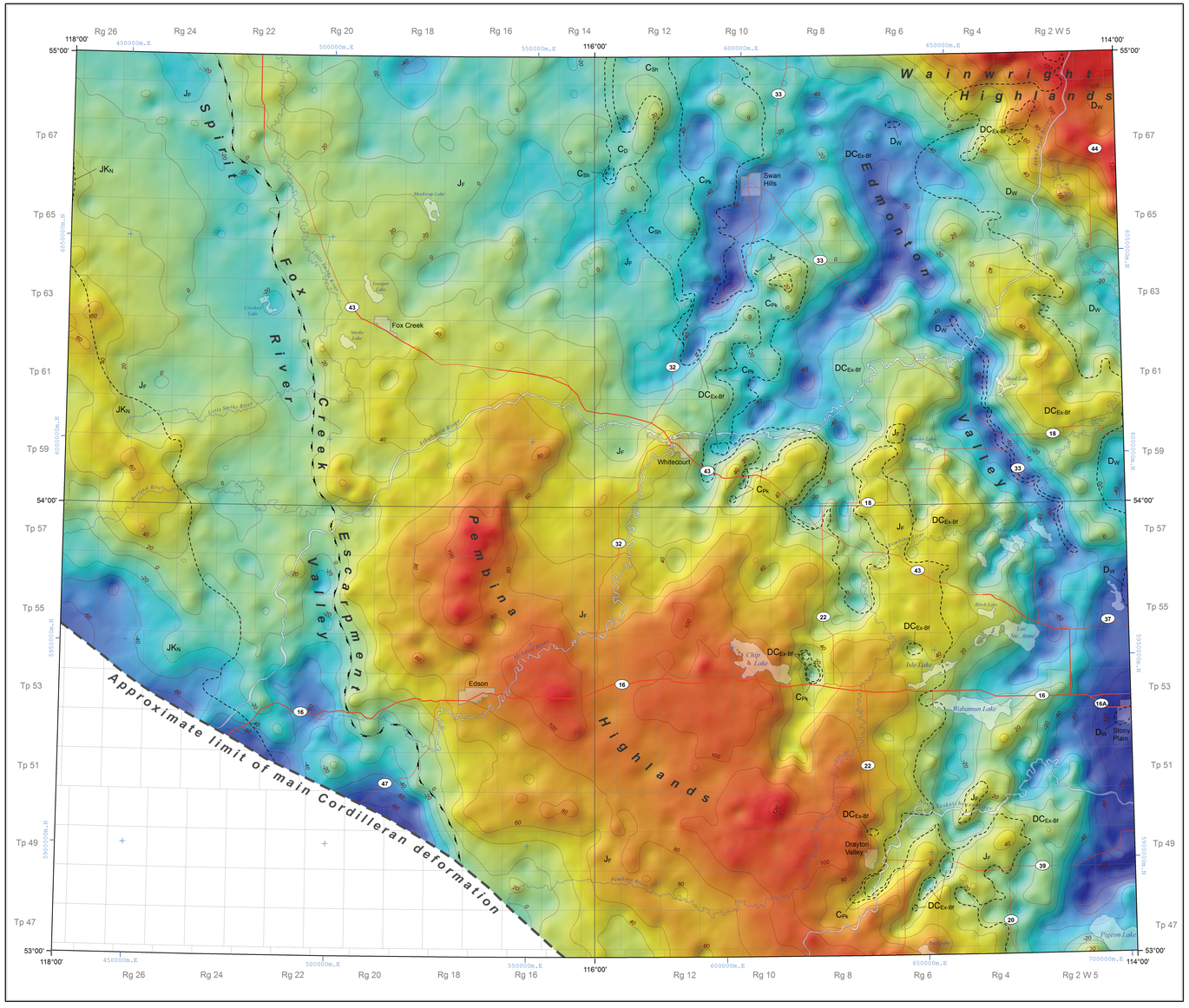
NTS 83F, 83G, 83J and 83K
SUB-CRETACEOUS PALEOTOPOGRAPHY




Alberta Geological Survey
(780) 422-1927
www.ags.gov.ab.ca

Published 2014
ISBN 978-1-4601-0131-5

**Map 573**

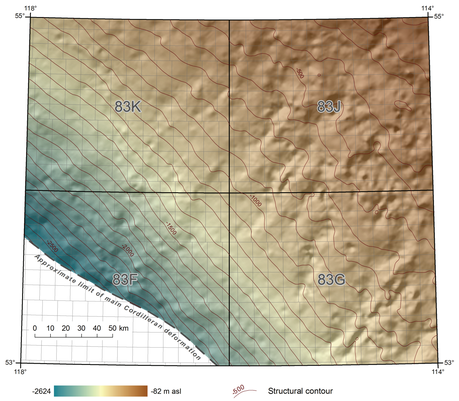
# Paleotopography of the Sub-Cretaceous Unconformity, West-Central Alberta (NTS 83F, 83G, 83J and 83K)

**J.T. Peterson and K.E. MacCormack**

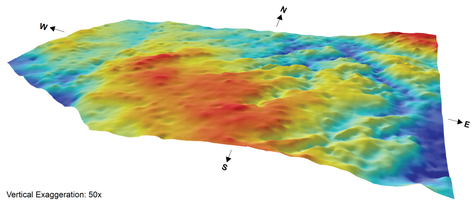
Scale 1:500 000

10 5 0 10 20 30 40 50 kilometres
5 0 5 10 15 20 25 miles

Projection: Universal Transverse Mercator, Zone 11
Datum: North American Datum, 1983


**Structural elevation of the sub-Cretaceous unconformity.**




Vertical Exaggeration: 50x

**Three-dimensional oblique view of the sub-Cretaceous paleotopography.**

## SYMBOL LEGEND

- Approximate boundary of subcropping stratigraphic unit
- $JK_N$ Nikanassin Formation
- $J_F$ Fernie Formation
- $C_D$ Debolt Formation
- $C_{Sh}$ Shunda Formation
- $C_{Pk}$ Pekisko Formation
- $DC_{Ex\text{-}Bf}$ Banff and Exshaw formations
- $D_W$ Wabamun Group
- Approximate edge of Fox Creek Escarpment

Sub-Cretaceous paleotopography (relative height in metres)
-124 140 m Contour line

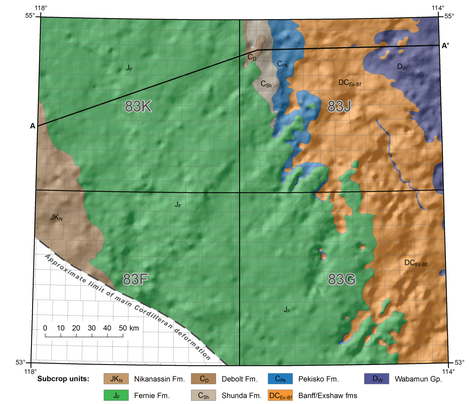
## BASEMAP LEGEND

- City or town
- Major highway
- Primary road
- Water body (lake or major river)
- River
- 600000m.E UTM, Zone 11 grid

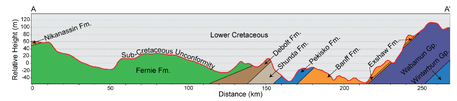
**Modified AER Table of Formations**

| ERA | PERIOD | | STRATIGRAPHY | | |
|---|---|---|---|---|---|
| MESOZOIC | CRETACEOUS | LOWER | BULLHEAD Age in Millions of Years | GETHING | MANNVILLE: OSTRACOD BEDS, ELLERSLIE |
| | | | | CADOMIN | |
| | JURASSIC | | 145 | NIKANASSIN | |
| | | | FERNIE | UPPER SHALE | |
| | | | | ROCK CREEK | |
| | | | | POKER CHIP | |
| | | | | NORDEGG | |
| | TRIASSIC | | 201 | | |
| PALEOZOIC | PERMIAN | | | | |
| | CARBONIFEROUS: PENNSYLVANIAN | | 323 | | |
| | | MISSISSIPPIAN | ROCKY MTN. | DEBOLT | |
| | | | | SHUNDA | |
| | | | | PEKISKO | |
| | | | | BANFF | |
| | | | 359 | EXSHAW | |
| | DEVONIAN | UPPER | WABAMUN | WABAMUN | |

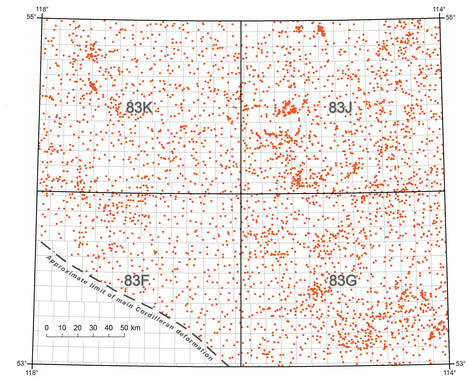
Clastics (sandstone, siltstone, conglomerate)
Shale
Carbonates (limestone, dolostone)




**Distribution of stratigraphic units subcropping at the sub-Cretaceous unconformity.**




**Paleotopographic profile illustrating succession of subcropping stratigraphic units.**




**Sub-Cretaceous unconformity data distribution.**

## Background

The sub-Cretaceous unconformity is an important regional surface across the Alberta Basin, which represents a significant period of non-deposition and erosion initiated after the deposition of Upper Jurassic/Lower Cretaceous sediments of the first foreland basin clastic wedge. With the exception of the upper Fernie and Nikanassin formations, this major unconformity surface separates the basin into two distinct depositional settings; a lower passive margin and an upper foreland basin.

The references listed provide further information on the nature of the sub-Cretaceous unconformity and the geology of the subcropping stratigraphic units in the study area.

## Methodology

The study area covers NTS map sheets 83G, 83J, 83K, and part of 83F. The southwest limit of the study area is defined by the approximate limit of the main Cordilleran deformation.

Geophysical wireline logs were reviewed to identify the depth of the unconformity and the corresponding subcropping stratigraphic units. Cores from various subcropping areas were reviewed to validate log responses at the unconformity surface.

ArcGIS Geostatistical Analyst® was used to model the unconformity surface data using a 500 metre grid cell spacing. The dominant southwest dipping trend was removed from the modelled surface to provide residual values representing an approximation of the paleotopography. Underlying stratigraphic units were modelled independently and then integrated into a 3D geocellular model using Petrel 2013®. The geocellular model was then truncated by the sub-Cretaceous unconformity surface to identify the subcrop geometry of each stratigraphic unit. Model results were cross-validated with well control data and subcrop edges were adjusted where required.

Paleotopography is displayed with a hillshade (azimuth 315°, altitude 45°) to provide a sense of topographic relief.

## Recommended Reference Format

Peterson, J.T. and MacCormack, K.E. (2014): Paleotopography of the sub-Cretaceous unconformity, west-central Alberta (NTS 83F, 83G, 83J and 83K); Alberta Energy Regulator, AER/AGS Map 573, scale 1:500 000.

## Acknowledgements

D.I. Paná and D.A. Leckie reviewed the map.
R. Elgr provided GIS and cartographic services for the mapping project.
Digital base provided by Spatial Data Warehouse and Natural Resources Canada.

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