

SYMBOL LEGEND

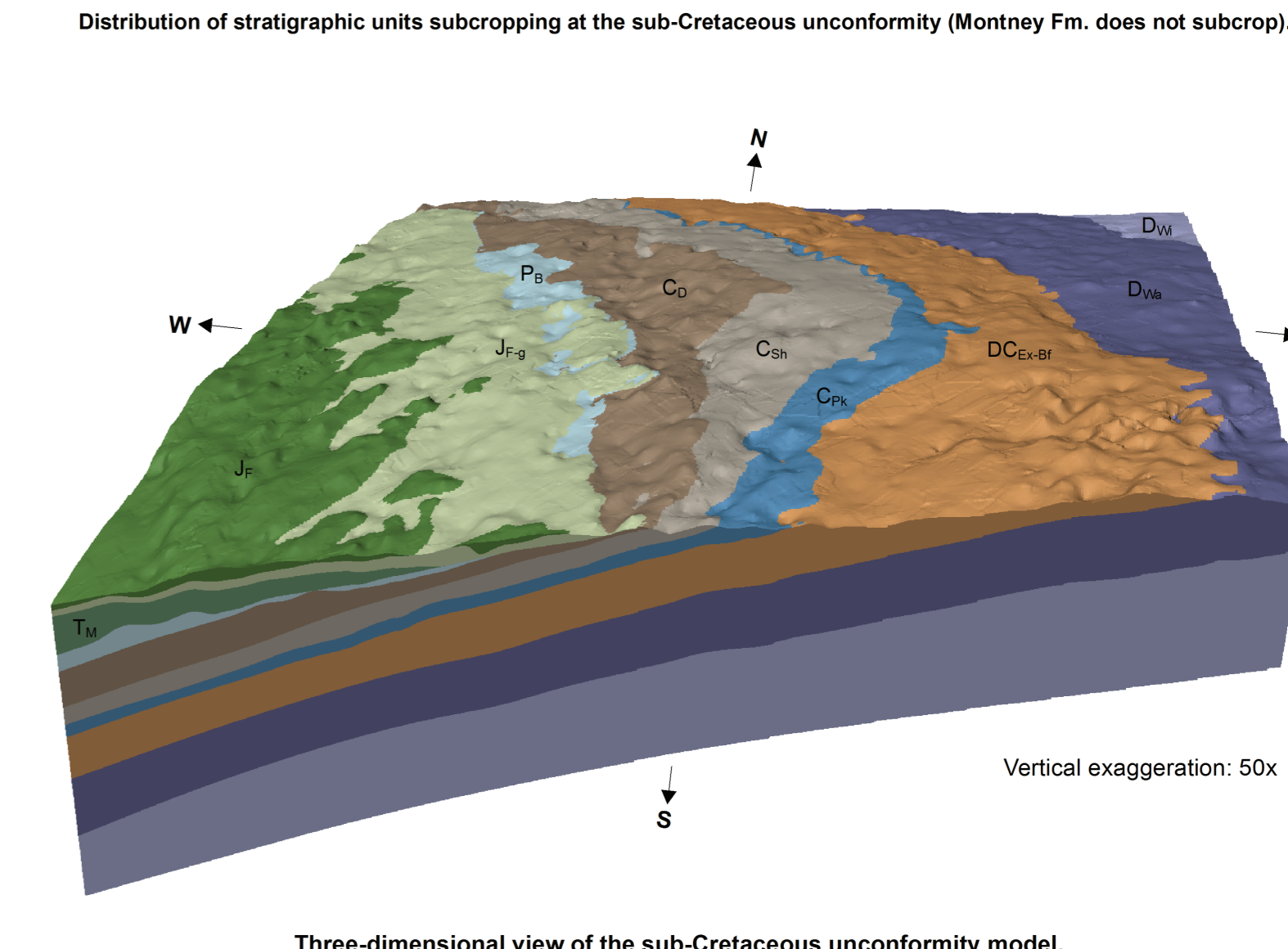
- - - Approximate boundary of subcropping stratigraphic unit
 - J_f Fernie Formation (undifferentiated)
 - J_{f-g} Gordondale Member (Fernie Formation)
 - P_b Belloy Formation
 - C_d Debolt Formation
 - C_{sh} Shunda Formation
 - C_{pk} Pekisko Formation
 - DC_{ex-br} Banff and Exshaw formations
 - D_{wa} Wabamun Group
 - D_{vb} Winterburn Group
 - - - Approximate edge of Fox Creek Escarpment
- Sub-Cretaceous paleotopography (height in metres relative to regional trend)
- 72 72 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

Schematic Stratigraphy
(Adapted from AER/AGS Table of Formations)

ERA	PERIOD	STRATIGRAPHY
MESOZOIC	CRETACEOUS	Upper: BULLHEAD, GETHING, McMURRAY, GARDNER, MANNVILLE
		Lower: BULLHEAD, GETHING, McMURRAY, GARDNER, MANNVILLE
	JURASSIC	Upper: UNDIFFERENTIATED SHALE AND SANDSTONE, GORDONDALE
	Lower: MONTNEY, BELLOY	
TRIASSIC	Upper: MONTNEY	
	Lower: BELLOY	
PALEOZOIC	CARBONIFEROUS	Upper: PENNSYLVANIAN, STODDART, DEBOLT, SHUNDA, PEKISKO, BANFF, EXSHAW
		Lower: WABAMUN, WINTERBURN
DEVONIAN	Upper: WABAMUN	
	Lower: WINTERBURN	



Background

The "sub-Cretaceous unconformity" is an important regional surface across the Alberta Basin, and represents a significant period of non-deposition and erosion initiated after the deposition of Upper Jurassic/lowermost Cretaceous sediments of the first foreland basin clastic wedge. In the investigated area, with the exception of the Upper Jurassic Fernie strata, this major unconformity surface separates the basin stratigraphy into sequences assigned to distinct depositional settings: an early passive margin basin and a subsequent foreland basin.

The topography of the sub-Cretaceous unconformity surface was an important control on the deposition and preservation of the overlying Cretaceous succession.

Methodology

The study area is located in the Peace River – Slave Lake region and covers NTS map sheets 83N, 83O, 83C, and 83B. Log correlation was the primary method for mapping the unconformity surface. Geophysical wireline logs for 4,918 wells were examined to assign picks identifying the depth of the unconformity and determine the underlying subcropping formation. An additional 7,884 picks were made to identify the position of underlying stratigraphic units. The unconformity surface was picked at a minimum density of three wells per township/range block. Where subcrop boundaries, complex structural or erosional features were present, additional wells were picked to aid in the delineation of these features.

The sub-Cretaceous unconformity picks were interpolated using ArcGIS Geostatistical Analyst[®] to model the unconformity surface at a 500 metre grid cell spacing. The paleotopographic surface is derived by subtracting the dominant southwest dipping trend from the modelled sub-Cretaceous surface. The stratigraphic units underlying the sub-Cretaceous unconformity were geostatistically modelled and then integrated into a 3D geocellular model using Petrol 2015[®]. The 3D model was truncated by the sub-Cretaceous unconformity surface to identify the subcrop geometry of each stratigraphic unit. These results were cross-validated with additional well control and subcrop edges were adjusted where required. Refer to AGS OFR 2015-08 (Peterson and MacCormack, 2015) for additional information on the sub-Cretaceous unconformity, sub-cropping unit geology, or the modelling methodology.

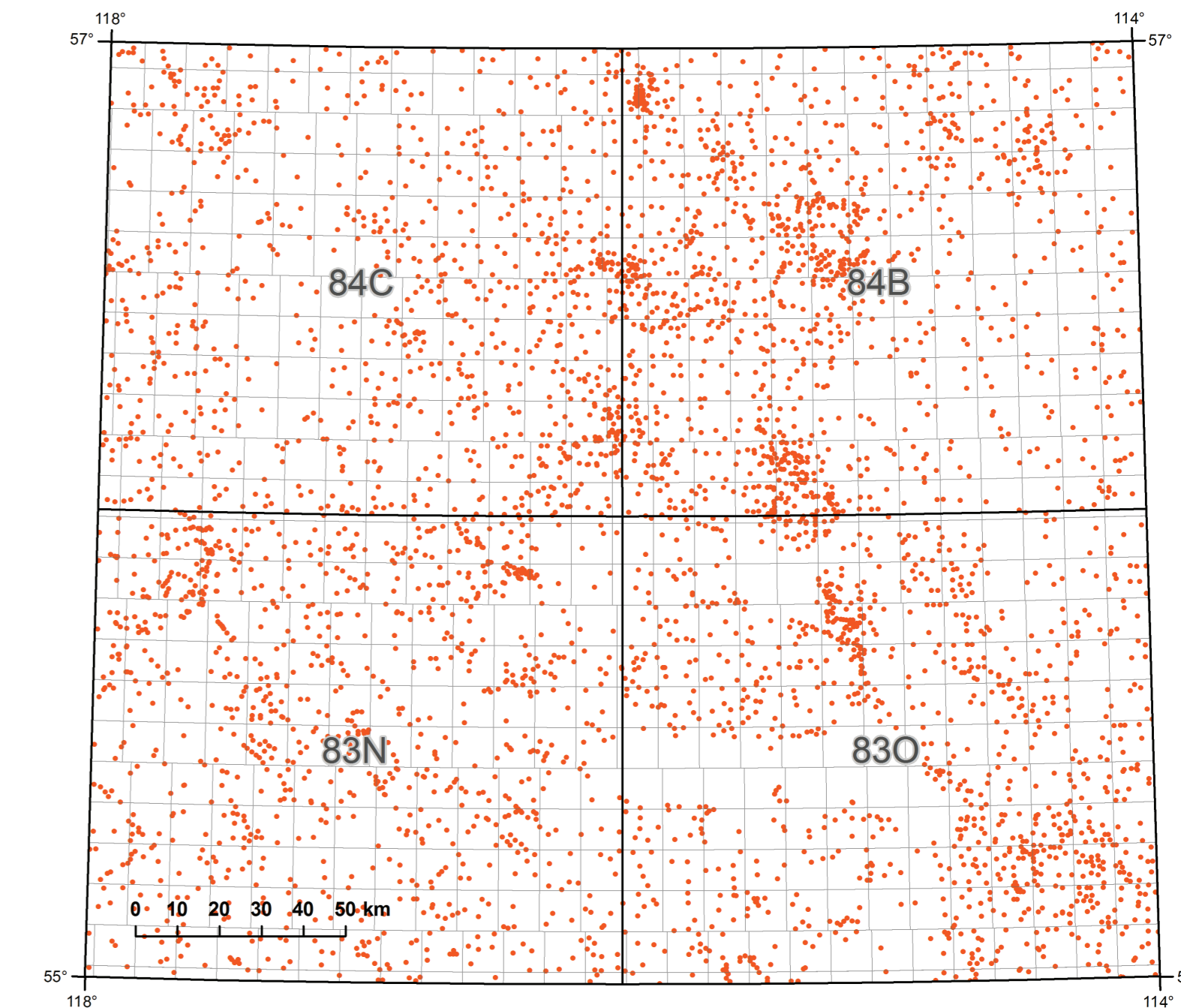
Paleotopography is displayed with a hillshade (azimuth 315°, altitude 45°) to provide a sense of topographic relief.

Acknowledgements

D.I. Paná 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.

References

- Alberta Geological Survey (2015): Alberta Table of Formations; Alberta Energy Regulator, URL <http://www.aer.ca/documents/catalog/TOF.pdf>
- Peterson, J.T. and MacCormack, K.E. (2015): Modelling of the sub-Cretaceous unconformity: elevation, subcrop mapping, and paleotopography in the Peace River – Slave Lake region, Alberta (NTS 83N, 83O, 84C, 84B); Alberta Energy Regulator, AER/AGS Open File Report 2015-08 (in press).
- Smith, D.G. (1994): Paleogeographic evolution of the Western Canada foreland basin; in Geological Atlas of the Western Canada Sedimentary Basin, G.D. Mossop and I. Shetsen (comp.), Canadian Society of Petroleum Geologists and Alberta Research Council, p. 277-296.



Recommended Reference Format

Peterson, J.T. and MacCormack, K.E. (2015). Paleotopography of the sub-Cretaceous unconformity, Peace River - Slave Lake region, Alberta (NTS 83N, 83O, 84C and 84B). Alberta Energy Regulator, AER/AGS Map 578, scale 1:500 000.

Disclaimer

The Alberta Geological Survey and its employees and contractors make no warranty, guarantee or representation, express or implied, or assume any legal liability regarding the correctness, accuracy, completeness, or reliability of this publication. When using information from this publication in other publications or presentations, due acknowledgement should be given to the Alberta Energy Regulator/Alberta Geological Survey.

Alberta Geological Survey
(780) 638-4491
www.ags.gov.ab.ca
Published 2015
ISBN 978-1-4601-0148-3

Map 578
Paleotopography of the Sub-Cretaceous Unconformity,
Peace River - Slave Lake Region, Alberta (NTS 83N, 83O, 84C and 84B)

J.T. Peterson and K.E. MacCormack

