Effects of Lateral Lithology Changes on the Development of Structures and Fractures in the Grande Cache Area, West-Central Alberta, Canada

Introduction

The stratigraphic architecture controls deformation from matrix to surface. This study investigates the influence of stratigraphy on the development of structures and fractures in the Grande Cache area, West-Central Alberta, Canada. The study area is characterized by a sequence of sedimentary rocks, including sandstones, shales, and carbonates, which have undergone tectonic deformation. The research aims to understand the relationship between stratigraphy and structural development.

Mine Area Overview

The mine area overview provides an overview of the stratigraphic sequence and the location of the study area. The sequence is characterized by a series of horizons, each representing a different stratigraphic unit. The study area is located in the Grande Cache area, West-Central Alberta, Canada.

Legend

The legend provides a key to the symbols and colors used in the diagrams. The legend includes symbols for different rock types, structures, and fracture orientations.

PIT 1: McEvoy Anticline

The McEvoy Anticline is a prominent feature in the study area. It is characterized by a series of folds and fractures, which have developed due to tectonic deformation. The anticline is oriented in the SW-NE direction and is associated with a series of sandstone and shale layers.

Hinge Zone of the Anticline

The hinge zone of the anticline is characterized by a series of fractures and faults. The fractures are oriented in the NW-SE direction and are associated with the folding of the strata. The hinge zone is a region of high strain, where the deformation is concentrated.

Scalene Fracture Analysis

The scalene fracture analysis provides a quantitative assessment of the fracture orientation and density. The analysis is based on the orientation of the fractures relative to the bedding planes. The results indicate a high density of fractures in the hinge zone and a lower density in the flanking areas.

Conclusions

The study of the Grande Cache area has provided valuable insights into the relationship between stratigraphy and structural development. The results indicate that the stratigraphic sequence controls the orientation and density of fractures and folds. The findings suggest that a detailed understanding of stratigraphy is crucial for predicting the development of structures and fractures in similar tectonic settings.

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Implications

The results of this study can be applied to other areas with similar stratigraphic architecture. The findings have implications for the exploration and development of mineral resources, as well as for the understanding of tectonic processes in similar settings.