

Research of Acoustic Propagation within Marine Riser in Deepwater Drilling

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Abstract : Early monitoring and real-time quantitative description of gas intrusion under the premise of ensuring the integrity of the drilling fluid circulation system will greatly improve the accuracy and effectiveness of deepwater gas-kick monitoring. Therefore, in order to study the propagation characteristics of ultrasonic waves in the gas-liquid two-phase flow within the marine riser, in this paper, a numerical simulation method of ultrasonic propagation in the annulus of the riser was established, and the credibility of the numerical analysis was verified by the experimental results of the established gas intrusion monitoring simulation experimental device. The numerical simulation can solve the sound field in the gas-liquid two-phase flow according to different physical models, and it is easier to realize the single factor control. The influence of each parameter on the received signal can be quantitatively investigated, and the law with practical guiding significance can be obtained.

Keywords : gas-kick detection, ultrasonic, void fraction, coda wave velocity

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