

Lithospheric evolution, thermo-tectonic history and source-rock maturation in the Gippsland Basin, Victoria, southeastern Australia

J. Röth^a, A. Parent^b, C. Warren^b, L. S. Hall^c, D. Palmowski^b, N. Koronful^b, S. S. Husein^b, V. Sachse^a, and R. Littke^a

^aInstitute of Geology and Geochemistry of Petroleum and Coal, Energy and Mineral Resources Group (EMR), RWTH Aachen University, Aachen, Germany; ^bSchlumberger GmbH, Aachen, Germany;

^cGeoscience Australia, Canberra, Australia

Joschka Röth – <https://orcid.org/0000-0003-0277-9487>

Ralf Littke – <https://orcid.org/0000-0003-0421-8720>

CONTACT Joschka Röth email joschka.roeth@rwth-aachen.de mail Institute of Geology and Geochemistry of Petroleum and Coal, Energy and Mineral Resources Group (EMR), RWTH Aachen University, Lochnerstr. 4–20, 52056 Aachen, Germany

Received 19 August 2020; accepted 25 May 2021

Editorial handling: Chris Fergusson

SUPPLEMENTARY PAPERS

Australian Journal of Earth Sciences (2020) 69(1), <https://doi.org/10.1080/08120099.2021.1938219>.

Copies of Supplementary Papers may be obtained from the Geological Society of Australia's website (www.gsa.org.au), the Australian Journal of Earth Sciences website (www.ajes.com.au) or from the National Library of Australia's Pandora archive (<https://pandora.nla.gov.au/tep/150555>).

Supplementary paper

Supplemental Table 1. Settings for thermal modelling (PetroMod crustal layer pre-processor).

Supplemental Table 2. Simulator settings.

Supplemental Table 1. Settings for thermal modelling (PetroMod crustal layer pre-processor).

Parameter	Value
Input	
Syn-rift from [Ma]	145.00
Syn-rift to [Ma]	103.00
Post-rift from [Ma]	103.00
Post-rift to [Ma]	0.00
Upper crust facies	Granite (continental)
Lower crust facies	Diorite (continental)
Upper mantle facies	Upper mantle (lithosphere)
Pre-rift thickness crust	Variable
Pre-rift thickness mantle	Variable
Stretching maps	Automatic calculation
Thermal properties	
Base temperature [°C]	1333
Stretching model	
Uniform stretching model	Off / crust and mantle decoupled
Time steps syn-rift	20
Time steps post-rift	100
Resolution (vertical cell number)	300
Stretching map sampling	
Stretching sampling factor (X)	2
Stretching sampling factor (Y)	2
Fitting	
Stretching factor precision (decimals)	2
Maximum iterations	1000
Syn-rift weight	2
Post-rift weight	5
Use syn-rift and final tectonic subsidence only	Off
Smoothing	
Filter width crust [grid points]	1
Filter width mantle [grid points]	5
Inversion routine	
Calculate strain rates	Off
Crustal thickness ratios [%]	Upper crust 50 / lower crust 50

Supplemental Table 2. Simulator settings.

Parameter	Applied value / option
Simulation method	Parallel run
Run control	
Temperature run	2D/3D temperature
Pressure run	2D/3D pressure
All time steps	Enabled
Optimisation	Use previous run (max 2)
Sampling	1 x 1
Stepsize x	582.182 m
Stepsize y	404.638 m
Output on sampled grid	
Calculation steps	10 / 10
Maximum time step duration	10 Ma
Minimum migration steps per time step	10
Number of CPU cores for parallel run	8
Migration method	Combined Darcy flow / IP
Processes and tools	
Fault method	Default settings (except for faults) Locally refined volumetric elements (LRVE)