

# Lithofacies, stratigraphy, and reservoir characteristics of the Galesville and Ironton Sandstones in OEE No. 1 and the surrounding areas, north-central Illinois

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## Abstract

The Galesville Sandstone and the overlying Ironton Sandstone are part of the Cambrian Knox Group and form the most extensive permeable reservoirs in northern Illinois. This study focuses on lithofacies analysis, stratigraphic variability, and reservoir characteristics of Galesville and Ironton Sandstones in OEE Well No. 1, McLean County, and the surrounding counties in north-central Illinois.

The Galesville and Ironton Sandstones consist of mature sandstone and sandy dolomite. They are over 200 feet thick in northern Illinois, but their thickness decreases southward, and they both pinch out toward the south and southeast. The Galesville (up to 100 feet thick) conformably underlies the dolomitic Ironton Sandstone and overlies, with a sharp contact, the Eau Claire Formation. It is a white, very porous, and fine-grained mature quartzose sandstone.

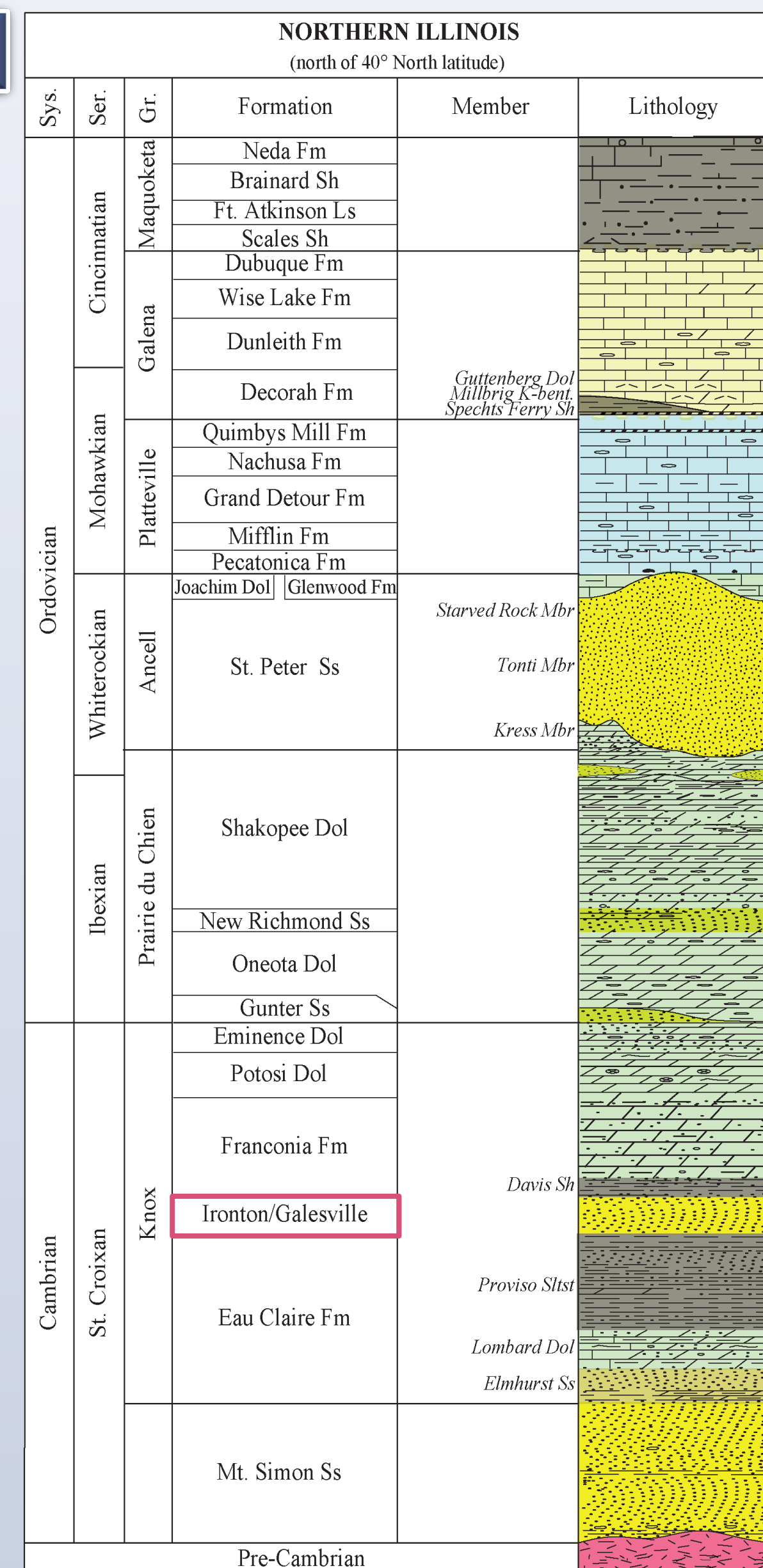
The Ironton Sandstone is over 100 feet thick and underlies, with a sharp contact, the glauconitic sandstone of the Franconia Formation. It consists of interlayering of dense dolomitic sandstone, sandy dolomite, and fine to coarse-grained, porous quartzose sandstone. In the OEE No. 1, the Galesville (68 feet thick) contains over 30 feet of reservoir in which average sidewall core porosity and permeability is 11.75% and 293 mD, respectively. In this well, Ironton (120 feet thick) consists of nearly 30 feet of reservoir with an average core porosity and permeability of 10.45% and 84 mD, respectively.

The reservoir intervals of the Galesville and Ironton are permeable and encased in impermeable units, thus the formations have excellent potential to serve as reservoirs for sequestration of anthropogenic CO<sub>2</sub>.

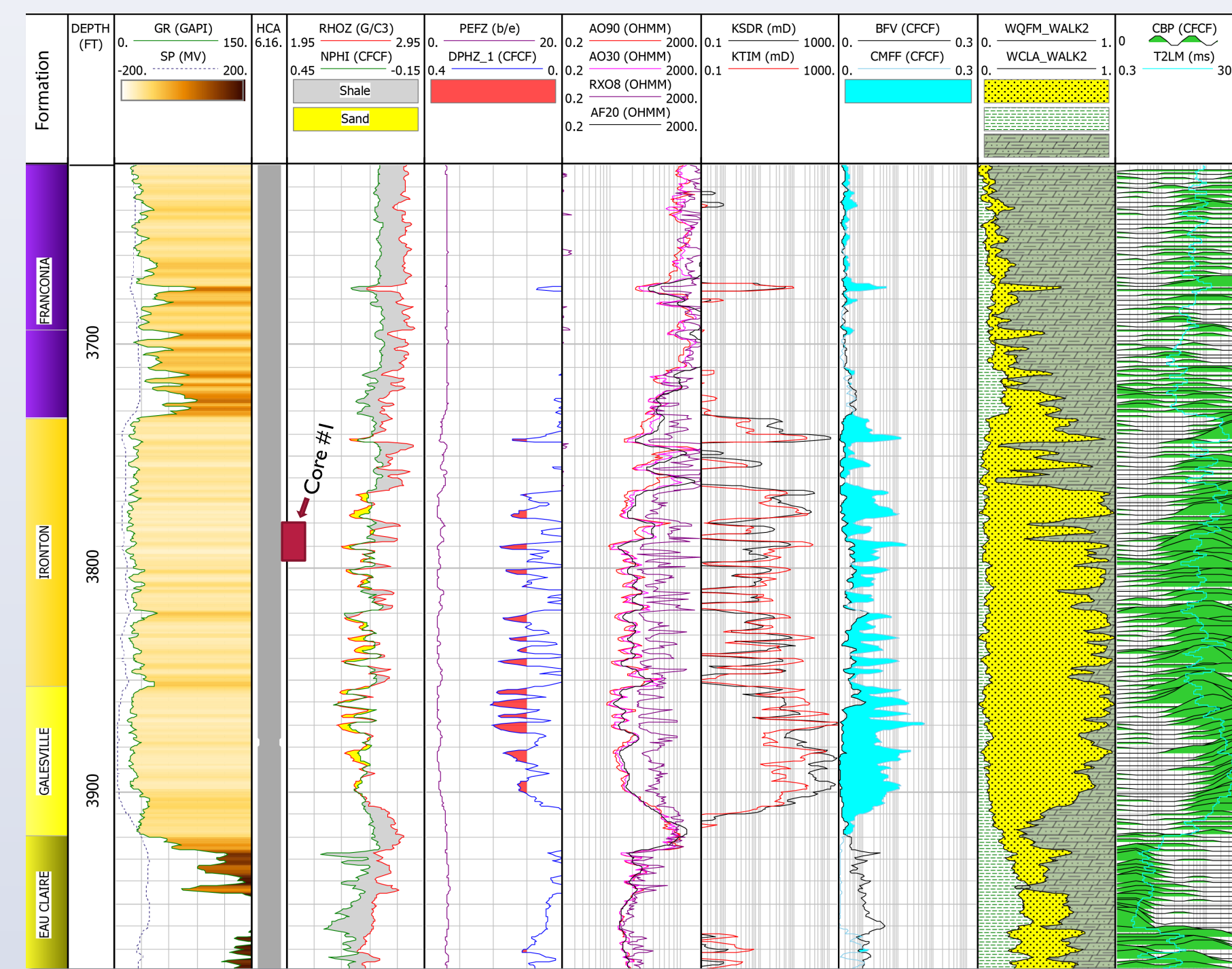
## Acknowledgments

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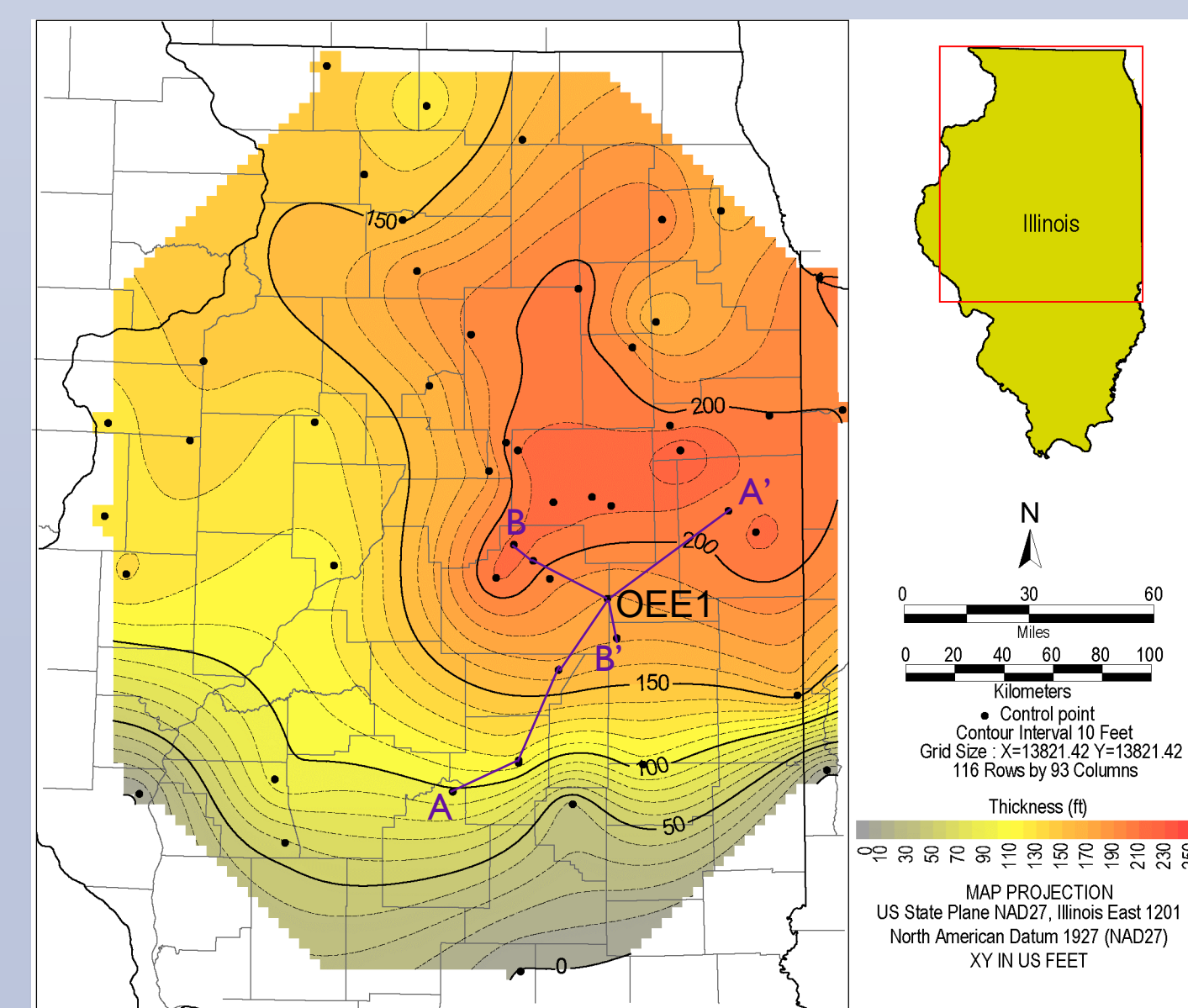
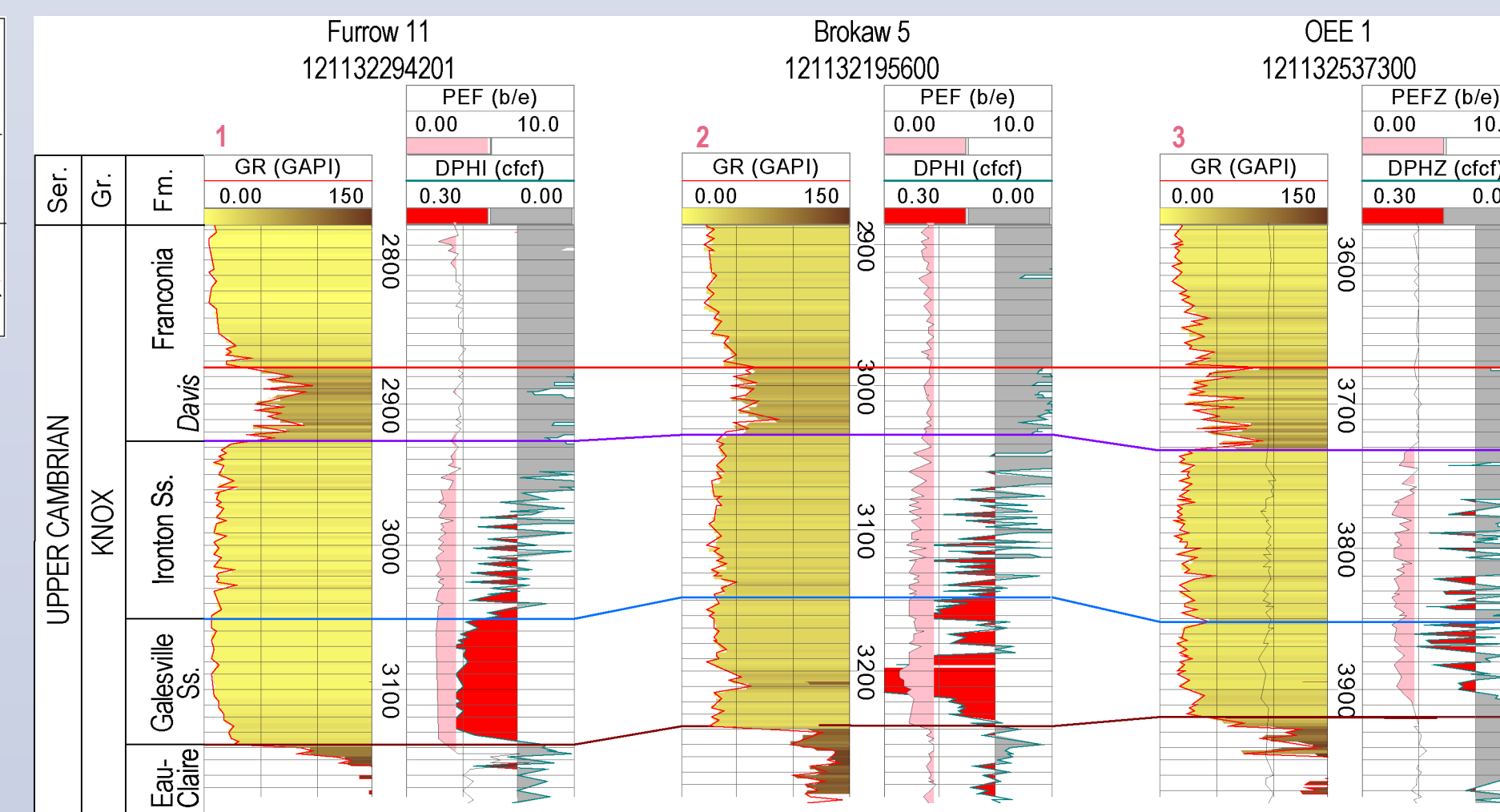


Stratigraphic classification in Northern Illinois

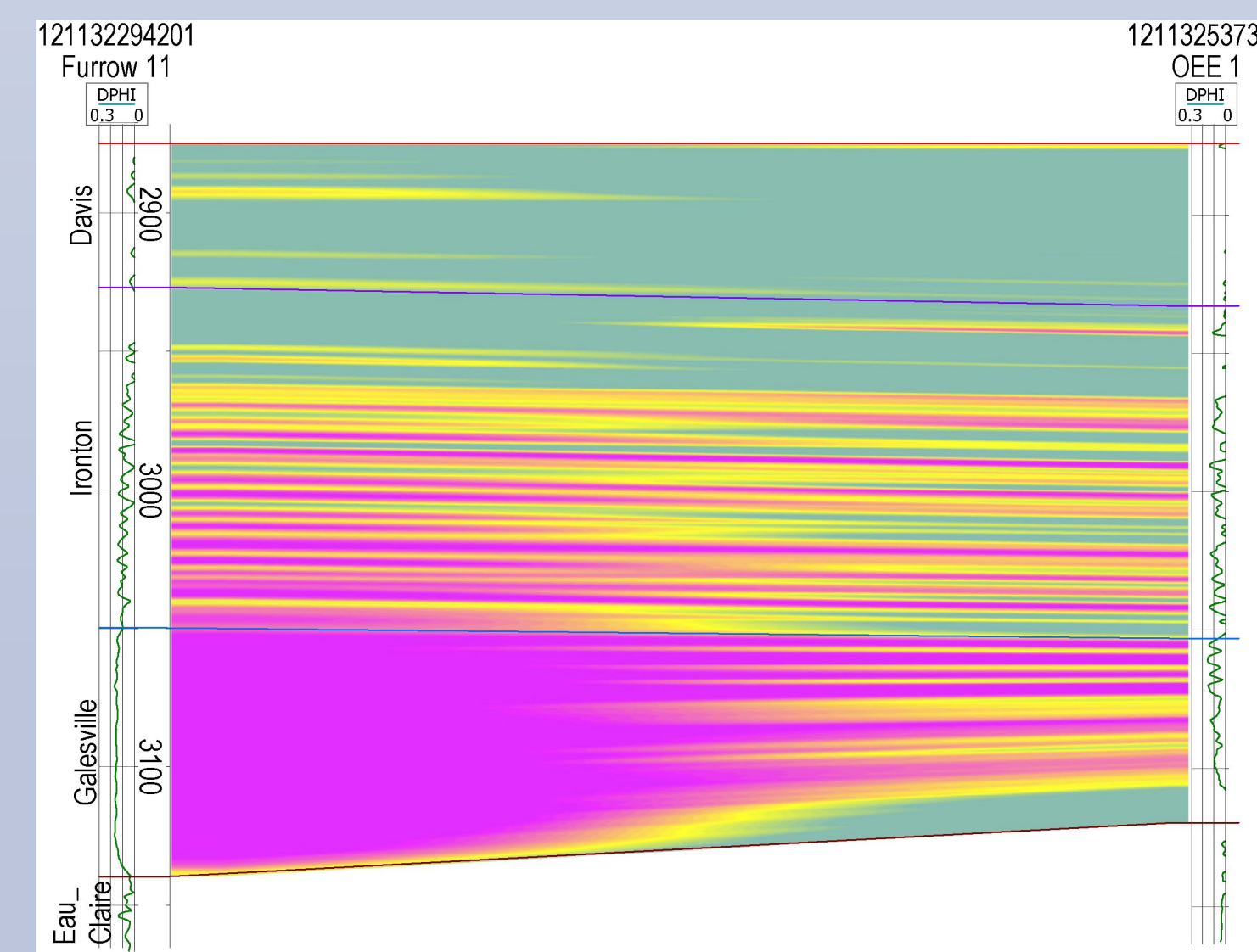


Ironton and Galesville petrophysics, OEE 1

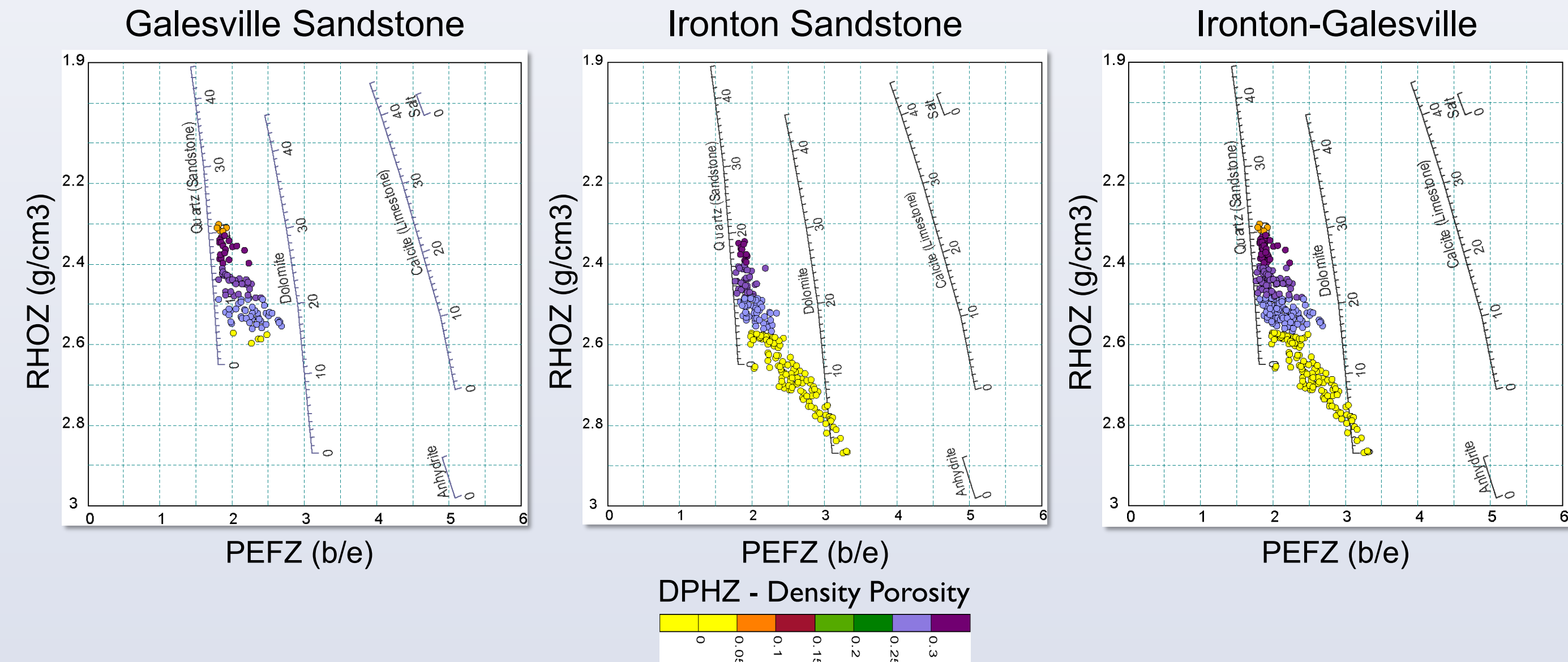
Stratigraphy and porosity variation of Galesville and Ironton sandstones



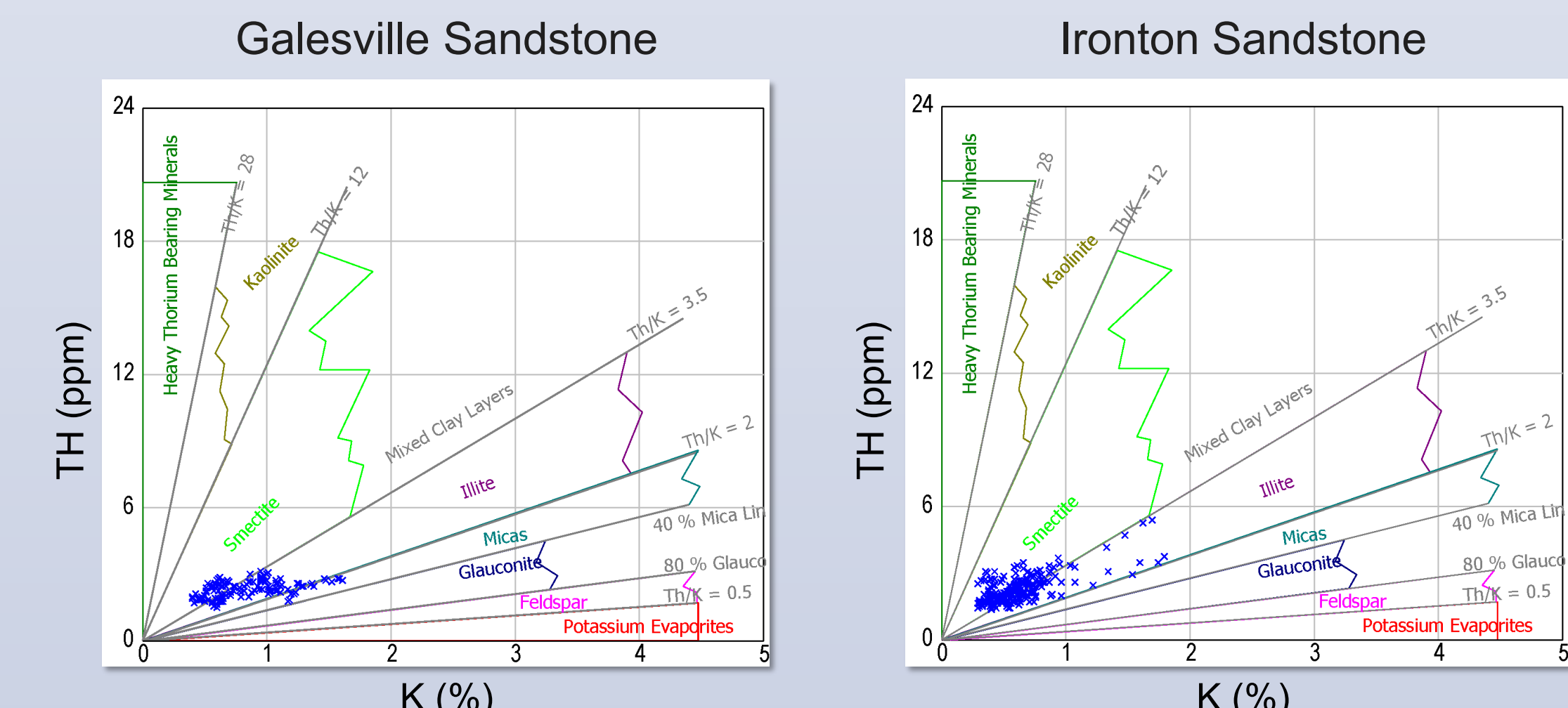
Ironton-Galesville thickness map



Interpretive density porosity, Furrow 11 to OEE 1, McLean County



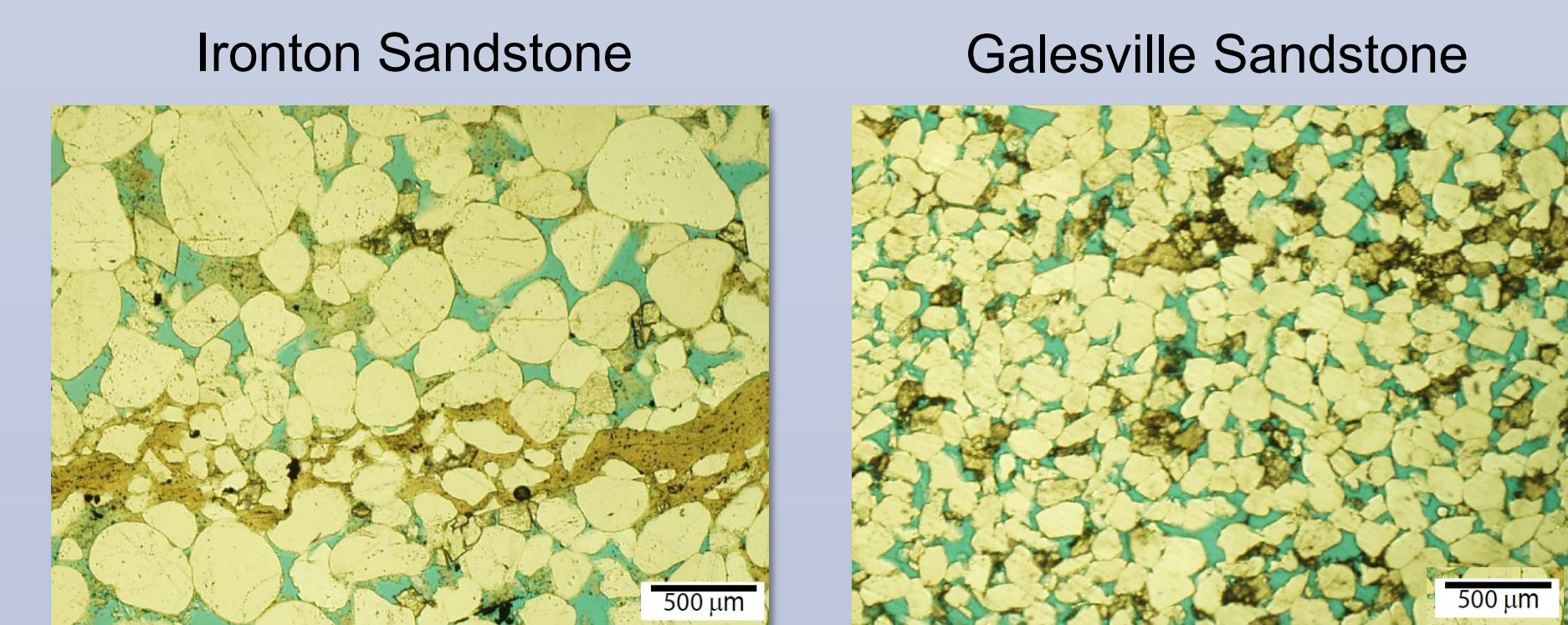
PE vs. Bulk density crossplot for Ironton and Galesville intervals at OEE 1



Thorium-potassium crossplot indicates presence of smectite, and illite clays, and low concentration of mica



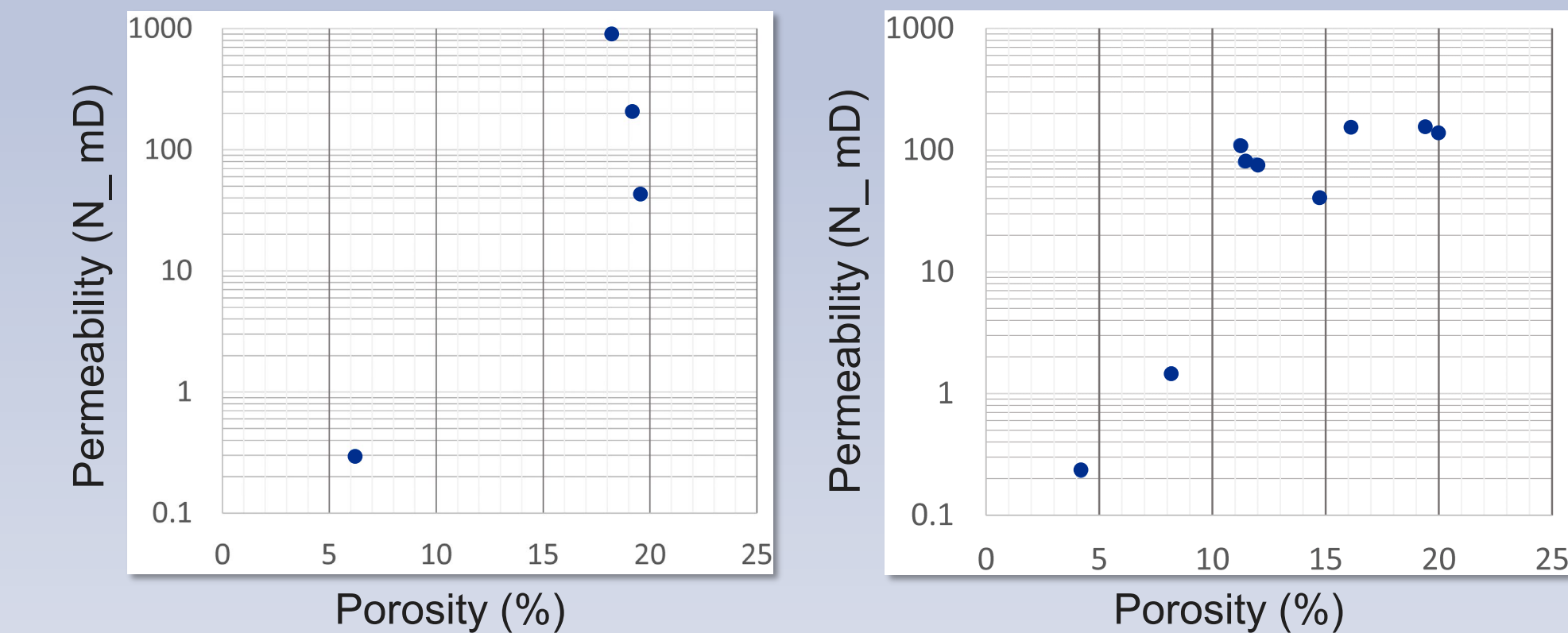
Depth 3780'-3785' Ironton core photo, OEE 1



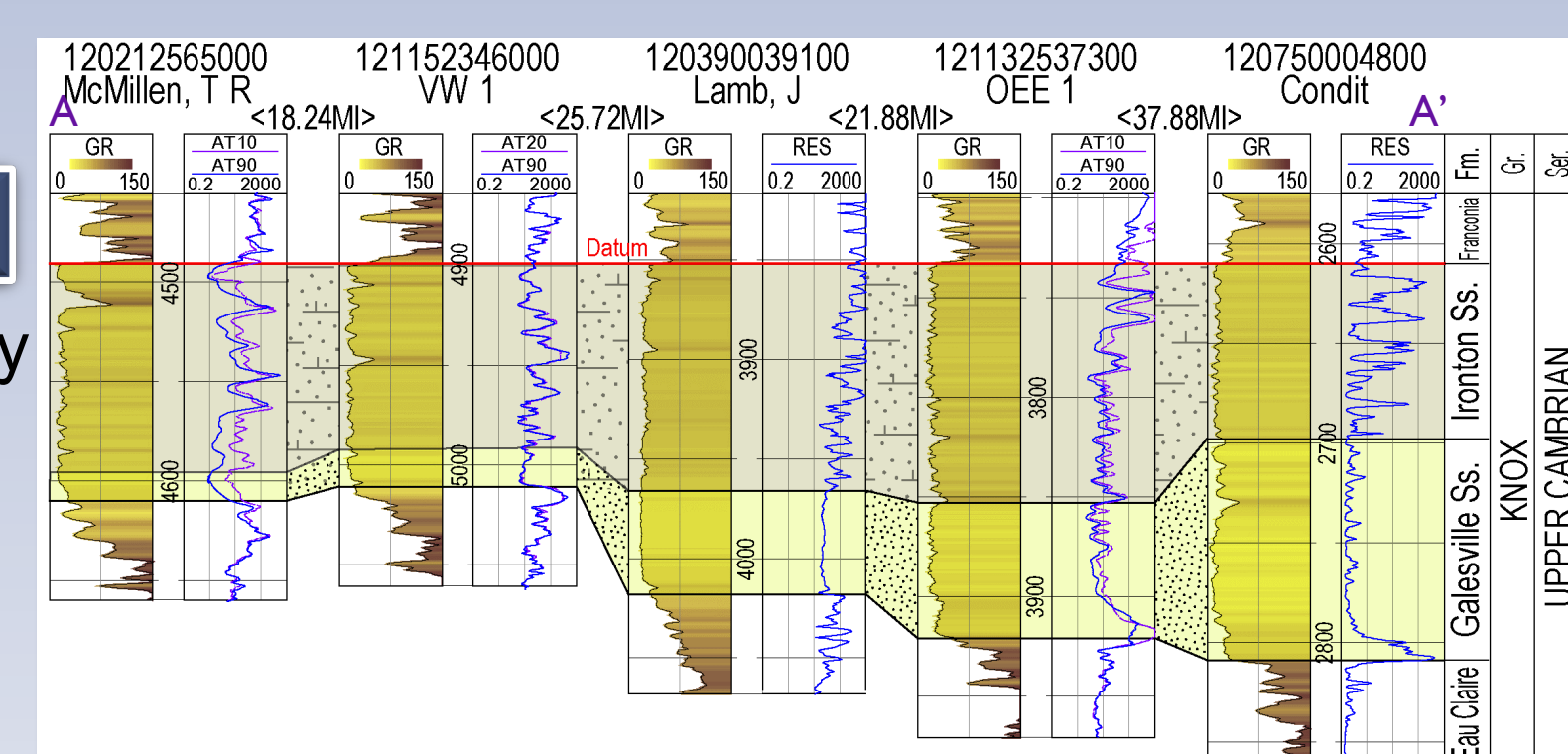
Quartz sandstone photomicrographs: Condite 1, API #120750004800, Iroquois County (37 miles northeast of OEE 1)



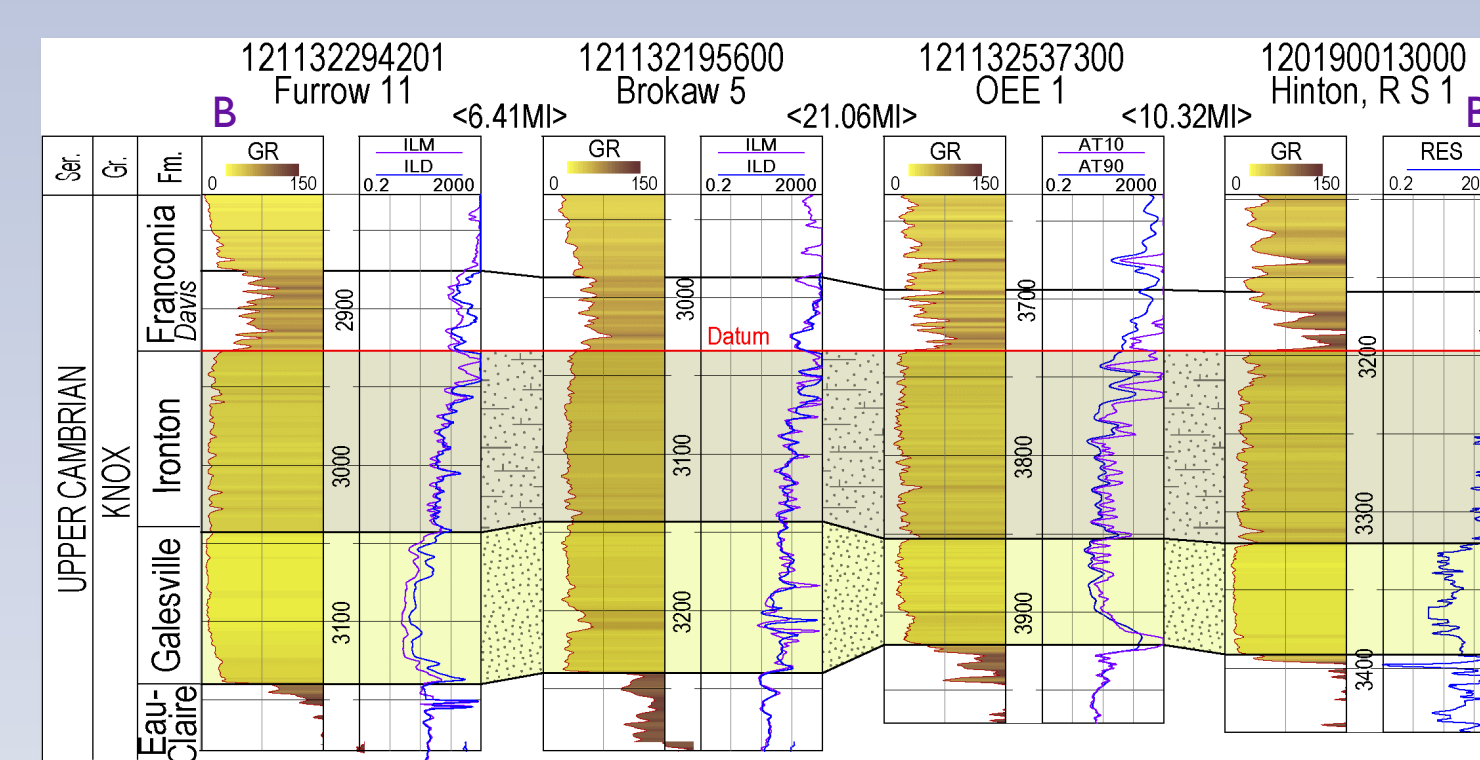
Plug photos, OEE 1



Permeability vs porosity crossplot from sidewall core analysis



Stratigraphic variability of Ironton and Galesville Sandstones in north-central Illinois



Stratigraphic variability of Ironton and Galesville Sandstones in north-central Illinois