Natural Resources Canada / Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

GEOLOGICAL TIME CHART

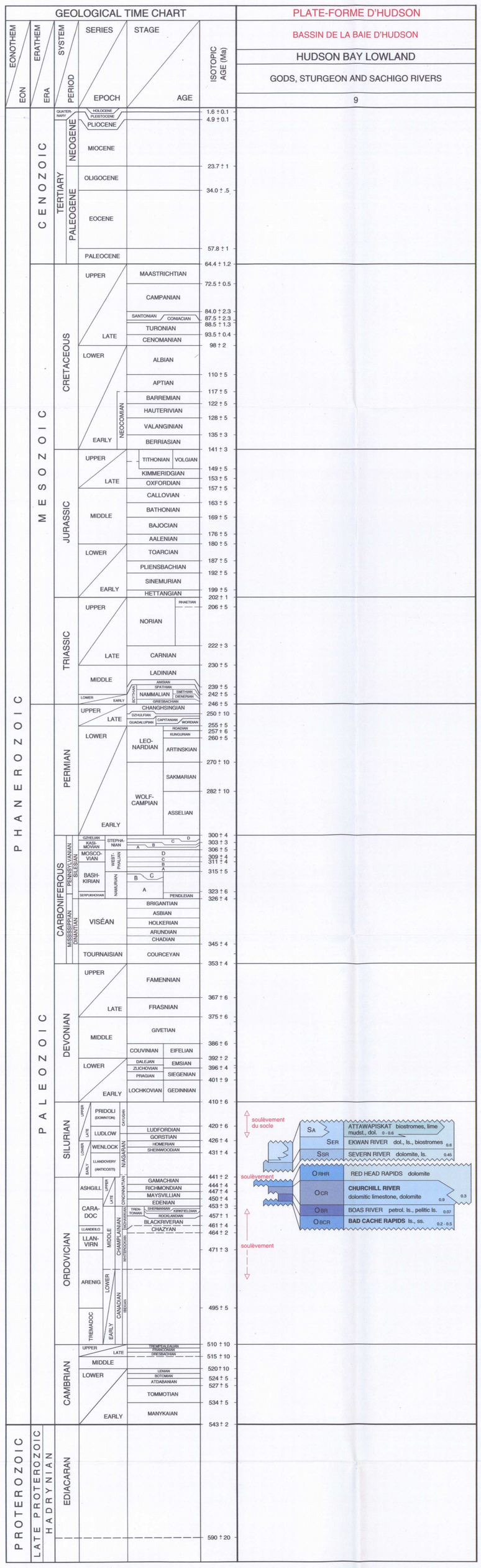
PLATE-FORME D'HUDSON

BASSIN DE LA BAIE D'HUDSON

HUDSON BAY LOWLAND

GODS, STURGEON AND SACHIGO RIVERS

9



GEOTECTONIC CORRELATION CHART FOR GODS LAKE, MAP NN-15-G

ABBREVIATIONS

dol	dolomite, dolomitic, dolostone	petrol	petroliferous
ls	limestone	ss	sandstone, quartz arenite
mdst	mudstone		

FACIES

Platformal limestone — Bioherms — Dolomite

Group or supergroup . . . . . **CHURCHILL RIVER**
Formation, member or intrusive body . . . . . SEVERN RIVER
Thickness (hundreds of metres) 6.8
For explanation of geological unit symbols, see Sheet 1 . . . . . SER

CONTACTS

	Established
Conformable	
Nonconformity, angular unconformity	

CONVENTIONS

Within each correlation chart column, units are placed above one another to portray relationships among them. Space limitations may require lateral separation of related units, or placing units that are not in contact, above one another. Where numerous units are included in a column and all relationships cannot be shown, first priority is given to stratigraphic (conformable, disconformable or unconformable) relationships. Second priority is given to intrusive contacts, many of which may also be inferred from the map.

Unit elements consist of, from left to right, all or some of:
1) a block indicating age and age range,
2) the name of a composite unit (e.g. a group or a formation with members),
3) a block containing the map symbol and colour,
4) a block containing the unit name, lithological description and facies colour.

The top and bottom of each unit element portray relationships to units directly above and below.
The position and vertical extent of only the left-hand block of the unit element indicate the best estimate of age and age range. Blocks to the right may be enlarged to accommodate unit symbols, names and lithologies.
A solid square placed to the left or right of the unit element indicates an isotopic age or the best interpretation of isotopic data.
Vertical arrows indicate possible age range or uncertainty in the isotopic or paleontological age.

GEOLOGICAL TIME CHART REFERENCES

Phanerozoic time chart from:

Harland, W.B., Armstrong, R.L., Cox, A.V., Craig, L.E., Smith, A.G. and Smith, D.G. 1990: A geologic time scale 1989. Cambridge University Press.

Palmer, A.J. 1983: The Decade of North American Geology 1983 geologic time scale. Geology, v. 11, p. 503 - 504.

Snelling, N.J., editor. 1985: The Chronology of the Geological Record. The Geological Society, Memoir 10.

Phanerozoic time chart modified by data from:

Baadsgaard, H., Lerbekmo, J.F., and McDougall, I. 1988: A radiometric age for the Cretaceous-Tertiary boundary based upon K - Ar, Rb - Sr, and U - Pb ages of bentonites from Alberta, Saskatchewan, and Montana. Canadian Journal of Earth Sciences, v. 25, p. 1088 - 1097.

Baadsgaard, H., Lerbekmo, J.F. and Wijbrans, J.R. 1993: Multimethod radiometric age for a bentonite near the top of the*Baculites reesidei* zone of southwestern Saskatchewan (Campanian - Maastrichtian stage boundary?). Canadian Journal of Earth Sciences, v. 30, p. 769 - 775.

Benus, A.P. 1988: Sedimentological context of a deep-water Ediacaran fauna (Mistaken Point Formation, Avalon Zone, eastern Newfoundland). *In* Trace Fossils, Small Shelly Fossils and the Precambrian - Cambrian Boundary, E. Landing, G.M. Narbonne and P. Myrow (eds.). New York State Museum/Geological Bulletin 463, p. 9.

Bowring, S.A., Grotzinger, J.P., Isachsen, C.E., Knoll, A.H., Pelechaty, S., and Kolosov, P. 1993: Calibrating rates of Early Cambrian evolution. Science, v. 261, p. 1293 - 1297.

Bralower, T.J., Ludwig, K.R. Obradovich, J.D., and Jones, D.L. 1987: Berriasian (Early Cretaceous) radiometric ages from the Great Valley sequence, California and their biostratigraphic and magnetostratigraphic correlation. Geological Society of America, Abstracts with Programs, v. 19, no. 7, p. 598.

Claoué-Long, J.C. Jones, P.L., Roberts, J., and Maxwell, S. 1992: The numerical age of the Devonian - Carboniferous boundary. Geological Magazine, v. 129, p. 281 - 291.

Channell, J.E.T., Rio, D., and Thunell, R.C. 1988: Miocene / Pliocene boundary magnetostratigraphy at Capo Spartivento, Calabria, Italy. Geology, v. 16, p. 1096 - 1099.

Compston, W., Williams, I.S., Kirschvink, J.L., Zhang Zichao, and Ma Guogan 1992: Zircon U - Pb ages for the Early Cambrian time - scale. Journal of the Geological Society, London, v. 149, p. 171 - 184.

Cooper, J.A. et al. 1992: Ion-probe dating of a mid-Early Cambrian tuff in South Australia. Journal of the Geological Society, London, v. 149, p. 185 - 192.

Dunning, G.R. and Krogh, T.E. 1991: Stratigraphic correlation of the Appalachian Ordovician using advanced U - Pb zircon geochronology techniques. *In* Advances in Ordovician Geology, C.R. Barnes and S.H. Williams (eds.). Geological Survey of Canada, Paper 90 - 9, p. 85 - 92.

Fordham, B.G. 1992: Chronometric calibration of mid - Ordovician to Tournaisian conodont zones: a compilation from recent graphic - correlation and isotope studies. Geological Magazine, v. 129, p. 709 - 721.

Herbert, T.D., Erba, E., Premoli Silva, I., Fischer, A.G., and Park, J. 1989: Improvements of Cretaceous geochronology using Earth's orbital pace-maker: status and prospects. *In* Abstracts, 28th International Geological Congress, Washington, D.C., U.S.A., v. 2, p. 2-51.

Hess, J.C. and Lippolt, H.J. 1986: $^{40}Ar/^{39}Ar$ ages of tonstein and tuff sanadines: new calibration points for the improvement of the Upper Carboniferous time scale. Chemical Geology (Isotope Geoscience Section), v. 59, p. 143 - 154.

Hodych, J.P. and Dunning, G.R. 1992: Did the Manicouagan impact trigger end - of - Triassic mass extinction?. Geology, v. 20, p. 51 - 54.

Jenkins, R.J.F. 1984: Ediacaran events: boundary relationships and correlation of key sections, especially in 'America'. Geological Magazine, v. 121, p. 635 - 643.

Kent, D.V. and Gradstein, F.M. 1985: A Cretaceous and Jurassic geochronology. Geological Society of America, Bulletin, v. 96, p. 1419 - 1427.

Kieffner, M.A. 1989: A conodont - based Silurian chronostratigraphy. Geological Society of America, Bulletin, v. 101, p. 904 - 912.

Kowallis, B.J., Christiansen, E.H., and Deino, A.L. 1990: Age of the Cenomanian - Turonian boundary in the western interior of the United States. *In* Geological Society of Australia, Abstracts, Seventh International Conference on Geochronology, Cosmochronology and Isotope Geology, no. 27., p. 55.

McIntosh, W.C., Geissman, J.W., Chapin, C.E., Kunk, M.J., and Henry, C.D. 1992: Calibration of the latest Eocene-Oligocene geomagnetic polarity time scale using $^{40}Ar/^{39}Ar$ dated ignimbrites. Geology, v. 20, p. 459 - 463.

Olsen, P.E., Fowell, S., Cornet, B., and Witte, W.K. 1989: Calibration of Late Triassic - Early Jurassic time scale based on orbitally induced lake cycles. *In* Abstracts, 28th International Geological Congress, Washington, D.C., U.S.A., v. 2, p. 2-547.

Roden, M.K., Parrish, R.R., and Miller, D.S. 1990: The absolute age of the Eifelian Tioga ash bed, Pennsylvania. Journal of Geology, v. 98, p. 282 - 285.

Samson,, S.D., Patchett, P.J., Roddick, J.C., and Parrish, R.R. 1989: Origin and tectonic setting of Ordovician bentonites in North America: isotopic and age constraints. Geological Society of America, Bulletin, v. 101, p. 1175 - 1181.

Tozer, E.T. 1988: Rhaetian: a substage, not a stage. IUGS Subcommission on Triassic Stratigraphy, Albertiana, v. 7, p. 9 - 15.

Tucker, R.D., Krogh, T., Ross, R.J. Jr., and Williams, S.H. 1990: Time-scale calibration by high-precision U-Pb zircon dating of interstratified volcanic ashes in the Ordovician and Lower Silurian stratotypes of Britain. Earth and Planetary Science Letters, v. 100, p. 51 - 58.

Van Staal, C.R. and Sullivan, R.W. 1992: Significance of U - Pb zircon dating of silicic volcanic rocks associated with the Brunswick - type massive sulphide deposits of the Tetagouche Group. Geological Association of Canada, Program with Abstracts, v. 17, p. A112.

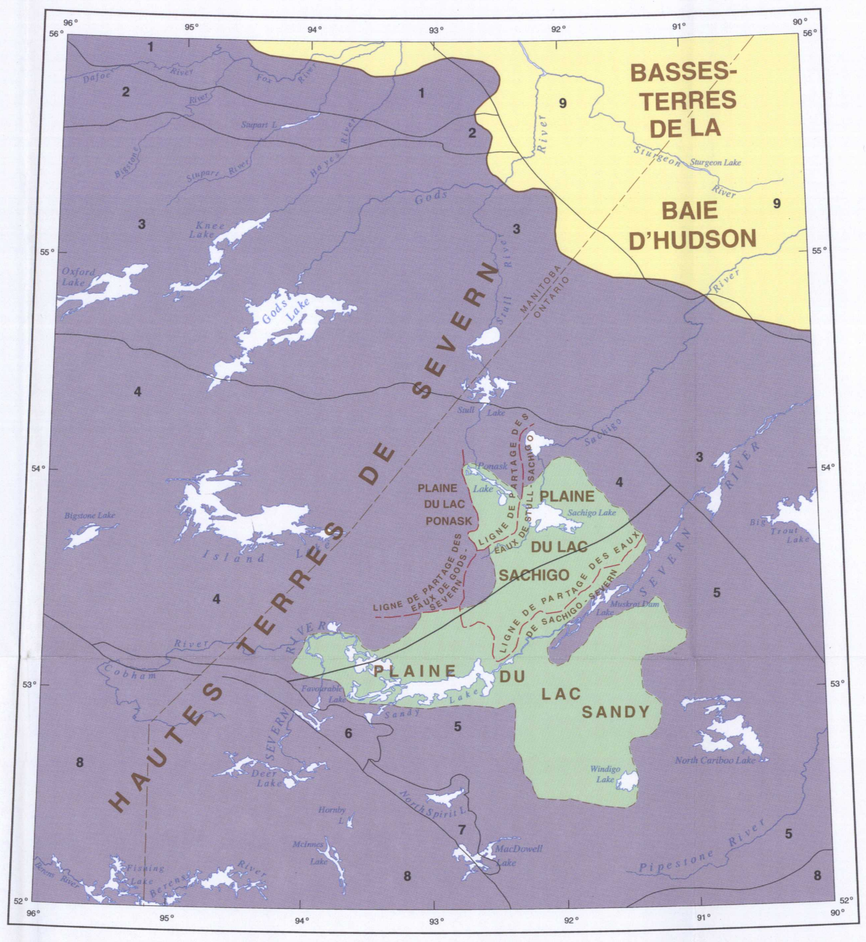
Westermann, G. 1984: Gauging the duration of stages: a new approach for the Jurassic. Episodes, v. 7, p. 26 - 28.

Wright, A.E., Fairchild, I.J., Moseley, F., and Downie, C. 1993: The Lower Cambrian Wrekin Quartzite and the age of its unconformity on the Ercall Granophyre. Geological Magazine, v. 130, p. 257 - 264.

Geological compilation by K.D. Card and B.V. Sanford, 1991

Geological cartography and data digitization by A.V. Okulitch, Geological Survey of Canada

Digital image processing by H&S Reliance Limited, Toronto, Ontario



PHYSIOGRAPHIC FEATURES

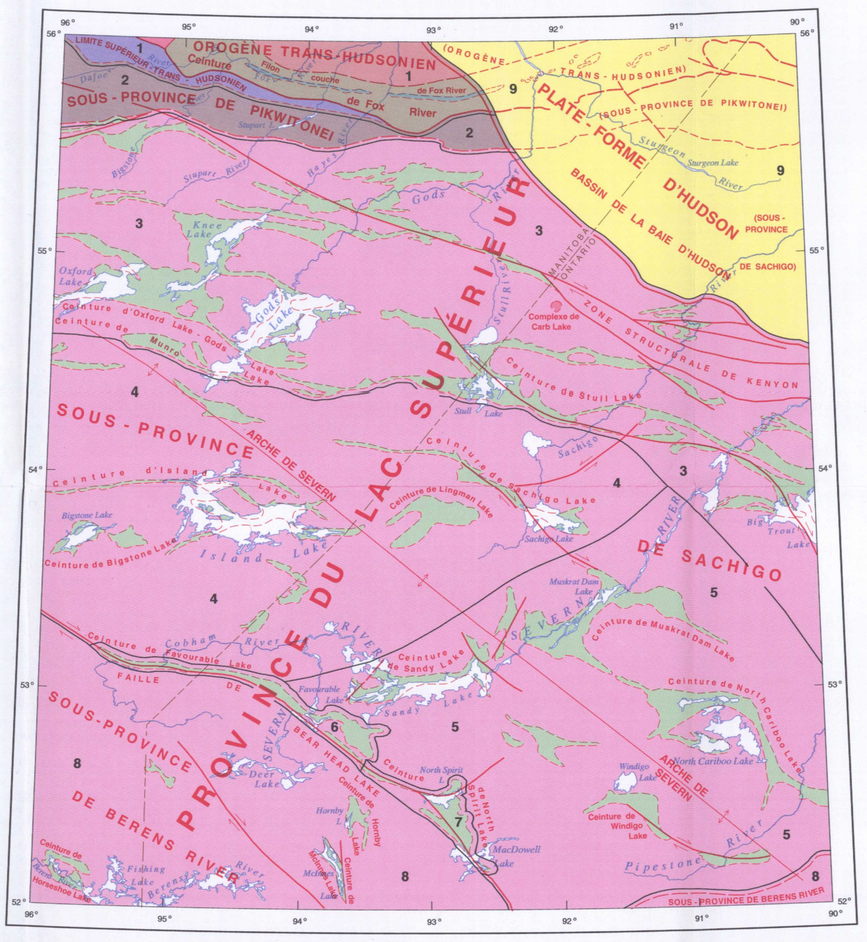
LEGEND

Uplands
Lowlands
Valleys, basins, troughs, trenches, flats, deltas and strandflats

Physiographic region boundary
Physiographic element boundary
Drainage divide
Correlation chart boundary (number represents column number on correlation charts) 2

NOTE

The physiographic elements within the Severn Upland are informal terms defined herein following the terminology of Mathews (1986). The flats are low swampy areas near Sandy, Sachigo and Ponash lakes, bounded by slightly higher, lake - dotted terrain. Part of the northwestern boundary is the drainage divide between the Severn River and Gods River basins. The flats are separated from each other by the Stull - Sachigo and Sachigo - Severn drainage divides.

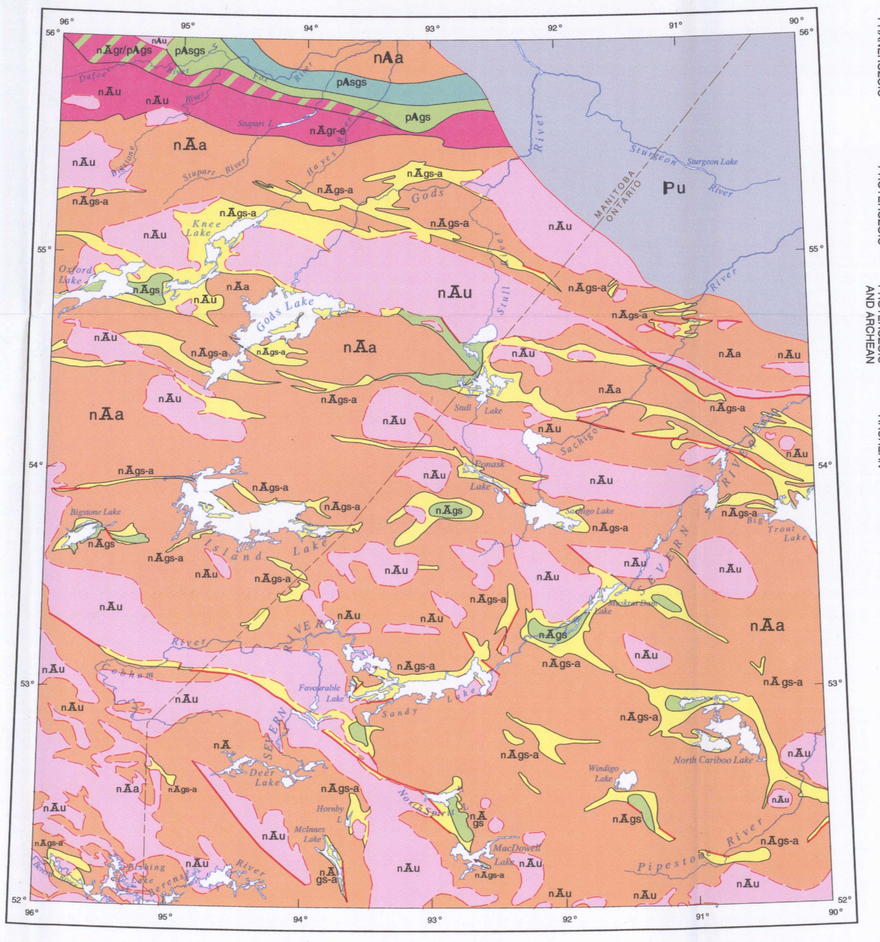


LITHOTECTONIC AND TECTONOSTRATIGRAPHIC FEATURES

LEGEND

Phanerozoic platform
Proterozoic plutonic terranes and intrusions
Precambrian tectonic zone
Proterozoic ultramafic bodies, oceanic crust
Proterozoic metasedimentary terranes
Proterozoic metavolcanic and metasedimentary terranes
Archean high-grade gneiss terranes
Archean plutonic terranes
Archean metavolcanic and metasedimentary terranes

Geological province boundary (approximate, subsurface)
Geological subprovince boundary (approximate, subsurface)
Geological belt, zone or terrane boundary (approximate, subsurface)
Fault; displacement unknown (approximate, subsurface)
Normal fault; solid circle on hanging wall (approximate, subsurface)
Thrust fault; teeth on hanging wall (approximate, subsurface)
Strike-slip fault, dextral, sinistral (approximate, subsurface); arrows indicate relative movement
Axial trace of arch, anticline (approximate, subsurface)
Axial trace of syncline (approximate, subsurface)
Correlation chart boundary (number represents column number on correlation charts) 2



METAMORPHISM

LEGEND

PHANEROZOIC
- PALEOZOIC
  - Pu — *Unmetamorphosed*
- APHEBIAN
  - NEOAPHEBIAN
    - nAu — *Unmetamorphosed to weakly metamorphosed plutonic rocks*
    - nAa — *Amphibolite facies (sillimanite mineral assemblage facies)*
  - PALEOAPHEBIAN
    - pAsgs — *Subgreenschist facies*
    - pAgs — *Greenschist facies*

PROTEROZOIC AND ARCHEAN
- NEOARCHEAN AND APHEBIAN
  - EARLY NEOARCHEAN AND PALEOAPHEBIAN
    - nĀgr /pAgs — *Granulite facies retrograded to greenschist facies*

ARCHEAN
- NEOARCHEAN
  - nĀu — *Unmetamorphosed to weakly metamorphosed plutonic rocks*
  - nĀgs — *Greenschist facies*
  - nĀgs-a — *Uppermost greenschist to lower amphibolite facies (staurolite mineral assemblage zone)*
  - nĀa — *Amphibolite facies (sillimanite mineral assemblage facies)*
  - nĀgr-e — *Granulite and eclogite facies*

Metamorphic facies contact
Unconformable contact
Intrusive contact
Fault

THE NATIONAL EARTH SCIENCE SERIES
GEOLOGICAL ATLAS
GENERAL CO-ORDINATOR: A.V. OKULITCH

MAP NN-15-G

SHEET 3

GODS LAKE

MANITOBA - ONTARIO

Scale 1:2 000 000

Kilometres 50 0 50 100 150 Kilomètres

Lambert Conformal Conic Projection
Standard Parallels 52°40'N and 55°20'N

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Sheet 3 of 4, Map NN-15-G, Phanerozoic geotectonic correlation chart, physiographic, lithotectonic and tectonostratigraphic features and metamorphism.

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1994: Geology, Gods Lake, Manitoba - Ontario. Geological Survey of Canada, Map NN-15-G, scale 1:1 000 000. (National Earth Science Series, Geological Atlas)

GEOLOGICAL SURVEY OF CANADA
COMMISSION GEOLOGIQUE DU CANADA
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