

Purple Springs, Alberta (10-14W4): Paleozoic Impact Crater

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Summary

The author presents the case why the complex structural feature located at Purple Springs, Alberta (10-14W4), is indeed an impact crater.

Introduction

There is a very complex sub-surface structural feature roughly 3.4 km in diameter located in the north-west portion of 10-14W4 that has been interpreted to be of impact origin, although other possible origins have been suggested. The impact would have occurred sometime after the deposition of the Mississippian Livingston formation and prior to deposition of the Jurassic Sawtooth formation. The well 100/04-32-010-14W4 sits almost exactly in the center of this feature.

Theory and/or Method

A Master's thesis (Westbroek, 1997) was done that looked at the Purple Springs feature as well as another possible impact feature at White Valley, Sask. The author concluded that the Purple Springs feature was likely of impact origin, but some characteristics of this feature did not conform to the accepted impact crater model (Melosh, 1989). This Master's thesis had access to three seismic lines over the Purple Springs feature, however, none of these lines passed exactly over the center of the feature. One significant problem with the impact origin theory for Purple Springs was the apparent absence of a central uplift under the center of the feature.

Examples

This current work has access to an additional seismic line that does pass through the apparent centre of the feature and this data do show the presence of a central uplift under the center of the feature.

Conclusions

The additional seismic line shows the presence of a central uplift under the center of the feature and this appears to be sufficient evidence to conclude that the Purple Spring feature is indeed of impact origin.

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References

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Westbroek, H.-H., 1997, Seismic Interpretation of Two Possible Meteorite Impact Craters: White Valley, Saskatchewan and Purple Springs, Alberta, Department of Geology and Geophysics, The University of Calgary, Calgary, Alberta, Canada.