



Reef Reservoir Identification by Wavelet Decomposition and Reconstruction: A Case Study from Yuanba Gas Field in China

Bingjie CHENG^{1,2,3}, Tianji XU⁴, Benedict ROBBINS⁵,
and ZhongMing SHEN¹

¹State Key Laboratory of Oil and Gas Reservoir Geology and Exploitation,
Chengdu University of Technology, Chengdu, China;
e-mail: chengbingjie09@cdut.cn

²Key Laboratory of Earth Exploration and Information Technology of
Ministry of Education, Chengdu University of Technology, Chengdu, China

³Meteorological Information and Signal Processing,
Key Laboratory of Sichuan Higher Education Institutes,
Chengdu University of Information Technology, Chengdu, China

⁴3rdGeophysical Institute, Exploration and Production Institute,
Southwest Oil and Gas Company, SINOPEC, Chengdu, China

⁵Fugro Aperio, Fugro Onshore Geotechnics, Wallingford, Oxfordshire, UK

A b s t r a c t

The organic reef is a special type of carbonate reservoir which always dominates the spatial distribution, reserves and accumulations of natural gas. However, it is difficult to determine the organic reef's internal structure and gas reservoirs due to numerous adverse factors such as the low resolution of seismic data, depth of burial, strong anisotropy, irregular spatial distribution and complex internal structure. A case study of wavelet decomposition and reconstruction technology applied to elucidate the features of organic reef reservoirs in the Changxing formation from Yuanba gas field shows that the seismic record reconstructed by high frequency signal can adequately describe the internal properties of

organic reef reservoirs. Furthermore, the root mean square amplitude ratio of both low and high frequency data obtained from the reconstructed seismic data clearly show spatial distribution of gas and water in reef reservoirs.

Key words: seismic signal, organic reef, wavelet decomposition and reconstruction, hydrocarbon detection, reef reservoir identification.