12/13/16 Shoshone, CA

☼ Start of Day Report

Conditions: Sunny, cool
Mood: A little tired
Objectives: ~~Construct~~ Collect photos of Canyon 1 using georefrenced points (GPS sighted markers, alternate paper plates) Possibly measure length and orientation of clasts

Notes: Need to stop by visitor center first to collect park pass

Update: Returned to Shoshone after getting pass, we forgot our torches at SHEAR, so we have decided to check out the Crystal Spring Formation for a protolith sample.

☼ 11am, New Report

Conditions: Sunny, warm
Mood: Unfettered
Objective: Obtain oriented samples of the Crystal Spring formation at it's type locality near by.

From Tecopa take Furnace Creek Rd SE, Then it briefly turns into Mesquite Valley Rd. Take a right onto Smith Talc Rd, Follow to The Excelsior Mine Rd past Beck Spring mine (Volkan mine?)

Look for white layers on north side of Road - Crystal Spring Fm. → Limestone

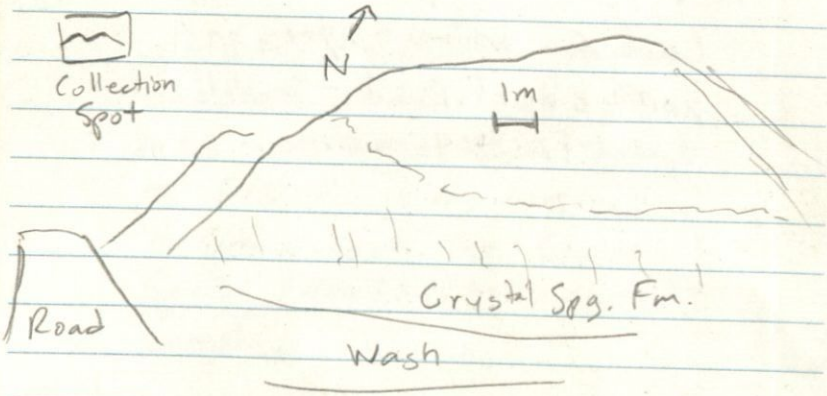
☼ 12:45 pm, Excelsior Mine Rd

Reached Kingston Peak pass with Crystal Spg. Fm.

Geology here is pretty fantastic with talc deposits and even material with pyrite included. Will collect data after lunch.

Crystal Spring Fm. Collection Spot - Kingston Peak 1:40 pm

~ Approximately 0.25 from where Excelsior Mine Rd goes into next valley to East



Photos of Crystal Spg. Fm. Outcrop
DSC_0017.jpg to 0020.jpg

Looking NW to NE
0017 0020

GPS Coordinates of Sample Collection Outcrop
UTM 11S 0597843
± 3m 3959770
WGS 1984

Crystal Spg Fm Measured by
174° 67NE Nick
Magnetic Dec. 12°

Sample CJ-CS1601
Layered limestone at Kingston Peak
174 65°?

Sample CJ-CS1602
178° 74°
More uniform limestone
Less layering

Photo of Sample CS1601
DSC_0021.jpg

34

Photo of sample CS1602
DSC_0022.jpg

End of Day Report Shoshone CA
8pm

We were succesful in finding two good samples of the Crystal Spg. Fm., although there have been some damage to my car on the return trip from a rock. The steering feels a bit stiff but we have been unable to find an obvious cause such as a fluid leak. I will have it serviced in Eugene unless it worsens.

Tomorrow we will begin photo grammetry of Canyon 1, no lunch left behind!

☆ Start of Day 12/14/16

Conditions: Clear, cool
Mood: Neutral
Objectives: Collect photos for Canyon 1 Agisoft model

Notes: Nick will assist by measuring orientation data of clasts in gneiss and marble

Ratio of axes and knowledge of stress axes could be used to determine ~~relative stress~~ strain/stress conditions?

88 12/14/16 Canyon 1

GPS: Photo geo refrence 1
UTM 11S 0521264
±2m 4012541
NAD 83

Geo ref 1 to Geo Ref 2
45ft ±6in

Geo ref 2 to Geo ref 3
98ft ±6in

GPS: Geo ref 3
Above dike in western half of canyon 1
UTM 11S 0521286
NAD 83 4012542 ±2m

Geo ref 2 to Geo ref 4
41.5ft ± 0.5ft

Geo ref 4 GPS
UTM 11S 0521259
± 2m 4012519

Georef 4 to Georef 5
41ft ± 0.5ft

Georef 5 GPS
UTM 11S 0521270
±2m 4012521

Georefs 4, 5 & 2 roughly at same elevation (± 1m) so good for triangulation

Georef 5 to 2
56ft ± 0.5ft

Georef 7 to 5
69ft ± 0.5ft

GPS Georef 7
UTM 11S 0521288
±3m 4012520

Georef 7 to 8
64 ft ± 0.5ft

Georef 8 to 6
44.5 ft ± 0.5 ft

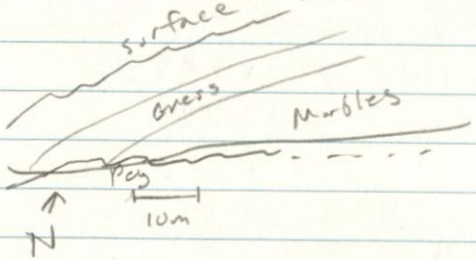
Georef 8 to 3
60 ft ± 0.5 ft

☼ Noon, 12/14/16. Canyon 1 midday report
placed 8 geocf markers in canyon plan to take photos after lunch

△ Updated observations of stratagraphic order

The gneiss is definitely above the marble ridge here

Cross section of Canyon 1



Need to revise work

? Are we on a thrust fault here

Photos for Agisoft model:
DSC_0023.jpg
through
DSC_0731.jpg

End of Day report 2pm
Canyon 1, 12/14/16
Overall the photos went well. Nate was a bit uncertain of measuring at first but seems more confident now. Will get data from him tonight.

Will need to confirm observations about strata. order next field day, shouldn't be an issue to update Thesis

40

☆ 12/17/16 Canyon 1

Conditions: Clear, cool, some wind
Mood: Tired, anxious
Objectives: Map out elements structures and other features of canyon 1, possibly reconfirm route to canyon 2 at end.

We will be using satellite photos combined w/ photogrammetry from my earlier work to map on, using tracing paper.
We will start at the west end of the canyon and work east.

◁ West end, canyon 1
Gneiss surrounding pegmatite at dry falls
/ Foliation of gneiss
N10W 14N
Walked 30ft+ south along canyon
◁ Gneiss primarily dominant in this boudins area with ribbons of pegmatite 1-2ft thick following foliation

/ Gneiss / peg boudins / foliation
N70W 35NE

.1* Walked another 20ft south to a large fracture in west canyon wall

△ Fracture appears to be a normal fault, NW side down with a conjugate SE side down near canyon floor

/ Normal fault
N38E 74NW

.2* Walking 20ft SE to large peg boudin

△ Normal fault, NW side down cuts across the canyon here a large boudin of pegmatite is exposed with a thin layer of Marble 1 covering it to the west

/ Second ~~normal~~ fault
N62E 85SE

/ Gneiss just west of fault in corner of canyon
~~N80W~~ N80E 30NW

,-,x Walked from large peg pouch to east until the dike

△ Immediately beneath the gneiss here is what looks like marble 2A, a well foliated mylonite marble melange as the canyon cuts deeper into the rock Marble 1 with its characteristic gneiss ribbons at folds becomes visible

X Gneiss foliation by dike N35E 38NW

△ Note: Marble 1 to Marble 2A appears to be a conformable contact, gradational?

,-,x Continuing up canyon to next dry falls

Δ Marble 1 briefly outcrops again in a depression at the second smaller dike, After this the canyon walls are ~~predom~~ all marble 2A with another window down to Marble 1

Beyond the window marble 2A continues, but large peg boulders are also present, with what looks like marble 2B around them

? Could Marble 2B be only proximal to pegs?

↗ Headed back down canyon west past the larger dike to collect SLO from gneiss

/ Gneiss ~15ft west of dike
N40E 28NW

Continuing West ~20ft past outcrop of €M2A on N side of canyon

Gneiss foliation
N55E 32NW

Continuing West to where pty cuts across canyon

Gneiss foliation at crossing
N70E 45NW

Following canyon to west, walked to small marble outcrop in bend in canyon at west end, then straight up 20ft laterally to NE to Gneiss/unknown marble contact

Gneiss foliation just below contact
N90W 35N

Sample: Unknown marble above gneiss
Appears similar to Marble 2A mylonitic and melange

CJ-16 C1 11

Foliation surface N80W 18NE

Photo of sample C111

Continued walking up slope to search for any additional contacts

After about 30-40ft came across possibly a new unit, very varnished but light tan on ~~outside, inside~~ fresh surface appears foliated

Photo of new unit

Sample CJ 16 C1 12
N32E 24NW foliation
possibly marble

Photo of sample C112

End of day report 3:45 pm

Mapping was successful although the two samples will need to be identified before labeling the map.

I am surprised at how little MVRS there was, the model is based on Canyon 2 since I didn't feel like canyon 1 made much sense at the time.

Now, though, it is clear things are more complex than previously thought.

Tomorrow we'll do photogrammetry in canyon 2

☆ Start of Day 12/18/16
Canyon 2, west end

Conditions: Clear, cold, windy
Mood: Optimistic
Objectives: Photogrammetry of Canyon 2 with georefrences. Additional tasks: clast size + orientation, mapping (if time), fracture orientations (if time)

We plan to set up and measure the location and distances between eight points while constructing the photogrammetry model.

Georefrence plate 1
UTM 11S 0521068
±2m 4012821 NAD 83

Geo ref 1 to Geo ref 2
69.5 ft ± 0.5 ft

Geo ref 2 GPS
UTM 11S 0521088
±3m 4012815 NAD 83

Geo ref 1 to 3
80 ft ± 0.5 ft

Geo ref 3 to 2
48 ft ± 0.5 ft

Geo ref 3 GPS
UTM 11S 0521014
±3m 4012825 NAD 83

Geo ref 3 to 4
83 ft ± 0.5 ft

Geo ref 4 to 5 63ft ±0.5ft
UTM 11S 0521123
±3m 4012800 NAD 83
↑ Georef 5 GPS

Georef 5 to 6
57ft ±0.5ft

Geo ref 6 GPS
UTM 11S 0521137
±4m 4012807 NAD 83

Georef 5 to 7
89ft ±0.5ft

Georef 6 to 7
47ft ±0.5ft

Georef 7 GPS
UTM 11S 0521151
±4m 4012794

Georef 5 to 8
47ft ± 0.5ft

Lunch report 11:45am 12/18/16

Conditions: Cool, clear, windy
Mood: Hopeful
Notes: All georeferences are now setup, will begin photogrammetry after lunch. Probably will have time to start mapping

Just 1. the canyon 1 the gneiss is above most of the marble, the previous model will have to be corrected. M2B is far more prevalent here, as well as M1.

Photogrammetry Canyon 2
DSC_0731.JPG to
DSC_0991.JPG (2nd folder)

! Finished Photogrammetry moving onto mapping

◁ While mapping cave across fault on M1/Gneiss contact at Dike some of the rocks along the fault surface appear fractured, could be breccia

[a] Sample CJ16-C213
Possible fault rock

/ Fault surface on rock sample N70E 39SE

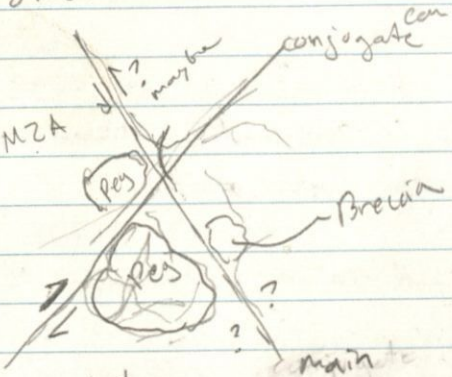
[b] Photos of sample C213 and fault
DSC_0500.JPG and 0501.JPG

? If The dike is cut by the fault and is not just going around it 3D the sense of slip could be hanging wall down - extension

◁ pegmatite clasts, such as in the pluto are definitely cut

Fault surface dissapears briefly in eroded middle of canyon but does continue into M1/M2A with offset pegmatite clasts

Sketch of faults on N side of



Sample CJ-16 C214
Breccia from same fault across canyon 2 (North side)
Contact of M1/M2A on fault near peg clasts as well

NSS flat - N marked on sample

Photo of sample C214 0502.JPG

[o] Photos of fault and conjugate fault
0503.JPG, 0504.JPG
looking north

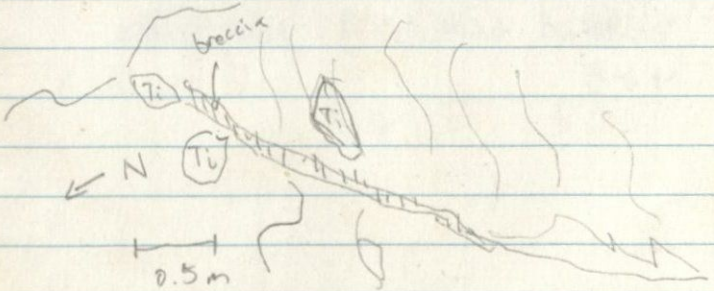
☆ Start of day report 12/20/16
10:20 am

Conditions: Clear, cool, calm
Mood: Positive
Objectives: Finish mapping
investigate faults/fractures
in detail of Canyon 2

◁ Starting at west end of Canyon 2
this appears to be a fault with
breccia cutting both M1 and M2A
~ 5 cm thick

✕ Fault surface
N 80 E 52 SE

[~] Sketch of fault & breccia



54

△ About 10 ft south of the previous fault is another fault with breccia 6-7 cm thick

✗ Fault surface
N60E 76SE

△ Note: This fault does not cut the dike

✗ Walked to end of map area in east

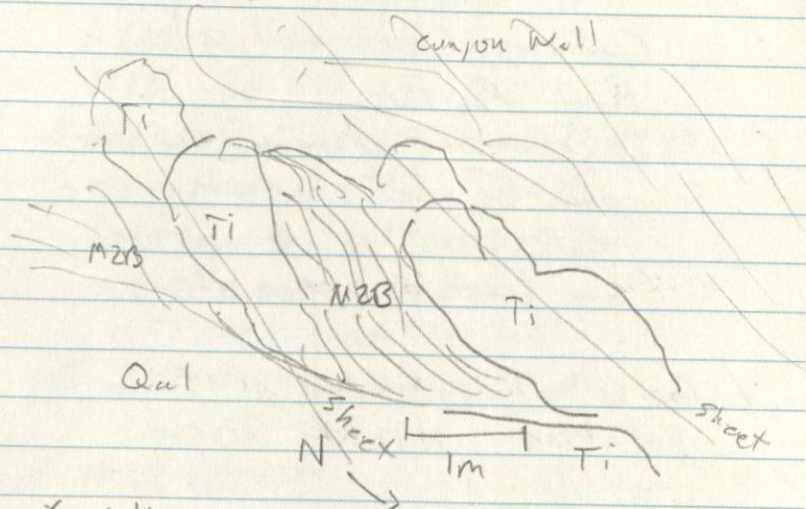
△ Faults / fractures concentrated more closely to areas with dikes. M2B in particular has very few fractures, or at least very few long fractures over a foot in length

△ The large Ti intrusions at the east end appear sheet like dipping to the SW

? Boudins?

✗ Walked back to Ti near faults 4 + 5

Sketch of Peg intrusion boudins?



- Walked 10-15 ft west to canyon wall

- Two possible faults in wall here mainly visible in M2A, and greens (hidden by debris, but looks like a surface)

Fault 4 (western most ~~eastern~~ of the two)
[redacted] N62E 70NW

Fault 5
N42E 50SE

56

* Lunch report 12:30pm

Conditions: Clear, cool, calm
Mood: Positive
Objectives: Map is mostly done
plan to add s/d from gneiss
Foliations Nick continues
on fracture orientations.

✗ Gneiss at west end of Canyon 2
Foliation N12W 20SW

↓* Walked 15 ft east to
gneiss cliff
✗ Gneiss foliation
N24W 22SW
↓* Walked 10ft NE along base of
cliff to gneiss
✗ Gneiss foliation
N15E 24NW
↓* Walked along base of gneiss
to 10ft past lake
✗ Gneiss foliation
N10W 36SW

Walked along base of gneiss to just NW of fault 4

/ Gneiss foliation
N6E 26 NW

△ Base of Gneiss in general varys in foliation s/d due to folds and faults but is generally near N–NNW with dips less than 40°

Walked to M2B North of Large Ti slabs

/ M2B foliation
N1E 31 NW

Walked to east end of map area M2B on southern wall

/ Foliation of M2B
N4E 15 NW

Hiked back to dike and pegmatite then went NE up peg to base of cliffs on North wall

/ Gneiss foliation
N4E 24 NW

△ Fault 1 reappears near top where cut in cliffs are

+ Fault surface in well cut
N 80 E 60 SE

+ Gneiss foliation in cut
N 14 E 22 NW

📷 Photo of fault surface extending over M1/M2A
(Note: this is source of earlier discussed sample)

Returned to base of Blk. Mts

◇ Gneiss at base far less deformed, not ~~my~~ mylonitic

= Note: find out elevation of base

Rite in the Rain.