Detachment Faulting & Geothermal Resources - Pearl Hot Spring, NV

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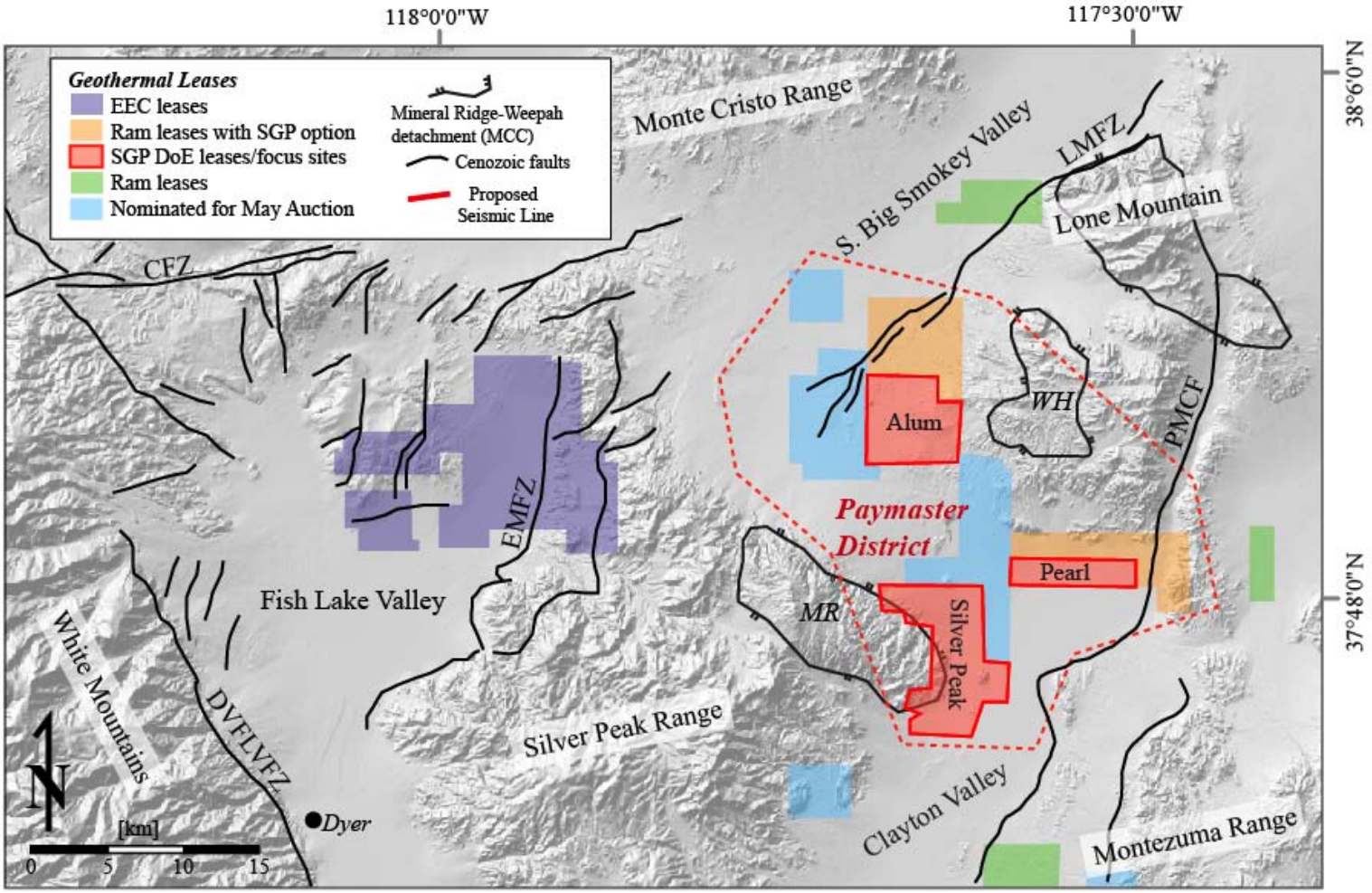
Dr. Daniel Stockli (PI)

University of Kansas

Detachment faulting and Geothermal Resources – An Innovative Integrated Geological and Geophysical Investigation of Pearl Hot Spring, Nevada

- Timeline
  - Project start 01/29/2010 - 01/28/2013 <1% complete
- Budget
  - Total project funding $ 4,242,519,
  - DOE $2,299,237, awardee share $1,943,282 (SGP, KU, and OU)
- Completion of Phase I will provide all the information needed for selection of the best location for the slimhole wells. If this decision point results in a 'go', slim holes will be drilled; if not, the Phase Report will act as the final report.
- Partners: Sierra Geothermal Power Inc. and University of Oklahoma

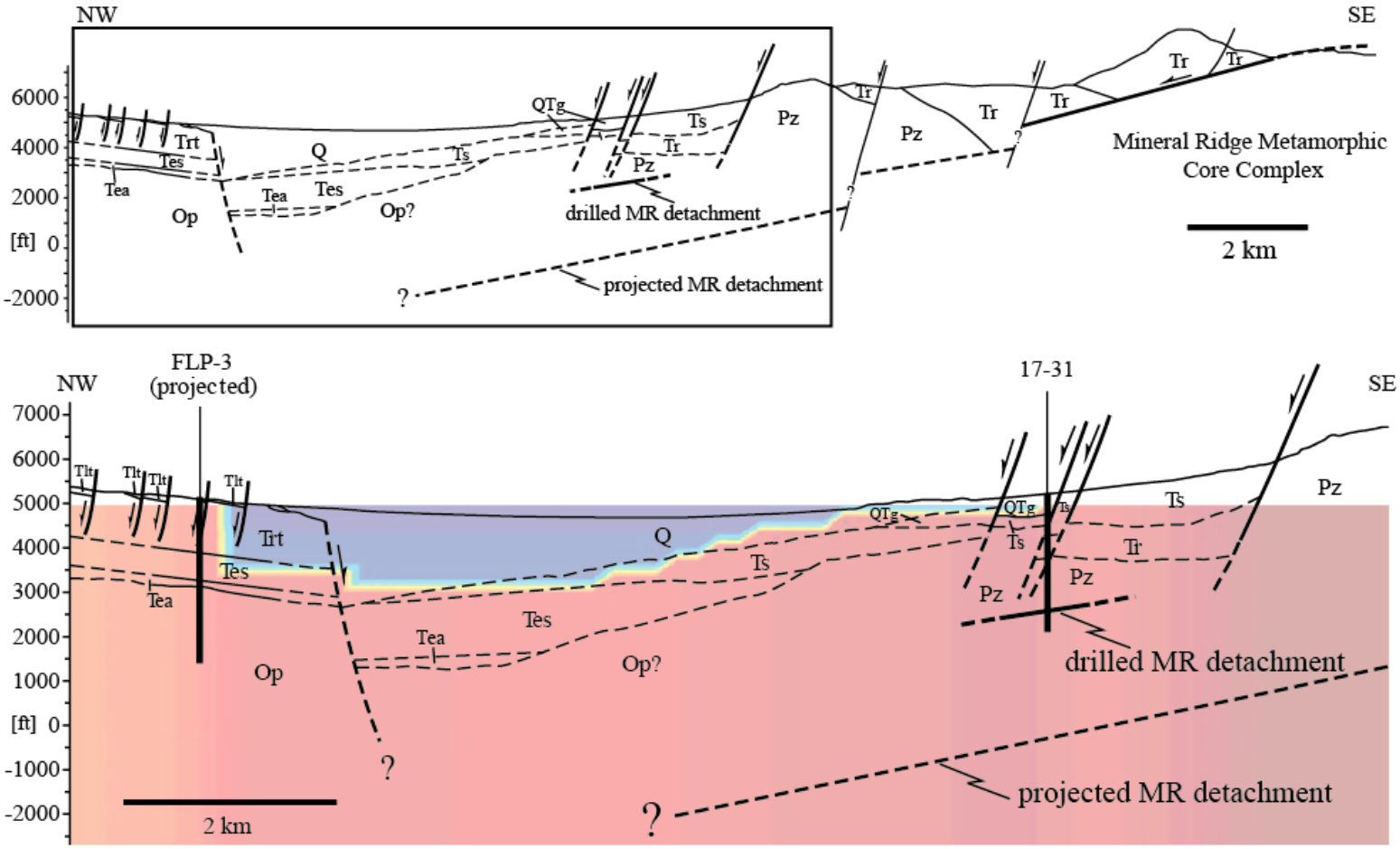

118°0'0"W
117°30'0"W
38°6'0"N
37°48'0"N
Geothermal Leases
EEC leases
Ram leases with SGP option
SGP DoE leases/focus sites
Ram leases
Nominated for May Auction
Mineral Ridge-Weepah detachment (MCC)
Cenozoic faults
Proposed Seismic Line
Monte Cristo Range
S. Big Smokey Valley
LMFZ
Lone Mountain
CFZ
Alum
WH
PMCF
Paymaster District
EMFZ
Pearl
Fish Lake Valley
MR
Silver Peak
White Mountains
DVFLVFZ
Silver Peak Range
Clayton Valley
Montezuma Range
Dyer
N
[km]
0
5
10
15

Objective of Pearl Hot Spring Project

Integration of new thermochronometric, structural and geological analyses, reflection and refraction seismic surveys and existing geophysical data into a 3-D Earth Model to elucidate the tectonic and 4-D thermal evolution of southern Clayton Valley and the Weepah Hills (Pearl Hot Spring geothermal play).

The combination of surface and subsurface thermochronometric constraints with a detailed 3-D Earth Model is a unique new approach to exploration. Detailed 3-D structural imaging coupled with a better understanding of the long-term thermal evolution will enable dramatically improved siting of geothermal exploration tests, and ultimately the location of geothermal production wells.

Example for structural uncertainty from Fish Lake Valley



Schoeder et al., in preparation

Summary of scientific/technical approach

(1) Structural and geological analysis of Pearl Resource

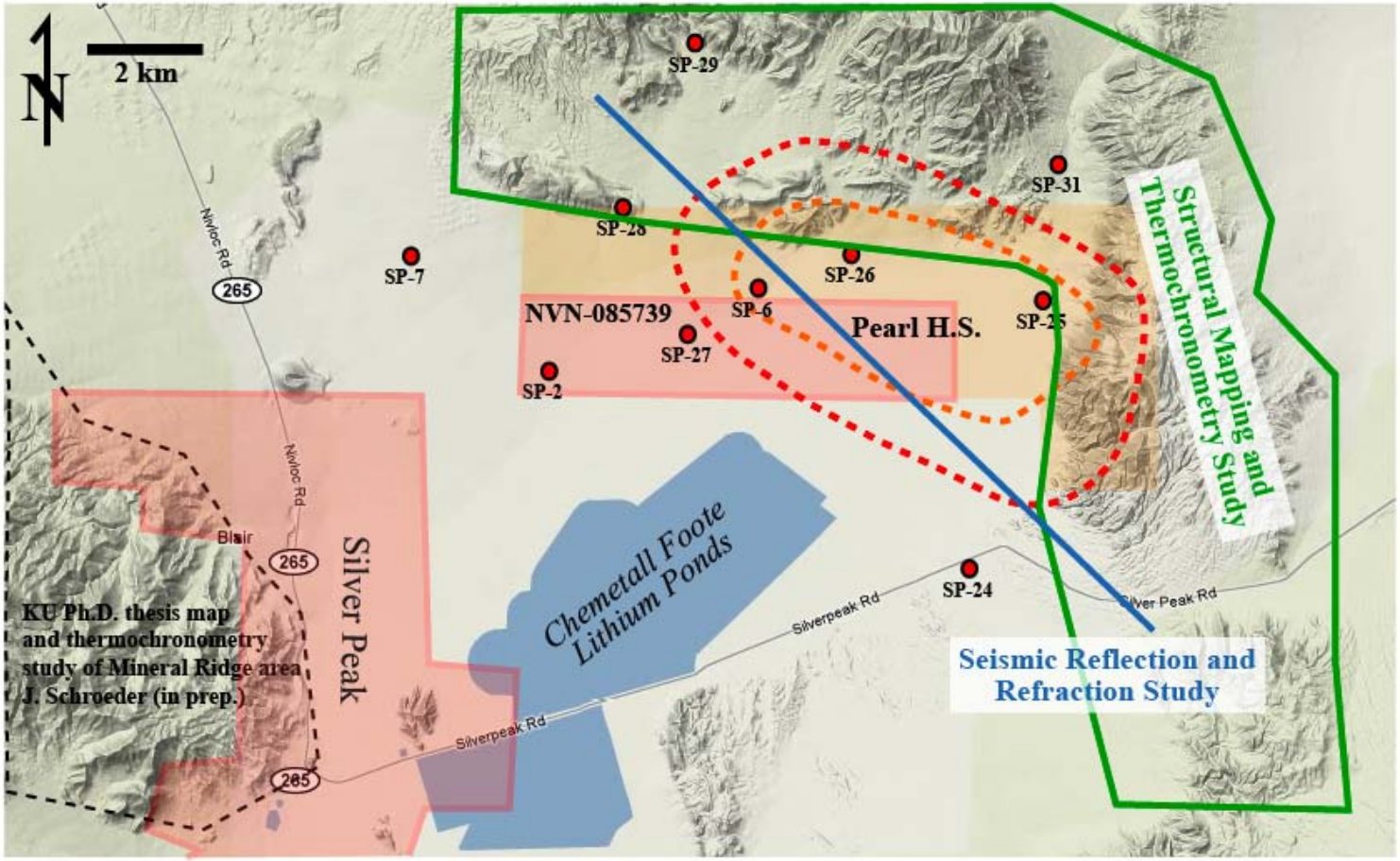
(2) (U-Th)/He Thermochronometry and geothermometry

(3) Reflection and Refraction Seismic (Active Source)

(4) Integration with existing geological/geophysical data

(5) 3-D Earth Model, combining all data

Innovative approach combining classic work with new geochemical and geophysical methodology


N
2 km
SP-29
SP-31
SP-28
SP-26
SP-7
SP-6
SP-25
NVN-085739
Pearl H.S.
SP-27
SP-2
Structural Mapping and Thermochronometry Study
Nivloc Rd
265
Blair
Silver Peak
Chemetall Foote Lithium Ponds
SP-24
Silverpeak Rd
Silver Peak Rd
Seismic Reflection and Refraction Study
KU Ph.D. thesis map and thermochronometry study of Mineral Ridge area J. Schroeder (in prep.)

Planned milestones and go/no-go decisions for FY09 and FY10

Milestones:

- Geological Mapping and Structural Analyses by Oct 10
- Thermochronometry and Geothermometry by Nov 10
- Reflection/Refraction Seismic Survey by Oct 10/Dec 10
- 3-D Earth Model Integration and Evaluation Jan 11

Go/No-go decision:on slimhole drilling Feb 11

Progress to date and/or planned accomplishments/outcomes:

The project funds were just released in May 2010 and the project's phase I is quickly kicking into gear. No project outcomes to report.

Summary of immediate plan:

May 2010: KU/OU kick-off meeting and permitting

June 2010: Start of structural and thermochronometric field program and installation of new HR-ICP-MS instrument

July 2010: Start of Reflection/Refraction Seismic work

End of 2010: Data compilation into 3-D Earth Model

Project Management/Coordination

Summary of project management plan

Stockli is the project leader; KU team (Stockli, Walker, graduate students) will carry out all structural, geological, and thermo-chronometric analyses during all Phases of the project.

The active source seismic data acquisition, processing, interpretation, and integration with existing gravity data will be carried out by Drs. Keranen and Keller from the University of Oklahoma, who are recognized experts in active source seismology and integration of seismic (reflection and refraction) data and gravity data.

- SGP will take the lead during phases II and III with Stockli and his team in charge of the scientific monitoring, evaluation, and continued data integration.

Future Directions

We hope to demonstrate that our work presents geothermal operators with a very cost-effective approach to help plan the location of exploration and ultimately production of utility-grade geothermal wells.

Besides the exploration and scientific benefits, the project will result in the education of several graduate and undergraduate students, helping train a new generation in renewable energy exploration, as well as temporary employment for students, collaborators, and any contractors (e.g., drillers).

If the exploration work identifies a viable resource, then the economic impact will include long-term employment and significant development potential for the local region.

Mandatory Summary Slide

- Low- and intermediate-temperature thermochronometry is quickly becoming a powerful and very cost-effective geothermal exploration tool (locating long-live geothermal anomalies)
- The Pearl Hot Spring Project conducted by KU/OU and SGP researchers focuses on a unique 3-D Earth Model to minimize structural/thermal uncertainties and elucidate the 4-D thermal evolution of the geothermal resource to optimize the drill location siting and exploration success
- The result of this innovative approach will be the drilling and testing of two geothermal exploration wells (cored) after careful end of phase I go/no-go evaluation