STRATIGRAPHIC ARCHITECTURE AND RESERVOIR CHARACTERIZATION OF THE SILURIAN RACINE FORMATION, FORSYTH FIELD, CENTRAL ILLINOIS

Yaghoob Lasemi

Illinois State Geological Survey, University of Illinois at Urbana-Champaign

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ILLINOIS

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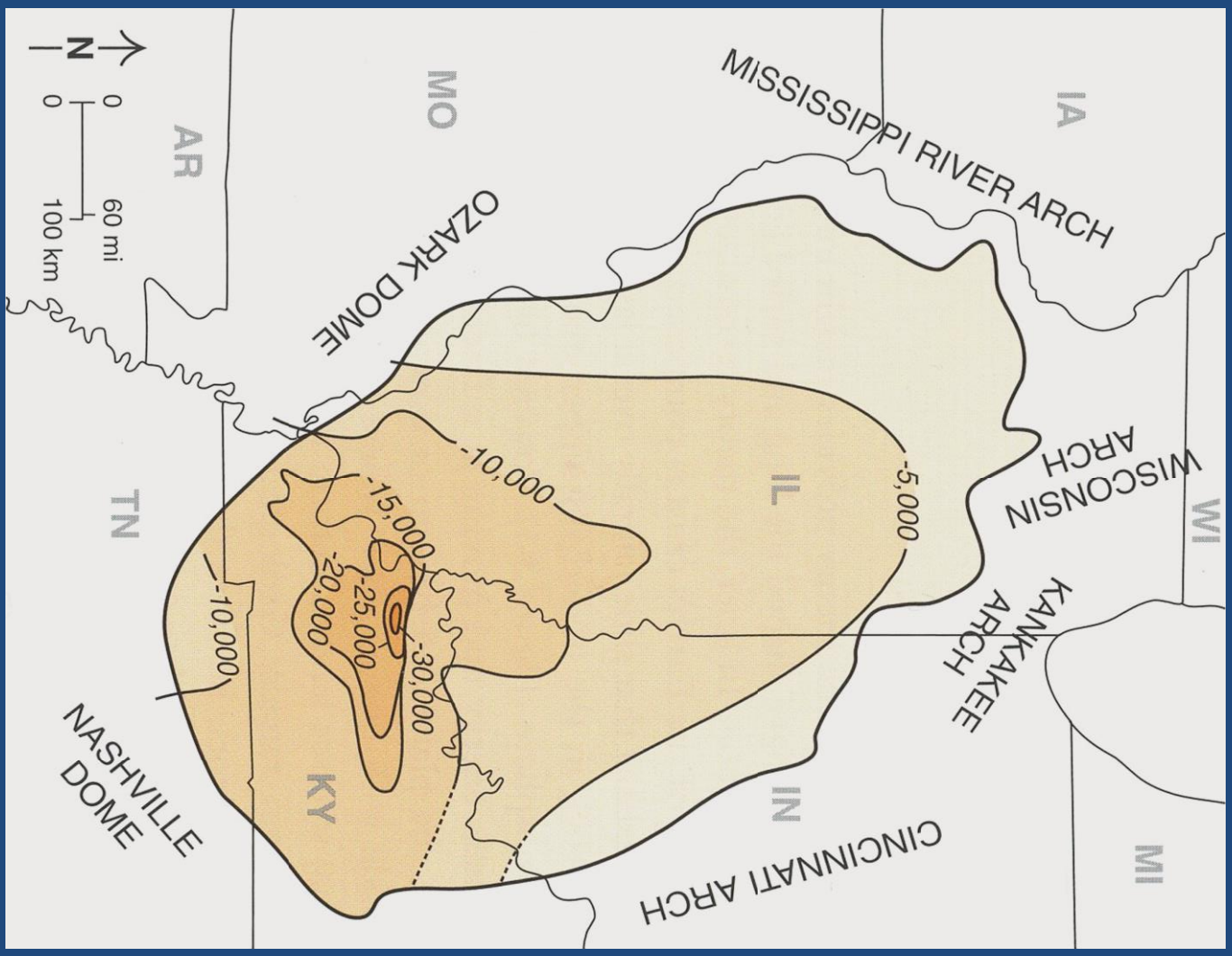
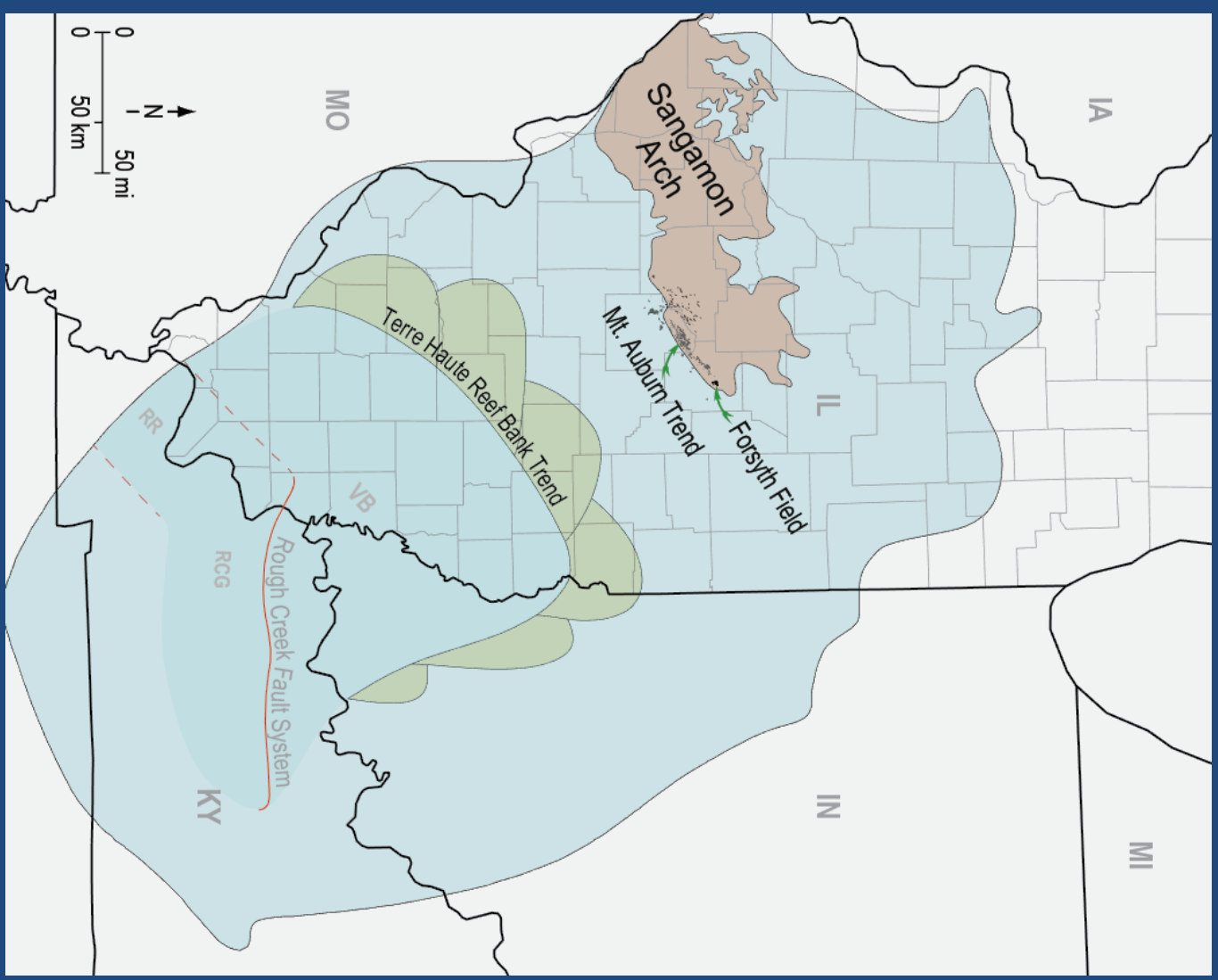
Presentation Outline

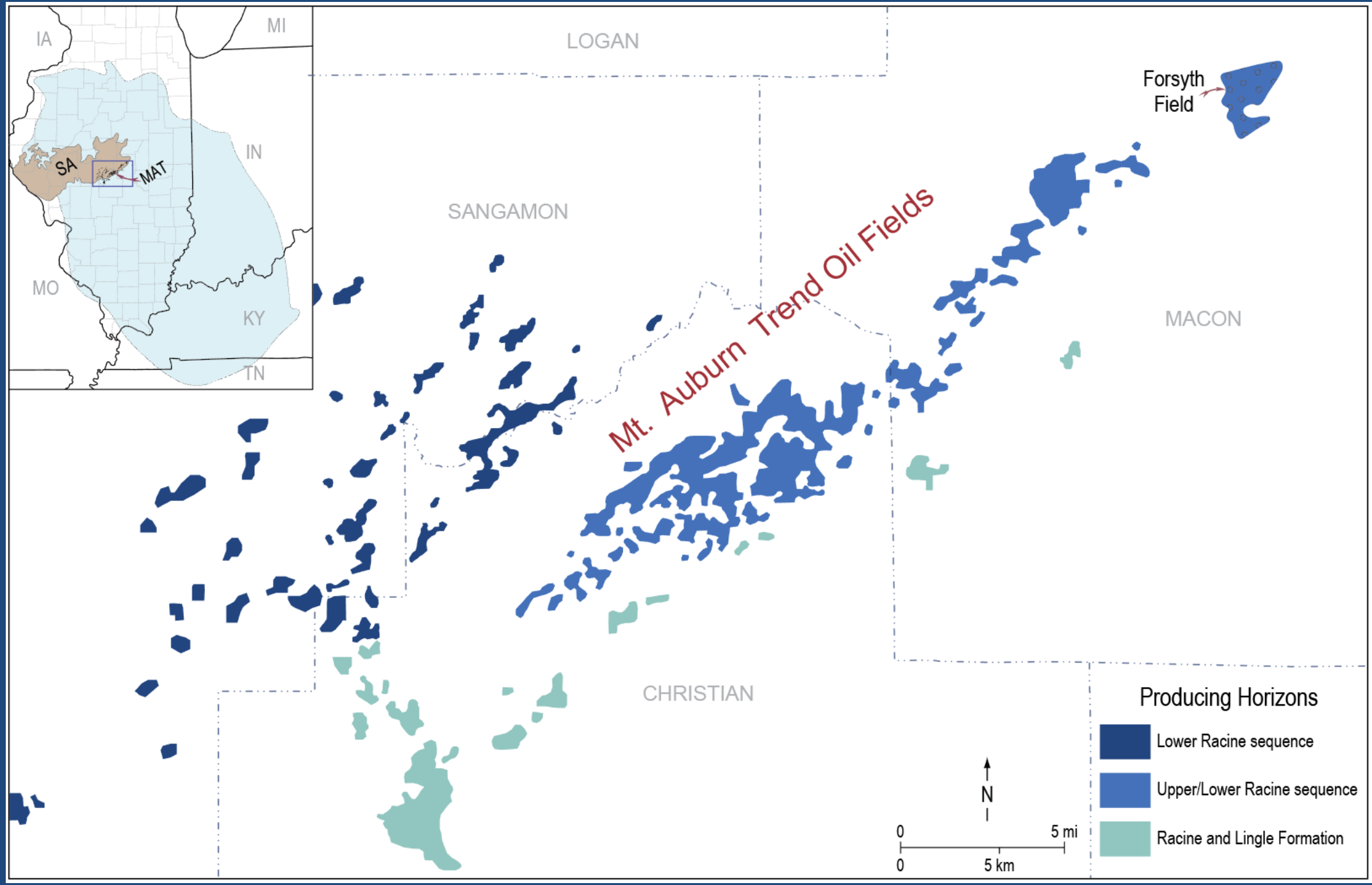
1. Geologic setting
2. Field discovery and development
3. Stratigraphy and reservoir characterization
4. Reservoir development and petroleum entrapment
5. Potential for future development



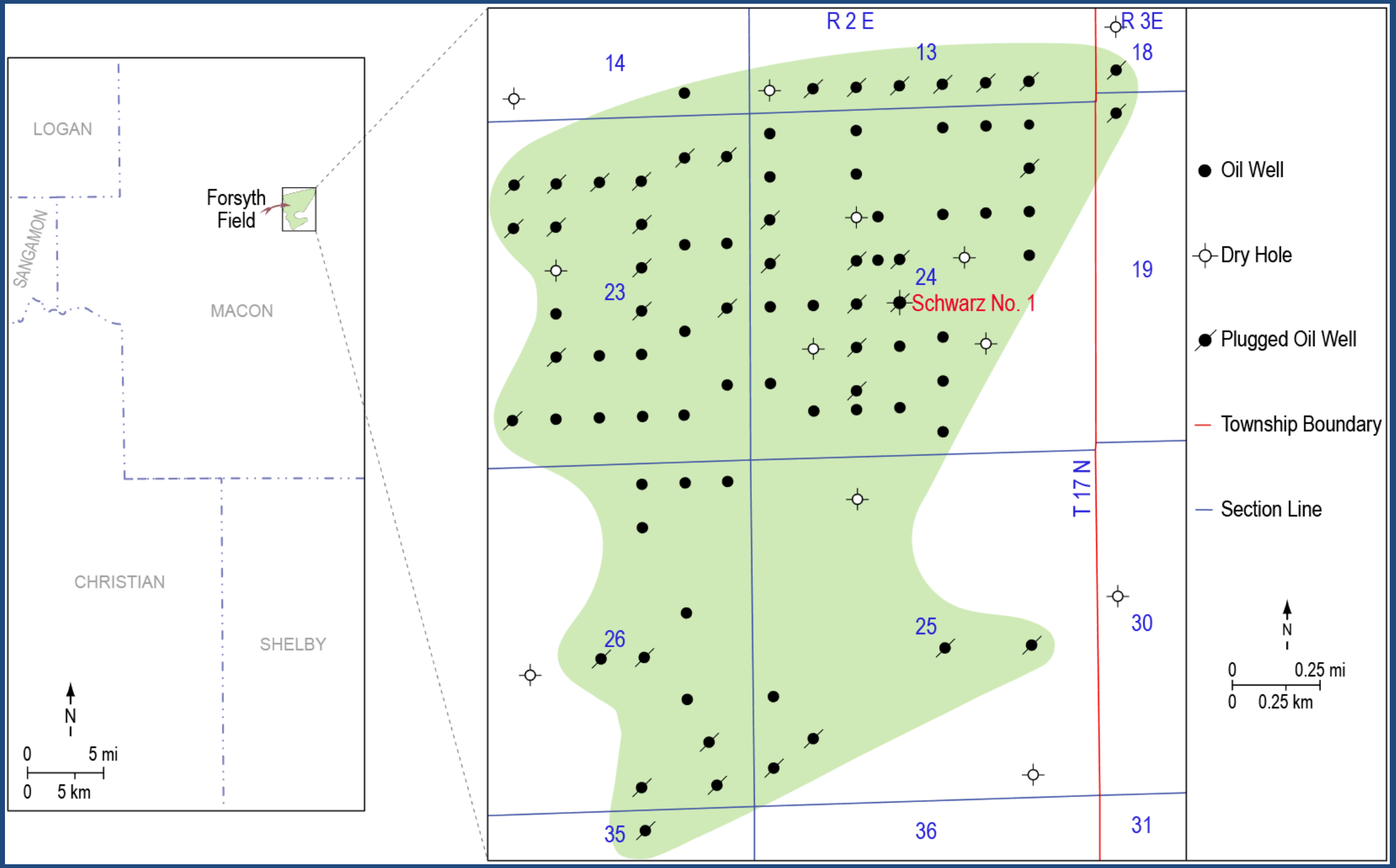
Illinois Basin and the Surrounding Arches and Domes (Kolata and Nelson, 2010)



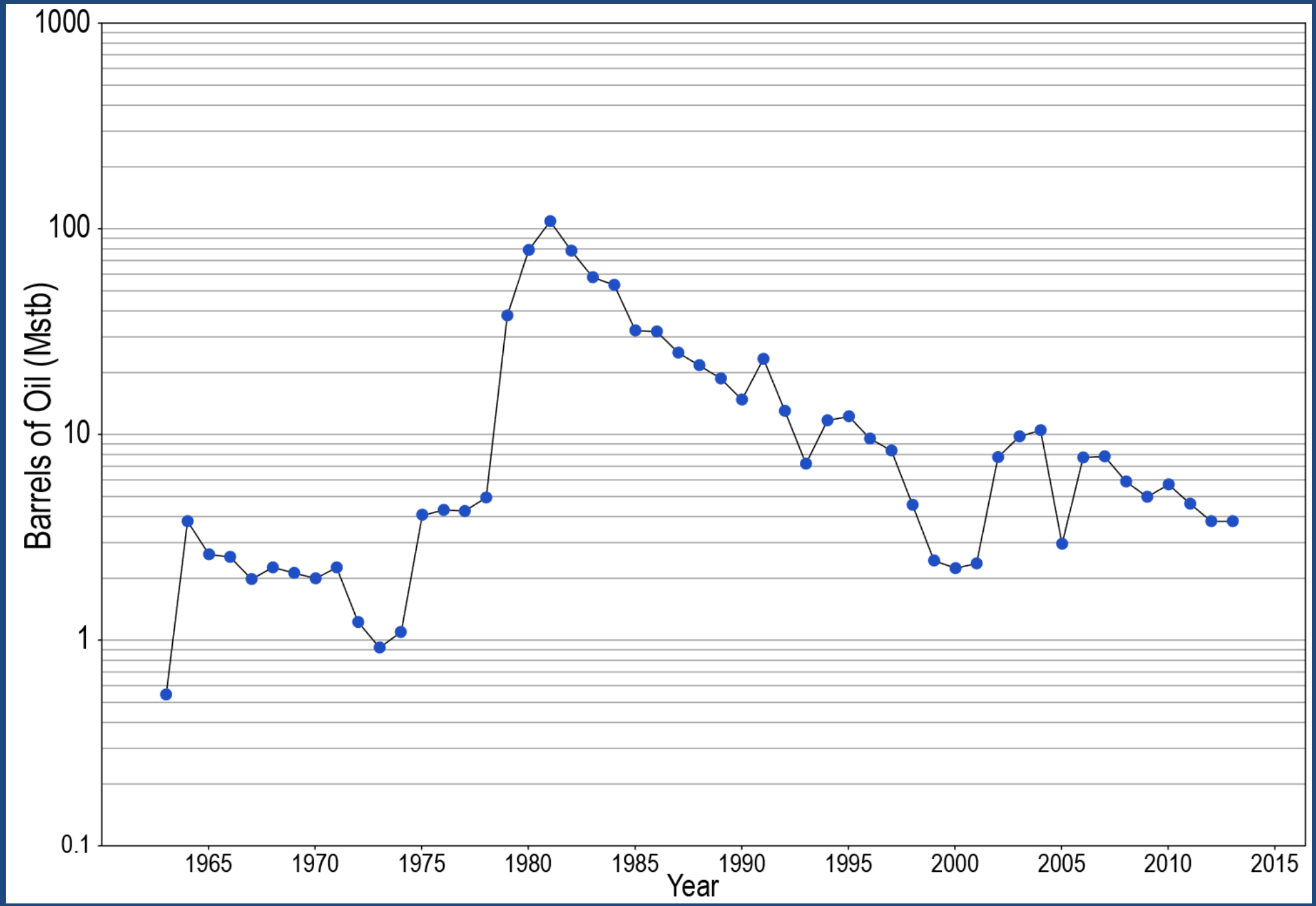
Illinois Basin During Silurian Time (Modified from Lasemi et al., 2010; Lasemi, 2014)



Mt. Auburn Trend Oil Fields in the Southern Flank of the Sangamon Arch

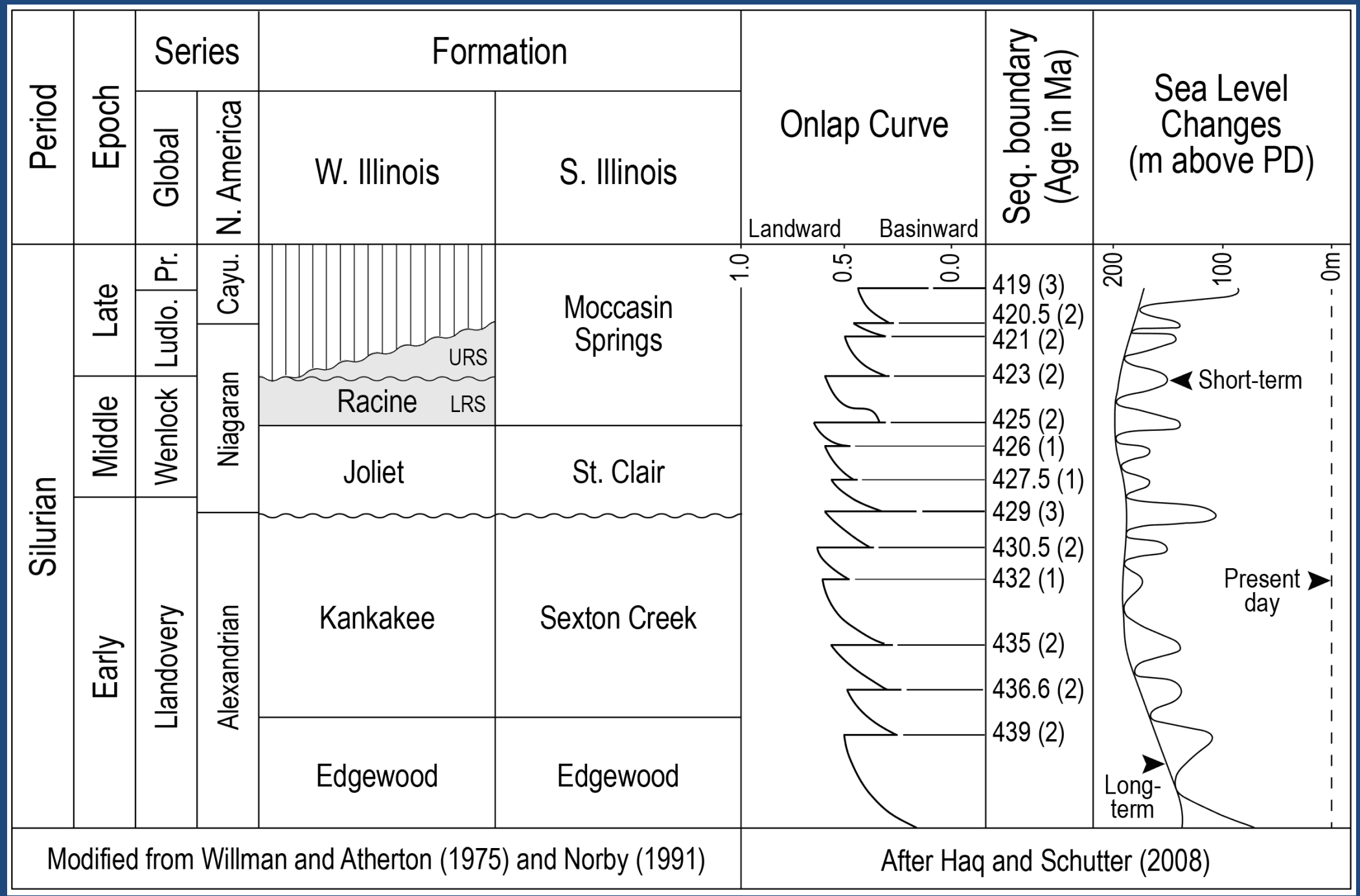


Reentry in Schwarz # 1, an Old Dry Hole, Led to Discovery in 1963



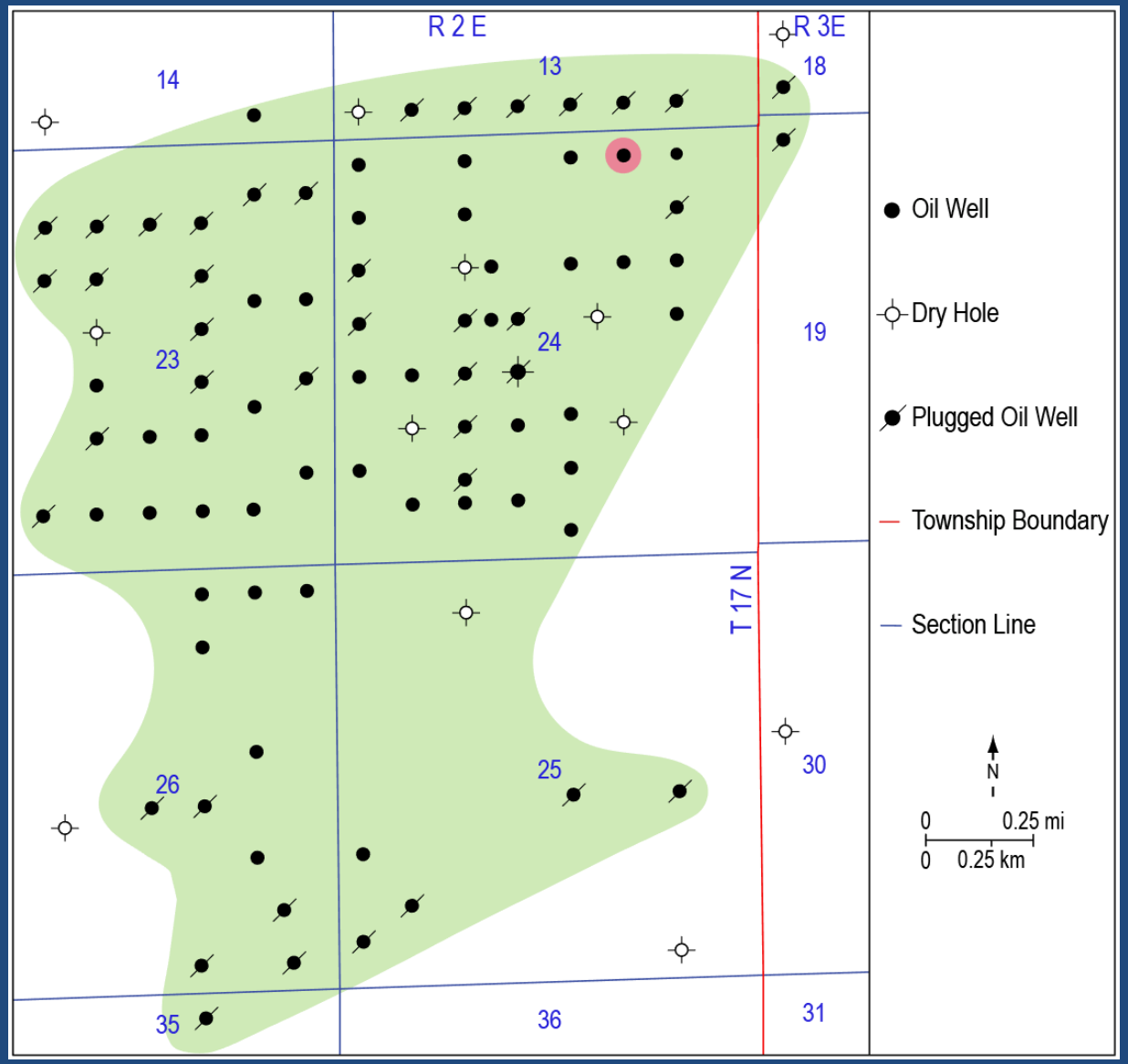
Annual Oil Production, 1963-2013;
Major Development in Early 80s

Stratigraphy and Correlation

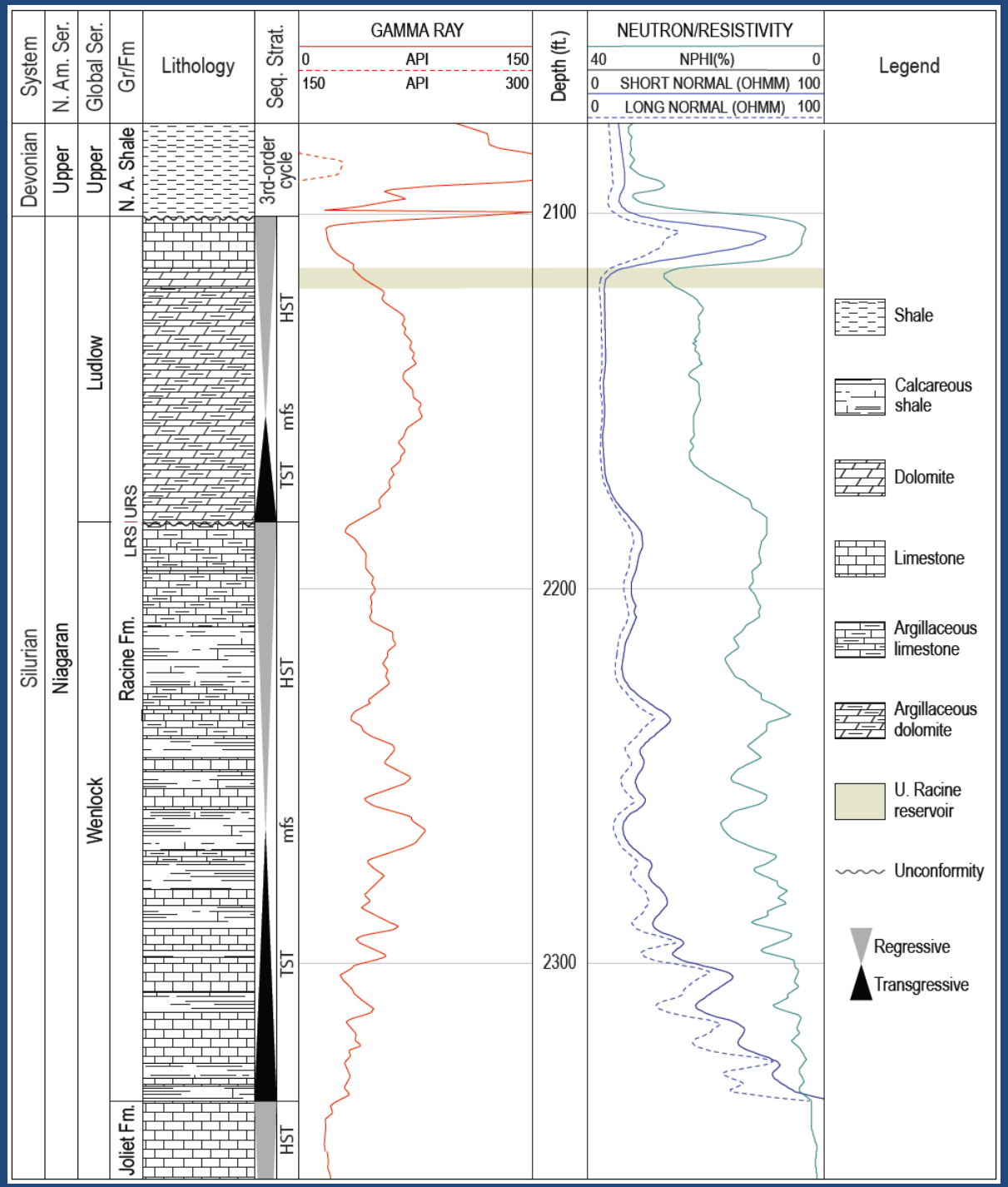


Stratigraphic Nomenclature of the Silurian System and Global Sea Level Changes (Racine Subdivision from Lasemi, 2009; Lasemi et al., 2010)

General Stratigraphic Column,
Southeast Margin of the Sangamon Arch

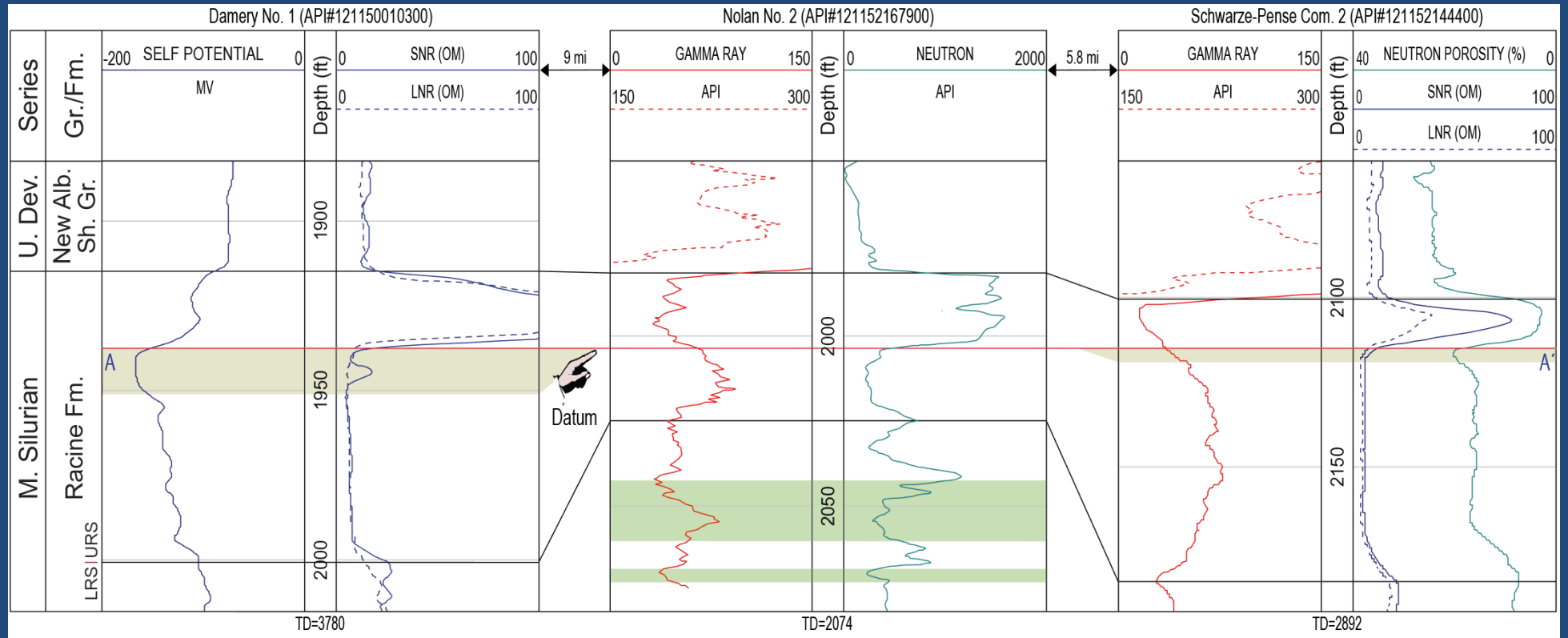


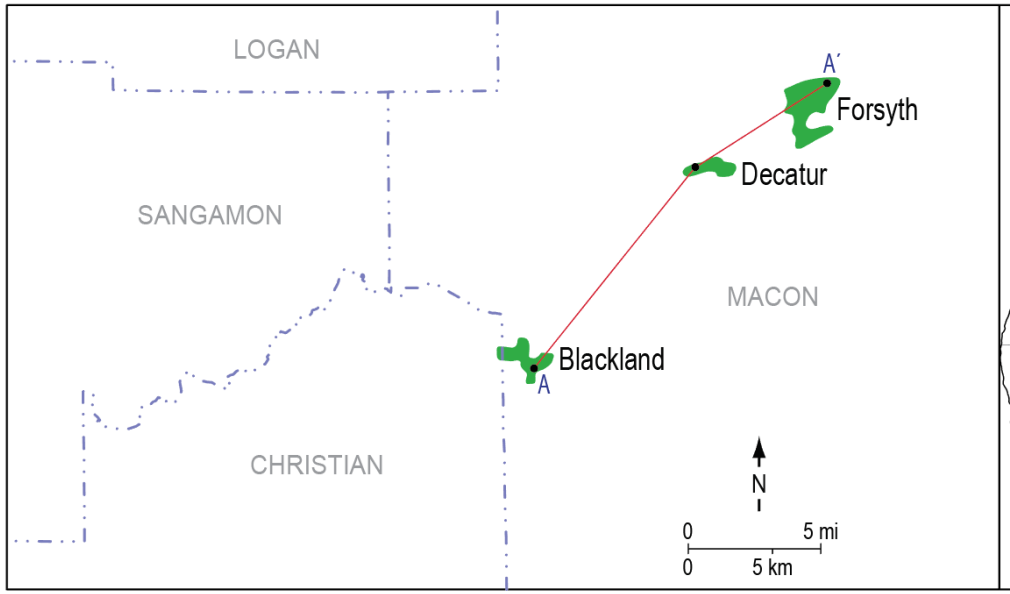
Stratigraphic Reference Section (Schwarze-Pense Com. No. 2, API #121152144400)

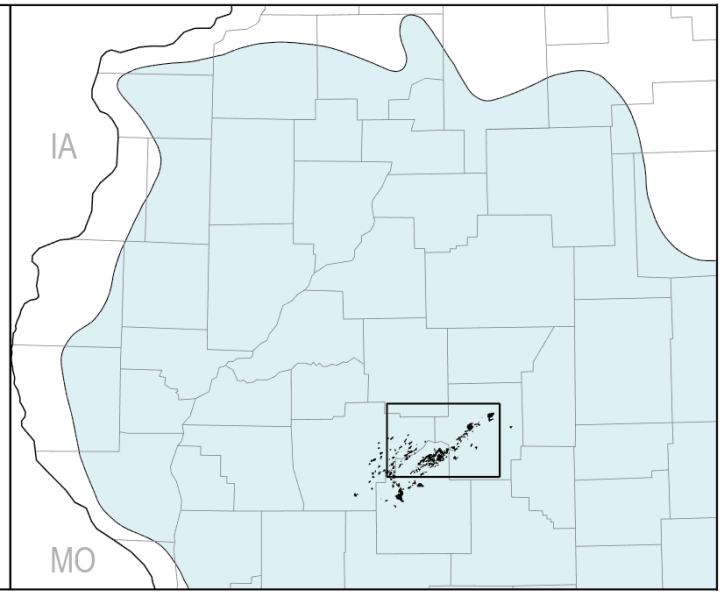


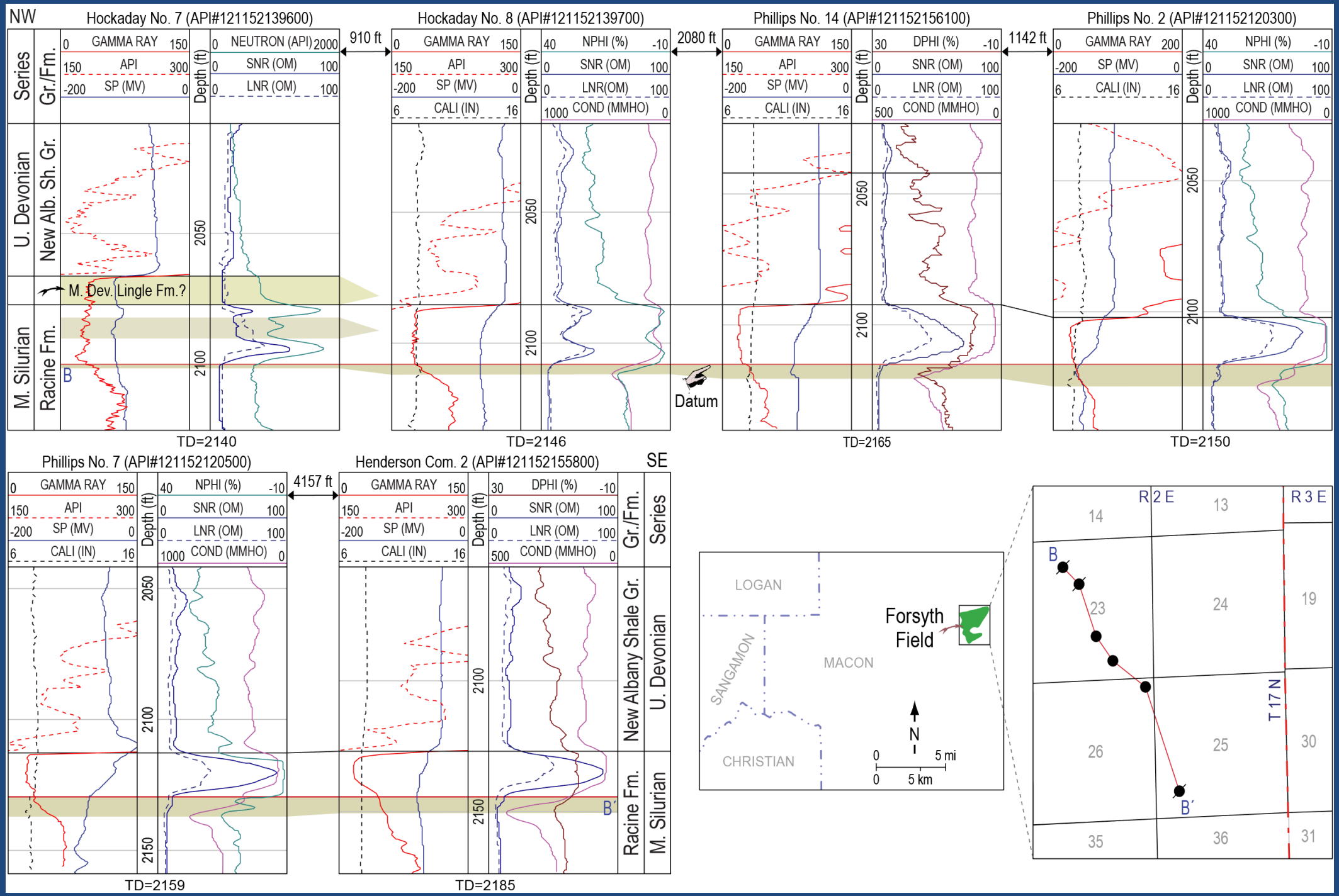
Reservoir Occurrence and Variability

Southwest-Northeast Stratigraphic Correlation, Mt. Auburn Trend

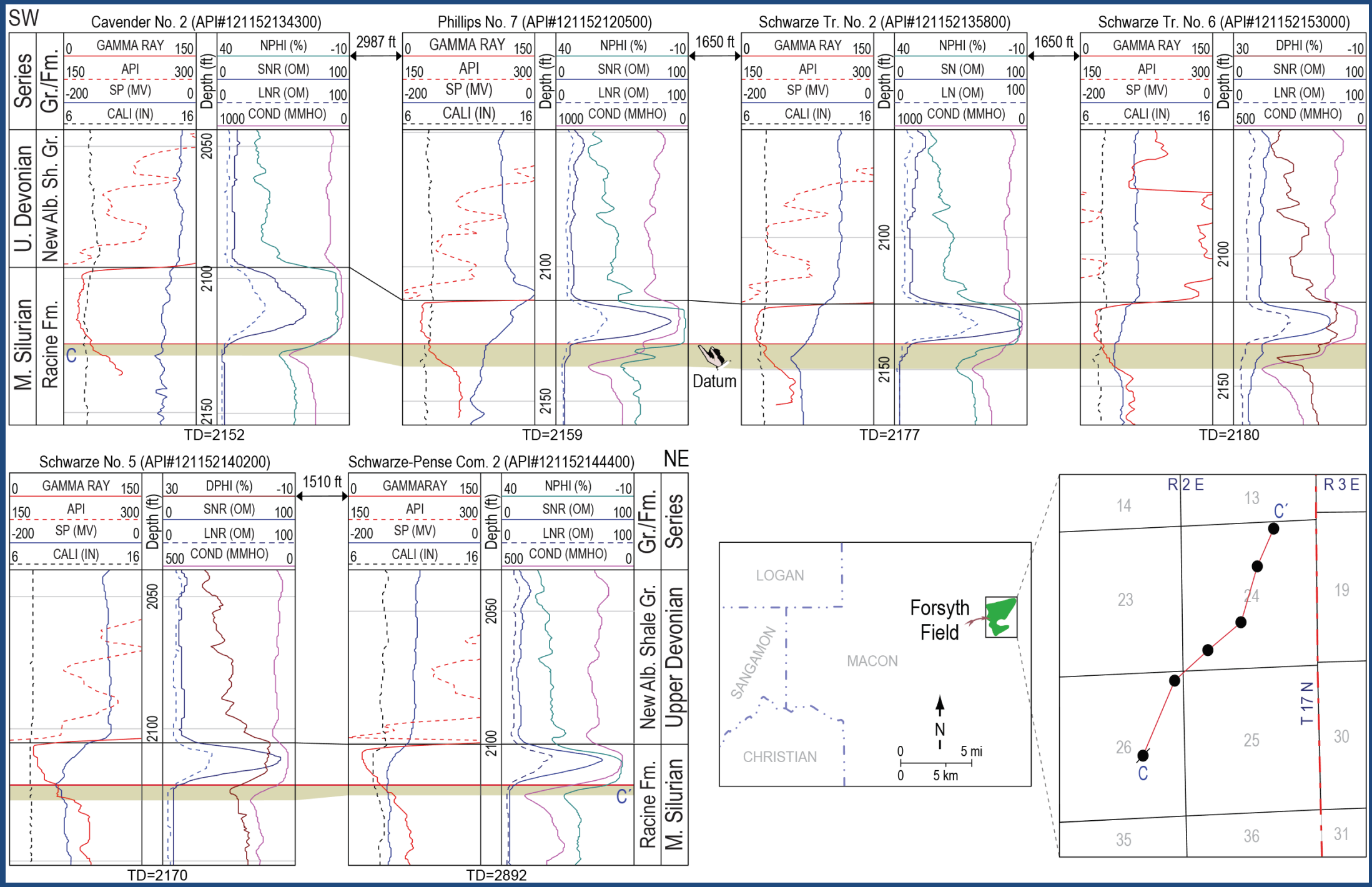




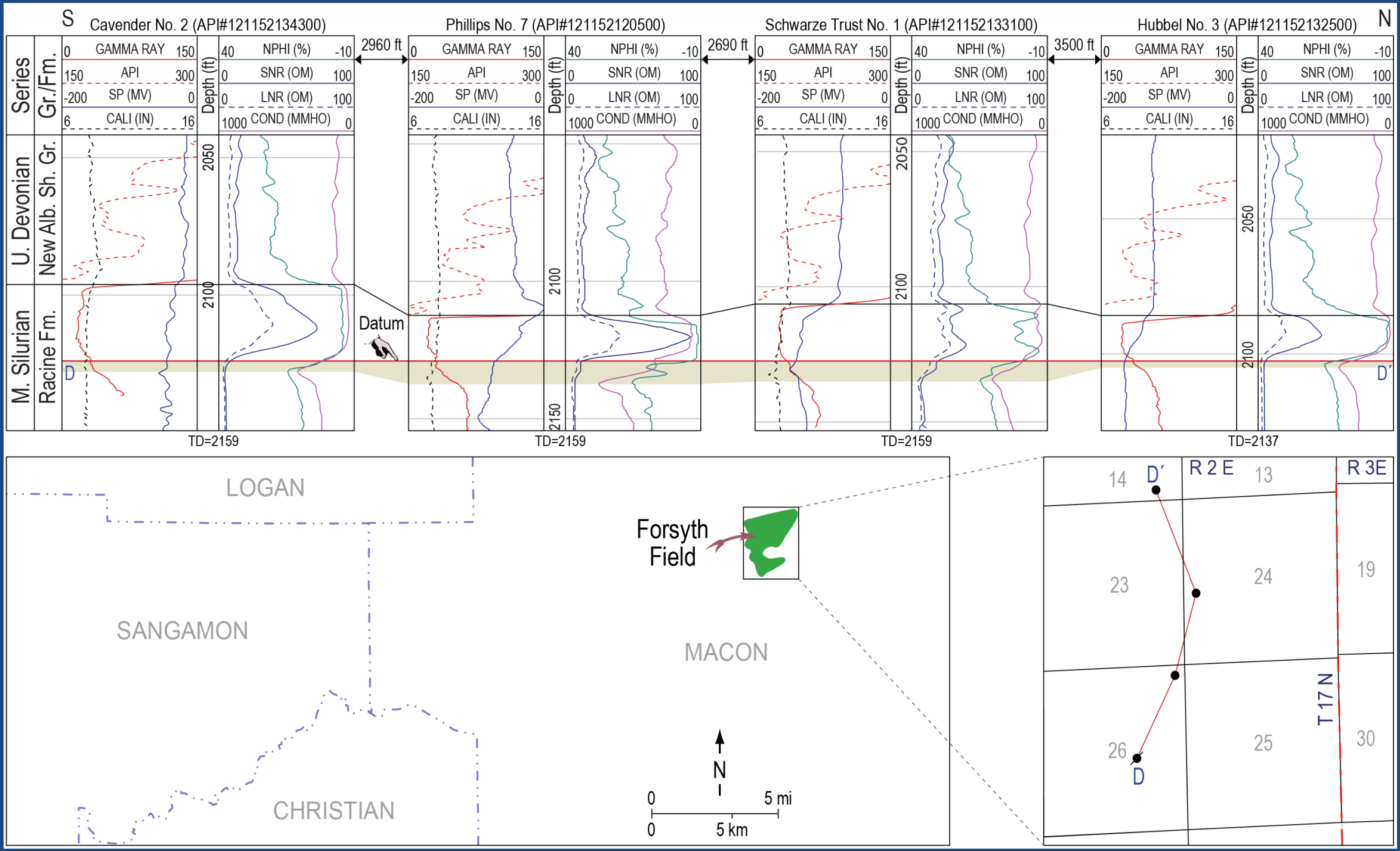




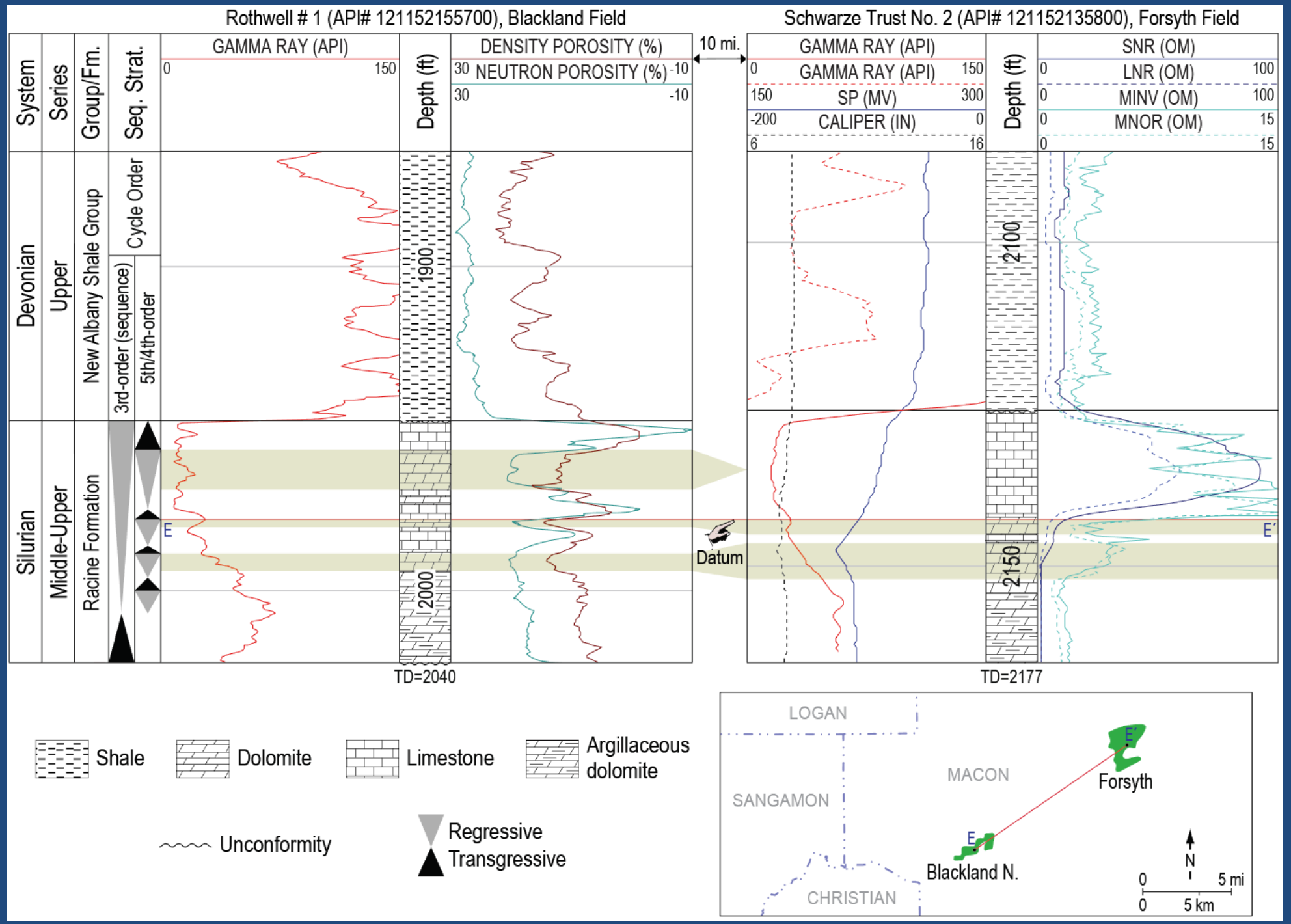
Northwest-Southeast Stratigraphic Correlation, Forsyth Field



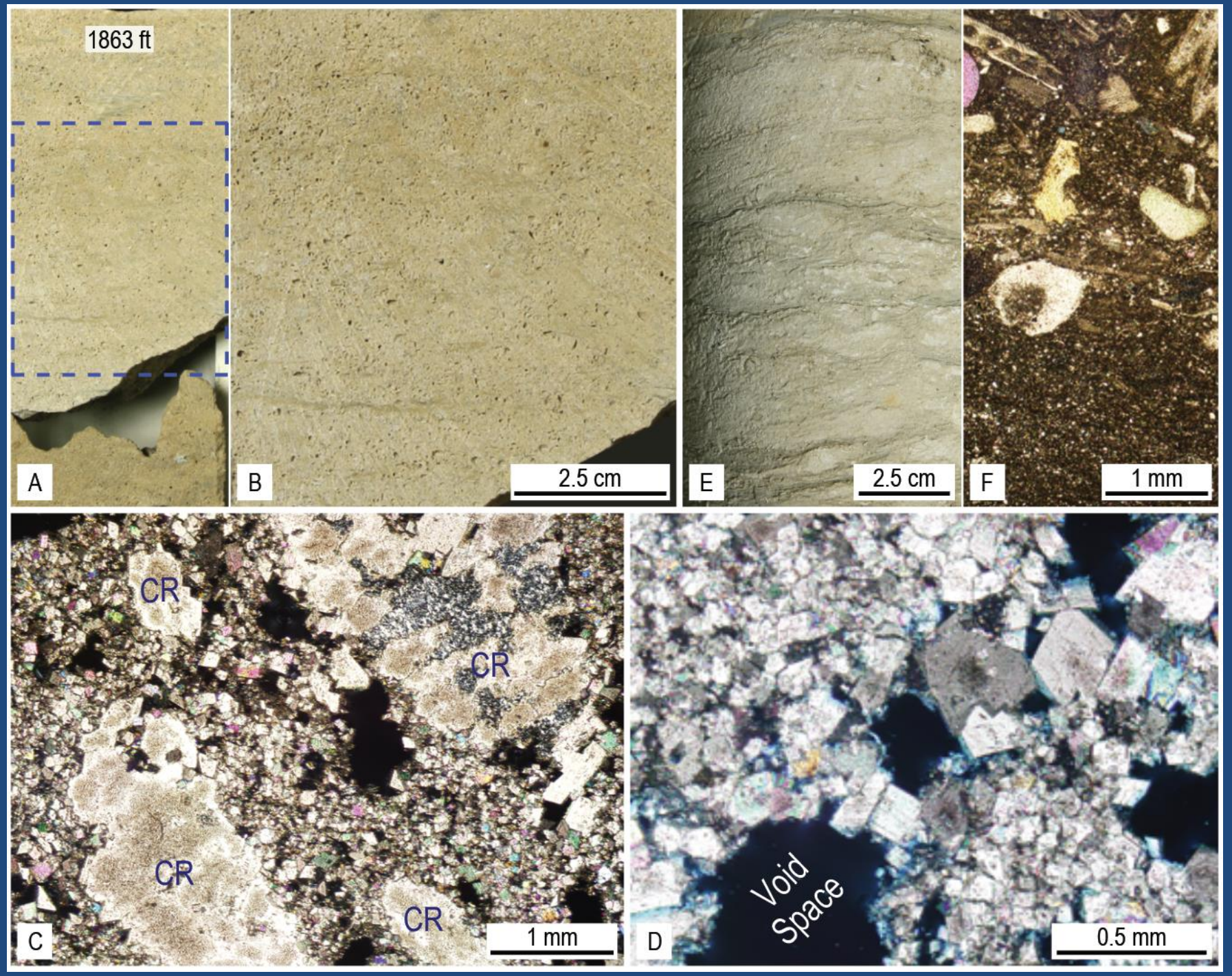
Southwest-Northeast Stratigraphic Correlation, Forsyth Field



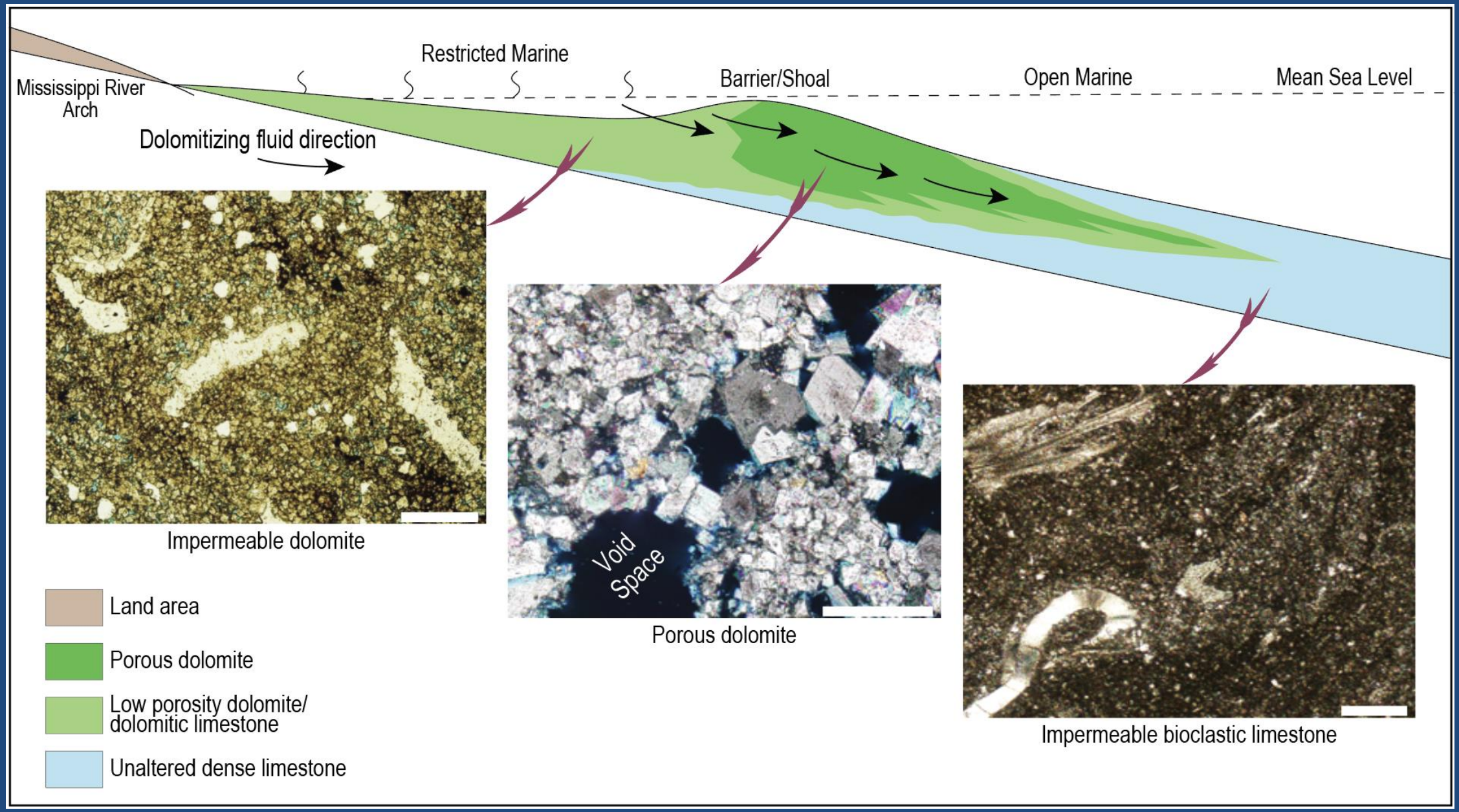
South-to-North Stratigraphic Correlation, Forsyth Field



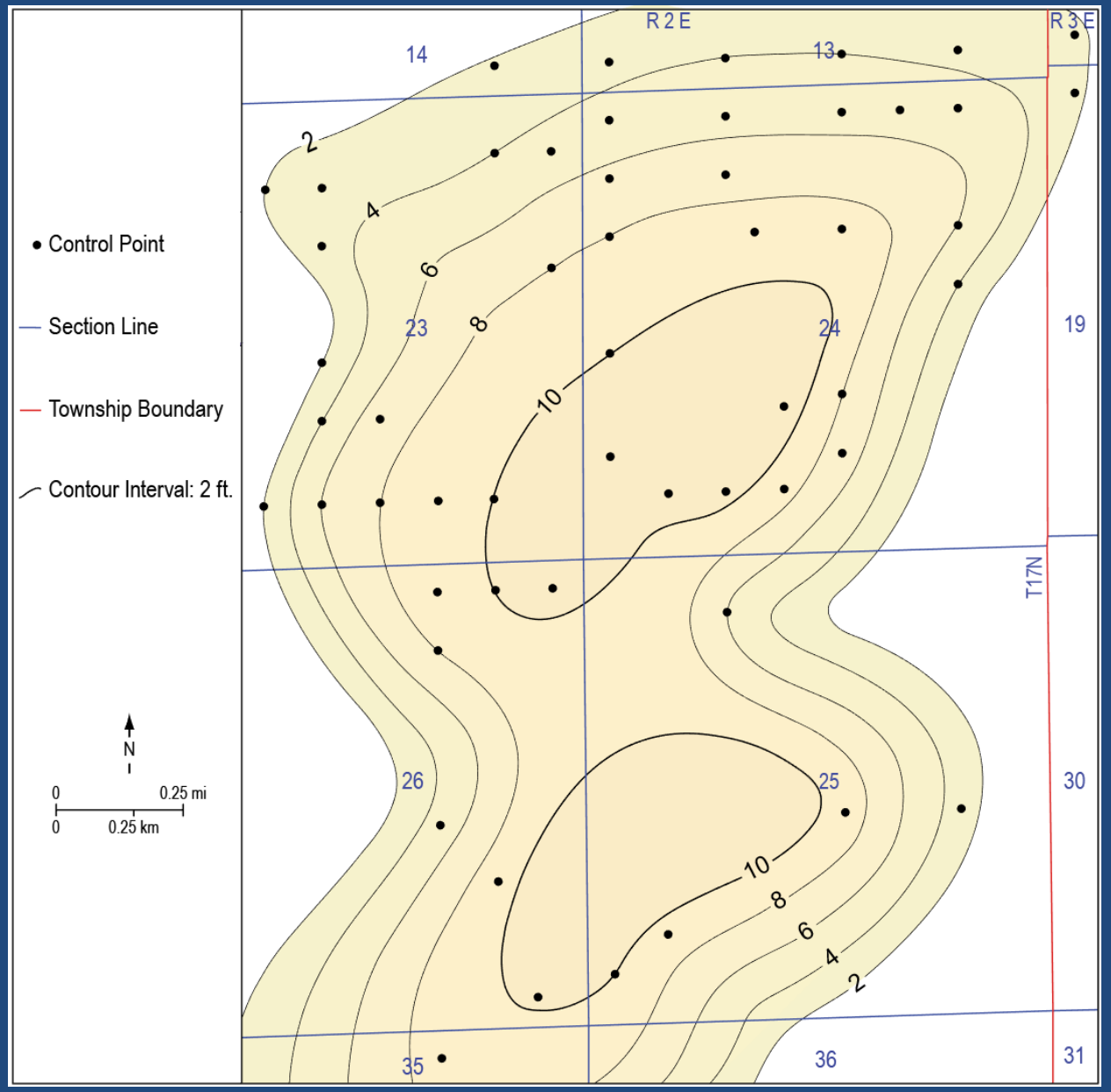
Reservoir Compartments Developed in the Highstand Package of the Upper Racine Sequence



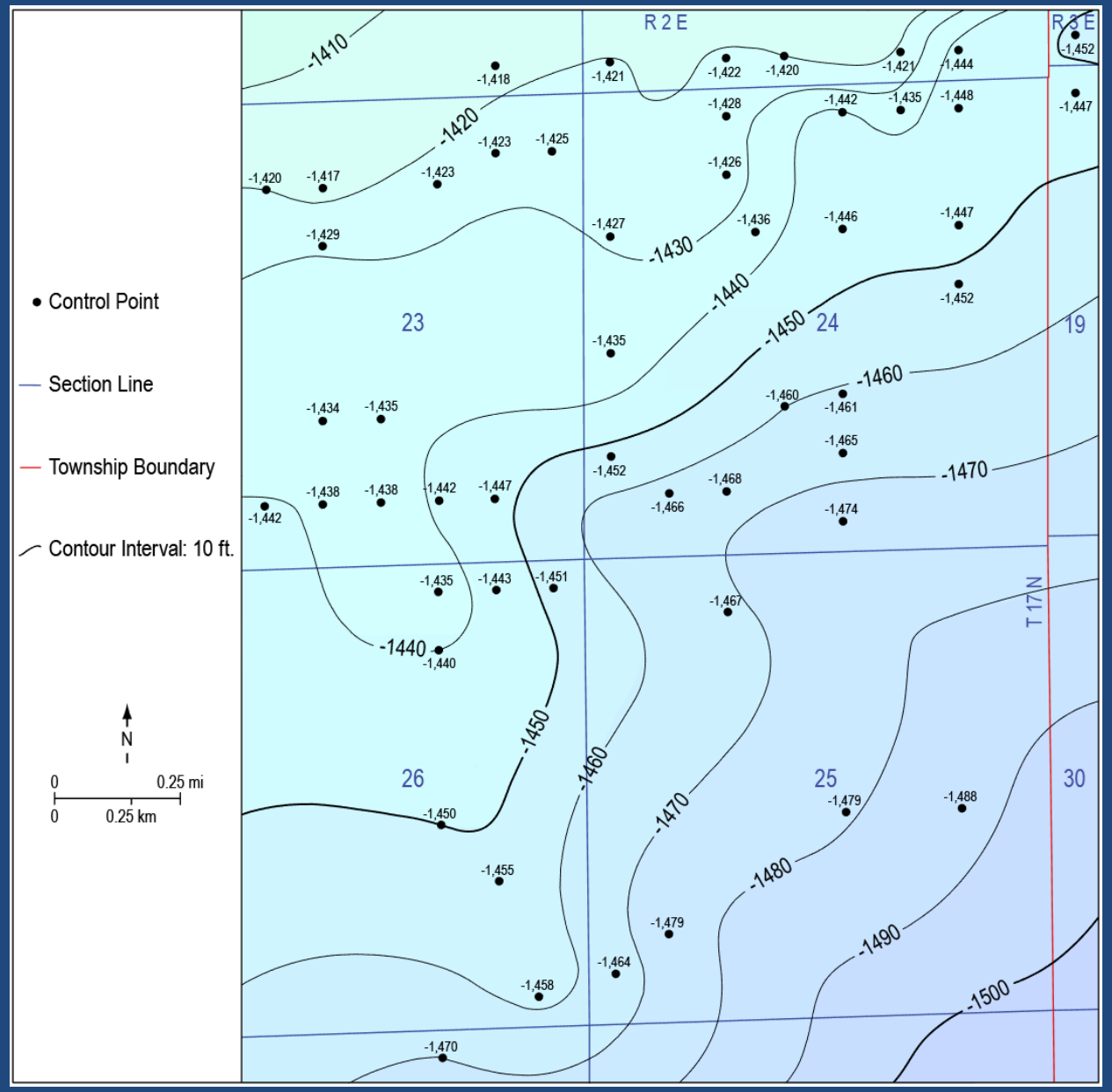
Core Samples from Podolsky Oil Co.
McMillen B-4, Mt. Auburn Consolidated Field,
Christian County



Depositional and Diagenetic Model for Reservoir Development in the Silurian Deposits of the Study Area (Photomicrograph Scale Bar: 0.5 mm)



Thickness Map of the Main Reservoir

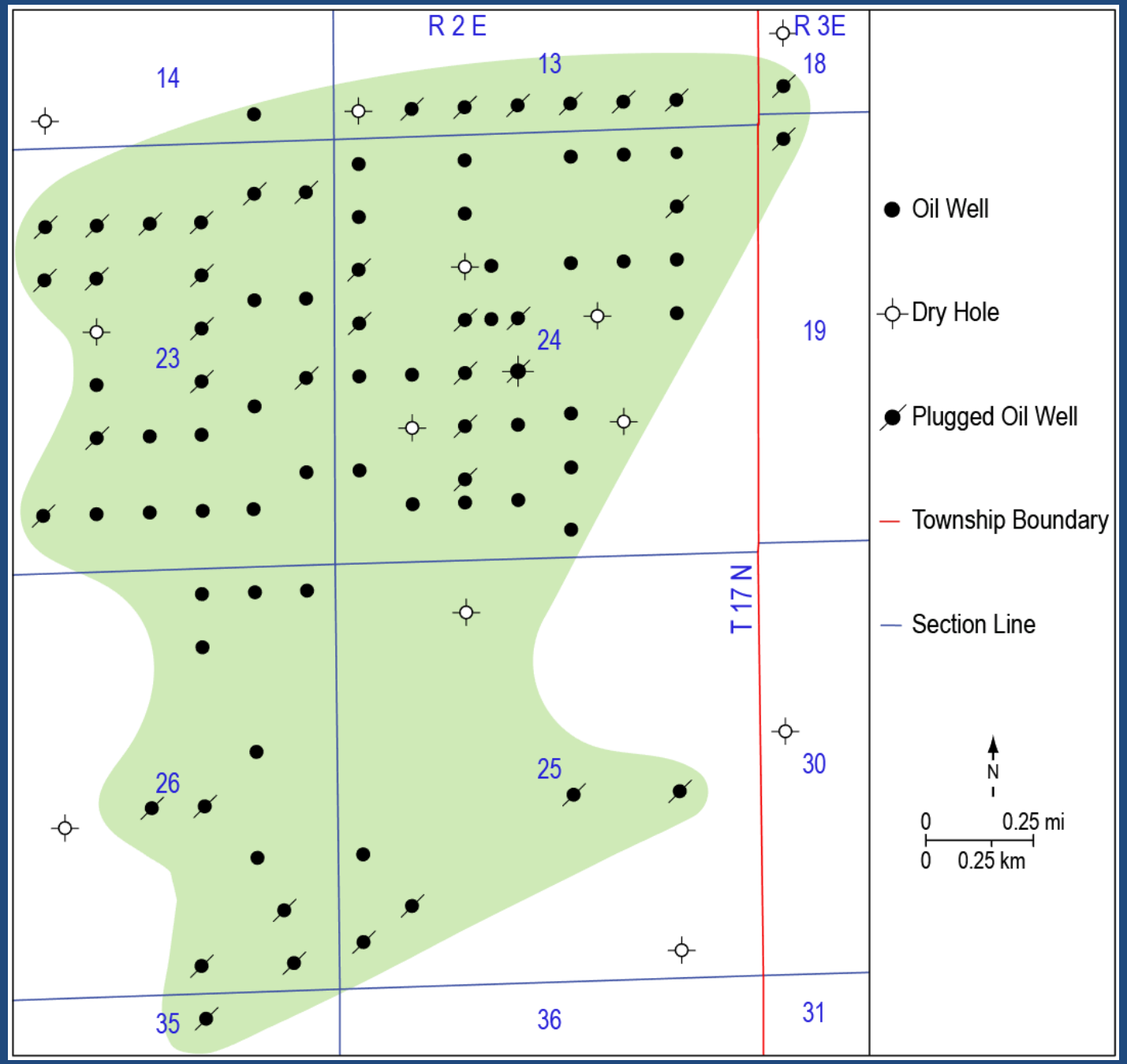


Reservoir Top Structure Contour Map

Potential for Improving Recovery

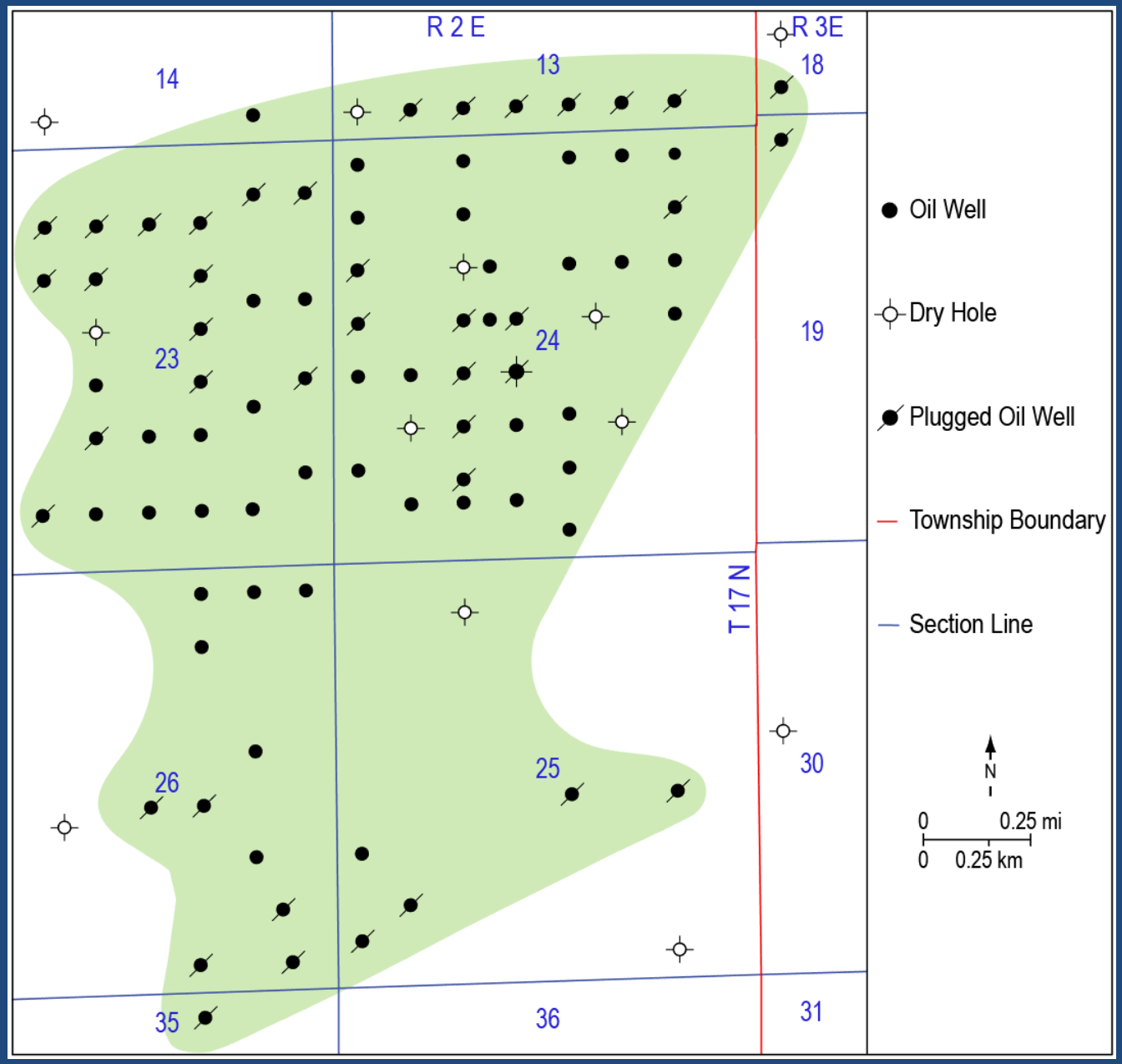
Poor Reservoir Performance

1. Calculated OOIP: Over 10,000,000 barrels.
2. Production per well: Less than 10,000 bbl./solution gas and gravity drive.
3. DST: Low SIP and negligible fluid recovery.
4. Initial oil production: Nearly 40 bbl. Average.



Suggestions for Increased Production

1. Infill drilling.
2. Development of undrilled areas.
3. Larger volume hydraulic fracturing.
4. Horizontal drilling.
5. Enhanced recovery through waterflooding or CO_2 EOR.



Conclusions

- The Silurian reservoir interval at Forsyth consists of dolomite bodies that occur in the upper part of small scale cycles, which suggest sea level fluctuation as the major control for their development.
- Low recorded shut-in pressure and negligible fluid recovery in DST, insignificant initial oil production, and below average cumulative primary production per well suggest poor permeability.
- Infill drilling and development of the undrilled areas, large volume hydraulic fracturing, and horizontal drilling could lead to significant increased production from the field.
- The field has produced less than 10% of its OOIP and has never been flooded. It has a great potential for significant increased recovery through waterflooding and CO2-EOR.

Thank You