Part 3: Ridge Basin field trip stop details and figures

Stop 1:

Whitaker Summit Overview

Meet at 8:00am

- a. Exit I-5 at Templin Highway exit; go west to Golden State Highway. Drive north on Golden State Highway to Whittaker Summit side road on Golden State Highway. Park on side of GSH.
- b. Location: 34.588404 x -118.716226
- c. Overview of the Ridge Basin looking northward toward Pyramid Lake.
- d. Outcrops in the Miocene Fisher Spring Sandstone Member of the Ridge Route Formation.
- e. Lacustrine delta and lagoon bar depositional facies.



Figure 22. View northward (toward Pyramid Lake) at Whitaker Summit from (unnamed) road off Golden State Highway (on the left) with Interstate 5 on the right. In the distance, Liebre Mountain is on the eastern boundary of the basin. This overview is near the depositional center of the southern Ridge Basin in the Fisher Spring Sandstone Member of the Ridge Basin Formation. Strata dip is highlighted with yellow lines.

Stop2:

Templin Highway and Old Ridge Route

8:45am

- a. Drive south on Golden State Highway and turn left onto Templin Highway. Continue on Templin Highway to the intersection with Old Ridge Route. Park on the southeast side of Templin Highway
- b. Location: 34.576455 x -118.671233
- c. Outcrops of the Miocene Castaic Formation overlain by the Marple Canyon Sandstone Member of the Miocene Ridge Route Formation
- d. Marine delta overlain by upper fluvial and deltaic and lower slope and turbidite depositional facies



Figure 23. Measured section of the Marple Canyon Sandstone Member of the Ridge Route Formation. Marple Canyon consists of fore-delta slope, delta, delta plain, and fluvial deposits that overlie the Castaic Formation. From Crowell (2003). Red boxes with numbers refer to photograph figure numbers.



Figure 24. Marple Canyon Sandstone Member of the Ridge Route Formation outcrop along Templin Highway west of the intersection with Old Ridge Route. The Marple Canyon Sandstone Member is comprised of a proximal delta and delta plain sandstone deposits.



Figure 25. Outcrop along Templin Highway east of the intersection with Old Ridge Route. The Marple Canyon Sandstone Member of the Ridge Route Formation in this section is comprised of heterolithic mudstones and sandstones deposited in a slope setting.



Figure 26. Outcrop along Templin Highway east of the intersection with Old Ridge Route. The Marple Canyon Sandstone Member of the Ridge Route Formation is comprised of heterolithic mudstones and sandstones deposited in a slope setting. At this location a growth fault (red line) provides accommodation for deltaic sand deposition onto slope muds.



Figure 27. Outcrop on Old Ridge Route north of Templin Highway. The Marple Canyon Sandstone Member of the Ridge Route Formation consists of a coarsening upward succession of tabular sand beds deposited in a deltaic to delta plain environment.



Figure 28. Marple Canyon Sandstone Member of the Ridge Route Formation cropping out along Old Ridge Route north of Templin Highway. This portion of the outcrop displays the transition from delta plain to braided fluvial deposition. The fluvial sandstones are coarse grained but individual sand beds fine upward.

Stop3:

Templin Highway view of Fisher Spring and Paradise Ranch Members

10:00am

- a. Continue on Templin Highway past the Old Ridge Route to a pull over.
- b. Location: 34.592032 x -118.673158
- c. Overview of the Paradise Ranch Shale Member of the Peace Valley Formation overlain by the Fisher Spring Sandstone Member of the Ridge Route Formation.
- d. Lateral extent of basin fill shales and easterly sourced deltaic depositional facies



Figure 29. Paradise Ranch Shale Member of the Peace Valley Formation overlain by the Fisher Spring Sandstone Member of the Ridge Route Formation on the eastern side of the Ridge Basin. The eastern sourced sandstones extend westward to the center of the basin. Bedding is highlighted with yellow lines.

Stop 4:

Osito Canyon Shale Member of the Peace Valley Formation interfingering with the Violin Breccia at Frenchman's Flat Campground on Piru Creek and Osito Creek.

10:30am

- a. Take Templin Highway back to Golden State Highway and to Frenchman's Flat Campground. <u>Rest rooms available</u>
- b. Location: 34.616360 x -118.743735
- c. Overview to the east of Osito Canyon Shale Member of the Peace Valley Formation (walk from parking are toward the northeast, across Osito Creek)
- d. Return to overview to the west of Violin Breccia at Frenchman's Flat Campground.
- e. Walk to the west toward Piru Creek. View Osito Canyon Shale Member of the Peace Valley Formation at 34.612843 x -118.746610
- f. Continue walking west toward Piru Creek cut. View Violin Breccia at 34.610172 x -118.750148
- g. Note lateral extent of the shale and limited extent of the Breccia
- h. Return to campground and eat lunch



Figure 30. Osito Canyon Shale outcrop along Osito Creek with a thick succession of deepwater mudstones of the Osito Canyon Shale Member of the Peace Valley Formation. Golden State Highway is to the left, Frenchman's Flat is to the left in the back ground. The dark vegetated hillside in the background on the left is Violin Breccia which was deposited from the west across the San Gabriel Fault. The Osito Canyon Shale was deposited in the center of the Ridge Basin. Bedding is highlighted with yellow lines.



Figure 31. Violin Breccia crops out along Piru Creek west of Frenchman's Flat Campground. The breccia slopes to the east (as indicated by yellow lines on bedding planes). The Piru Creek section is proximal to the San Gabriel Fault and the Violin Breccia talus slope is comprised exclusively of coarse grained deposits. To the east, shales of the Osito Canyon become more prevalent.



Figure 32. Frenchman's Flat Campground looking to the west. The dark slope to the left is the Violin Breccia. To the right is the Osito Canyon Shale Member of the Peace Valley Formation. The units are inter-fingering on the lower slope. Piru Creek is in the middle of the picture. See figure 33 for an interpretation of the nature of the Violin Breccia and Osito Canyon facies and contact. Yellow lines highlight bedding surfaces.



Figure 33. Sketch of nearshore and lacustrine facies of Violin Breccia located at Frenchmans Flat. Violin Breccia and the Osito Canyon Shale tongue on the hillside west of Piru Creek as shown in Figure 32. (From Nemec and Steel, 1984; Link and Crowell, 2003, in Crowell, 2003).



Figure 34. North dipping Violin Breccia beds with very thin shale interbeds. Bedding highlighted with yellow lines. Outcrop south of Piru Creek in a proximal setting. Farther to the west there are only breccia-on-breccia contacts. To the east, shale interbeds become more prevalent and thicker.

Stop 5:

Piru Gorge Sandstone Member at Pyramid Lake Dam

12:30am

- a. Walk to Pyramid Lake Dam along Golden State Highway from the Frenchman's Flat parking area. This is a 2.1 mile (3.4 km) walk along a road. Total walking distance 4.2 miles (6.8 km). Should take ~40 minutes each way.
- b. Location: 34.640156 x -118.762039
- c. View Piru Gorge Sandstone Member of the Ridge Route Formation on the east and west side of the parking area at the base of the dam.
- d. Three Lower deltaic sequences with delta clino-forms (bottom set, fore set, top set). Overlain by fluvial deposits. Interbedded shales. Lower shales were deposited in brackish water; upper shales were deposited in freshwater lacustrine setting.



Figure 35. Photograph by Cameron Campbell of the Upper sandstone unit, Middle Shale Unit, and the upper portion of the Lower Sandstone Unit of the Piru Gorge Sandstone Member of the Ridge Route Formation. View to the east from Golden State Highway.

The Piru Gorge Sandstone was deposited in the center of the Ridge Basin and thins into the Violin Breccia to the west and into the Ridge Route Formation to the east. Overall the Piru Gorge Sandstone exceeds 185 meters in thickness and is divided into three units; 1) the 55m thick upper sandstone unit; 2) the 45m thick middle shale unit; and 3) the 85m thick lower sandstone unit. The sandstone units are comprised of lower deltaic sequences with well-developed clinoforms, consisting of bottomset, foreset, and topset beds. Paleocurrent patterns indicate transport to the southwest, south, and southeast. Overlying fluvial and interchannel deposits have distinctive channel fills, with some levee and overbank deposits as well as trace fossils.

The middle shale unit is organic rich and contains thin beds of limestone, dolomite, chert, and siltstone. Total organic carbon values from the shale range from 0.2% to 1.9%, averaging 1.5%. It is one of the most organic rich shales in the basin. On the basis of trace fossils and organic content, the base of the lacustrine shale was deposited in fresh water while the top was deposited in brackish water.

Stop 6:

Overview of basin fill units from the Visitor Center at Pyramid Lake.

2:30pm

- a. From Frenchman's Flat, drive back on GSH to Templin Highway. Take I-5 north to Vista del Lago exit. Go to the Vista Del Lago Visitor Center. <u>Rest rooms available</u>.
- b. Location: 34.662369 x -118.760841
- c. Overview of the Piru Gorge Sandstone Member and the Apple Canyon Sandstone Member of the Ridge Route Formation inter-fingering with the Alamos Canyon Shale member of the Peace Valley Formation.



Figure 36a. Photograph of the Apple Canyon Sandstone Member of the Ridge Basin Formation in the Alamos Canyon Siltstone and Posey Canyon Shale Members of the Peace Valley Formation. View from the Visitor Center at Pyramid Lake, to the east. Bedding surfaces highlighted with yellow lines.



Figure 36b. Photograph of Pyramid Lake with the Violin Breccia in the background, the Posey Canyon Shale on the peninsula on the right, and the Piru Gorge Sandstone to the left. The dam is to the left. Bedding surfaces highlighted with yellow lines.

Stop 7:

Alamos Canyon Shale Member of the Peace Valley Formation at Pyramid Lake Road

3:00pm

- Return to I-5 north, exit at Smokey Bear Road, turn left and left again onto Pyramid Lake Road, southbound to an outcrop of the Alamos Canyon Shale Member of the Peace Valley Formation. Park on the side Pyramid Lake Road.
- b. Location: 34.687981 x -118.788560
- c. Note fissile nature of the shale, with soft sediment deformation



Figure 37. Photograph of the Alamos Canyon Shale Member of the Peace Valley Formation along Pyramid Lake Road displaying the fissile nature of the shale. Bedding surfaces highlighted with yellow lines.



Figure 38. Photograph of the Alamos Canyon Shale Member of the Peace Valley Formation at Pyramid Lake Road showing folding and fracturing of the shale and the fissile nature of the lithofacies. Keyfob on the lower left for scale (blue circle). Bedding surface highlighted with yellow line.

Stop 8:

Apple Canyon Sandstone Member of the Ridge Route Formation at Hungry Valley Road

3:20pm

- a. Pyramid Lake Road northbound to intersection with Hungary Valley Road. Go left and park near Aqueduct.
- b. Location: 34.704298 x -118.799833
- c. View outcrop of Apple Canyon Sandstone Member of the Ridge Route Formation
- d. Note heterolithic nature and fine scale bedding features.
- e. Deltaic lacustrine depositional setting



Figure 39. Photograph across Alamos Creek with the Hungry Valley Formation overlying Apple Canyon Sandstone Member of the Ridge Route Formation. Bedding surfaces highlighted with yellow lines. Location of Figure 40 is highlighted in the red box.



Figure 40. Photograph of Apple Canyon SS at Hungry Valley Road. The delta plain to fluvial sandstones are fine grained, thin bedded and heterolithic. Bedding surfaces highlighted with yellow lines. Location of Figure 41 indicated with red box.



Figure 41. Apple Canyon Sandstone at Hungry Valley Road. Sandstone is very fine grained and thinly bedded. Key fob left of center for scale (blue circle). Bedding surfaces highlighted with yellow lines.

Stop 9:

Hungry Valley Formation at Ralph Ranch Road (North Peace Valley Road).

3:45pm

- a. Return to Smokey Bear Road, get on I-5 northbound and exit at Quail Lake Road. Go left under the freeway to Ralphs Ranch Road (North Peace Valley Road), turn left and drive to outcrop just past LA County Fire Department Station #77 to view steeply dipping outcrops of the Mio-Pliocene lower Hungry Valley Formation on the west side of Ralphs Ranch Road.
- b. Location: 34.755891 x -118.796576
- c. Hungry Valley Formation is the final fill stage for the Ridge Basin
- d. It consists of alluvial fan and fluvial sediments.
- e. To the west and north, the Hungry Valley Formation overlies the San Gabriel Fault.

4:30pm Return to Bakersfield



Figure 42a. Steeply dipping Hungry Valley Formation fluvial sands on Ralphs Ranch Road (North Peace Valley Road), south of Quail Lake Road. Bed is dipping 80 degrees but appears to be overturned. Bedding surfaces highlighted with yellow lines (up indicated by arrow). Small faults offset beds (red lines).



Figure 42b. Matrix supported poorly sorted pebble and granule bed incised into medium to coarse grained sand in the Hungry Valley Formation on Ralphs Ranch Road. The bed has been faulted (red lines) and up is to the right. Key fob center left for scale (blue circle). Erosion surface highlighted by yellow line.



Figure 42c Hungry Valley Formation along Interstate 5 taken from Ralphs Ranch Road. Automobiles are on I-5. The beds are dipping to the north (yellow lines). View is to the east.

References:

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