JFES NewsLetter

Japan Formation Evaluation Society – A Chapter of SPWLA

JFES Newsletter
e-mail: JFES-Newsletter@slb.com
Tel: 042-759-2111 / Fax: 042-759-4271

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Invitation to the 95th Chapter Meeting *(Second 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 11, 2016.** *(There is still some vacancy, so first come first served.)*

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

Venue: ***Schlumberger, Tokyo office*** (near Tokyo station)
7th Floor (Seminar Room), Meiji Yasuda Life Yaesu Bldg,
7-16, Yaesu 2-Chome, Chuo-ku, Tokyo, 104-0028

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.

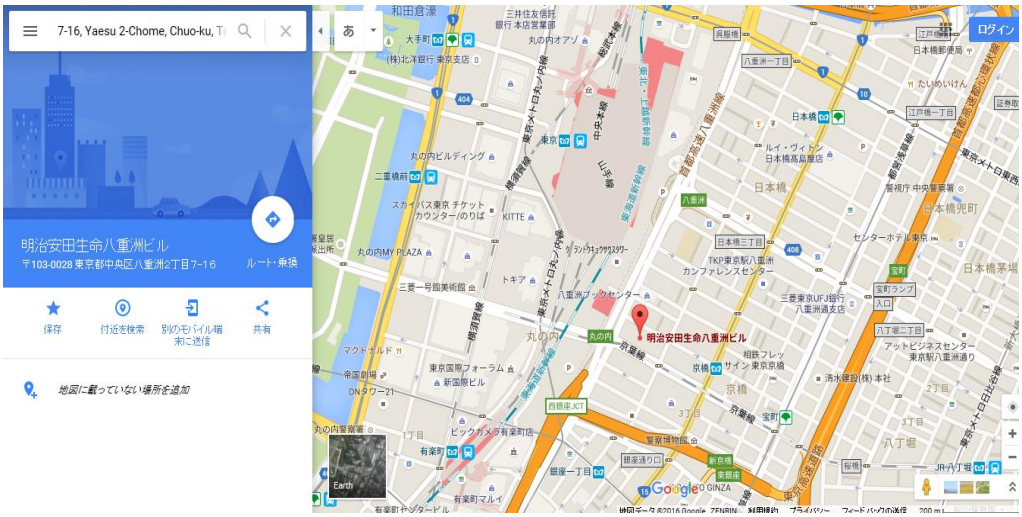
He has worked in the oil and gas industry for 37 years. He has written over 90 publications and received 15 patents. He is a member of SPWLA, SPE and SEG.

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** @ the same venue as Chapter meeting
1,000 yen



Best Presenter Award of the 21st Formation Evaluation Symposium 2015

The best presenter award was selected from all the papers presented at the 21st Formation Evaluation Symposium of Japan, held at JOGMEC-TRC on October 13th and 14th, 2015. For this selection, the board members reviewed the performances of the oral presentation such as the contents of research, quality of presentation material and presentation skills and the papers. The testimonial will be given to the awardee at the coming JFES Symposium of this year. The awarded presentation and the authors are shown below.

SIMULATION STUDY FOR STIMULATED RESERVOIR VOLUME IN RESPONSE TO STRESS CONTRAST AND NATURAL FRACTURE BEHAVIORS: Tetsuya Tamagawa (JAPEX), Kimio Watanabe (Renergies Ltd.) and Kazuhiko Tezuka (JAPEX)

The authors developed a hydraulic fracturing simulator for modeling a primary tensile fracture propagation interacting with a natural fracture system and applied this simulator to the quantitative evaluation of the effects of horizontal stress contrast and the degree of shear dilation on a stimulated reservoir volume (SRV). In this study, the natural fracture system was modeled using a three-dimensional discrete fracture network (DFN) referring to the actual data sets gathered from a multi-stage hydraulic fracturing job conducted in the tight oil reservoir in Japan.

As a result of this study, it was revealed that
1. under high horizontal stress contrast, the large shear dilation contributes to create a wide SRV, whereas the small shear dilation creates a narrow one, and
2. the SRV created with the small shear dilation widens gradually when the state of horizontal stresses changes from a high contrast to a very low one.

The board members recognized the originality, novelty and practical utility of this paper, as this paper clearly suggests the interaction between induced fractures and natural fractures and the growth of SRV as a function of the stress state. Furthermore, the performances of the presentation by Dr. Tamagawa were highly evaluated. (Masanori Kurihara, Session Chair)