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Journal of Petroleum Science and Engineering
Volume 195, December 2020, Article number 107818

Conventional and intelligent models for detection and prediction of fluid loss events during drilling operations : A comprehensive review (Review)

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Abstract

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Fluid loss to subsurface formations is a challenging aspect during drilling operations in petroleum industry. Several other drilling issues such as fluid influx and pipe sticking can be triggered in such scenarios, posturing a significant risk to rig personnel, environment, and economical drilling. Therefore, prediction and early detection of lost circulation events are required for safe and economic drilling operation. Several theoretical studies have been performed to detect and predict fluid loss event during hydrocarbon extraction. This paper reviews the existing conventional and intelligent models developed for early detection and prediction of lost circulation events. These predictive and detecting models comprise of Artificial Intelligence (AI) algorithms that require improvements for data reduction, universal prediction and compatibility. The review also covers several sensor-based techniques, different geostatistical-based models and Pressure-While-Drilling (PWD) tools for their applications in early loss circulation detection. In addition, loss circulation zones types, severity level, scenario and common preventive measures are also included in this review. This study aims to provide a systematic review of the published literature from the last forty years on the developed conventional and intelligent models for detection and prediction of fluid loss events and emphasizes on increasing AI involvement for precise results. © 2020 Elsevier B.V.

Author keywords

Artificial intelligence Detection Drilling Lost circulation Prediction

Funding details

Funding sponsor	Funding number	Acronym
	0153AA-E87	

Funding text

This work is supported by Petroleum Engineering Department and Institute of Hydrocarbon Recovery at Universiti Teknologi PETRONAS . The financial assistance is provided by the grant number YUTP 0153AA-E87 .

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