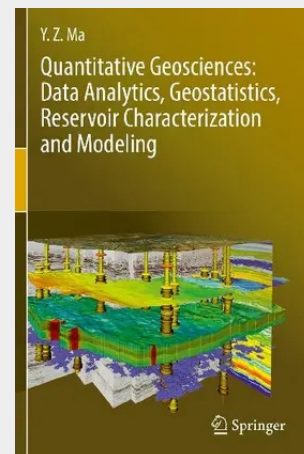


Quantitative Geosciences: Data Analytics, Geostatistics, Reservoir Characterization and Modeling

Earth science is becoming increasingly quantitative in the digital age. Quantification of geoscience and engineering problems underpins many of the applications of big data and artificial intelligence. This book presents quantitative geosciences in three parts. Part 1 presents data analytics using probability, statistical and machine-learning methods. Part 2 covers reservoir characterization using several geoscience disciplines: including geology, geophysics, petrophysics and geostatistics. Part 3 treats reservoir modeling, resource evaluation and uncertainty analysis using integrated geoscience, engineering and geostatistical methods. As the petroleum industry is heading towards operating oil fields digitally, a multidisciplinary skillset is a must for geoscientists who need to use data analytics to resolve inconsistencies in various sources of data, model reservoir properties, evaluate uncertainties, and quantify risk for decision making. This book intends to serve as a bridge for advancing the multidisciplinary integration for digital fields. The goal is to move beyond using quantitative methods individually to an integrated descriptive-quantitative analysis. In big data, everything tells us something, but nothing tells us everything. This book emphasizes the integrated, multidisciplinary solutions for practical problems in resource evaluation and field development.

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128,39 €

119,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783030178628

Medium: Buch

ISBN: 978-3-030-17862-8

Verlag: Springer

Erscheinungstermin: 15.08.2020

Sprache(n): Englisch

Auflage: 1. Auflage 2019

Produktform: Kartoniert

Gewicht: 1136 g

Seiten: 640

Format (B x H): 155 x 235 mm

