drive north on Bitterwater Road approximately 11.4 miles, reaching stop number 6.

Because the SAF trace is not a “perfect” slice along the surface, you will be driving parallel to a “branch” fault of the SAF. To the right along this road, there are numerous fault scarps and features formed from mass wasting processes (slumps, earth flows, and small land slides). This is evidence of the continuing “creep” or movement along the SAF. As the fault creeps and moves, masses of earth move downward under the influence of gravity into the fault trace. So, here one can observe erosion at its best by looking at the numerous mass wasting features.

### **Questions**

1. What is mass wasting?
2. What characteristics does one look for to detect various slumps, earth flows, and small landslide features?
3. What is the main force behind these mass wasting features?
4. Why would you not build your house in this immediate area?

### **SAF Stop #7 – Was it James Dean’s fault?**

#### **153.4 total mi / 98.4 mi from stop 1 / 15 minute stop**

From stop 6, continue north on Bitterwater Road toward Hwy. 46. You will come to a “T” in the road where Bitterwater Road ends. Turn left and continue toward Hwy. 46. Approximately 19.2 miles from stop 6, you will reach the Hwy. 46 junction.

CAREFULLY turn right onto Hwy. 46 toward Cholame and drive 2.3 miles to Cholame Valley Road, turning left toward Parkfield. You will stop here approximately ¼ of mile up Cholame Valley Road --- where James Dean met his fate.

Here is where James Dean's life came to a tragic end as he drove his 1955 Spyder Porsche. A truck driver pulled out in front of him at this location, and they collided. James Dean was killed on September 30, 1955 --- just thought you would like to know. Incidentally, I wonder if James Dean knew how close he was to the San Andreas Fault in 1955. The accident was definitely his fault. In addition, plate tectonics was not even accepted in 1955...again, thought you'd like to know!



The Crash Scene Where James Dean Lost His Life 9/30/55

Here looking to the left, you will observe the last detectable traces of the SAF. The trace will vanish as we traverse northward on Cholame Valley Road and become more evident the closer we approach Parkfield.

### Question

1. Study the picture in the “crash of James Dean” and see if you can pinpoint the actual crash site based on the mountain view in the picture.

### SAF Stop #8 – epicenter of the 2004 6M earthquake

**158.7 total mi / 103.7 mi from stop 1 / 15 minute stop**

Continue north on Cholame Valley Road for approximately 5.3 miles, veering left and then veering to the next right. This is the sight of the 6M earthquake in 2004. This earthquake fulfills the long overdue prediction of Parkfield quakes that supposedly take place about every 22 years. The last “real” measurable earthquake used for statistically predicting quakes in the Parkfield area was in 1966.

### Questions

1. Do the math and calculate how long overdue the 6M earthquake of 2004 occurred and indicate the year an earthquake should have taken place according to prediction methods.

2. What is the statistical earthquake prediction method use by seismologists, and when should the next 6M or greater earthquake take place in this area?

### **SAF final stop # 9 – Parkfield, CA – It’s time to admit fault!**

#### **168.5 total mi / 113.5 mi from stop 1 / 30 minute stop or more?**

Continue north approximately 9.8 miles on Cholame Valley Road toward Parkfield. You will cross two bridges where the road narrows. When approaching the “Y” in the road, you will see that Parkfield is located to the right. Park just before the “Y” and the white bridge on the right. Here you will walk across the bridge with the class. We will be crossing over the SAF (back and forth), and you will experience both the North American and Pacific plates. In fact, you will see signs showing you the location of the Pacific and North American plates. As you traverse the bridge, notice the “bend” in the metal railings which conforms to the right lateral strike slip motion of the SAF. The bridge is built atop concrete pillars in two sections so as the fault creeps, the bridge slides on the concrete pillars.

Continue approximately ½ mile to the right into Parkfield and visit the Parkfield Café. You can have a bite to eat and a beverage. Observe the posters in the Parkfield Café lobby and absorb the knowledge. By the way, don’t tell them you’re a geologist --- they will just roll their eyes and say, “Yeah, another one.”

### **Questions**

1. Does the SAF run exactly perpendicular to the bridge?
2. Observing the “bend” and curvature of the bridge railing, how would you determine the fault is creeping as a right-lateral-strike slip fault?
3. Write three observations that interest you at the Parkfield Café lobby – geologically.
4. Finally, write down 3 things that have interested you during the entire field trip – Thanks for coming!!!!!!!!!!!!!!!

When you have finished your tour of Parkfield, drive back down Cholame Valley Road to the Hwy. 46 junction. CAREFULLY turn left (east) and head back toward Bakersfield. It is approximately 101.2 miles back to Bakersfield College. Please drive carefully.



