JFES NewsLetter

Japan Formation Evaluation Society – A Chapter of SPWLA

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JFES Newsletter
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Invitation to the 95th Chapter Meeting *(First circular)*

We are pleased to announce that the forthcoming Chapter Meeting will be held as follows. SPWLA Distinguished Speaker for 2015-2016 is invited to our chapter meeting this time. Those who are interested in attending this meeting are asked to send an e-mail registration at JFES-Newsletter@slb.com no later than **March 4, 2016.**

Date & Time: Wednesday, March 16, 2016, 15:30 – 17:30

Venue: ***Schlumberger, Tokyo office*** (near Tokyo station)

***The venue may change to Waseda University if registration exceeds the room capacity**

Program:

SPWLA Distinguished Speaker Talk: "Determination of Wettability from Magnetic Resonance Relaxation and Diffusion Measurements on Fresh-State Cores"

Presenter: Chanh Cao Minh (Schlumberger)

Reservoir wettability is a critical parameter affecting hydrocarbon distribution within the reservoir rocks and its recovery. The sensitivity of nuclear magnetic resonance (NMR) responses to rock wettability has been demonstrated in a number of publications. These publications suggest that wettability can be determined in the laboratory from NMR T2 relaxation measurements obtained in cores after proper cleaning, re-saturation, and aging with reservoir fluids. Wettability changes may be noticed on logging measurements as a downward shift of the oil peak in the T2 spectrum from the bulk T2 response of live oils. The main practical obstacle in the T2 shift-based evaluation of wettability is the poor separation of oil and water peaks in the T2 spectrum. The bulk T2 of live oils must also be measured, which is a difficult task, and the core sample must be perfectly cleaned to quantify the NMR surface relaxation effect.

We demonstrate an improved method based on two-dimensional mapping of NMR diffusion vs. T2 (2D map) with two principal advantages. First, the separation between the oil and water signals in the 2D map is greatly improved compared with the T2-based approach with the added diffusion measurement. Second, key properties such as tortuosity (represented by the Archie cementation exponent m) and effective surface relaxivities of oil and water can be inferred from the 2D map using diffusion models that respect the fluid confinement state within the pore size

distribution. Since the effective surface relaxivities depend on the fluid saturation and contact with the rock, the wettability index and the rock relaxivity can then be estimated. These results are based on a single-step NMR measurement on fresh-state (or "as received") plugs cored with water-base muds containing no surfactants and that should be available days after the cores are recovered.

A wettability index using this new NMR method was obtained for carbonate samples from Middle East reservoirs. A strong correlation coefficient of R2 = 0.7 is observed between this new NMR approach and the standard, more time-consuming methods such as the Amott-Harvey and U.S. Bureau of Mines techniques. A sensitivity study of the NMR wettability index versus signal-to-noise ratio is performed on the core data to assess the feasibility of this new technique down hole. The results suggest that it is possible to obtain reservoir wettability using downhole NMR measurements under appropriate conditions provided sufficient signal-to-noise is obtained.

Chanh Cao Minh

Biography

Chanh is a SPWLA Distinguished Speaker for 2015-2016 for his work on wettability using NMR.

He is the Director of Measurements for Schlumberger, specializing in Wireline and LWD technology. He is one of 6 active Fellows in the company. Fellow is the highest technical achievement rank in Schlumberger.

He has worked in the oil and gas industry for 37 years. He has written over 90 publications and received 15 patents. He is a member of SPWLA, SPE and SEG.

Chapter meeting talk: "Overview of Distributed Optical Fiber Sensing for Oilfield Industry"

Presenter: Toru Ikegami（Schlumberger K.K.）

The technology of using optical fiber as distributed sensors for oilfield applications has been evolved since it was introduced in 1990's. Recently, distributed acoustic sensing technology attracts the attention of the industry. In this talk, we overview the distributed optical fiber sensing technology and its application to oilfield industry.

18:00 - Icebreaker

*Details of Icebreaker will be announced separately