

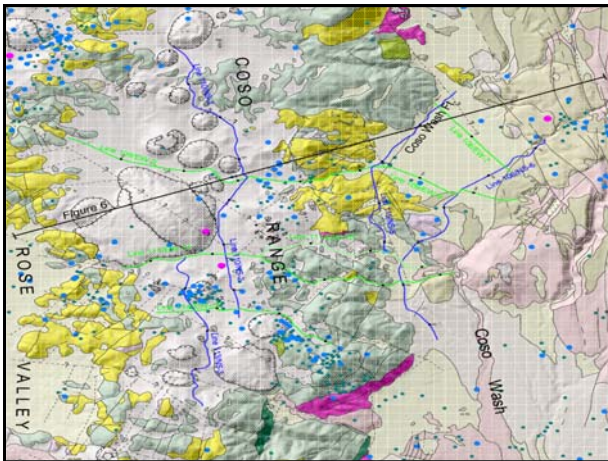
OUTLINE

- INTRODUCTION
- DATA PROCESSING
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- Migrated Reflection Imaging
- DISCUSSION

NEW SEISMIC IMAGING OF THE COSO GEOTHERMAL FIELD, EASTERN CALIFORNIA

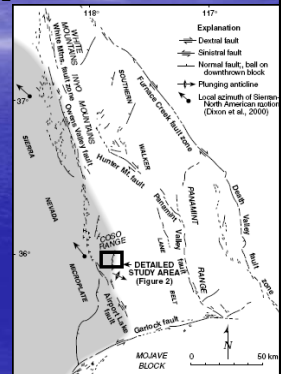
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INTRODUCTION

- This paper presents new seismic images of the Coso geothermal field in eastern California
- 45 line-km of 2-D reflection acquired in the central Coso Range to image structure in the crystalline rocks that host the geothermal field



DATA PROCESSING

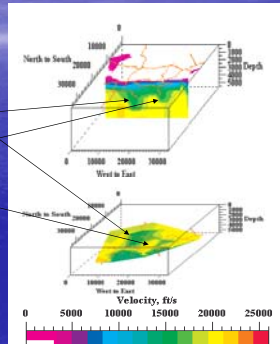
- The processing consists of the following steps:
- 1) P-wave first arrivals in the seismic data for individual lines are inverted to obtain the shallow 2-D velocity structure along the line. The inversion is performed using SeisOpt @2D.
- 2) Kirchhoff pre-stack seismic images are developed for each line by using the velocity tomograms as a basis for migrating the reflection data.
 - Preprocessing of the data (muting, filtering, etc) was performed prior to the migration.

INTRODUCTION

- The data were processed using a combination of detailed velocity modeling and Kirchhoff pre-stack migration to obtain accurate, depth-migrated images of the subsurface structure
- The goal of this study was to image moderately to steeply dipping brittle faults and fractures that may control permeability and localize production in the field.
- To image deeper structures and assess their relationship to shallow faults that accommodate active strike-slip faulting and extension in the central Coso Range.

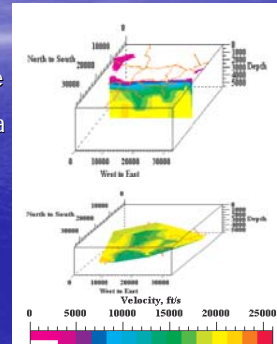
3-D RESULTS

- Two low velocity zones
- Main production area
- East Flank
- Low velocities with 4.6 km/s (15,000 ft/s) crystalline bedrock velocities of about 6.1 km/s (20,000 ft/s)



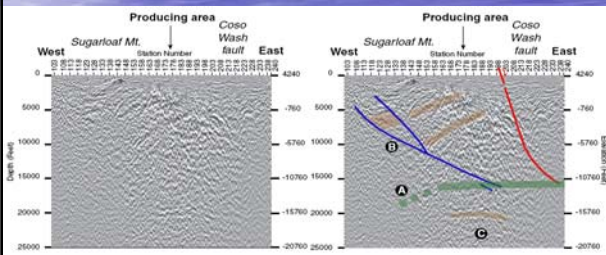
3-D RESULTS

- They interpolated the shallow velocity structure between individual 2-D seismic lines to develop a 3-D model of lateral velocity variations beneath the geothermal field.
- SlicerDicer, ver. 3.0.3, was used for 3-D visualization of the 2-D data



Migrated Reflection Imaging

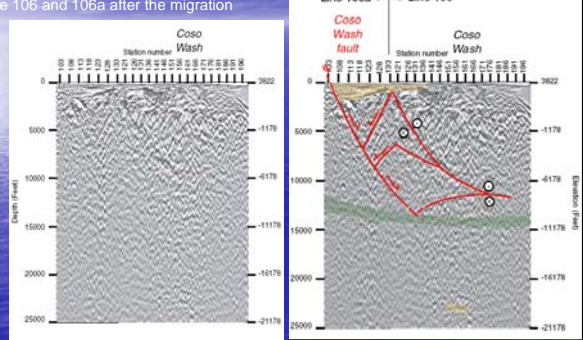
East-west depth-migrated line 109



(A) imaged on lines 106 and 106a (Previous fig). Moderately east-dipping reflectors west of the Coso Wash fault (B) also appear to terminate against the 4 km reflecting horizon. West-dipping reflectors (C) appear to terminate against the B reflectors.

Migrated Reflection Imaging

Line 106 and 106a after the migration

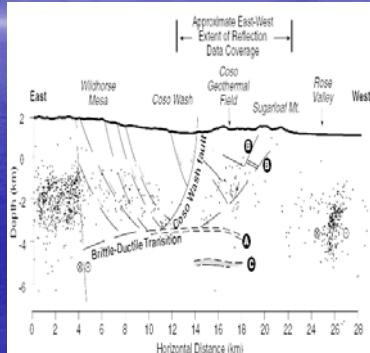


DISCUSSION

Reflector (A) lies at or near the base of seismicity and is interpreted to be the local brittle-ductile transition zone beneath the Coso field. Brittle faulting accommodated by the southeast-dipping Coso Wash fault and antithetic faults of Wildhorse Mesa is confined to the upper 4 km above the brittle-ductile transition.

East-dipping reflectors west of the Coso Wash fault (B) underlie Sugarloaf Mt. and some of the youngest volcanic domes in the Coso Range. These reflectors may be moderate to low-angle normal faults or magma conduits.

The high-amplitude reflector at 6 km depth beneath the geothermal field (C) is interpreted to be a lens of fluid or a magmatic sill



DISCUSSION

Interpreted relationship between major features imaged on lines 106 and 109, mapped geology and seismicity (events recorded by the Southern California Seismic Network).

