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# Morphometric Scaling Relationship in the Cenozoic Submarine Channels System of Canterbury Basin, New Zealand: Implications for sedimentary processes and pale-environment reconstruction

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The Submarine channel is primary conduits to transfer sediment from shelf to the basin floor area. Understanding the submarine channels sedimentary processes and paleoenvironment from subsurface data remain a challenging issue. The aim of this work is to implemented morphometry analysis in the Cenozoic submarine channels system on the Canterbury basin, New Zealand. Thus, the evolution, sedimentary processes and paleoenvironment reconstruction will be understandable. High quality 3D seismic reflection and wellbore data were utilized in this study and conventional seismic interpretation (e.g. interpretation of horizon and fault followed by seismic slicing and seismic attribute analysis) has been applied to reveal the geomorphology of the submarine channels. Regional correlation to the closest wellbore utilized 2D seismic reflection data providing stratigraphy and regional tectonic information. Morphometric parameters such as thalweg depth (lowest point on a channel's base), wall depth (middle point on a channel's body), height, top width and base width, sinuosity, thalweg gradient, cross-sectional area of the channel's body, and the relationships among them were measured at intervals of 100m perpendicular to the channels' pathways. Morphometry analysis shows that channel's width (top and base) vary from proximal to distal part of the study area in context of hundred to thousand meters, respectively. These suggests an autogenic control in the erosion of channel flank and the allogenic control (rate of sediment supply). Some of the channels has increasing both top and base width basinward, signify the existence of turbidity current in the upper slope area. In addition, the sinuosity of the channels is increasing towards the distal part of the study area giving indication of relatively flat area on the paleo-bathymetry. This study provide a basis for understanding the sedimentary processes and paleoenvironment reconstruction from subsurface data and might be applicable for similar system worldwide.