Monday, October 12, 2020

Virtual Meeting via Zoom
12:00–1:00 p.m.
HGS Members $10 Non-Members $30 Students $5
https://www.hgs.org/civicrm/event/info?id=2240
Registered Attendees: A confirmation email will be sent upon registration with meeting links.
Event contact: Bryan Guzman – vice.president@hgs.org

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3-D Geological Model of Shale Reservoirs Using Significant Amounts of Horizontal Well Data

A high-quality 3-D geological modeling of shale reservoirs is significant for improving the performance of shale plays by benefiting shale reservoir evaluation, numerical simulation, horizontal well drilling, and so on. Distinct from conventional reservoirs, data in horizontal wells are common in shale reservoirs. These data in horizontal wells cause various issues in 3-D structural and property modeling. As for 3-D structural modeling, the main challenge is to deal with the complicated spatial relationship between horizontal laterals and formation surfaces; as for 3-D property modeling, reservoir data acquired from horizontal wells is extremely uneven (enriched in drilling target zones and missed below drilling target zones), failing to determine frequency distribution of reservoir properties.

To overcome these problems, we have developed a comprehensive method to effectively use horizontal well data in 3-D geological modeling. Pseudo vertical wells (PVW) at and between formation tops are used to provide more controlling points for structural models with a suitable estimation of isochore/isopach map of formations/layers. And, frequency distribution of a certain reservoir property could be estimated by either using vertical well data only or removing the repeated segments of horizontal laterals. We have used the developed method in several shale plays, such as Marcellus Shale in Southwestern PA, Longmaxi-Wufeng Shale in Fuling Shale Gas Field, etc. Although there is still room to improve the method, it has helped us to improve quality of 3-D geological models of shale reservoirs. ■

Biographical Sketch

Guochang Wang is currently an associate professor at Saint Francis University. He received his Bachelor degree in petroleum engineering from China University of Geosciences (Wuhan) in June 2006 and his PhD degree in geology from the West Virginia University in August 2012. Then, he, as a postdoctoral fellow, worked at University of Chinese Academy of Sciences in Beijing, China for two and half years. He joined Saint Francis University in March 2015 and now is an associate professor in Petroleum and Natural Gas Engineering Department. His research focused on shale reservoir characterization through petrophysical analysis, 3D geological modeling, SEM image analysis, seismic interpretation, machine learning, hydraulic fracturing simulation, reservoir simulation, and various other techniques.