BASIN ANALYSIS OF UPPER OLIGOCENE AND LOWER MIOCENE STRATA IN THE GRAPEVINE AND FUNERAL MOUNTAINS, CALIFORNIA-NEVADA

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Geological Society of America Annual Meeting & Exposition
Salt Lake City, Utah
October 16–19, 2005

This presentation was prepared to document work performed by the Center for Nuclear Waste Regulatory Analyses (CNWRA) for the Nuclear Regulatory Commission (NRC) under Contract No. NRC–02–02–012. The activities reported here were performed on behalf of the NRC Office of Nuclear Material Safety and Safeguards, Division of High-Level Waste Repository Safety. This presentation is an independent product of the CNWRA and does not necessarily reflect the view or regulatory position of the NRC.

Objective

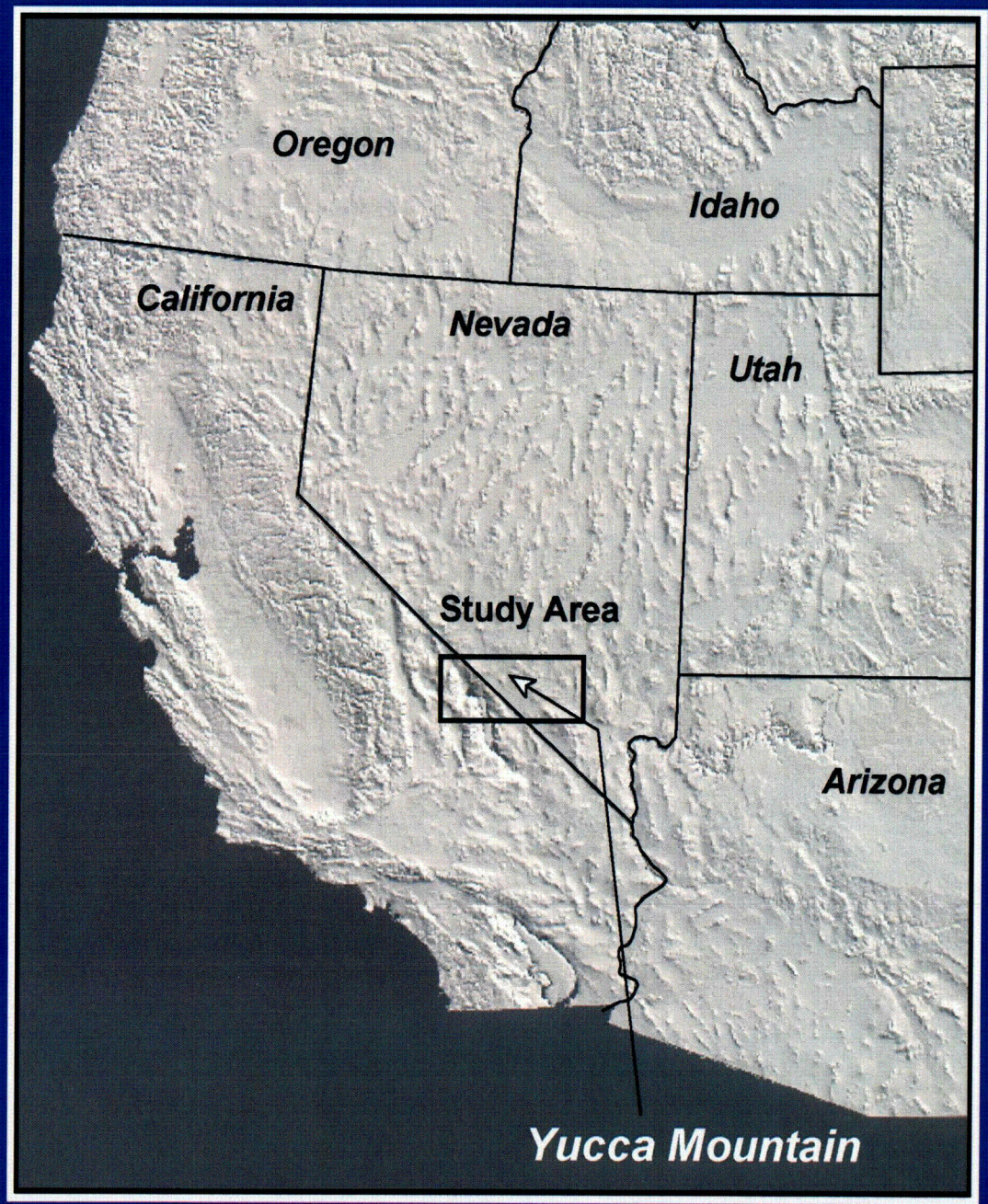
- Examine geologic record of Oligocene and early Miocene extensional deformation and basin development in the region surrounding potential high-level waste repository at Yucca Mountain, Nevada

- These Tertiary rocks are important to Yucca Mountain studies:

  - Comprise much of the basin fill down-gradient from the potential repository (e.g., as applied to hydrogeologic models of basin fill)

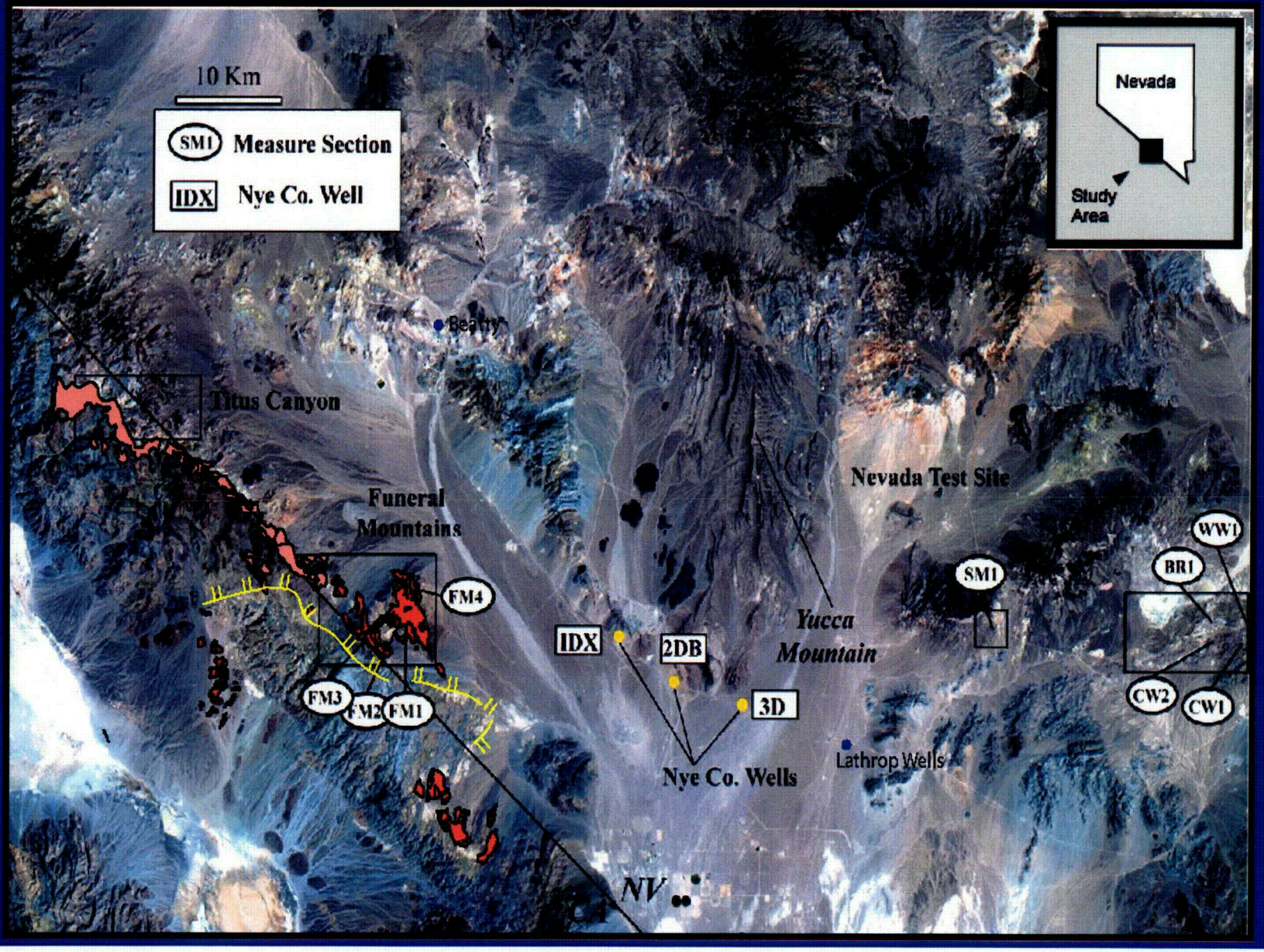
  - Provide the framework for understanding tectonic setting and seismotectonics (e.g., as applied to earthquake and faulting hazard studies)

Central Basin and Range Province

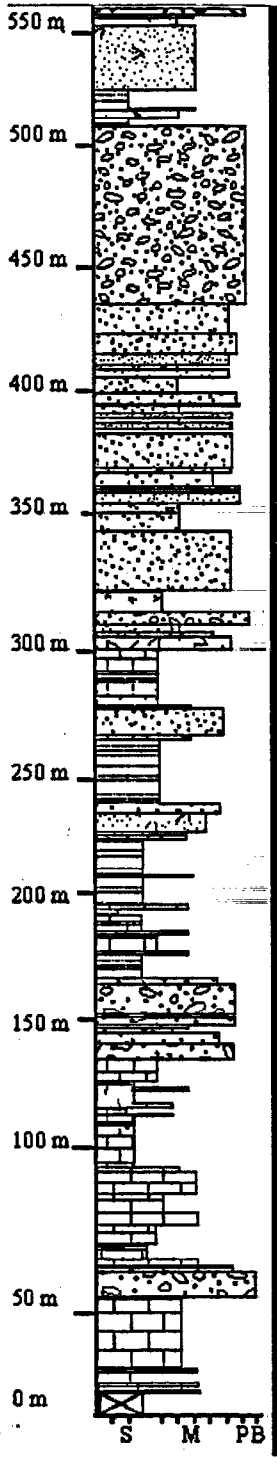


C01

Satellite Image of the Study Area Showing the Locations of Previously Measured Sections and the Deep Nye County Wells



C02



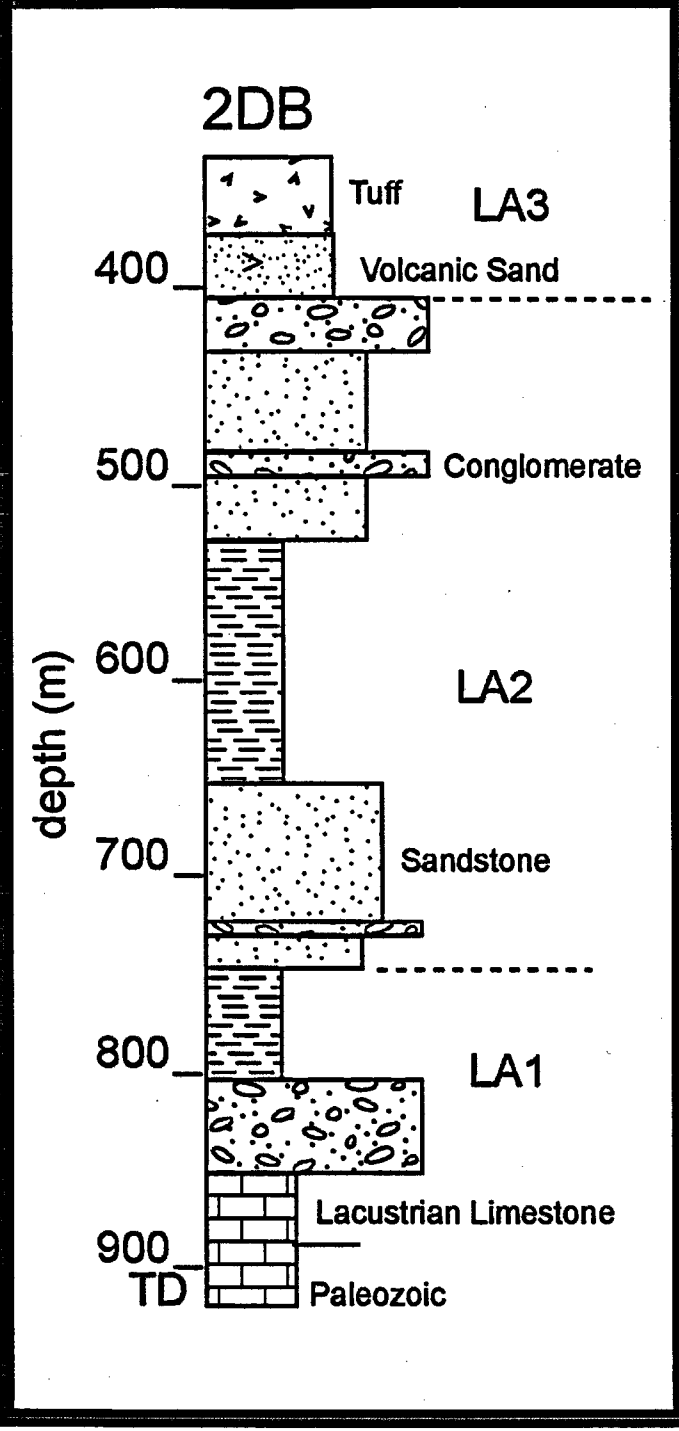
Three Lithofacies Associations

Previous work identified three lithofacies associations that comprise the early tertiary stratigraphic record.

LA3 Upper part of the section dominated by tuffs and volcaniclastic sandstones

LA2 Middle part of the section dominated by red clast-supported conglomerates and red fine- to coarse-grained sandstones

LA1 Lower part of the section dominated by white to brown fossiliferous limestones and matrix supported conglomerates



Nye County Well NC EWDP 2DB

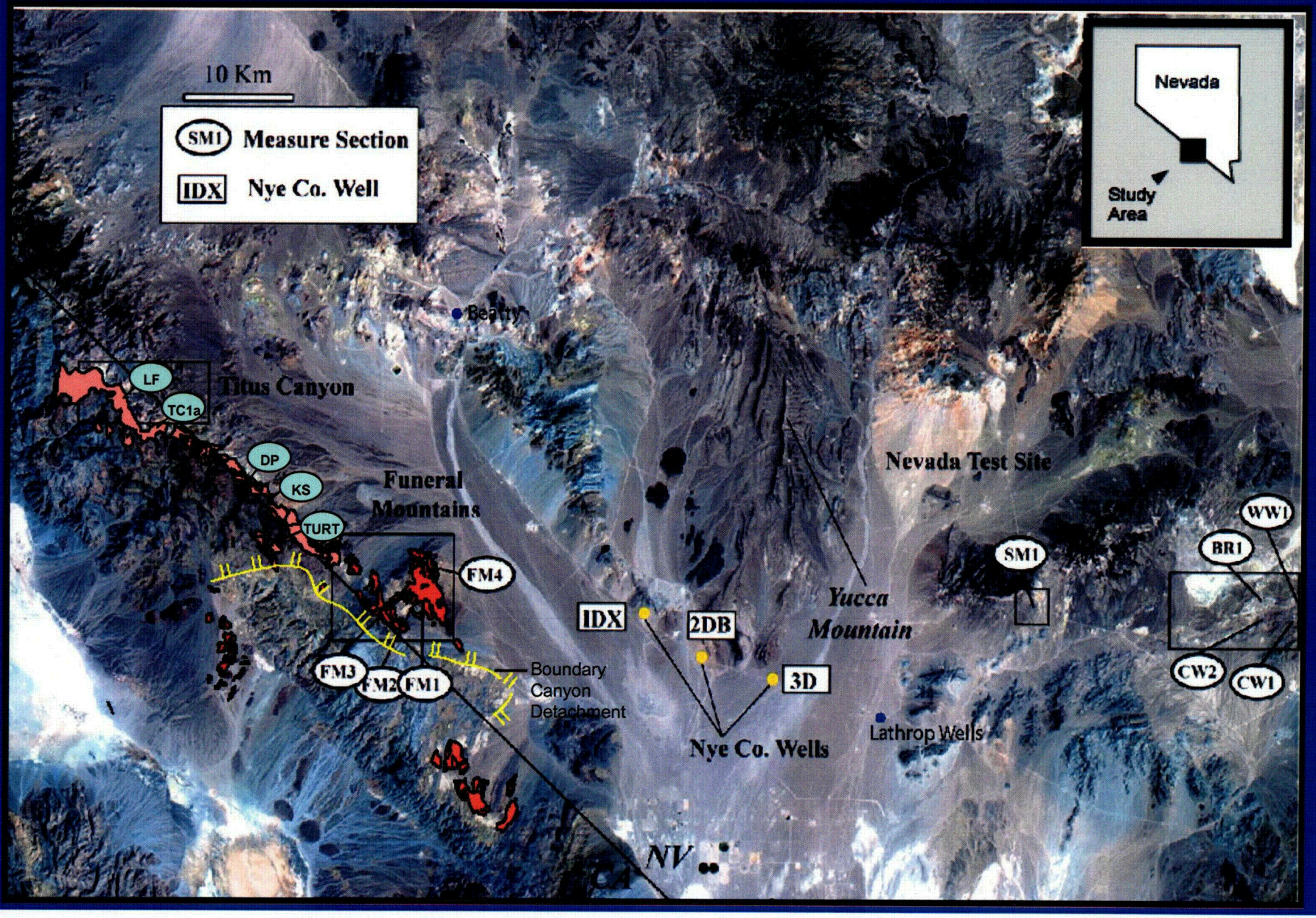
These three lithofacies have been identified in Nye County Wells.

LA3 Tuff and volcaniclastic sandstone

LA2 Red sandstone and red conglomerate with quartzite and carbonate clasts

LA1 White to brown fossiliferous limestone and matrix-supported conglomerate

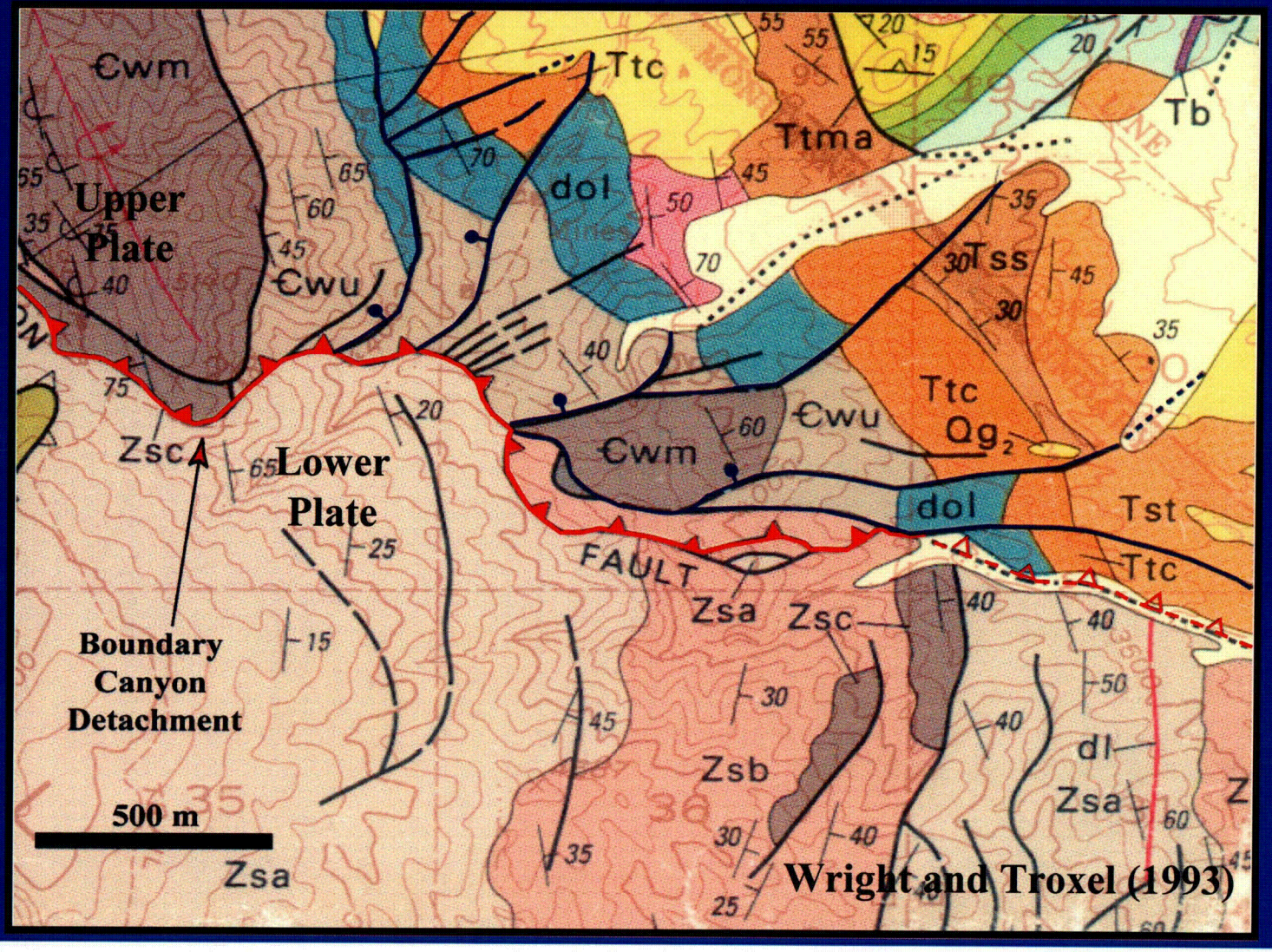
Present Work Extends Correlation West into Titus Canyon



C03

Boundary Canyon Detachment

In the Funeral Mountains, basin bounding normal faults splay from the Boundary Canyon Detachment.



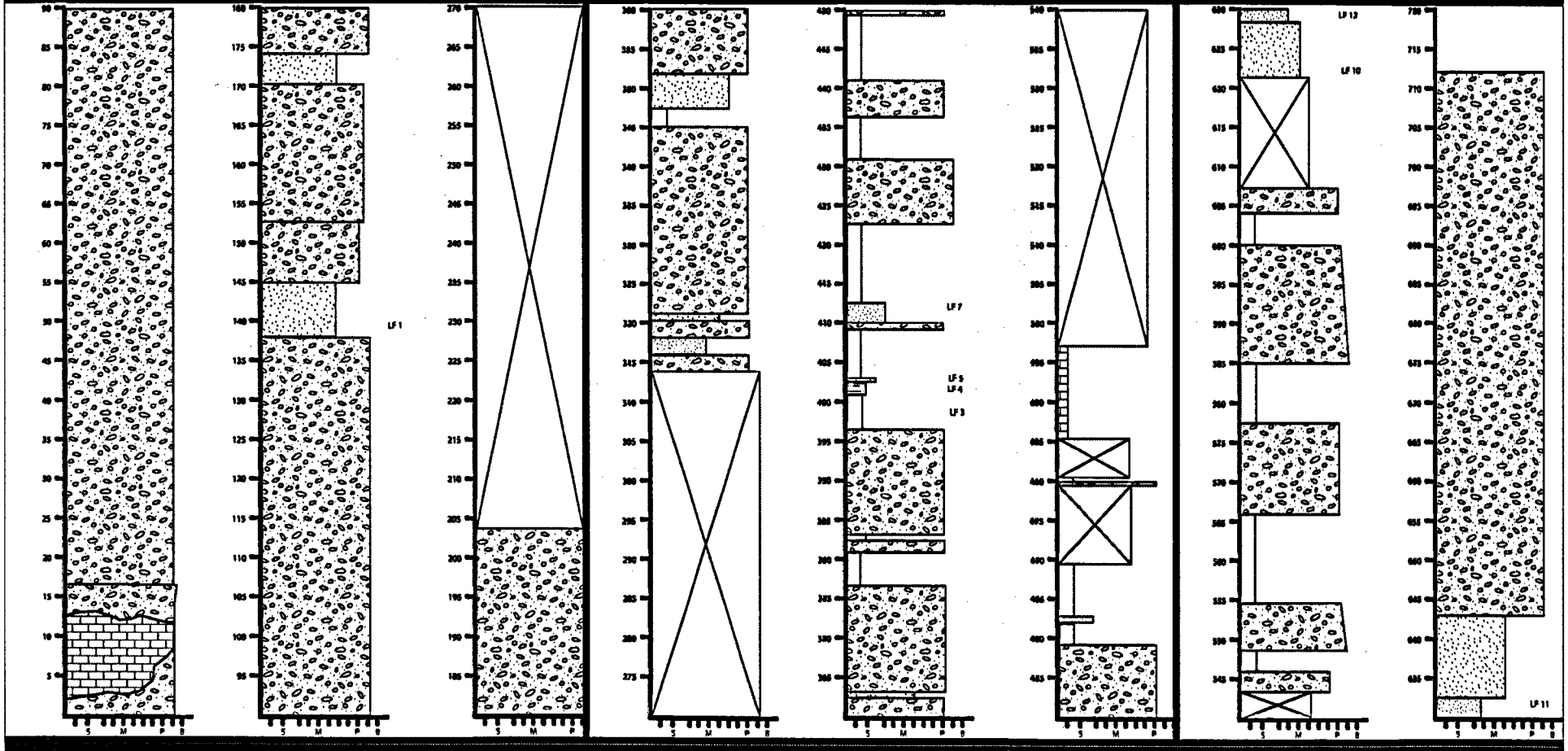
C04

Large Polished Boulders Are Characteristic of the Base of the Section Near Boundary Canyon Detachment

C05

Leadfield Measured Section

New measured section from Titus Canyon showing LA1 and LA2 lithofacies.

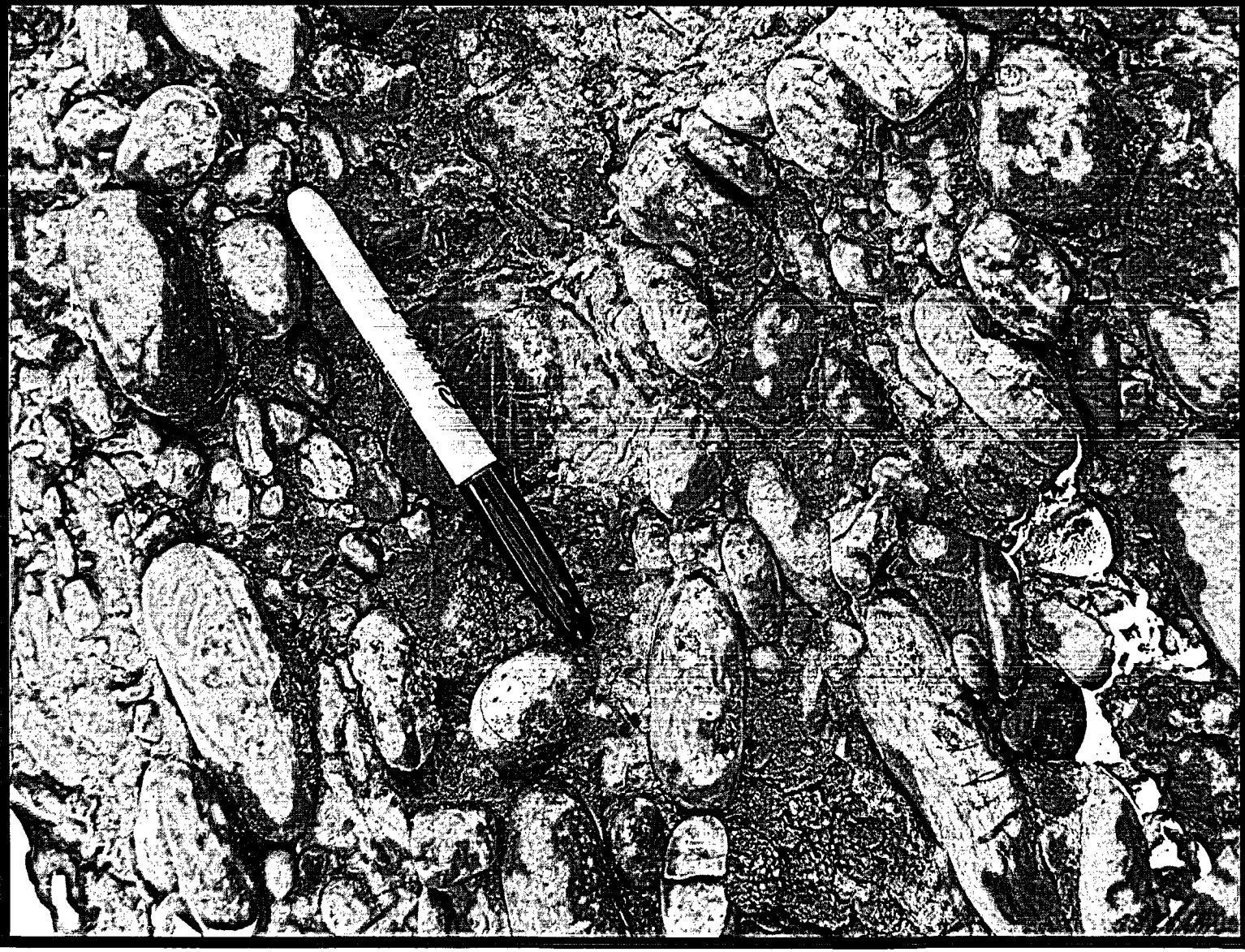


LA1 – Matrix Supported Conglomerate

LA1 – Large Limestone Landslide Blocks
(Person for Scale, Lower Left)

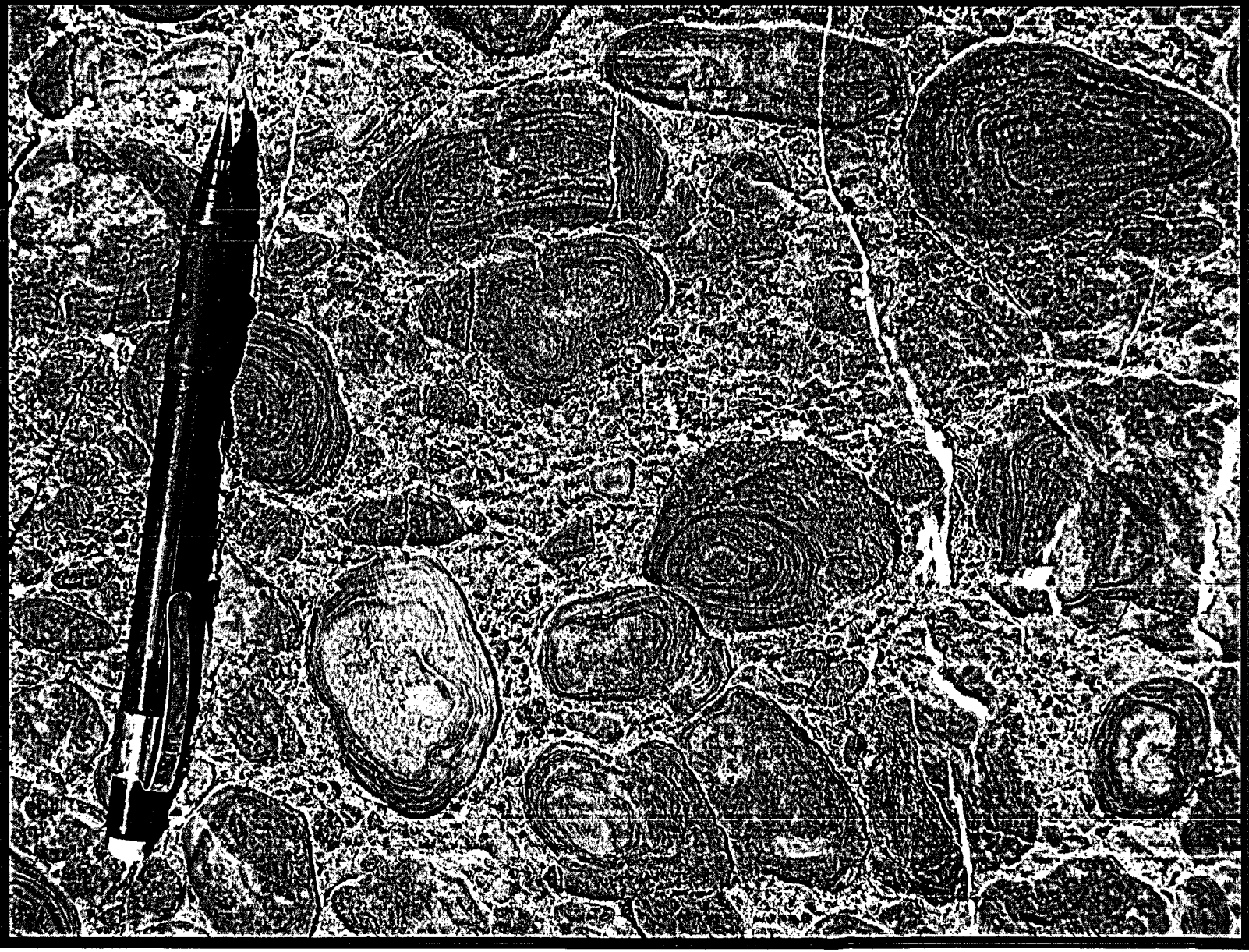
LA2 – Clast Supported Conglomerate with Fine Sand Lenses

LA2 – Clast Supported Conglomerate – Note Imbrication



LA2 – Paleosol Development

LA2 – Oncalitic Limestone



LA3 – Volcaniclastic Sands and Conglomerates

Conclusions

- Three lithostratigraphic units correspond to three stages of supradetachment basin development.

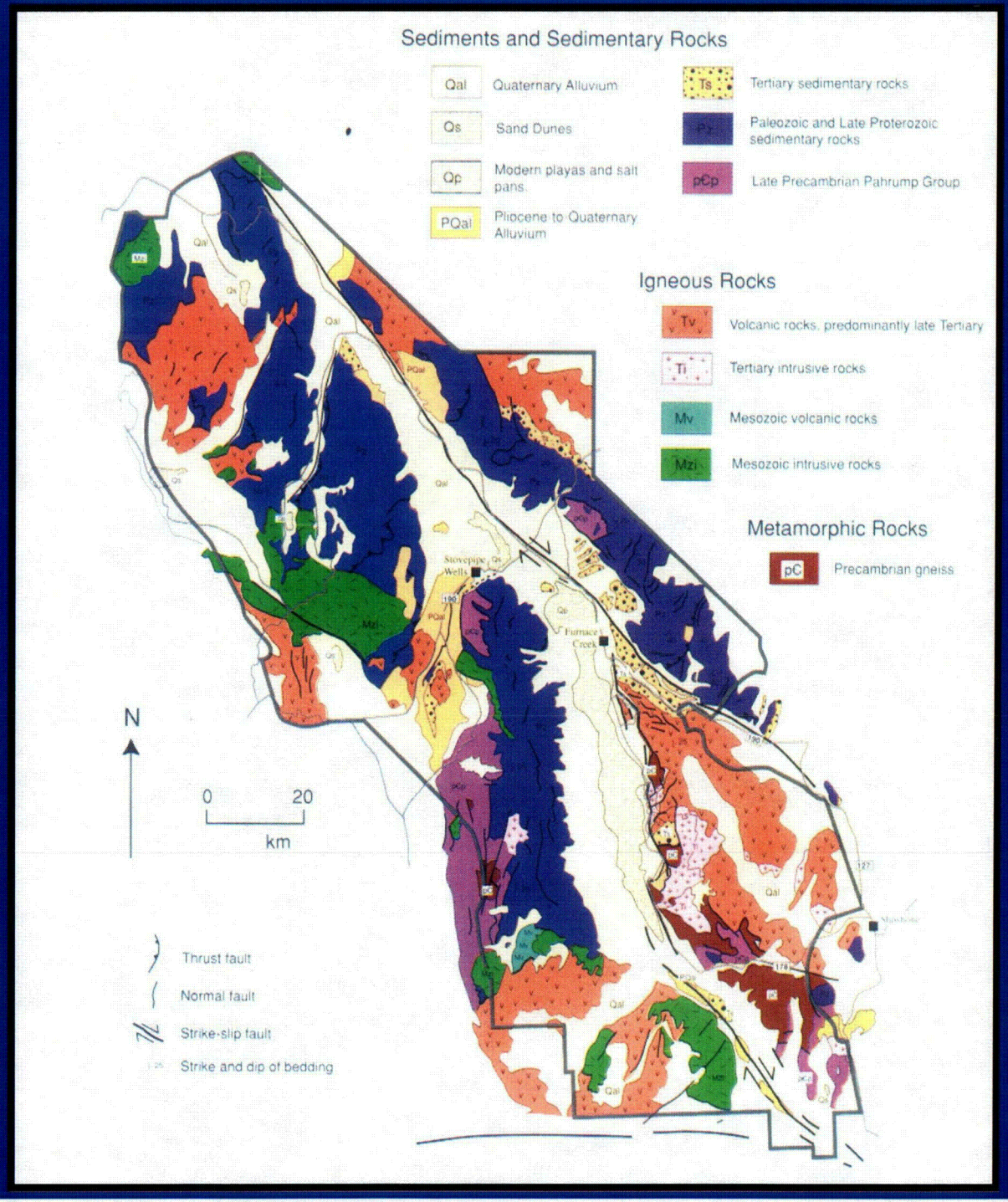
  LA1 - isolated lacustrian basins with limited sediment flux
  LA2 - development of through-going fluvial systems
  LA3 - thinned crust and initiation of volcanism

- Recognition of the lateral extent and thickness of these units is important to support reliable groundwater models in performance assessment calculations of a potential repository at Yucca Mountain.

- Distribution of these units suggest basin development early in the Tertiary prior to Basin and Range extension.

Back-up Slide

Death Valley National Park Geologic Map



(Miller and Wright, 2002)

C06