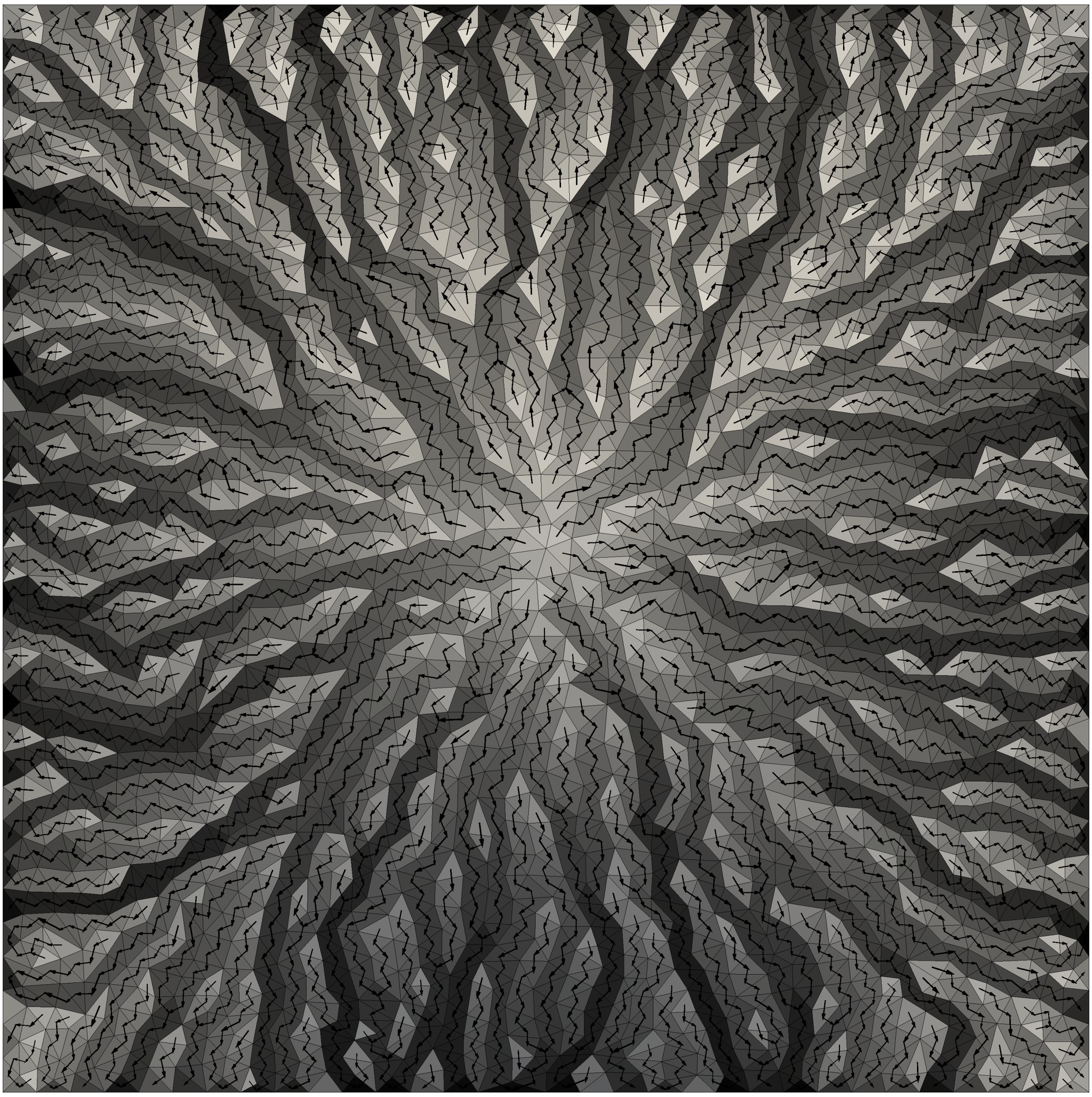

Literature

Contents

This is a *very* rough attempt at classifying my somewhat extensive bibliography per theme/topic. It goes without saying that this cannot be extensive and that since I started computational geodynamics myself around 2006. The provided lists are biaised towards the last 2 decades or so. In retrospect, the categories I have chosen could have been subdivided into narrower fields. I understand that having 100+ references for 'subduction' or 'mantle convection' is not particularly useful, but it means that all these papers show up in the bibliography section of this book, and the titles of said papers are then searchable per keyword.

Chapter 1

Review papers

- Subduction

1982 Controls of subduction geometry, location of magmatic arcs, and tectonics of (back-)arc regions [786]

1995 From the trench to the core-mantle boundary [1933]

2001 Stagnant slabs in the upper and lower mantle transition region [1166]

2001 A Review of the Role of Subduction Dynamics for Regional and Global Plate Motions [183]

2002 Subduction zones [3468]

2008 Modeling the subduction dynamics [290]

2009 Exhumation of oceanic blueschists and eclogites in subduction zones [11]

2009 A review of the role of subduction dynamics for regional and global plate motions [183]

2009 Stagnant Slab: A Review [1168]

2010 Slab dynamics in the transition zone [282]

2011 Future directions in subduction modeling [1236]

2013 Introduction to the special issue on "Subduction Zones" of Solid Earth [439]

2014 Rheological and geodynamic controls on the mechanisms of subduction and HP/UHP exhumation of crustal rocks during continental collision [483, 476]

2016 Continental versus oceanic subduction zones [4066]

2017 Subduction-transition zone interaction: A review [1305]

2018 Slab breakoff: A critical appraisal of a geological theory as applied in space and time [1204]

2018 Subduction initiation in nature and models [3471]

2021 Subduction initiation from the earliest stages to self-sustained subduction [2047]

2021 When plateau meets subduction zone: A review of numerical models [2241]

2022 Numerical modeling of subduction: State of the art and future direction [1253]

2022 The diversity of subduction zones [586]

2022 Subduction initiation triggered by collision [3962]

2023 review of the thermal structure of subduction zones [1895, 3907]

- Orogeny:

1970 Mountain Belts and the New Global Tectonics [915]

1988 Support, structure, and evolution of mountain belts [2494]

2012 Experimental modelling of orogenic wedges: A review [1359]

2012 Thermal–mechanical evolution of crustal orogenic belts at convergent plate boundaries [3723]

2013 the origin of orogens [1754]

- Mantle convection

1992 Geophysical and geochemical observations in the mantle [865]

1998 The scales of mantle convection [46]

2005 Numerical and laboratory studies of mantle convection [3539]

2008 Mantle convection: a review [2702]

2012 Dynamics and evolution of the deep mantle [3514]

2018 Crustal evolution and mantle dynamics through Earth history [2014]

2020 Mantle Convection in Terrestrial Planets [2580]

- Mantle & plates:

2003 The generation of plate tectonics from mantle convection [247]

2009 Supercontinent-superplume coupling, true polar wander and plume mobility [2181]

2011 Mantle convection models featuring plate tectonic behavior [2267]

2012 Interior dynamics and long term evolution of habitable planets [3532]

2014 Mantle dynamics in the Mediterranean [1060]

2015 Rapid Plate Motion Variations Through Geological Time [1692]

2017 A mantle convection perspective on global tectonics [716]

- Plate tectonics and/or Wilson cycle

1988 The Supercontinent Cycle [2629]

2011 Plate Tectonics, the Wilson Cycle, LLSVPs and Mantle Plumes [470]

2014 Review of Wilson Cycle plate margins [444]

2014 The supercontinent cycle [2628]

2018 The diversity of tectonic modes and thoughts about transitions between them [2104]

2019 Mantle plumes and mantle dynamics in the Wilson cycle [1538]

2019 Fifty years of the Wilson Cycle concept in plate tectonics [3910]

2019 Supercontinents: myths, mysteries, and milestones [2746]

2022 Tectonic evolution of convergent plate margins [4067]

2023 Deconstructing plate tectonic reconstructions [3279]

2023 Plate tectonics in the twenty-first century [4065]

2023 A tectonic manifesto [3469]

- Mantle structure

1986 Temperature distribution in crust and mantle [1782]

2000 Heterogeneity of the lowermost mantle [1203]

2001 5 page review of Earth's mantle structure [1525]

2002 Mantle mixing: the generation, preservation, and destruction of chemical heterogeneities [1889]

2003 Whole-mantle convection and the transition-zone water filter [248]

2007 Thermo-chemical structure of the lower mantle [909]

2012 Geophysics of Chemical Heterogeneity in the Mantle [3481]

2013 Caveats on tomographic images [1126]

2015 Thermally Dominated Deep Mantle LLSVPs: A Review [858]

2019 What lies beneath? thoughts on the lower mantle. [1537]

- Plumes

1977 Old paper with very funny cartoons [1598]

2021 Mantle plumes and their role in Earth processes [2001]

- Computational geodynamics

1997 Quantification of uncertainty in computational fluid dynamics [3051]

2000 Modelling plate tectonics and convection in the mantle [2536]

2001 Overview of numerical methods for Earth simulations [2538]

2002 Uncertainty Quantification for Multiscale Simulations [914]

2005 Numerical solution of saddle point problems [235]

2008 Recent advances in computational geodynamics: Theory, numerics and applications [1874]

2013 Overview of adaptive finite element analysis in computational geodynamics [2393]

2013 What makes computational open source software libraries successful? [138]

2014 Advances and challenges in geotectonic modelling [488]

2015 Attributes of a community computer code [752]

2015 Attributes of a community lithospheric modeling computer code [752]

2015 Moving lithospheric modeling forward: Attributes of a community computer code [752]

2017 Software and the Scientist: Coding and Citation Practices in Geodynamics [1689]

2019 Impact of Outreach through Software Citation for Community Software [1690]

2019 The Role of Scientific Communities in Creating Reusable Software [1906]

2020 On the cause of continental breakup [2668]

2022 Eighty Years of the Finite Element Method: Birth, Evolution, and Future [2231]

- Extensional systems

2016 Fault linkage and relay structures in extensional settings [1123]

2017 Rifted margin architecture and crustal rheology: Reviewing Iberia-Newfoundland, Central South Atlantic, and South China Sea [414]

2019 Rifted Margins: State of the Art and Future Challenges [2786]

2023 Geodynamics of continental rift initiation and evolution [417]

- Rheology

1983 Rheology of the lithosphere [1965]

1987 Rheology of the Lithosphere [1964] [2925]

1999 The yield stress - a review [141]

2002 The Origins of Rheology: A Short Historical Excursion [940]

2003 Modeling shear zones: solid- and fluid-thermal-mechanical approaches [2958]

2008 Rheology of the Lower Crust and Upper Mantle [469]

2008 Tectonic pressure: Theoretical concepts and modelled examples [2330]

2010 Rheology of deep upper mantle [1849]

2011 Rheology and strength of the lithosphere [489]

2012 Serpentine in active subduction zones [2992]

2014 Plate tectonics on terrestrial planets: From the view-point of mineral physics [1850]

2014 Yielding to Stress: Recent Developments in Viscoplastic Fluid Mechanics [134]

2015 Tectonic significance of serpentinites [1393]

2021 Clarification of terminology conflicts [3787]

2021 Fold geometry and folding [2591]

- Miscellaneous
  - The solid Earth's influence on sea level [731]
  - Vening Meinesz [3748]
  - The geoscience of coupled deep Earth-surface processes in Europe [678]

- The lithosphere

2005 Evolution of the continental lithosphere [3343]

2010 Lithosphere tectonics and thermo-mechanical properties: An integrated modelling approach for Enhanced Geothermal Systems exploration in Europe [679]

2013 The behavior of the lithosphere on seismic to geologic timescales [3830]

2014 Continental transforms [2677]

2017 The structural evolution of the deep continental lithosphere [751]

- Gravity & Geoid studies
  - Long wavelength gravity and topography anomalies [3829]
  - The geological significance of the geoid [583]
  - Observing Global Mass Transport to Understand Global Change and to benefit society [2732]
  - Understandin deep earth dynamics: a numerical modelling approach [3333]
  - Gravity observations and 3D structure of the Earth [3023]

- Salt tectonics
  - Salt tectonics at passive margins: Geology versus models [407]
  - The Role of Salt Tectonics in the Energy Transition [960]
- Planetary Magnetic Fields and Fluid Dynamos [1799]
- Analogue modelling: historical outline [2023]; Approaches, scaling, materials and quantification, with an application to subduction experiments [3186]
- Exhumation of (ultra-)high-pressure terranes: concepts and mechanisms [3819]
- Paradigms, new and old, for ultra-high-pressure tectonism [1430]
- The role of solid-solid phase transitions in mantle convection [1046]
- Verification, validation and confirmation of numerical models [2724]
- Experimental modelling of orogenic wedges [1359]
- Structure and dynamics of the mantle wedge [1893]
- Mountain building, observations and models of dynamic topgraphy [1104, 1053]
- Reconciling laboratory and observational models of mantle rheology in geodynamic modelling [1950]
- Controlling parameters, surface expressions and the future directions in delamination modeling [1312]
- Structural dynamics of salt systems [1730]
- Crustal versus mantle core complexes [406]
- Precambrian geodynamics: concepts and models [1254]
- A review of brittle compressional wedge models [432]
- accreted terranes: a compilation of island arcs, oceanic plateaus, submarine ridges, seamounts, and continental fragments [3574]
- Hotspot swells [1942]
- Theory of scale models as applied to the study of geologic structures [1648]
- Dynamic Topography and Ice Age Paleoclimate [2472]
- Coupled surface to deep Earth processes: Perspectives from TOPO-EUROPE with an emphasis on climate- and energy-related societal challenges [683]
- How to efficiently debug computational solid mechanics models so you can enjoy the beauty of simulations [726]

Chapter 2

Geodynamics

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2.1 Analogue modelling

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2.2 Biogeodynamic, geodynamics+biosphere

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2.28 Delamination, edge driven convection, gravitational instability, mantle unrooting, lithosphere thinning, small scale convection, drip

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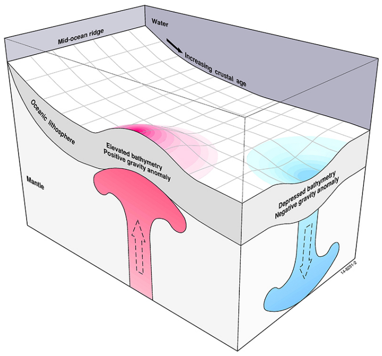

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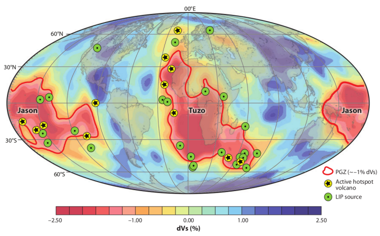
2.39 LLSVP, ULVZ, CMB layer, thermo-chemical piles, D” layer



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this should be split into oceanic, continental, 2D, 3D ... add oceanic transforms as separate topic?

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2.66 Subduction

This category should be subdivided into continental collision, subduction 2D & 3D...
needs sorting: what are the major subtopics ? plate contact/trench? bending ? angle?

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See EGU blog article: https://blogs.egu.eu/divisions/gd/2021/02/17/rayleigh-taylor-instability

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3.7 Icy satellites, icy moons

Icy moons are a class of natural satellites with surfaces composed mostly of ice. An icy moon may harbor an ocean underneath the surface, and possibly include a rocky core of silicate or metallic rocks. `https://en.wikipedia.org/wiki/Icy_moon`

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The Galilean satellites were first seen by the Italian astronomer Galileo Galilei in 1610. Io is closest, followed by Europa, Ganymede, and Callisto. It has a smooth and bright surface, with a layer of water surrounding the mantle of the planet, thought to be 100 kilometers thick.

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3.7.2 Ceres

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3.7.3 Enceladus

Enceladus is the sixth-largest moon of Saturn (19th largest in the Solar System). It is about 500 kilometers in diameter, about a tenth of that of Saturn's largest moon, Titan. Enceladus is mostly covered by fresh, clean ice, making it one of the most reflective bodies of the Solar System. https://en.wikipedia.org/wiki/Enceladus

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3.7.4 Callisto

The Galilean satellites were first seen by the Italian astronomer Galileo Galilei in 1610. Io is closest, followed by Europa, Ganymede, and Callisto (1.9 million km or 26.4 R_J from Jupiter). Callisto has the lowest mean density of all Galilean satellites.

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3.7.5 Ganymede

The Galilean satellites were first seen by the Italian astronomer Galileo Galilei in 1610. Io is closest, followed by Europa, Ganymede, and Callisto.

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3.8 Io

The Galilean satellites were first seen by the Italian astronomer Galileo Galilei in 1610. Io is closest, followed by Europa, Ganymede, and Callisto. With a diameter of 3642 kilometers, it is the fourth-largest moon in the Solar System, and is only marginally larger than Earth's moon.

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Chapter 4

Geological areas on Earth

4.1 South America, Andes, Andean orogeny

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4.2 Central America, Mexico, Guld of Mexico

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4.3 Chile Triple junction

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4.4 North America

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Chapter 5

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5.12 Lattice Boltzmann Method, Lattice Gas Automata

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2008 Ch. Huber, A. Parmigiani, B. Chopard, M. Manga, and O. Bachmann. "Lattice Boltzmann model for melting with natural convection". In: *International Journal of Heat and Fluid Flow* 29 (200), pp. 1469–1480. DOI: 10.1016/j.ijheatfluidflow.2008.05.002

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5.16 Benchmark, analytical solutions, code comparisons, methodology, num. methods, theory

this category makes little sense ... should be split? removed?

1974: Hirt *et al.* [1579]

1975: Wakiya [3771, 3772]

1984: Yuen & Sabadini [4016], Smolarkiewicz [3350]

1989: Blankenbach *et al.* [304]

1990: Travis *et al.* [3640]

1993: Lenardic & Kaula [2111]

1994: Braun & Sambridge [380]

1995: Braun & Sambridge [379], Moresi & Solomatov [2534], Fullsack [1177]

1996: [4086], [2533]

1997: [3044]

1999: [2202], [299]

2001: [2535], [1883]

2002: [2568]

2003: [3521][2528][1248][1249][3541][3229]

2004: [1870][1821][1827][2569]

2005: [2572]

2006: [1869][2554][2684][2574][3549]

2007: [3626], [627], [1866], [1860], [2531], [1238], [852], [4117]

2008: [4079][912][3656][2031][2392][1228] [3714][1531][370][812][600][3517][1687]

2009: [1937], [1212], [3727], [2907]

2010: [1865][1867][998][1936]

2011: [971][3676][1558][2573][854][2103]

2012: [771][614][2025][2390][1223][78]

2013: [631][1896][1243][1686]

2014: [3583][2394][2244][3439]

2015: [2096][3110][630][2391]

2016: [976][305]

2017: [3097][3905][2326]

2018: Meriaux *et al.* [2445], Crameri [772], Wieczorek & Meshede [3878]

2019: [2226][885][1209][1136][4001][3059]

2020: [1616][3642][1208][1740, 1741] **2021**: Clevenger & Heister [672]

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5.18 Numerical hardware, GPU

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3-642-16405-7_23
David A Sanchez, Christopher Gonzalez, David A Yuen, Grady B Wright, and Gregory A Barnett. “High rayleigh number mantle convection on GPU”. in: *GPU Solutions to Multi-scale Problems in Science and Engineering*. Springer, 2013, pp. 335–352. DOI: 10.1007/978-3-642-16405-7_22

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2015 Tuan Ta, Kyoshin Choo, Eh Tan, Byunghyun Jang, and Eunseo Choi. “Accelerating DynEarthSol3D on tightly coupled CPU–GPU heterogeneous processors”. In: *Computers & Geosciences* 79 (2015), pp. 27–37. DOI: 10.1016/j.cageo.2015.03.003

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2004 Maxwell L Rudolph, Taras V Gerya, David A Yuen, and Sara DeRosier. “Visualization of multiscale dynamics of hydrous cold plumes at subduction zones”. In: *Visual Geosci* 17 (2004), p. 59

2005 M.L. Rudolph, T.V. Gerya, and D.A. Yuen. “Challenges in the visualization of a two-dimensional mantle dynamics simulation using one billion tracers”. In: 2005, pp. 459–462. DOI: xxxx

2008 Shi Chen, Huai Zhang, David A Yuen, Shuxia Zhang, Jian Zhang, and Yaolin Shi. “Volume rendering visualization of 3D spherical mantle convection with an unstructured mesh”. In: *Visual Geosciences* 13.1 (2008), pp. 97–104
Dave R Stegman et al. “gLucifer: next generation visualization framework for high-performance computational geodynamics”. In: *Visual Geosciences* 13.1 (2008), pp. 71–84
Magali I Billen et al. “A geoscience perspective on immersive 3D gridded data visualization”. In: *Computers & Geosciences* 34.9 (2008), pp. 1056–1072. DOI: 10.1016/j.cageo.2007.11.009
B.J. Kadlec, G.A. Dorn, H.M. Tufo, and D.A. Yuen. “Interactive 3-D computation of fault surfaces using level sets”. In: *Visual Geosciences* 13.1 (2008), pp. 133–138. DOI: 10.1007/s10069-008-0016-9
Megan Damon, Masanori C Kameyama, Michael Knox, David H Porter, Dave Yuen, and Erik OD Sevre. “Interactive visualization of 3d mantle convection”. In: *Visual Geosciences* 13 (2008), pp. 49–57. DOI: 10.1007/s10069-007-0008-1
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2012 D.A. May. “Volume reconstruction of point cloud data sets derived from computational geodynamic simulations”. In: *Geochem. Geophys. Geosyst.* 13.5 (2012), Q05019. DOI: 10.1029/2012GC004170
Simon Schröder, John A Peterson, Harald Obermaier, Louise H Kellogg, Kenneth I Joy, and Hans Hagen. “Visualization of Flow Behavior in Earth Mantle Convection”. In: *IEEE Transactions on Visualization and Computer Graphics* 18.12 (2012), pp. 2198–2207. DOI: 10.1109/TVCG.2012.283

2015 Markus Wiedemann, Christoph Anthes, Hans-Peter Bunge, Bernhard SA Schuberth, and Dieter Kranzlmülle. “Transforming Geodata for Immersive Visualisation”. In: *2015 IEEE 11th International Conference on e-Science*. 2015, pp. 249–254. DOI: 10.1109/eScience.2015.80

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C Mallard, B Jacquet, and N Coltice. “ADOPT: A tool for automatic detection of tectonic plates at the surface of convection models”. In: *Geochemistry, Geophysics, Geosystems* 18.8 (2017), pp. 3197–3208

2018 Fabio Crameri. “Geodynamic diagnostics, scientific visualisation and StagLab 3.0”. In: *Geoscientific Model Development* 11.6 (2018), pp. 2541–2562

2019 C Bane Sullivan and Whitney J Trainor-Guitton. “PVGeo: an open-source Python package for geoscientific visualization in VTK and ParaView”. In: *Journal of Open Source Software* 4.38 (2019), p. 1451. DOI: 10.21105/joss.01451

2020 Fabio Crameri, Grace E. Shephard, and Philip J. Heron. “The misuse of colour in science communication”. In: *Nature Communications* 11 (2020), p. 5444. DOI: 10.1038/s41467-020-19160-7

5.20 Rheology, plasticity

Chapter 6

Codes in geodynamics

In what follows I make a quick inventory of the main codes of computational geodynamics, for crust, lithosphere and/or mantle modelling. In order to find all CIG-codes citations go to: https://geodynamics.org/cig/news/publications-refbase/

- **ABAQUS** ABAQUS code

  1988 Regenauer-Lieb and Yuen [2959]
  2000 Regenauer-Lieb and Yuen [2957]
  2001 Branlund, Regenauer-Lieb, and Yuen [361]
  2002 Gerbault, Davey, and Henrys [1225]
  2003 Funiciello, G. Morra, and Giardini [1179]
  2005 Hetzel and Hampel [1560]
  2006 Hampel and Pfiffner [1448]
  2007 Capitanio, Morra, and Goes [536]
  2008 Cailleau and Oncken [516], Maniatis and Hampel [2341]
  2009 Heidbach [1517], Maniatis, Kurfess, Hampel, and Heidbach [2340]
  2010 Capitanio, Morra, Goes, Weinberg, and Moresi [537]
  2012 Naliboff, Lithgow-Bertelloni, Ruff, and Koker [2623], Li and Hampel [2161]
  2013 So, Yuen, and Lee [3353]
  2014 Fourel, Goes, and Morra [1128]
  2015 Peters, Veveakis, Poulet, Karrech, Herwegh, and Regenauer-Lieb [2792], Hampel and Hetzel [1446], Zeumann and Hampel [4032]
  2017 Nabavi, Alavi, Mohammadi, Ghassemi, and Frehner [2590]
  2018 Nabavi, Alavi, Mohammadi, and Ghassemi [2589]
  2019 Hampel, Lüke, Krause, and Hetzel [1447]
  2020 So and Capitanio [3354]
  2021 Dielforder and Hampel [922]
  2023 Chen et al. [599]

- **ADINA** ADINA code

  2018 Zhu, Zhang, Zhu, and Guo [4104]

- **ACuTEMan** ACuTEMan code A multigrid-based mantle convection simulation code

  2005 Kameyama [1830], Kameyama, Kageyama, and Sato [1833]
  2008 Damon, Kameyama, Knox, Porter, Yuen, and Sevre [826]
  2015 Miyagoshi, Kameyama, and Ogawa [2476], Kameyama, Miyagoshi, and Ogawa [1834]
  2020 Miyagoshi, Kameyama, and Ogawa [2475]

- **Alborz-3DSCV** Alborz-3DSCV

2015 Shahnas and Peltier [3282]

2023 Shahnas and Pysklywec [3283]

- **ANSYS** ANSYS code

  – Nemčok & Henk [2639]
  – Guo *et al.* [1407]

- **ADELI** ADELI code

Belonging to the same family as the FLAC (Fast Lagrangian Analysis of Continua; Cundall and Board, 1988 [801]) and Parovoz codes (Poliakov and Podladchikov, 1992 [2850]; Gerbault *et al.* , 2009 [1231]), ADELI is based on an explicit temporal finite difference approach associated with the dynamic relaxation method (Underwood, 1983). Numerical and mechanical aspects of this code in a 2-D or 3-D context can be found in Hassani *et al.* (1997) [1498] and Chéry *et al.* (2001) [622].

https://code.google.com/archive/p/adeli/

https://code.google.com/archive/p/adeli/wikis/Publications.wiki

1996 Hassani and Chéry [1497]

1997 Hassani, Jongmans, and Chéry [1498]

1998 Huc, Hassani, and Chéry [1651]

1999 Vanbrabant, Jongmans, Hassani, and Bellino [3721]

2000 Lesne, Calais, Deverchère, Chéry, and Hassani [2139]

2001 Chéry, Zoback, and Hassani [622]

2003 Provost, Chéry, and Hassani [2869]

2004 Godard, Cattin, and Lavé [1300], Berger, Jouanne, Hassani, and Mugnier [265]

2006 Vernant and Chery [3731], Godard, Lavé, and Cattin [1301]

2008 Bonnardot, Hassani, and Tric [321] and Bonnardot, Hassani, Tric, Ruellan, and Regnier [322], Got, Monteiller, Monteux, Hassani, and Okubo [1330], Neves, Tommasi, Vauchez, and Hassani [2653]

2012 Gerbault, Cappa, and Hassani [1224], Gibert, Gerbault, Hassani, and Tric [1286]

2013 Wang, He, Ding, and Gao [3795]

2014 Cerpa, Hassani, Gerbault, and Prévost [566], Messager, Hassani, and Nivière [2449]

2015 Cerpa, Araya, Gerbault, and Hassani [564]

2018 Cerpa, Guillaume, and J.Martinod [565], Gerbault, Hassani, Lizama, and Souche [1226]

2019 Tarayoun, Mazzotti, and Gueydan [3565]

2020 Cerpa and Arcay [569]

2021 Signorelli, Hassani, Tommasi, and Mameri [3312], Cerpa et al. [572]

2022 Gerbault et al. [1233], Gerbault et al. [1233]

2023 Mameri, Tommasi, Vauchez, Signorelli, and Hassani [2329]

- Aspect ASPECT code

This code is hosted by CIG at https://geodynamics.org/cig/software/aspect/. It is an open source community code based on the finite element library deal.II [137, 65, 66]. It is massively parallel, relies on the p4est library for adaptive mesh refinement, uses the Trilinos solver library [1552], and can deal with 2D and 3D geometries.

2012 Kronbichler, Heister, and Bangerth [2030]

2015 Austermann et al. [84], Tosi et al. [3627]

2016 Dannberg and Heister [830], Gassmöller, Dannberg, Bredow, Steinberger, and Torsvik [1206], Zhang and O'Neill [4048]

2017 He, Puckett, and Billen [1509], Dannberg, Eilon, Faul, Gassmöller, Moulik, and Myhill [828], Heister, Dannberg, Gassmöller, and Bangerth [1522], Rose, Buffet, and Heister [3097], Rose and Buffett [3098], Austermann, Mitrovica, Huybers, and Rovere [83], Thieulot [3591], Bredow, Steinberger, Gassmöller, and Dannberg [384], O'Neill, Marchi, Zhang, and Bottke [2693], Takeyama, Saitoh, and Makino [3545]

2018 Dannberg and Gassmöller [829], O'Neill and Zhang [2694], Glerum, Thieulot, Fraters, Blom, and Spakman [1295] Gassmöller, Lokavarapu, Heien, Puckett, and Bangerth [1207], Perry-Houts and Karlstrom [2789], Puckett, Turcotte, He, Lokavarapu, Robey, and Kellogg [2870], Bredow and Steinberger [383], Zhang and Li [4038]

2019 Bauville and Baumann [163], Steinberger, Bredow, Lebedev, Schaeffer, and Torsvik [3449], Corti et al. [756], Liu and King [2226], Gassmöller, Lokavarapu, Bangerth, and Puckett [1209], Dannberg, Gassmöller, Grove, and Heister [834], Njinju et al. [2672], Şengül Uluocak, Pysklywec, Göğüş, and Ulugergerli [3276], Robey and Puckett [3059], Fraters, Thieulot, Berg, and Spakman [1136], Fraters, Bangerth, Thieulot, Glerum, and Spakman [1137], Lin, Xu, Sun, and Zhou [2193], Heron et al. [1548], Heron, Pysklywec, Stephenson, and Hunen [1551], Perry-Hout [2788]

2020 Gassmöller, Dannberg, Bangerth, Heister, and Myhill [1208], Farangitakis, Heron, McCaffrey, Hunen, and Kalnins [1065], Louis–Napoléon, Gerbault, Bonometti, Thieulot, Martin, and Vanderhaeghe [2258], Heyn, Conrad, and Trønnes [1564], Heyn, Conrad, and Trønnes [1565], Glerum, Brune, Stamps, and Strecker [1296], Lees, Rudge, and McKenzie [2094] Naliboff, Glerum, Brune, Péron-Pinvidic, and Wrona [2624], Citron et al. [658], Heron, Murphy, Nance, and Pysklywec [1542], O'Neill, Lowman, and Wasiliev [2681], Assanelli, Luoni, Rebay, Roda, and Spalla [79], Muluneh et al. [2576], Negredo, Mancilla, Clemente, Morales, and Fullea [2632], Lesher et al. [2137], Mitrovica et al. [2472], Withers [3913]

2021 Barrionuevo et al. [146], Bredow and Steinberger [385], Rajaonarison, Stamps, and Naliboff [2914], Saxena, Choi, Powell, and Aslam [3175], Grevemeyer, Rüpke, Morgan, Iyer, and Devey [1367], Heckenbach, Brune, Glerum, and Bott [1514], Njinju, Stamps, Neumiller, and Gallager [2671], Clevenger and Heister [672], Faccenna, Becker, Holt, and Brun [1054], Neuharth, Brune, Glerum, Heine, and Welford [2647], Comeau, Stein, Becken, and Hansen [725], Gouiza and Naliboff [1335], Sandiford, Brune, Glerum, Naliboff, and Whittaker [3158], Holt and Condit [1605], Fraters and Billen [1138], Magni, Naliboff, Prada, and Gaina [2309], Şengül Uluocak, Göğüş, Pysklywec, and Chen [3277], Richter, Brune, Riedl, Glerum, Neuharth, and Strecker [3039], Dannberg, Myhill, Gassmöller, and Cottaar [836]

2022 Thieulot and Bangerth [3594], Palmiotto, Ficini, Loreto, Muccini, and Cuffaro [2733], Behr, Holt, Becker, and Faccenna [207], O'Neill and Aulbach [2695], Zha, Lin, Zhou, Xu, and Zhang [4033], Neuharth, Brune, Glerum, Morley, Yuan, and Braun [2648], Neuharth, Brune, Wrona, Glerum, Braun, and Yuan [2649], Lundin, Doré, Naliboff, and van Wijk [2286], Heyn and Conrad [1563], Bahadori et al. [106], Liu and Yang [2220], Weerdesteijn, Conrad, and Naliboff [3836], Cloetingh, Koptev, Lavecchia, Kovács, and Beekman [682], Bahadori et al. [107], Holt [1602], Liu and King [2227], Pan, Naliboff, Bell, and Jackson [2734], Xie, Huang, and Zhang [3939], Lee, Saxena, Song, Rhie, and Choi [2093], Heilman and Becker [1520], Maestrelli, Brune, Corti, Keir, Muluneh, and Sani [2302], Dannberg, Gassmöller, Li, Lithgow-Bertelloni, and Stixrude [835], Pons, Sobolev, Liu, and Neuharth [2858]

2023 Heron, Peace, McCaffrey, Sharif, Yu, and Pysklywec [1543], Hollyday, Austermann, Lloyd, Hoggard, Richards, and Rovere [1599], Weerdesteijn et al. [3837], Changsheng, Pengchao, and Dongping [578], Zheng, Zhang, Wang, Zhang, and Shi [4064], Liu et al. [2239], Schmid, Brune, Glerum, and Schreurs [3230], Lanari et al. [2050], Monaco, Dannberg, Gassmoeller, and Pugh [2496], Phillips, Naliboff, McCaffrey, Pan, Hunen, and Froemchen [2819], He and Kapp [1507], Bodur et al. [312], Liu et al. [2229], Liu and Pysklywec [2236], Heron et al. [1549], Bodur et al. [312], Pons, Rodriguez Piceda, Sobolev, Scheck-Wenderoth, and Strecker [2857], Liu, Yang, and Qi [2221], Sandiford and Craig [3159], Neuharth and Mittelstaedt [2650], Richards, Coulson, Hoggard, Austermann, Dyer, and Mitrovica [3027], Liu, Yang, and Qi [2221], Saxena, Dannberg, Gassmöller, Fraters, Heister, and Styron [3176], Njinju, Stamps, Atekwana, Rooney, and Rajaonarison [2670], Guo, Sun, and Wei [1406], Dannberg, Chotalia, and Gassmöller [833], Steinberger, Grasnick, and Ludwig [3451],

2024 Wiel, Hinsbergen, Thieulot, and Spakman [3881], Dong et al. [939], Gea, Lis Mancilla, Negredo, and Hunen [1211]

- **BASIL & ELLE**

  From `http://homepages.see.leeds.ac.uk/~eargah/basil/`: Basil is a finite element program which calculates quantities which describe stress and strain in non-linear viscous materials, for strains up to the of order 100%. The calculations describe very viscous Earth materials which undergo irreversible large-strain deformation at high temperature and over long time periods, under the influence of body forces and surface tractions. Sybil is the post-processing program that permits basil solutions to be examined in detail using an interactive graphical user interface.

  The program permits a spatially variable Newtonian or non-Newtonian viscosity in a 2-D geometry with boundary conditions on traction and/or velocity. It is also possible to include a single fault or discontinuity in the problem in a dynamically self consistent way. The 2-D deformation field represents either plane-strain deformation, or it permits a specified distribution of normal stress in the third direction. The latter is referred to as the thin viscous sheet formulation when the normal force is due to gravity acting on variations of the layer thickness. Plane-stress calculations are a specific case of the thin viscous sheet formulation.

  The programs basil and sybil have been developed mainly at Monash University since 1988, and before that at ANU and Harvard. The present set of programs has been developed mainly by Greg Houseman, Terence Barr and Lynn Evans.

ELLE is an open-source multi-process and multi-scale software for the simulation of geologic processes, especially (but not only) during deformation and metamorphism. It is coupled to/based on BASIL. See `http://elle.ws/` for a complete list of publications.

In Barr and Houseman [143] we find in the appendix: "we use triangular elements with quadratic interpolation func- tions for velocity and linear interpolation functions", i.e. $P_2 \times P_1$ elements.

1992 Barr and Houseman [144](?)

1996 Barr and Houseman [143], Houseman and England [1618]

1997 Houseman and Gubbins [1631], Houseman and Molnar [1620], Bons, Barr, and Ten Brink [327], Neil and Houseman [2637]

2000 Houseman, Neil, and Kohler [1632]

2001 Tenczer, Stüwe, and Barr [3569], Jessell, Bons, Evans, Barr, and Stüwe [1786]

2008 Bons, Koehn, and Jessell [326]

2019 Llorens [2242]

- **BEM** Fast Multipole-accelerated Boundary Element Method Boundary Element Method BEM

Crouch, Starfield, and Rizzo [787]

Katzman *et al.* [1862]

Morra *et al.* [2553]

Morra *et al.* [2552]

Morra *et al.* [2556]

Ribe [2996]

Quevedo, Morra, and Müller [2903], Butterworth *et al.* [507], Li & Ribe [2178]

Quevedo, Hansra, Morra, Butterworth, and Müller [2902]

Di Leo *et al.* [918], Li *et al.* [2176]

Xu & Ribe [3942]

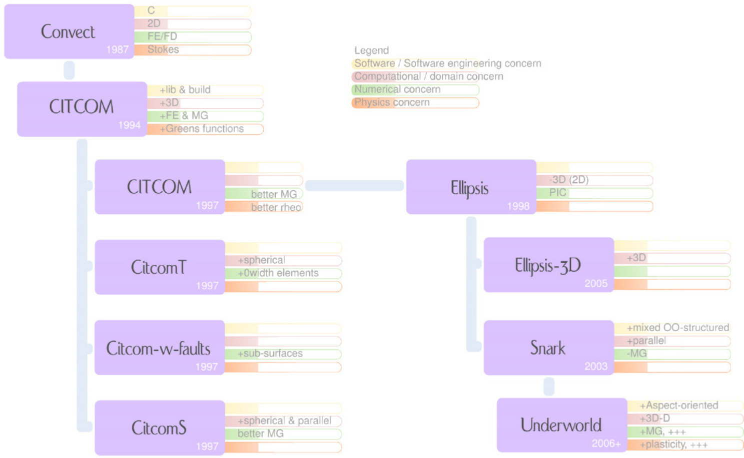
Gerardi *et al.* [1220]

- **CHIC** CHIC code

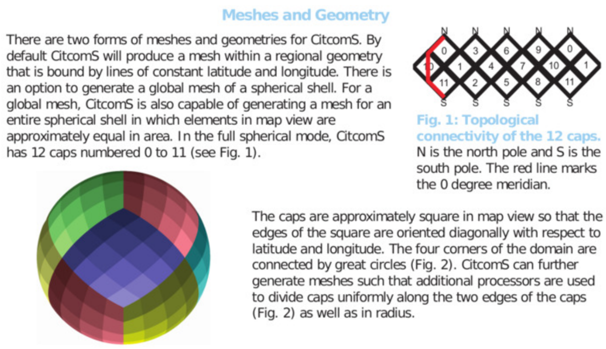
Noack, Rivoldini, and van Hoolst [2673]

- CitcomS and **CitComCU** CitComS code

Citcom (California Institute of Technology COnvection in the Mantle) was developed by Louis Moresi at the California Institute of Technology (Moresi, 1992). This code solved the equations of viscous fluid dynamics, and, as the name implies, was geared towards modelling convection in the Earth's mantle. Moresi and Solomatov (**1995**) provide a detailed description of the multigrid finite element algorithm. After this and during his time at CSIRO, Dr. Moresi modified the code to include mobile integration points. The code became a particle-in-cell finite-element code named CItcom , which was able to track and evolve material properties on particles. This work at CSIRO resulted in a new generation of the software, named Ellipsis.



Taken from a presentation give by Quenette at CIG meeting in 2009.



Taken from a poster by Tan *et al.* at Geomath, Sept. 26th, 2008.

These codes are hosted by CIG at
`https://geodynamics.org/cig/software/citcomcu/`
`https://geodynamics.org/cig/software/citcoms/`

1995 Moresi & Solomatov [2534], Moresi & Parsons [2539]

1996 Solomatov & Moresi [3375], Moresi & Gurnis [2530], Zhong & Gurnis [4085]

1997 Moresi & Lenardic [2526], Burgess *et al.* [467], Solomatov & Moresi [3384]

1998 Moresi & Solomatov [2532], Zhong *et al.* [4078], Gurnis *et al.* [1420], Reese *et al.* [2954]

1999 Moresi & Lenardic [2537], Burgess & Moresi [468], van Keken & Zhong [1885], Lenardic & Moresi [2108], Reese *et al.* [2955]

2000 Zhong *et al.* [4082], Gurnis *et al.* [1410, 1419], Lenardic *et al.* [2107], Solomatov & Moresi [3379]

2001 Billen and Gurnis [284], Lenardic and Moresi [2122], Zhong [4089]

2002 Tan, Gurnis, and Han [3551], Solomatov and Moresi [3383]

2003 Hunen and Zhong [1674], Conrad and Gurnis [738], Billen and Gurnis [285], Lenardic, Moresi, and Mühlhaus [2124], Vezolainen, Solomatov, Head, Basilevsky, and Moresi [3735], Lenardic and Moresi [2106], Billen, Gurnis, and Simons [292],

2004 Ke and Solomatov [1880], Solomatov [3371], Freeman, Moresi, and May [1145], Lenardic, Nimmo, and Moresi [2125], Cooper, Lenardic, and Moresi [749], McNamara and Zhong [2420], Vezolainen, Solomatov, Basilevsky, and Head [3734], Roberts and Zhong [3058]

2005 Hunen, Zhong, Shapiro, and Ritzwoller [1676], Billen and Hirth [286], McNamara and Zhong [2422], McNamara and Zhong [2421], Lenardic, Moresi, Jellinek, and Manga [2123], Zhong [4087]

2006 Solomatov and Barr [3373], Becker [186], Becker, Chevrot, Schulte-Pelkum, and Blackman [191], Piromallo, Becker, Funiciello, and Faccenna [2827], Tan, Choi, Thoutireddy, Gurnis, and Aivazis [3549], Zhang and Pysklywec [4039] Becker, Schulte-Pelkum, Blackman, Kellogg, and O'Connell [189], Conrad and Lithgow-Bertelloni [739], Freeman, Moresi, and May [1144], Cooper, Lenardic, and Moresi [748], Zhong [4068], Ke and Solomatov [1879], Roberts and Zhong [3056], Cooper, Lenardic, Levander, Moresi, and Benn [750]

2007 Solomatov and Barr [3374], Billen and Hirth [287], Zhong, Zhang, Li, and Roberts [4081], Manea and Gurnis [2334], Ballmer, Hunen, Ito, Tackley, and Bianco [128], Ritsema, McNamara, and Bull [3046], Moucha, Forte, Mitrovica, and Daradich [2560], Conrad, Behn, and Silver [737], Quenette, Moresi, Sunter, and Appelbe [2899], Huang and Davies [1642], Roberts and Zhong [3057]

2008 Garnero and McNamara [1202], Wijk, Hunen, and Goes [3882], Di Giuseppe, Van Hunen, Funiciello, Faccenna, and Giardini [917], Zhong, McNamara, Tan, Moresi, and Gurnis [4079], Höink and Lenardic [1591], Lenardic, Jellinek, and Moresi [2121], Liu, Spasojević, and Gurnis [2216], Chen, Zhang, Yuen, Zhang, Zhang, and Shi [600], Becker, Kustowski, and Ekström [196], Becker [200], Sleep [3342], Leng and Zhong [2128], King [1938], Liu and Gurnis [2212], Métivier and Conrad [2451], Roberts and Nimmo [3055], Spasojevic, Liu, Gurnis, and Müller [3404],

2009 Ke and Solomatov [1878], Bull, McNamara, and Ritsema [448], Spasojevic, Liu, and Gurnis [3403], Lia and Zhong [2181], Armitage, Henstock, Minshull, and Hopper [64], Naliboff, Conrad, and Lithgow-Bertelloni [2622], Zhang, Zhong, and McNarmara [4043], Andrews and Billen [49], Roberts, Lillis, and Manga [3054], Foley and Becker [1113], Burkett and Billen [471], Becker and Faccenna [183], Ballmer, Hunen, Ito, Bianco, and Tackley [127], Leng and Zhong [2127], Bower, Gurnis, Jackson, and Sturhahn [352], Zhong [4069], Conrad and Husson [734], Cooper and Conrad [746], Manea, Manea, Leeman, and Schutt [2335]

2010 Leng and Zhong [2134], Bull, McNamara, Becker, and Ritsema [447], Srámek and Zhong [3417], Wijk et al. [3886], Ballmer, Ito, Hunen, and Tackley [129], Alpert, Becker, and Bailey [41], Burkett and Billen [472], Zhang, Zhong, Leng, and Li [4042], Billen [282], Conrad and Behn [732], Jadamec and Billen [1746], Zhu, Shi, and Tackley [4110], Boschi, Faccenna, and Becker [335], Höink and Lenardic [1596], Harig, Zhong, and Simons [1489], Faccenna, Becker, Lallemand, Lagabrielle, Funiciello, and Piromallo [1050], DiCaprio, Muller, and Gurnis [921], Faccenna and Becker [1049], Ghosh, Becker, and Zhong [1278], Lassak, McNamara, Garnero, and Zhong [2063], McNamara, Garnero, and Rost [2419], Shephard, Müller, Liu, and Gurnis [3298], Spasojevic, Gurnis, and Sutherland [3401], Spasojevic, Gurnis, and Sutherland [3402]

2011 Becker and Faccenna [188], Lenardic, Moresi, Jellinek, O'Neill, Cooper, and Lee [2120], Becker and Kawakatsu [201], van Hunen and Allen [3707], Leng and Gurnis [2129], Liu and Stegman [2214], Ballmer, Ito, Hunen, and Tackley [130], Bower, Wicks, Gurnis, and Jackson [353], Trubitsyn, Evseev, Evseev, and Kharybin [3653], Obermaier, Billen, Hagen, Hering-Bertram, and Hamann [2697], Bianco, Conrad, and Smith [278], Zhang, Xing, Yuen, Zhang, and Shi [4053], DiCaprio, Gurnis, Muller, and Tan [920], Orth and Solomatov [2727], Matthews, Hale, Gurnis, Müller, and DiCaprio [2379], Tan, Leng, Zhong, and Gurnis [3554], Ramsay and Pysklywec [2920], Schaefer, Boschi, Becker, and Kissling [3178], Hinsbergen, Steinberger, Doubrovine, and Gassmöller [1574], Summeren, Conrad, and Gaidos [3500], Zhang and Zhong [4040]

2012 Arredondo and Billen [71], Jadamec and Billen [1743], Billen and Jadamec [288], Bottrill, Hunen, and Allen [342], Husson, Conrad, and Faccenna [1682], Zhong, Yuen, Moresi, and Knepley [4083], Hines and Billen [1573], Jadamec, Billen, and Kreylos [1747], Manea, Pérez-Gussinyé, and Manea [2337], Solomatov [3372], Trubitsyn [3652], Cottaar and Buffett [761], Han, Tobie, and Showman [1453], Höink, Lenardic, and Richards [1593], Husson and Conrad [1681], Liu and Stegman [2213], Miller and Becker [2458], Summeren, Conrad, and Lithgow-Bertelloni [3501], Natarov and Conrad [2630], Roberts and Arkani-Hamed [3052], Roberts and Barnouin [3053], Shephard, Liu, Müller, and Gurnis [3297], Srámek and Zhong [3418], Weller and Lenardic [3853], Zhang, Zhong, and Flowers [4041], Zahirovic, Müller, Seton, Flament, Gurnis, and Whittaker [4021], Magni, Hunen, Funiciello, and Faccenna [2305]

2013 Ballmer, Conrad, Smith, and Harmon [125], Bower, Gurnis, and Seton [350], Bower, Gurnis, and Sun [351], Jadamec, Billen, and Roeske [1744], Quéré, Lowman, Arkani-Hamed, Roberts, and Moucha [2901], Faccenna, Becker, Jolivet, and Keskin [1055], Olson, Deguen, Hinnov, and Zhong [2719], Arrial and Billen [72], Faccenna, Becker, Conrad, and Husson [1053], Conrad, Steinberger, and Torsvik [740], Burkett and Gurnis [473], Showman, Han, and Hubbard [3305], Flament, Gurnis, and Müller [1104], Conrad [731], O'Neill, Debaille, and Griffin [2687] Ghosh, Becker, and Humphreys [1275], Huang, Yang, and Zhong [1643], Key, Constable, Liu, and Pommier [1918], Summeren, Gaidos, and Conrad [3502], Magni, Faccenna, Hunen, and Funiciello [2310], Alpert, Miller, Becker, and Allam [42]

2014 Rudolph and Zhong [3113], Flament et al. [1101], Becker, Conrad, Schaeffer, and Lebedev [192], Bull, Domeier, and Torsvik [446], Kaislaniemi and Hunen [1822], Zhu [4111] Arrial, Flyer, Wright, and Kellogg [73], Wang, van Hunen, Pearson, and Allen [3784], Magni, Bouilhol, and Hunen [2308], Sekhar and King [3270], Agrusta, Hunen, and Goes [18],

2015 Wong and Solomatov [3924], Zhong and Rudolph [4094], Williams, Li, McNamara, Garnero, and Soest [3901], Ballmer, Conrad, Smith, and Johnsen [126], Bower, Gurnis, and Flament [349], Becker, Lowry, Faccenna, Schmandt, Borsa, and Yu [198], Bouilhol, Magni, Hunen, and Kaislaniemi [345], Seton, Flament, Whittaker, Müller, Gurnis, and Bower [3278], Dannberg and Sobolev [831], Hunen and Miller [1673], Wang, Huang, and Zhong [3800], Wang, van Hunen, and Pearson [3783], Wang, Agrusta, and Hunen [3782], Hassan, Flament, Gurnis, Bower, and Múller [1496], Leng and Gurnis [2131], Taramon, Rodriguez-Gonzalez, Negredo, and Billen [3564], King [1948], Wang, Huang, and Zhong [3804], Ballmer, Schmerr, Nakagawa, and Ritsema [131], Motoki and Ballmer [2559], Liu and Zhong [2233], Weller, Lenardic, and O'Neill [3855], Holt, Becker, and Buffett [1601], Holt, Buffett, and Becker [1604]

2016 Wong and Solomatov [3923] Wong and Solomatov [3925], Weller, Lenardic, and Moore [3856], Weller and Lenardic [3854], Jadamec [1742], Jadamec [1745], Fritzell, Bull, and Shephard [1155], Rodríguez-González, Billen, Negredo, and Montesi [3072], Liu and Zhong [2235], Bobrova and Baranov [308], Maunder, Hunen, Magni, and Bouilhol [2388], Li, Black, Zhong, Manga, Rudolph, and Olson [2151], Gu, Li, McCammon, and Lee [1380], Kiefer and Li [1929], McKinnon et al. [2417], Wang, Huang, Zhong, and Chen [3801], Yang and Gurnis [3973], Hu, Liu, Hermosillo, and Zhou [1639]

2017 Agrusta, Goes, and Hunen [17], Magni, Allen, Hunen, and Bouilhol [2307], Becker [190], Freeburn, Bouilhol, Maunder, Magni, and Hunen [1142], Haynie and Jadamec [1506], Faccenna, Oncken, Holt, and Becker [1059], MacDougall, Jadamec, and Fischer [2296], Ghosh, Thyagarajulu, and Steinberger [1282], Ballmer, Lourenço, Hirose, Caracas, and Nomura [133], Taposeea, Armitage, and Collier [3561], Yang, Gurnis, and Zhan [3971], Li and Zhong [2155], Holt and Becker [1603], Zhou and Liu [4098]

2018 Heyn, Conrad, and Tronnes [1562], King [1941], Riel, Capitanio, and Velic [3040], Kaislaniemi, Hunen, and Bouilhol [1823], Wang, Hunen, and Pearson [3785], Király, Holt, Funiciello, Faccenna, and Capitanio [1961], Hu, Liu, and Zhou [1640], Li, Zhong, and Olson [2147], Bellas, Zhong, Bercovici, and Mulyukova [211], Citron, Manga, and Tan [657], Trubitsyn and Evseev [3654], Trubitsyn and Trubitsyn [3651], Weller and Lenardic [3859], Yang, Gurnis, and Zahirovic [3974], Mao and Zhong [2350], Billen and Arredondo [283], Faccenna, Holt, Becker, Lallemand, and Royden [1058]

2019 Flament [1102], Maunder, Hunen, Bouilhol, and Magni [2387], Weller, Fuchs, Becker, and Soderlund [3857], Fuchs and Becker [1158], Magni [2306], Li and Zhong [2154], Ma, Liu, Gurnis, and Zhang [2294], Mao and Zhong [2348], Paul, Ghosh, and Conrad [2752], Bobrov and Baranov [307], Lenardic, Weller, Höink, and Seales [2109], Huang et al. [1641], Schliffke, Hunen, Magni, and Allen [3201], Allu Peddinti and McNamara [38], Reali, Jackson, Orman, Bower, Carrez, and Cordier [2936] Wang and Becker [3794], Trubitsyn [3650]

2020 Weller and Kiefer [3858], Briaud, Agrusta, Faccenna, Funiciello, and Hunen [396], Paul and Ghosh [2751], van den Broek, Magni, Gaina, and Buiter [3698], Hertgen, Yamato, Guillaume, Magni, Schliffke, and Hunen [1556], Lourenço and Rudolph [2262], Billen [289], Semple and Lenardic [3275], Dang, Zhang, Li, Huang, Spencer, and Liu [827], Wang and Li [3805],

2021 Cao, Flament, and Müller [529], Liu, Gurnis, Leng, Jia, and Zhan [2210], Luo and Leng [2291], Schliffke, Hunen, Gueydan, Magni, and Allen [3200], Liu, Gurnis, and Leng [2209], Manjón-Cabeza Córdoba and Ballmer [2342], Wang and Li [3806], Cao, Flament, Bodur, and Müller [528], Mao and Zhong [2349] Hu, Liu, and Gurnis [1638], Moreno and Manea [2524], Samuel, Ballmer, Padovan, Tosi, Rivoldini, and Plesa [3154], Mao and Zhong [2347]

2022 Li and McNamara [2152], Schliffke, Hunen, Allen, Magni, and Gueydan [3199], Yuan and Li [4002], Flament, Bodur, Williams, and Merdith [1103], King et al. [1955], Ronghua, Jian, and Yong [3089], Ghosh and Pal [1281], Manjón-Cabeza Córdoba and Ballmer [2343], Peng and Liu [2773], Fuchs and Becker [1163]

2023 Li [2149], Liu, Li, Zhang, and Sun [2234], Bodur and Flament [313], Hansen, Garnero, Li, Shim, and Rost [1467], Wang et al. [3803], Liu, Leng, Wang, and Zheng [2211], Zhang, Zhang, Liang, and Tokle [4054], Li [2149], Becker and Fuchs [193]

2024 Bellas-Manley and Royden [215], Lobkovsky, Baranov, Bobrov, and Chuvaev [2246]

- CitcomSVE CitComSVE code

  It is a massively parallelized finite element software package for modeling elastic and viscoelastic deformation on regional and global scales due to surface loads or tidal loads. It employs a Lagrangian deformable grid and works for 3-D Cartesian, regional spherical, and global spherical geometries, and was first developed from CitcomS It incorporates dynamic sea-level equation, degree-1 motion, true polar wander, and mantle compressibility. The package makes use of massively parallel computations that enables high resolution and efficient modeling. As these loading models share similar numerical algorithms and finite element structures to their counterparts of convection models, they are benefitted directly from new developments to convection models including non-linear rheology and parallel computing.

2003 Zhong, Paulson, and Wahr [4091]

2005 Paulson, Zhong, and Wahr [2754]

2012 Zhong, Qin, A, and Wahr [4092]

2013 Geruo, Wahr, and Zhong [1234], Zhong and Watts [4080]

2014 A, Wahr, and Zhong [1]

2016 Qin, Zhong, and Wahr [2893]

2020 Bellas, Zhong, and Watts [213]

2021 Bellas and Zhong [210], Bellas and Zhong [212]

2022 Kang, Zhong, A, and Mao [1838], Bellas, Zhong, and Watts [214], Zhong, Kang, A, and Qin [4090]

- **COMSOL** COMSOL

2008 van Keken et al. [3714]

2012 Rodriguez-González, Negredo, and Billen [3071], He [1508]

2014 Currenti and Williams [804], Paczkowski, Montési, Long, and Thissen [2731]

2015 Ratnaswamy, Stadler, and Gurnis [2934], Khaleque, Fowler, Howell, and Vynnycky [1919]

2021 Chapman [580], Trim, Butler, and Spiteri [3643], Khaleque and Motaleb [1920] Lee, Seoung, and Cerpa [2090], Dasgupta, Sen, and Mandal [841]

2023 Yoo and Lee [3983], Su [3496], Keum and So [1917]

2024 Dasgupta and Lee [840], Sagazan et al. [3138]

- **ConMan** ConMan codeSCAM code This code is hosted by CIG at `https://geodynamics.org/cig/software/conman/`

1990 King, Raefsky, and Hager [1946], King and Ritsema [1954], Gurnis [1408] Humphreys and Hager [1670], King and Hager [1940]

1991 Kellogg [1901], Lenardic, Kaula, and Bindschadler [2118]

1992 Squyres, Jankowski, Simons, Solomon, Hager, and McGill [3416], Zhong and Gurnis [4075]

1993 Kellogg and King [1902], Kiefer [1923], Lenardic and Kaula [2111] Lenardic, Kaula, and Bindschadler [2116], Zhong, Gurnis, and Hulbert [4076], Zhong and Gurnis [4071]

1994 Ita and King [1719], Farnetani and Richards [1070] Gaherty and Hager [1190], Gurnis and Torsvik [1411] King and Hager [1939], Lenardic and Kaula [2114] Lenardic and Kaula [2115] Zhong and Gurnis [4073]

1995 King and Ita [1952], King and Anderson [1943], Lenardic and Kaula [2112], Lenardic, Kaula, and Bindschadler [2117], Puster, Hager, and Jordan [2876], Puster, Jordan, and Hager [2877], Zhong and Gurnis [4074]

1996 Larson and Kincaid [2061], Lenardic and Kaula [2113], Moresi, Zhong, and Gurnis [2533]

1997 van Keken, King, Schmeling, Christensen, Neumeister, and Doin [3712], Kellogg and King [1903], Kellogg [1900], Moresi and Lenardic [2526]

1998 King and Anderson [1944], Ita and King [1720], van Keken et al. [3714], King and Anderson [1944], Lenardic [2110], Montague, Kellogg, and Manga [2504]

1999 Becker, Faccenna, O'Connell, and Giardini [184], Lenardic and Moresi [2108], Conrad and Molnar [735], Coltice and Ricard [718], Han and Gurnis [1449], Rowland and Davies [3101] Sidorin, Gurnis, and Helmberger [3310]

2000 Lenardic and Moresi [2119], Conrad [730], Montague and Kellogg [2505], Elkins-Tanton and Hager [1000], Lenardic and Moresi [2119]

2001 Conrad and Hager [733], Hunt and Kellogg [1677]

2002 Elkins-Tanton, Orman, Hager, and Grove [1002]

2003 Farnetani and Samuel [1073], Tackley and King [3521], Samuel and Farnetani [3152], Tackley and King [3521]

2004 Elkins-Tanton, Hager, and Grove [1001], Showman and Han [3304], Redmond and King [2941], Nagel, Breuer, and Spohn [2592]

2005 Koglin Jr., Ghias, King, Jarvis, and Lowman [1980], Coltice [715], Mitri and Showman [2466], Showman and Han [3303], Tan and Gurnis [3552]

2006 Naliboff and Kellogg [2619], Coltice and Schmalzl [722]

2007 Naliboff and Kellogg [2618], Davies, Davies, Hassan, Morgan, and Nithiarasu [852], Coltice, Phillips, Bertrand, Ricard, and Rey [717], Elkins-Tanton [999], Long, Hager, Hoop, and Hilst [2255], Naliboff and Kellogg [2618], Redmond and King [2940]

2008 Han and Showman [1452], Davies, Davies, Hassan, Morgan, and Nithiarasu [857]

2009 Farnetani and Hofmann [1069], Hebert, Antoshechkina, Asimow, and Gurnis [1510], King [1937], Lee and King [2087], Watters, Zuber, and Hager [3826]

2010 King et al. [1936], Conrad, Wu, Smith, Bianco, and Tibbetts [736], Han and Showman [1450], Lee and King [2088]

2011 Han and Showman [1451], Lee and King [2086]

2014 Kim and Lee [1930], Lee and Lim [2089]

2015 King, Frost, and Rubie [1945], Kim, Lee, and Kim [1931], Lim and Lee [2190]

2022 Gasc et al. [1205]

SCAM (Spherical Convection in an Axisymmetric Mantle) is a spherical, axisymmetric version of the finite element code ConMan (!). It is used in Kellogg & King (1997) [1903], King (1997) [1947], Kiefer & Kellogg (1998) [1928], Kiefer (2003)[1925], Redmond & King (2004) [2941], Li & Kiefer [2156], Kiefer & Li [1929]. Also probably [1070] and [1074].

- **ConvRS/ConvGS**

2008 Yoshida [3987]

2009 Yoshida and Nakakuki [3993]

2012 Yoshida, Tajima, Honda, and Morishige [3985], Yoshida [3986]

2013 Yoshida [3984]

2020 Yoshida, Saito, and Yoshizawa [3997]

2023 Yoshida [3988]

- Douar Douar code

2008 Braun, Thieulot, Fullsack, DeKool, and Huismans [370], Thieulot, Fullsack, and Braun [3595]

2009 Yamato, Husson, Braun, Loiselet, and Thieulot [3952]

2010 Braun and Yamato [372], Loiselet et al. [2253]

2014 Murphy, Taylor, Gosse, Silver, Whipp, and Beaumont [2585], Whipp, Beaumont, and Braun [3866]

2018 Nettesheim, Ehlers, Whipp, and Koptev [2646]

2019 Koptev, Ehlers, Nettesheim, and Whipp [2008]

2020 Schütt and Whipp [3263]

2022 Koptev, Nettesheim, and Ehlers [2009], Koptev, Nettesheim, Falkowski, and Ehlers [2010]

- Nameless code of Trompert and Hansen

  Trompert and Hansen [3648] Trompert and Hansen [3647]Trompert and Hansen [3646] Goes, Cammarano, and Hansen [1304] Loddoch, Stein, and Hansen [2248] Loddoch and Hansen [2247]Stein and Hansen [3438] Stein, Fahl, and Hansen [3436] Stein, Lowman, and Hansen [3440] Stein and Hansen [3435] Stein and Hansen [3442]

- MANDYOC MANDYOC code

  2009 **saus09**
  2017 Sacek [3135]
  2021 Salazar-Mora and Sacek [3140]
  2022 Sacek, Assunção, Pesce, and Silva [3136], Silva and Sacek [3314]

- MC3D MC3D code

  MC3D utilises a hybrid spectral finite difference scheme flow solver and a finite volume scheme for the solution of the energy equation. It was originally developed at Los Alamos in the late 1980's for Cray/Vector architecture. and later parallelized (MPI) to run on clusters (1999). MC3D is second-order accurate in time and space.

  1991 Gable, O'connell, and Travis [1186]
  1999 Lowman and Gable [2268]
  2001 Lowman, King, and Gable [2274]
  2003 Lowman, King, and Gable [2275]
  2004 Thomas, Kendall, and Lowman [3600], Lowman, King, and Gable [2273]
  2005 Koglin Jr., Ghias, King, Jarvis, and Lowman [1980]
  2007 Gait and Lowman [1192], Gait and Lowman [1191], Nettelfield and Lowman [2645], Jarvis and Lowman [1776], Lowman, Pinero-Feliciangeli, Kendall, and Shahnas [2276]
  2008 Gait, Lowman, and Gable [1193], Lowman, Gait, Gable, and Kukreja [2265]
  2010 Heron and Lowman [1550], O'Farrell and Lowman [2680]
  2011 Stein, Finnenkötter, Lowman, and Hansen [3437], Heron and Lowman [1539], Lowman, King, and Trim [2266]
  2014 Trim, Heron, Stein, and Lowman [3645]
  2015 Tosi et al. [3627], Heron, Lowman, and Stein [1541]
  2016 Trim and Lowman [3644]

- **DYNEARTHSOL** DYNEARTHSOL code

  By critically evaluating the strengths and weaknesses of the FLAC algorithm, Choi *et al.* (2013) created a new code, DynEarthSol2D, and Tan *et al.* (2013) [AGU abstract] further extended it to three dimensions, DynEarthSol3D. DynEarthSol3D (Dynamic Earth Solver in three Dimensions) is a robust, flexible, open source finite element code for modeling non-linear responses of continuous media and thus suitable for long-term tectonic modeling. `https://github.com/tan2/DynEarthSol`

  2013 Choi, Tan, Lavier, and Calo [631]
  2015 Jammes, Lavier, and Reber [1767], Ta, Choo, Tan, Jang, and Choi [3512]
  2017 Logan, Lavier, Choi, Tan, and Catania [2250]

- **GeoFEST** GeoFEST code GeoFEST (Geophysical Finite Element Simulation Tool) is a two- and three-dimensional finite element software package for the modeling of solid stress and strain in geophysical and other continuum domain applications. The physics models supported include isotropic linear elasticity and both Newtonian and power-law viscoelasticity, via implicit quasi-static time stepping. In addition to triangular, quadrilateral, tetrahedral and hexahedral continuum elements, GeoFEST supports split-node faulting, body forces, and surface tractions.

  [2742]

- **ELMER** ELMER code Elmer is an open source multiphysical simulation software mainly developed by CSC - IT Center for Science (CSC). Elmer development was started 1995 in collaboration with Finnish Universities, research institutes and industry. Elmer includes physical models of fluid dynamics, structural mechanics, electromagnetics, heat transfer and acoustics, for example. These are described by partial differential equations which Elmer solves by the Finite Element Method (FEM). `https://www.csc.fi/web/elmer`

  [2316] [2315]

- **LaCoDe** LaCoDe code

  2019 de Montserrat, Morgan, and Hasenclever [885]

  2022 Vannucchi, Clarke, Montserrat, Ougier-Simonin, Aldega, and Morgan [3724]

- **MDoodz**, Duretz code

  `https://github.com/tduretz/MDOODZ6.0`

  2012 Yamato, Tartese, Duretz, and May [3954]

  2013 Yamato, Husson, Becker, and Pedoja [3951]

  2015 Yamato, Duretz, May, and Tartese [3957]

  2016 Duretz, May, and Yamato [976], Duretz, Petri, Mohn, Schmalholz, Schenker, and Müntener [977]

  2019 Chenin, Manatschal, Decarlis, Schmalholz, Duretz, and Beltrando [611], Duretz et al. [980], Petri, Duretz, Mohn, Schmalholz, Karner, and Müntener [2799]

  2020 Poh, Yamato, Duretz, Gapais, and Ledru [2845], Bessat, Duretz, Hetényi, Pilet, and Schmalholz [267], Candioti, Schmalholz, and Duretz [526], Chenin, Schmalholz, Manatschal, and Duretz [612], Auzemery, Willingshofer, Yamato, Duretz, and Sokoutis [86]

  2021 Porkoláb, Duretz, Yamato, Auzemery, and Willingshofer [2861], Candioti, Duretz, Moulas, and Schmalholz [524], Auzemery, Willingshofer, Yamato, Duretz, and Beekman [88], Poh, Yamato, Duretz, Gapais, and Ledru [2846]

  2022 Auzemery, Yamato, Duretz, Willingshofer, Matenco, and Porkoláb [89], Yamato, Duretz, Baïsset, and Luisier [3956], Candioti, Duretz, and Schmalholz [525]

- **FEniCS** FEniCS code

  The FEniCS Project is a modern collection of open source software components directed at the automated solution of differential equations by finite element methods.

  2013 Vynnytska, Rognes, and Clark [3763]

  2014 Alisic, Rudge, Katz, Wells, and Rhebergen [29]

  2017 Jiménez, Duddu, and Bassis [1790]

  2020 Reuber and Simons [2983]

  2021 Jones, Sime, and van Keken [1803]

- **GAIA** GAIA

  2008 Hüttig and Stemmer [1687]

  2011 Tosi and Yuen [3630]

  2012 Noack, Breuer, and Spohn [2675]

  2013 Hüttig, Tosi, and Moore [1686], Plesa, Tosi, and Hüttig [2840], Noack and Breuer [2674]

  2018 Plesa et al. [2839]

  2019 Neumann [2652]

  2020 Agarwal, Tosi, Breuer, Padovan, Kessel, and Montavon [14], Schulz, Tosi, Plesa, and Breuer [3262]

- **GALE** GALE

  This code is hosted by CIG at `https://geodynamics.org/cig/software/gale/` GALE was meant to become the Citcom of Long Term Tectonics at CIG. However, the LTT group summarised its status in 2009 as follows[1]:

  > CIG LTT Failures
  > Use is very limited
  > Some technical issues
  > pressure oscilations
  > Slow UZAWA convergence
  > Some non-functional rheologies (users need to be warned!)
  > Easiest to fall back on our individual "known" codes
  > Difficulty in translating geology to/from GALE (difficult I/O interface)
  > Community engagement in development has not materialized
  > Opaque code
  > Limited time for PI's to invest in getting involved in development
  > Lack of understanding of the St. Germain infrastructure
  > Numerous tutorial workshops (focusing mainly on how to run the cookbook examples)
  > CIG rapid responses to (as yet limited) user requests for help

  Rather logically only a handful of publications were produced with this code:

  2008 Fay, Bennett, Spinler, and Humphreys [1079], Goyette, Takatsuka, Clark, Müller, Rey, and Stegman [1347]
  2010 Beutel, Wijk, Ebinger, Keir, and Agostini [275], Cruz, Malinski, Wilson, Take, and Hilley [792]
  2012 Le Pourhiet, Huet, May, Labrousse, and Jolivet [2078], Li and Qi [2167]
  2013 Arrial and Billen [72]

- **(G)TECTON** GTECTON TECTON

  1980 Melosh and Raefsky [2438]
  1981 Melosh and Raefsky [2437]
  1986 Sabadini, Yuen, and Portney [3134]
  1993 Govers and Wortel [1341]
  1995 Govers and Wortel [1342]
  1996 Gurnis, Eloy, and Zhong [1417], Giunchi, Sabadini, Boschi, and Gasperini [1292], Zhong, Gurnis, and Moresi [4077]
  1999 Govers and Wortel [1344], Furlong and Govers [1181]
  2001 Buiter, Govers, and Wortel [433], Govers and Meijer [1346]
  2002 Buiter, Govers, and Wortel [434]
  2005 Govers and Wortel [1343], Wijk [3883], Wijk and Blackman [3885]
  2006 Franco, Govers, and Wortel [1131], Liu and Bird [2238], Schmalzle, Dixon, Malservisi, and Govers [3220]
  2007 Wijk and Blackman [3884]
  2008 De Franco, Govers, and Wortel [884], De Franco, Govers, and Wortel [883]
  2009 Lafemina et al. [2043], Plattner, Malservisi, and Govers [2837]
  2010 Benthem and Govers [232], Plattner, Malservisi, Furlong, and Govers [2836]
  2011 Baes, Govers, and Wortel [98], Baes, Govers, and Wortel [99]
  2013 Plattner, Amelung, Baker, Govers, and Poland [2838], Warners-Ruckstuhl, Govers, and Wortel [3817]
  2014 Benthem, Govers, and Wortel [233]
  2015 Marketos, Govers, and Spiers [2356], Nijholt and Govers [2659]
  2016 George, Malservisi, Govers, Connor, and Connor [1218], Marketos, Spiers, and Govers [2355]
  2017 Özbakır, Govers, and Wortel [2729]

[1] `https://geodynamics.org/cig/files/2714/1158/9008/2009_CIG_Talk_-_LTTWG.pdf`

2018 Govers, Furlong, Wiel, Herman, and Broerse [1345], Nijholt, Govers, and Wortel [2660], Herman, Furlong, and Govers [1527], Barjasteh [140]

2020 Herman and Govers [1528]

- ELEFANT ELEFANT code

2015 Tosi et al. [3627], Maffione, Thieulot, Hinsbergen, Morris, Plümper, and Spakman [2303]

2016 Buiter et al. [438]

2017 Thieulot [3591], Lavecchia, Thieulot, Beekman, Cloetingh, and Clark [2068]

2018 Plunder, Thieulot, and Hinsbergen [2842]

2019 Fraters, Thieulot, Berg, and Spakman [1136]

- **ELLIPSIS** ELLIPSIS code Section 3 of [2899] presents the evolutionary path which lead to this code.

2001 Moresi, Dufour, and Mühlhaus [2535]

2003 Moresi, Dufour, and Mühlhaus [2528], Wijns, Boschetti, and Moresi [3888] Mühlhaus, Moresi, and Čada [2570], Weinberg, Moresi, and Van der Borgh [3847] O'Neill and Moresi [2691], O'Neill, Moresi, Lenardic, and Cooper [2682]

2004 Wijns [3889]

2005 Wijns, Weinberg, Gessner, and Moresi [3887], O'Neill, Moresi, and Lenardic [2690], O'Neill, Moresi, and Jaques [2692]

2006 O'Neill, Moresi, Müller, Albert, and Dufour [2684]

2007 Moresi, Quenette, Lemiale, Mériaux, Appelbe, and Mühlhaus [2531], Gessner, Wijns, and Moresi [1264] Dyksterhuis, Rey, Mueller, and Moresi [986], O'Neill, Lenardic, Moresi, Torsvik, and Lee [2689]

2008 O'Neill, Lenardic, Griffin, and O'Reilly [2685], Clark, Stegman, and Müller [669]

2009 O'Neill, Lenardic, Jellinek, and Moresi [2688], Rey, Teyssier, and Whitney [2991]

2010 Pysklywec, Ellis, and Gorman [2884]

2011 Leng and Gurnis [2129], Rey, Teyssier, Kruckenberg, and Whitney [2990]

2012 Leng, Gurnis, and Asimov [2126]

2014 Rey, Coltice, and Flament [2988], Capitanio [543](?)

2021 Zhang and Leng [4050]

2023 Zhang, Li, Leng, and Gurnis [4052], Zhang, Leng, and Chen [4051]

- FANTOM FANTOM code

2011 Thieulot [3592], Allken, Huismans, and Thieulot [36]

2012 Allken, Huismans, and Thieulot [35]

2013 Allken, Huismans, Fossen, and Thieulot [37]

2014 Erdos, huismans, Beek, and Thieulot [1024], Thieulot, Steer, and Huismans [3596]

2015 Erdos, huismans, and Beek [1023]

2018 Salazar-Mora, Huismans, Fossen, and Egydio-Silva [3139]

2019 Erdős, Huismans, and Beek [1025], Theunissen and Huismans [3578], Wolf and Huismans [3918]

2021 Erdős, Huismans, Faccenna, and Wolf [1027]

2022 Theunissen and Huismans [3579], Wolf, Huismans, Braun, and X. [3917], Erdős, Huismans, and Faccenna [1026], Theunissen, Huismans, Lu, and Riel [3580], Pichel, Huismans, Gawthorpe, Faleide, and Theunissen [2824], Pichel, Huismans, Gawthorpe, Faleide, and Theunissen [2823]

2023 Pichel, Huismans, Gawthorpe, and Faleide [2822]

2024 Lu, May, and Huismans [2283]

- FDCON FDCON

2005 Enns, Becker, and Schmeling [1022]

2012 Crameri et al. [771]

2013 Fuchs and Schmeling [1160]

2015 Fuchs, Koyi, and Schmeling [1159]

- FLUIDITY FLUIDITY code

2011 Davies, Wilson, and Kramer [854]

2012 Kramer, Wilson, and Davies [2025]

2014 Garel, Goes, Davies, Davies, Kramer, and Wilson [1199], Voci, Davies, Goes, Kramer, and Wilson [3749]

2016 Davies, Le Voci, Goes, Kramer, and Wilson [860], Jones, Davies, Campbell, Wilson, and Kramer [1801]

2017 Hedjazian, Garel, Davies, and Kaminski [1515]

2020 Alsaif, Garel, Gueydan, and Davies [43], Maunder, Prytulak, Goes, and Reagan [2386], Garel, Thoraval, Tommasi, Demouchy, and Davies [1201]

2021 Suchoy, Goes, Maunder, Garel, and Davies [3497], Knight, Davies, and Capitanio [1977], Beall, Fagereng, Huw Davies, Garel, and Rhodri Davies [165], Duvernay, Davies, Mathews, Gibson, and Kramer [984], Garel and Thoraval [1200]

2022 Cerpa, Sigloch, Garel, Heuret, Davies, and Mihalynuk [571], Chen, Davies, Goes, Suchoy, and Kramer [591], Chen, Davies, Goes, Suchoy, and Kramer [592]

2023 Pilia et al. [2826]

- **I2(3)E(L)VIS, I3MG** I2(3)(EL)VIS code

I3MG is described in the appendix of Faccenda and VanderBeek [1048] (2023).

2003 Gerya and Yuen [1248], Gerya and Yuen [1249], Gerya, Uken, Reinhardt, Watkeys, Maresch, and Clarke [1247]

2004 Gerya, Yuen, and Maresch [1250], Gerya, Yuen, and Sevre [1251], Gerya, Perchuk, Maresch, and Willner [1245], Gerya, Uken, Reinhardt, Watkeys, Maresch, and Clarke [1259]

2005 Burg and Gerya [463], Maresch and Gerya [2353], Stöckhert and Gerya [3487]

2006 Buiter et al. [431], Gerya and Stöckhert [1237], Gorczyk, Gerya, Connolly, Yuen, and Rudolph [1324], Gerya, Connolly, Yuen, Gorczyk, and Capel [1241]

2007 Gerya and Yuen [1238], Gorczyk, Gerya, Connolly, and Yuen [1323], Gerya and Burg [1239], Gorczyk, Guillot, Gerya, and Hattori [1326], Gorczyk, Willner, Gerya, Connolly, and Burg [1328]

2008 Schmeling et al. [3221], Gerya, Connolly, and Yuen [1240], Ueda, Gerya, and Sobolev [3674], Faccenda, Gerya, and Chakraborty [1043], Zhu, Gerya, Yuen, Honda, Yoshida, and Connolly [4106], Burg and Gerya [462], Castro and Gerya [560], Mishin, Gerya, Burg, and Connolly [2464], Nikolaeva, Gerya, and Connolly [2662], Gerya, Perchuk, and Burg [1263]

2009 Gerya, Fossati, Cantieni, and Seward [1242], Burg et al. [465], Lin, Gerya, Tackley, Yuen, and Golabek [2195], Faccenda, Minelli, and Gerya [1040], Li and Gerya [2180]

2010 Nikolaeva, Gerya, and Marques [2661], Baumann, Gerya, and Connolly [155], Li, Gerya, and Burg [2174], Sizova, Gerya, Brown, and Perchuk [3338]

2011 Duretz, Gerya, and May [969], Duretz, May, Gerya, and Tackley [971], Li, Xu, and Gerya [2173], Gerya [1236], Gerya and Meilick [1244], Blanco-Quintero, Gerya, Garcia-Casco, and Castro [303], Nikolaeva, Gerya, and Marques [2663], Golabek, Keller, Gerya, Zhu, Tackley, and Connolly [1316], Lin, Gerya, Tackley, Yuen, and Golabek [2196], Perchuk and Gerya [2780], Zhu, Gerya, Honda, Tackley, and Yuen [4109], Gerya [1261]

2012 Crameri et al. [771], Duretz, Gerya, Kaus, and Andersen [968], Z. Li and Gerya [4020], Faccenda, Gerya, Mancktelow, and Moresi [1044], Gorczyk, Hobbs, and Gerya [1327], Ueda, Gerya, and Burg [3673], Schenker, Gerya, and Burg [3196], Sizova, Gerya, and Brown [3337], Vogt, Gerya, and Castro [3753]

2013 Li, Xu, Gerya, and Burg [2172], Naliboff, Billen, Gerya, and saunders [2620], Malatesta, Gerya, Crispini, Federico, and Capponi [2321], Dinther, Gerya, Dalguer, Mai, Morra, and Giardini [928], Dinther, Gerya, Dalguer, Corbi, Funiciello, and Mai [927], Zhu, Gerya, Tackley, and Kissling [4107], Dymkova and Gerya [987], Gerya, May, and Duretz [1243], Marques et al. [2365], Chen, Gerya, Zhang, Zhu, Duretz, and Jacoby [596], Chen, Gerya, Zhang, Aitken, Li, and Liang [597], Duretz and Gerya [967], Castro, Vogt, and Gerya [561], Liao, Gerya, and Wang [2183], Vogt, Castro, and Gerya [3751], Gerya [1260], Gerya [1256], Mikhailov et al. [2457], Ruh, Gerya, and Burg [3119], Schubert, Driesner, Gerya, and Ulmer [3257], Agrusta, Arcay, Tommasi, Davaille, Ribe, and Gerya [19]

2014 Duretz, Gerya, and Spakman [970], Püthe and Gerya [2878], Vogt and Gerya [3750], Baitsch-Ghirardello, Gerya, and Burg [110], Liao and Gerya [2185], Sternai, Jolivet, Menant, and Gerya [3475], Manea, Leeman, Gerya, Manea, and Zhu [2336], Burov and Gerya [477], Gorczyk, Smithies, Korhonen, Howard, and Gromard [1325], Dinther, Mai, Dalguer, and Gerya [929], Marques, Cabral, Gerya, Zhu, and May [2363], Baitsch-Ghirardello, Stracke, Connolly, Nikolaeva, and Gerya [111], Golabek, Bourdon, and Gerya [1314], Gerya [1254], Gerya [1262], Gillmann and Tackley [1289], Sizova, Gerya, and Brown [3339], Li [2179]

2015 Ueda, Willett, Gerya, and Ruh [3675], Ruh, Pourhiet, Agard, Burov, and Gerya [3120], Gerya, Stern, M.Baes, Sobolev, and Whattam [1246], Ruh, Pourhiet, Agard, Burov, and Gerya [3120], Koptev, Calais, Burov, Leroy, and Gerya [2003], Herrendörfer, Dinther, Gerya, and Dalguer [1553]

2016 Koptev et al. [2005], Malatesta, Gerya, Crispini, Federico, and Capponi [2320], Sternai et al. [3478], Fischer and Gerya [1100], Mannu, Ueda, Willett, Gerya, and Strasser [2344], Huangfu, Wang, Cawood, Li, Fan, and Gerya [1646], Duretz, Agard, Yamato, Ducassou, Burov, and Gerya [966], Menant, Sternai, Jolivet, Guillou-Frottier, and Gerya [2442]

2017 Mannu, Ueda, Willett, Gerya, and Strasser [2345], Koptev, Cloetingh, Burov, Francois, and Gerya [2004], Liao and Gerya [2186], Vogt, Matenco, and Cloetingh [3754], Shi, Wei, Li, Liu, and Liu [3302], Chen, Capitanio, Liu, and Gerya [595], Liao, Wang, Gerya, and Ballmer [2188], Huangfu, Wang, Fan, Li, and Zhou [1647]

2018 Gorczyk, Mole, and Barnes [1322], Zhou, Li, Gerya, Stern, Xu, and Zhang [4100], Dal Zilio, Faccenda, and Capitanio [820], Maierová, Schulmann, and Gerya [2317], Gerya and Burov [1255], Vogt, Willingshofer, Matenco, Sokoutis, Gerya, and Cloetingh [3755], Herrendörfer, Gerya, and Dinther [1554], Dal Zilio, Dinther, Gerya, and Pranger [819], Liu et al. [2240], Liu and Li [2223], Yang, Li, Gerya, Xu, and Shi [3970]

2019 Koptev, Beniest, Jolivet, and Leroy [2002], Li, Gerya, and Connolly [2177], Dal Zilio, Dinther, Gerya, and Avouac [818], Sizova, Hauzenberger, Fritz, Faryad, and Gerya [3340], Menant, Angiboust, and Gerya [2440], Lei, Li, and Liu [2097], Gülcher, Beaussier, and Gerya [1396], Zelst, Wollherr, Gabriel, Madden, and Dinther [4031], Huangfu, Li, Fan, and Shi [1645], Zhong and Li [4096], Van Dinther, Künsch, and Fichtner [3702], Liu and Chen [2208]

2020 Baes, Sobolev, Gerya, and Brune [101], Zhou, Li, Gerya, and Stern [4101], Schierjott, Thielmann, Rozel, Golabek, and Gerya [3198], Dai et al. [817], Chowdhury, Chakraborty, Gerya, Cawood, and Capitanio [640], Ruh [3121], Menant, Angiboust, Gerya, Lacassin, Simoes, and Grandin [2441], Chen, Liu, Capitanio, Gerya, and Li [598], Munch, Gerya, and Ueda [2582], Tang, Chen, Meng, and Wu [3556], Gülcher, Gerya, Montési, and Munch [1395], Brizzi, Zelst, Funiciello, Corbi, and Dinther [400], Peral et al. [2776], Petrini, Gerya, Yarushina, Dinther, Connolly, and Madonna [2800], Perchuk, Gerya, Zakharov, and Griffin [2777], Baes, Sobolev, Gerya, and Brune [103], D'Acquisto, Dal Zilio, Molinari, Kissling, Gerya, and Dinther [811], Sternai [3476], Li et al. [2144], Yoshida, Saito, and Yoshizawa [3996], D'Acquisto, Dal Zilio, Molinari, Kissling, Gerya, and Dinther [811], Ishii and Wallis [1708]

2021 Pei, Li, and Shi [2765], Chowdhury, Chakraborty, and Gerya [639], Yan, Chen, Xiong, Wan, and Xu [3959], Qing, Liao, Li, and Gao [2894], Baes, Sobolev, Gerya, Stern, and Brune [102], Balázs et al. [123], Zhou and Wada [4102], Kerswell, Kohn, and Gerya [1916], Behr, Gerya, Cannizzaro, and Blass [206], Cui, Li, and Liu [798], Sternai et al. [3477], Perchuk, Gerya, Zakharov, and Griffin [2778], Angiboust, Menant, Gerya, and Oncken [54], Lo Bue, Faccenda, and Yang [2243], Gerya, Bercovici, and Becker [1257], Brizzi et al. [399]

2022 Zhong and Li [4097], Zakharov, Lubnina, Stepanova, and Gerya [4022], Corradino, Balazs, Faccenna, and Pepe [755], Munch, Ueda, Schnydrig, May, and Gerya [2583], Koulakov, Schlindwein, Liu, Gerya, Jakovlev, and Ivanov [2022], Yan, Chen, Zuza, Tang, Wan, and Meng [3960], Balázs, Faccenna, Gerya, Ueda, and Funiciello [121], Van Agtmaal, Van Dinther, Willingshofer, and Matenco [3687], Shen, Liao, and Zhang [3296], Liao, Li, Gao, Shen, Qing, and Wu [2187], Dong et al. [938], Jiang, Mao, and Hu [1788] Pang, Zhang, Shi, and Gerya [2739], Balázs, Gerya, May, and Tari [122]

2023 Wu, Liao, Qing, and Shen [3934], Zhong and Li [4095], Pang, Liao, Ballmer, and Li [2738], Andrić-Tomašević, Koptev, Maiti, Gerya, and Ehlers [50], Perchuk, Zakharov, Gerya, and Griffin [2779], Izumi, Hirauchi, and Yoshida [1727], Boonma, García-Castellanos, Jiménez-Munt, and Gerya [329], Liu and Gerya [2222], Stanković, Gerya, Cvetkov, and Cvetković [3424], Cheng, Zhang, Lin, Ding, and Zhang [608], Wang, Li, and Huangfu [3802], Yang, Mitchell, Spencer, Sun, Zhang, and Zhao [3967], Xue, Muirhead, Moucha, Wright, and Scholz [3944], Gülcher, Yu, and Gerya [1400], Sanhueza, Yáñez, Buck, Araya Vargas, and Veloso [3163], Faccenda and VanderBeek [1048]

2024 Xiang et al. [3938], Fu and Li [1157]

- I3MG (related to I3(EL)VIS) I3MG code

2014 Faccenda [1041]

2016 Chang, Ferreira, and Faccenda [576]

2019 Sturgeon, Ferreira, Faccenda, Chang, and Schardong [3494], Ferreira, Faccenda, Sturgeon, Chang, and Schardong [1092]

- LaMEM LaMEM code

2008 Schmeling et al. [3221]

2010 Kaus, Mühlhaus, and May [1867]

2011 Lechmann, May, Kaus, and Schmalholz [2083]

2012 May [2390]

2014 Lechmann, Schmalholz, Hetényi, May, and Kaus [2084], Collignon, Kaus, May, and fernandez [712], Baumann, Kaus, and Popov [156], Fernandez and Kaus [1084], Fernandez and Kaus [1085]

2015 Pusok and Kaus [2872], Fernandez and Kaus [1086], Collignon, Fernandez, and Kaus [711]

2016 Kaus et al. [1872], Collignon, Yamato, Castelltort, and Kaus [713]

2018 B.J.P. Kaus and Popov [93], Reuber, Kaus, Popov, and Baumann [2981], Reuber, Popov, and Kaus [2982]

2019 Eichheimer et al. [997], Howell, Olive, Ito, Behn, Escartin, and Kaus [1635], Pusok and Stegman [2873], Wang, Kaus, Zhao, Yang, and Li [3799]

2020 Eichheimer et al. [996], Spitz, Schmalholz, Kaus, and Popov [3414], Piccolo, Kaus, White, Palin, and Reuber [2821], Pusok and Stegman [2874], Yang et al. [3969], Spitz, Bauville, Epard, Kaus, Popov, and Schmalholz [3413], Reuber, Holbach, Popov, Hanke, and Kaus [2984]

2021 Sun et al. [3504]

2022 Toffol, Yang, Pennacchioni, Faccenda, and Scambelluri [3615], Almeida, Riel, Rosas, Duarte, and Kaus [39], Moulas, Kaus, and Jamtveit [2561], Pusok, Stegman, and Kerr [2875], Spang, Baumann, and Kaus [3400], Liu, Sobolev, Babeyko, and Pons [2228], Husson et al. [1685], Rojas-Agramonte et al. [3076]

2023 Gao, Chen, Yang, and Wang [1196], Riel et al. [3042], Yang, Zhao, and Li [3968]

2024 Duarte, Riel, Rosas, Popov, Schuler, and Kaus [953]

- LAPEX2D,LAPEX3D (LAgrangian Particle EXplicit, based on the prototype code PAROVOZ) LAPEX code

2005 Sobolev, Petrunin, Garfunkel, and Babeyko [3356], Babeyko and Sobolev [97], Sobolev and Babeyko [3358]

2006 Buiter et al. [431], Babeyko, Sobolev, Vietor, Oncken, and Trumbull [96], Sobolev, Babeyko, Koulakov, and Oncken [3359], Petrunin and Sobolev [2806]

2008 Petrunin and Sobolev [2802], Babeyko and Sobolev [95], Schmeling et al. [3221]

2011 Sobolev et al. [3357]

- LARGE, PyGmod PyGmod

  LARGE 0.2.0 (Lithosphere AsthenospheRe Geodynamic Evolution) is a geodynamic modelling Python package that implements a flexible and user friendly tool for the geodynamic/modelling community. It simulates 2D large scale geodynamic processes by solving the conservation equations of mass, momentum, and energy by a finite difference method with the moving tracers technique. LARGE uses advanced modern numerical libraries and algorithms but unlike common simulation code written in Fortran or C this code is written entirely in Python.

2015 Creati, Vidmar, and Sterzai [781]

2020 Creati and Vidmar [780]

- LITMOD2D/3D

2007 Afonso, Ranalli, and Fernandez [9]

2008 Afonso, Fernandez, Ranalli, Griffin, and Connolly [8]

2009 Fullea, Afonso, Connolly, Fernandez, Garcia-Castellanos, and Zeyen [1171]

2010 Fullea, Fernandez, Afonso, Verges, and Zeyen [1172]

2019 Jiménez-Munt et al. [1792]

- Mandyoc

2017 Sacek [3135]

2021 Salazar-Mora and Sacek [3140]

2022 Sacek, Assunção, Pesce, and Silva [3136], Silva and Sacek [3314]

2023 Silva, Sacek, and Silva [3313]

- MARC

1997 Negredo, Sabadini, and Giunchi [2634]

1999 Negredo, Sabadini, Bianco, and Fernandez [2633]

- **`MILAMIN, MILAMIN_VEP`** MILAMIN MILAMIN_VEP MVEP2

  MILAMIN is a finite element method implementation in native MATLAB that is capable of doing one million degrees of freedom per minute on a modern desktop computer. This includes pre-processing, solving, and post-processing. The MILAMIN strategies and package are applicable to a broad class of problems in Earth science. `http://milamin.org/`

2008 Dabrowski, Krotkiewski, and Schmid [812], Schmid, Dabrowski, and Krotkiewski [3228]

2009 Golabek, Gerya, Kaus, Ziethe, and Tackley [1313], Kaus, Liu, Becker, Yuen, and Shi [1875]

2010 Krotkiewski and Dabrowski [2032], Kaus [1865], Deubelbeiss, Kaus, and Connolly [911]

2011 Yamato, Kaus, Mouthereau, and Castelltort [3955]

2012 Gerault, Becker, Kaus, Faccenna, Moresi, and Husson [1221], Ruh, Kaus, and Burg [3123], Thielmann and Kaus [3581]

2013 Schmalholz and Podlachikov [3205]

2014 Johnson, Brown, Kaus, and VanTongeren [1794]

2015 Lu, Kaus, Zhao, and Zheng [2281], Gérault, Husson, Miller, and Humphreys [1222], Baumann and Kaus [158], Thielmann, Kaus, and Popov [3582], Mulyukova, Steinberger, Dabrowski, and Sobolev [2581]

2016 Jaquet, Duretz, and Schmalholz [1771], Marques and Kaus [2364], Cao, Kaus, and Paterson [527]

2018 Duretz, Souche, de Borst, and Le Pourhiet [975], Jaquet and Schmalholz [1772], Jaquet, Duretz, Grujic, Masson, and Schmalholz [1770], Cosentino, Morgan, and Jordan [760], Jensen [1785], Ran et al. [2921], Chenin, Schmalholz, Manatschal, and Karner [610]

2019 Siravo et al. [3336], Bauville and Baumann [163], Souche, Galland, Haug, and Dabrowski [3392], Andrés-Martínez, Pérez-Gussinyé, Armitage, and Morgan [48]

2020 Humair, Bauville, Epard, and Schmalholz [1669], Pérez-Gussinyé, Andrés-Martínez, Araújo, Xin, Armitage, and Morgan [2784]

2023 Liu, Liu, Morgan, Xu, and Chen [2215], Raghuram, Pérez-Gussinyé, Andrés-Martínez, García-Pintado, Araujo, and Morgan [2911]

- PARAVOZ/FLAMAR/FLAC FLAC PARAVOZ FLAMAR

  The FLAMAR code (Burov *et al.* , 2001) is based on the F.L.A.C. (Fast Lagrangian Analysis of Continua) algorithm developed by Cundall and Board (1988) and Cundall (1989) [802]. It is modified after the PARA(O)VOZ code from Poliakov *et al.* (1993) [2849] by several other studies such as Le Pourhiet (PhD thesis, 2004) and Yamato (PhD thesis, 2006).

  geoflac code at `https://github.com/tan2/geoflac` used in [1320]

1989 Cundall [802], Hobbs and Ord [1586]

1993 Poliakov, Cundall, Podlachikov, and Lyakhovsky [2849], Zhang, Hobbs, and Jessell [4056]

1994 Wilson and Zhang [3908]

1996 Zhang, Hobbs, Ord, and Mühlhaus [4057]

1998 Gerbault, Poliakov, and Daignieres [1228]

2000 Lavier, Buck, and Poliakov [2071]

2001 Burov, Jolivet, Le Pourhiet, and Poliakov [479], Burov and Poliakov [480]

2002 Babeyko, Sobolev, Trumbull, Oncken, and Lavier [94], Cloetingh et al. [676], Koons, Zeitler, Chamberlain, Craw, and Meltzer [1997]

2003 Hall, Gurnis, Sdrolias, Lavier, and Mueller [1438], Gerbault, Henrys, and Davey [1227], Upton, Koons, and Eberhart-Phillips [3680]

2004 Gurnis, Hall, and Lavier [1409], Gerbault and Willingshofer [1229], Toussaint, Burov, and Avouac [3634], Tirel, Brun, and Burov [3611], Cloetingh et al. [677], Toussaint, Burov, and Jolivet [3635]

2005 Burov and Guillou-Frottier [478]

2006 Burov, Watts, et al. [487], Le Pourhiet, Mattioni, and Moretti [2081], Le Pourhiet, Gurnis, and Saleeby [2080]

2007 Nagel and Buck [2593], Yamato, Agard, Burov, Pourhiet, Jolivet, and Tiberi [3947], Burov and Toussaint [481], Chemenda [588]

2008 Yamato, Burov, Agard, Le Pourhiet, and Jolivet [3949], Tirel, Brun, and Burov [3610], Burov and Yamato [482], González et al. [1321]

2009 Gerbault, Cembrano, Mpodozis, Farias, and Pardo [1231], Yamato, Husson, Braun, Loiselet, and Thieulot [3952], Burov and Cloetingh [491], Tirel, Gautier, Hinsbergen, and Wortel [3613], Yamato, Mouthereau, and Burov [3953], Bialas and Buck [277]

2010 Burov and Cloetingh [475]

2012 Angiboust, Wolf, Burov, Agard, and Yamato [53], Gerbault, Cappa, and Hassani [1224], Tan, Lavier, van Avendonk, and Heuret [3553], Guillou-Frottier et al. [1394], Gerbault [1223],

2013 Watremez et al. [3825], François, Burov, Meyer, and Agard [1133], Tirel, Brun, Burov, Wortel, and Lebedev [3612], Choi, Buck, Lavier, and Petersen [633]

2014 Francois, Burov, Agard, and Meyer [1132], Ganne, Gerbault, and Block [1195], Burov et al. [483], Burov, Francois, Yamato, and Wolf [476]

2015 Wu, Lavier, and Choi [3933], Geoffroy, Burov, and Werner [1217], Dias, Lavier, and Hayman [919]

2016 Martinod et al. [2371], Jammes and Lavier [1766]

2017 Persaud, Tan, Contreras, and Lavier [2791]

2018 Gerbault, Schneider, Reverso-Peila, and Corsini [1232]

2019 Jammes and Lavier [1764], Chenin et al. [613]

2021 Sagazan and Olive [3137]

2023 Gómez-Romeu, Jammes, Ducoux, Lescoutre, Calassou, and Masini [1320]

- PINK3D

2015 von Tscharner and Schmalholz [3757]

- PLASTI

2006 Fuller, Willett, and Brandon [1175], Fuller, Willett, Fisher, and Lu [1176]
2013 Cassola [555]
2020 Fernández-Blanco, Mannu, Bertotti, and Willett [1087]
2021 Fernández-Blanco, Mannu, Cassola, Bertotti, and Willett [1088]

- ProSpher 3D ProSpher 3D

  Spectral method for modeling mantle convection with LVV has been developed. The method is stable under high viscosity contrast (5 orders of magnitudes). Benchmarks confirm reliability of the method in application to mantle dynamics.

2013 Petrunin, Kaban, Rogozhina, and Trubitsyn [2805]
2020 Petrunin, Kaban, El Khrepy, and Al-Arifi [2803], Petrunin, Kaban, El Khrepy, and Al-Arifi [2804]

- pTatin2D/pTatin3D: A nice succinct description of the code is given in Appendix B of [2082]. pTatin3D

2013 Philippe [2811]
2014 May, Brown, and Le Pourhiet [2394]
2015 May, Brown, and Le Pourhiet [2391]
2017 Le Pourhiet, May, Huille, Watremez, and Leroy [2082], Mao, Gurnis, and May [2351]
2018 Jourdon, Le Pourhiet, Petit, and Rolland [1806], Le Pourhiet, Chamot-Rooke, Delescluse, May, Watremez, and Pubellier [2079]
2019 Jourdon, Le Pourhiet, F, and Masini [1805]
2020 Duclaux, Huismans, and May [959], Jourdon, Le Pourhiet, Mouthereau, and May [1808]
2021 Jourdon, Kergaravat, Duclaux, and Huguen [1807], Ioannidi, Le Pourhiet, Agard, Angiboust, and Oncken [1705]
2022 Larvet, Le Pourhiet, and Agard [2062], Ioannidi, Bogatz, and Reber [1704], Wolf, Huismans, Wolf, Rouby, and May [3916]

- **RBF** Radial Basis Functions

  Arrial, Flyer, Wright, and Kellogg [73]

  See also poster by Yuen

- RHEA RHEA

2008 Burstedde et al. [493]
2010 Stadler, Gurnis, Burstedde, Wilcox, Alisic, and Ghattas [3421]
2012 Alisic, Gurnis, Stadler, Burstedde, and Ghattas [28]
2013 Burstedde et al. [492]

- SAMOVAR

  Elesin, Gerya, Artemieva, and Thybo [998]

- **SANGRE** SANGRE code SANGRE stands for Stress ANalysis of Geological REgions.

  Anderson & Bridwell[45], Fleitout & Yuen [1109, 1106]

- SEPRAN SEPRAN code

  SEPRAN [3269] is a Fortran-based multi-purpose Finite Element package developed by SEPRA engineering company in cooperation with the department of applied mathematics of Delft Technical University starting in the early 1980s. The package has been used for 25 yr in the education and research program at Utrecht University and many students have used the package in their work dealing with numerical modelling in geodynamics. SEPRAN is available for a range of platforms including Linux/Unix and Microsoft Windows. It contains a mesh generator with a flexible scripting interface for general 2-D and 3-D mesh configurations.

  The package provides tools for a range of applications in science and engineering, including second order elliptic, parabolic and hyperbolic equations, suitable for mechanical problems dealing with linear elasticity and for flow problems for both incompressible and compressible viscous media.

1993 Berg, Keken, and Yuen [263]

1994 Vlaar, Keken, and Berg [3747], Keken, Yuen, and Berg [1894]

1995 Den Berg, Yuen, and Keken [892], Berg and Yuen [259]

1996 Berg and Yuen [264], Van Keken, Karato, and Yuen [3711]

1997 Van Den Berg and Yuen [3690], Keken [1886]

1998 De Smet, Berg, and Vlaar [887], Van Keken and Ballentine [3716]

1999 Smet, Berg, and Vlaar [3345]

2000 De Smet, Berg, and Vlaar [886], Van Hunen, Van Den Berg, and Vlaar [3708]

2001 Drury, Van Roermund, Carswell, De Smet, Van Den Berg, and Vlaar [947], Van Hunen, Van den Berg, and Vlaar [3709], Schott, Van den Berg, and Yuen [3236]

2002 McNamara, Keken, and Karato [2424], Ciskova, van Hunen, van den Berg, and Vlaar [656], Hunen, Berg, and Vlaar [1671], Hunen, Berg, and Vlaar [1672], Van Keken, Kiefer, and Peacock [3718], Van den Berg, Yuen, and Allwardt [3693], Schott, Van den Berg, and Yuen [3237]

2003 McNamara, Keken, and Karato [2425], Van Thienen, Van Den Berg, De Smet, Van Hunen, and Drury [3719], Van Keken, Ballentine, and Hauri [3717]

2004 Thienen, Berg, and Vlaar [3588], Thienen, Berg, and Vlaar [3586], Thienen, Vlaar, and Berg [3590], van den Berg, Yuen, and Rainey [3695], van Hunen, van den Berg, and Vlaar [3710]

2005 Thienen, Vlaar, and Berg [3589], Segal and Praagman [3269], Berg, Rainey, and Yuen [258], Lin and Keken [2200]

2006 Lin and van Keken [2198], Lin and van Keken [2199], Abers, Keken, Kneller, Ferris, and Stachnik [2]

2007 Thienen [3587], Čížková, Hunen, and van den Berg [665], Brandenburg and Keken [360], Brandenburg and Keken [359], Kneller, van Keken, Katayama, and Karato [1972]

2008 Plank and Keken [2833], Brandenburg, Hauri, Keken, and Ballentine [358], Kneller and van Keken [1973], Hunen and Berg [1675]

2009 Vatteville, van Keken, Limare, and Davaille [3726], Summerena, Berg, and Hilst [3503]

2010 Berg, Hoop, Yuen, Duchkov, Hilst, and Jacobs [257], Syracuse, Keken, and Abers [3507], Vries, Berg, and Westrenen [3760], Berg, De Hoop, Yuen, Duchkov, Hilst, and Jacobs [256], van den Berg, Yuen, Beebe, and Christiansen [3694]

2011 Keken, Hacker, Syracuse, and Abers [1888], Jacobs and van den Berg [1735], Berg, Yuen, Jacobs, and Hoop [260]

2012 Bengtson and van Keken [229], Chertova, Geenen, Berg, and Spakman [614], Van Keken, Kita, and Nakajima [3715]

2013 Androvicova, Čížková, and van den Berg [52], Čížková and Bina [660], Bossmann and Keken [339]

2014 Chertova, Spakman, Geenen, Berg, and Hinsbergen [615], Morishige and Keken [2549], Chertova, Spakman, Berg, and Hinsbergen [617]

2015 van den Berg, Segal, and Yuen [3689], Čížková and Bina [661], Morishige [2550]

2017 Ciskova, van den Berg, and Jacobs [655], Wei, Wiens, Keken, and Cai [3838]

2018 Spakman, Chertova, van den Berg, and van Hinsbergen [3395], Chertova, Spakman, and Steinberger [616]

2019 Zhao, De Vries, Berg, Jacobs, and Westrenen [4062], Berg, Yuen, Umemoto, Jacobs, and Wentzcovitch [262], Capella, Spakman, Hinsbergen, Chertova, and Krijgsman [530], Keken, Wada, Sime, and Abers [1890], Čížková and Bina [664]

2020 Morishige and Kuwatani [2547], Jones, Maguire, Keken, Ritsema, and Koelemeijer [1802]

2021 Pokornỳ, Čížková, and van den Berg [2848], Morishige and Tasaka [2548]

2023 Pokornỳ, Čížková, Bina, and Berg [2847]

- **SHELLS** SHELLS code It is a thin-shell program for modeling neotectonics of regional or global lithosphere with faults

  Kong and Bird [1988], Negredo, Bird, Sanz de Galdeano, and Buforn [2635]

- **SISTER** SISTER code

  2016 Olive, Behn, Mittelstaedt, Ito, and Klein [2714]

  2018 Weiss, Ito, Brooks, Olive, Moore, and Foster [3852]

  2021 Hamdani, Aharonov, Olive, Parez, and Gvirtzman [1444]

- **SLIM3D** SLIM3D code

  2008 Popov and Sobolev [2860]

  2010 Quinteros, Sobolev, and Popov [2908]

  2012 Brune, Popov, and Sobolev [410]

  2013 Brune, Popov, and Sobolev [411], Brune and Autin [409]

  2014 Brune [408], Heine and Brune [1521], Koopmann, Brune, Franke, and Breuer [1999], Brune, Heine, Pérez-Gussinyé, and Sobolev [415]

  2015 Clift, Brune, and Quinteros [673]

  2017 Brune, Corti, and Ranalli [413], Baes and Sobolev [105]

  2018 Baes, Sobolev, and Quinteros [104], Tutu, Steinberger, Sobolev, Rogozhina, and Popov [3672], Tutu, Sobolev, Steinberger, Popov, and Rogozhina [3671]

  2019 Sobolev and Brown [3360]

- **SLOMO** SLOMO code

  Kaus [1864] Kaus, Steedman, and Becker [1871]

- **SNAC** SNAC code SNAC (StGermaiN Analysis of Continua) is an updated Lagrangian explicit finite difference code for modeling a finitely deforming elasto-visco-plastic solid in 3D. The code is hosted at `https://geodynamics.org/cig/software/snac/` .

  Choi, Lavier, and Gurnis [634] Choi and Gurnis [632] Quenette and Lavier [2897] Choi, Seeber, Steckler, and Buck [635]

- **SPECFEM3D** SPECFEM3D code The Cartesian version simulates acoustic (fluid), elastic (solid), coupled acoustic/elastic, poroelastic or seismic wave propagation in any type of conforming mesh of hexahedra (structured or not.) It can, for instance, model seismic waves propagating in sedimentary basins or any other regional geological model following earthquakes. It can also be used for non-destructive testing or for ocean acoustics.

  It is an open source code hosted by the CIG at `https://geodynamics.org/cig/software/specfem3d/`

  Komatitsch, Tsuboi, Tromp, Levander, and Nolet [1985]

- **MICROFEM**/SOPALE MICROFEM code SOPALE code For an explanation of nested version of the numerical model, see appendix A of Wenker and Beaumont [3863].

  1993 Willett, Beaumont, and Fullsack [3893]

  1994 Willett and Beaumont [3897], Beaumont, Fullsack, and Hamilton [171], Beaumont and Quinlan [181]

  1995 Fullsack [1177], Ellis, Fullsack, and Beaumont [1007]

  1996 Beaumont, Kamp, Hamilton, and Fullsack [176], Beaumont, Ellis, Hamilton, and Fullsack [168], Waschbusch and Beaumont [3824]

  1998 Ellis, Beaumont, Jamieson, and Quinlan [1005], Jamieson, Beaumont, Fullsack, and Lee [1755], Waschbusch, Batt, and Beaumont [3823]

  1999 Willett [3896], Willett [3894], Ellis, Beaumont, and Pfiffner [1006], Ellis and Beaumont [1004], Beaumont, Ellis, and Pfiffner [169], Percival, Lucas, Jones, Beaumont, Eaton, and Rivers [2782]

2000 Pysklywec, Beaumont, and Fullsack [2882], Beaumont, Munoz, Hamilton, and Fullsack [178], Pfiffner, Ellis, and Beaumont [2809]

2001 Beaumont, Jamieson, Nguyen, and Lee [174], Pysklywec [2887]

2002 Huismans and Beaumont [1660], Pysklywec, Beaumont, and Fullsack [2881]

2003 Huismans and Beaumont [1659], Vanderhaeghe, Medvedev, Fullsack, Beaumont, and Jamieson [3722], Willett and Pope [3899], Pysklywec, Mitrovica, and Ishii [2886], Buiter and Pfiffner [436], Wissing, Ellis, and Pfiffner [3912]

2004 Beaumont, Jamieson, Nguyen, and Medvedev [175], Pysklywec and Cruden [2883], Pysklywec and Beaumont [2880], Ellis, Schreurs, and Panien [1010], Gemmer, Ings, Medvedev, and Beaumont [1214], Jamieson, Beaumont, Medvedev, and Nguyen [1757]

2005 Gemmer, Beaumont, and Ings [1213], Huismans, Buiter, and Beaumont [1663]

2006 Pysklywec [2879], Selzer [3272], Panien, Buiter, Schreurs, and Pfiffner [2740], Jamieson, Beaumont, Nguyen, and Grujic [1759], Beaumont, Nguyen, Jamieson, and Ellis [179], Culshaw, Beaumont, and Jamieson [800], Cruden, Nasseri, and Pysklywec [789]

2007 Huismans and Beaumont [1662], Currie, Beaumont, and Huismans [806], Morency, Huismans, Beaumont, and Fullsack [2522], Selzer, Buiter, and Pfiffner [3273], Buiter and Torsvik [445], Jamieson, Beaumont, Nguyen, and Culshaw [1758], Shaw and Pysklywec [3294]

2008 Selzer, Buiter, and Pfiffner [3271], Warren, Beaumont, and Jamieson [3820], Warren, Beaumont, and Jamieson [3821], Göğüş and Pysklywec [1310], Buiter, Huismans, and Beaumont [435], Huismans and Beaumont [1661], Currie, Huismans, and Beaumont [809]

2009 Keppie, Currie, and Warren [1913], Beaumont, Jamieson, Butler, and Warren [173], Buiter, Pfiffner, and Beaumont [437], Gradmann, Beaumont, and Albertz [1351], Simon, Huismans, and Beaumont [3324]

2010 Albertz, Beaumont, Shimeld, Ingsand, and Gradmann [27], Albertz and Beaumont [25], Gray and Pysklywec [1360], Pysklywec, Gogus, Percival, Cruden, and Beaumont [2885], Albertz, Beaumont, and Ings [26], Jamieson, Beaumont, Warren, and Nguyen [1761], Ings and Beaumont [1703], Ings and Beaumont [1702]

2011 Currie and Beaumont [805], Butler, Veaumont, and Jamieson [504], Huismans and Beaumont [1658], Jamieson and Beaumont [1752]

2012 Gray and Pysklywec [1361], Gray and Pysklywec [1362], Komut, Gray, Pysklywec, and Gogus [1987], Gradmann and Beaumont [1349], Jammes and Huismans [1762], Allen and Beaumont [32], Gradmann, Beaumont, and Ings [1352], Goteti, Ings, and Beaumont [1332], Beaumont and Ings [172]

2013 Butler, Beaumont, and Jamieson [502], Chenin and Beaumont [609] Fillon, Huismans, and Beek [1095], Fillon, Huismans, Beek, and Muñoz [1096] Goteti, Beaumont, and Ings [1331], Gray and Pysklywec [1363] Kneller, Albertz, Karner, and Johnson [1974], Nilfouroushan, Pysklywec, Cruden, and Koyi [2665] Krystopowicz and Currie [2033]

2014 Gogus [1309], Jammes, Huismans, and Muñoz [1763], Huismans and Beaumont [1664], Butler, Beaumont, and Jamieson [503]

2015 Allen and Beaumont [30], Butler, Beaumont, and Jamieson [501], Heron, Pysklywec, and Stephenson [1536], Currie, Ducea, DeCelles, and Beaumont [807]

2016 Liu and Currie [2225], Allen and Beaumont [31], Kelly, Butler, and Beaumont [1907], Heron, Pysklywec, and Stephenson [1547], Heron and Pysklywec [1544], Heron, Pysklywec, and Stephenson [1546]

2017 Butler and Beaumont [500], Gradmann and Beaumont [1350]

2018 Wenker and Beaumont [3863], Wenker and Beaumont [3862], Heron, Pysklywec, and Stephenson [1545]

2020 Li et al. [2168], Beucher and Huismans [271], Kelly, Beaumont, and Butler [1908]

2021 Gün, Pysklywec, Göğüş, and Topuz [1401], Lu and Huismans [2282], Wang, Currie, and DeCelles [3786]

2022 Gün, Pysklywec, Göğüş, and Topuz [1403], Kelly, Beaumont, and Jamieson [1909]

- **STAG3D/StagYY** STAG3D code STAGYY code

1994 Tackley [3520]

1995 Schubert and Tackley [3251]

1996 Tackley [3515], Tackley [3525]

1998 Moore, Schubert, and Tackley [2513], Thompson and Tackley [3602]

2000 Tackley [3519], Tackley [3524], Tackley [3527], Tackley [3529]

2001 Tackley [3522]

2002 Farnetani, Legras, and Tackley [1072], Tackley [3528], Tackley and Xie [3538]

2003 Tackley and Xie [3541]

2004 Xie and Tackley [3941], Xie and Tackley [3940], Nakagawa and Tackley [2599], Nakagawa and Tackley [2608] Nakagawa and Tackley [2601], Schubert, Masters, Olson, and Tackley [3255], Yoshida and Ogawa [3995]

2005 Grigné, Labrosse, and Tackley [1373], Farnetani and Samuel [1071] Nakagawa and Tackley [2598], Nakagawa and Tackley [2607] Nakagawa and Buffett [2596], Yoshida and Ogawa [3994]

2006 Mittelstaedt and Tackley [2474]

2007 Grigné, Labrosse, and Tackley [1374], Grigné, Labrosse, and Tackley [1375], Hernlund and Tackley [1532], Tackley, Nakagawa, and Hernlund [3534]

2008 Deschamps and Tackley [906], Hernlund, Tackley, and Stevenson [1533] Hernlund and Tackley [1531], Samuel and Tackley [3150] Nakagawa and Tackley [2606], Tackley [3517], Van Heck and Tackley [3703]

2009 Deschamps and Tackley [907], Nakagawa, Tackley, Deschamps, and Connolly [2610], Keller and Tackley [1899]

2010 Deschamps, Tackley, and Nakagawa [908], Nakagawa and Tackley [2604] Morishige, Honda, and Tackley [2546], Samuel, Tackley, and Evonuk [3151], Nakagawa, Tackley, Deschamps, and Connolly [2611]

2011 Rolf and Tackley [3079], Golabek, Keller, Gerya, Zhu, Tackley, and Connolly [1316], Cammarano, Tackley, and Boschi [519] Nakagawa and Tackley [2600], Deschamps, Kaminski, and Tackley [899]

2012 Rolf, Coltice, and Tackley [3077], Crameri, Tackley, Meilick, Gerya, and Kaus [770], Coltice, Seton, Rolf, Müller, and Tackley [723], Deschamps, Yao, Tackley, and Sanchez-Valle [910], Deschamps, Cobden, and Tackley [898], Armann and Tackley [63], Nakagawa, Tackley, Deschamps, and Connolly [2612], Ulvrová, Labrosse, Coltice, Råback, and Tackley [3678]

2013 Ruedas, Tackley, and Solomon [3118], Ruedas, Tackley, and Solomon [3117], Tackley, Ammann, Brodholt, Dobson, and Valencia [3531], Nakagawa and Tackley [2602], Moore and Webb [2515], Morishige and Honda [2551]

2014 Yao, Deschamps, Lowman, Sanchez-Valle, and Tackley [3980], Crameri and Tackley [768], Leone, Tackley, Gerya, May, and Zhu [2135], Rolf, Coltice, and Tackley [3081], Coltice, Rolf, and Tackley [714], Bello, Coltice, Rolf, and Tackley [217], Li, Deschamps, and Tackley [2164], Rozel, Besserer, Golabek, Kaplan, and Tackley [3106], Nakagawa and Tackley [2603]

2015 Bello, Coltice, Tackley, Müller, and Cannon [218], Deschamps, Li, and Tackley [901], Li, Deschamps, and Tackley [2163], Nakagawa, Nakakuki, and Iwamori [2597], Petersen, Stegman, and Tackley [2796]

2016 Sim, Stegman, and Coltice [3317], Crameri and Tackley [769], Atkins, Valentine, Tackley, and Trampert [81], Kankanamge and Moore [1839]

2017 Coltice, Gerault, and Ulvrova [716], Petersen, Stegman, and Tackley [2797], Rozel, Golabek, Jain, Tackley, and Gerya [3107], Ballmer, Houser, Hernlund, Wentzcovitch, and Hirose [132], Patočka, Čadek, Tackley, and Čížková [2749], Crameri, Lithgow-Bertelloni, and Tackley [776], Ruedas and Breuer [3116]

2018 Guerrero, Lowman, Deschamps, and Tackley [1383], Coltice and Shephard [724], Bocher, Fournier, and Coltice [310], Coltice, Larrouturou, Debayle, and Garnero [720], Arnould, Coltice, Flament, Seigneur, and Müller [68], Crameri [772], Crameri and Lithgow-Bertelloni [775], Langemeyer, Lowman, and Tackley [2053], Deschamps, Rogister, and Tackley [902], Rolf, Steinberger, Sruthi, and Werner [3082], Rolf and Pesonen [3078], Rolf, Capitanio, and Tackley [3080], Khan et al. [1921], Furst, Peyret, Chery, and Mohammadi [1182]

2019 Guerrero, Lowman, and Tackley [1384], Arnould, Ganne, Coltice, and Feng [70], Deschamps and Li [900], Patočka, Čížková, and Tackley [2750], Coltice, Husson, Faccenna, and Arnould [719], Crameri, Conrad, Montési, and Lithgow-Bertelloni [774], Ulvrova, Coltice, Williams, and Tackley [3677], Gillooly, Coltice, and Wolf [1290], Jain, Rozel, and Tackley [1749], Jain, Rozel, Tackley, Sanan, and Gerya [1750]

2020 Langemeyer, Lowman, and Tackley [2052], Gülcher, Gebhardt, Ballmer, and Tackley [1398], Yan, Ballmer, and Tackley [3958], Arnould, Coltice, Flament, and Mallard [69], Ribe, Tackley, and Sanan [3011], Grima, Lithgow-Bertelloni, and Crameri [1377], Schierjott, Rozel, and Tackley [3197], Lourenço, Rozel, Ballmer, and Tackley [2260], Bolrão et al. [319], Karlsson, Cheng, Crameri, Rolf, Uppalapati, and Werner [1854], Uppalapati, Rolf, Crameri, and Werner [3679]

2021 Rodriguez, Arnould, Coltice, and Soret [3067], Langemeyer, Lowman, and Tackley [2051], Meier, Bower, Lichtenberg, Tackley, and Demory [2434], Guerrero, Lowman, and Tackley [1382], Gülcher, Ballmer, and Tackley [1397]

2022 Li et al. [2166], Huang, Li, and Zhao [1644], Adams, Stegman, Smrekar, and Tackley [7], Basu Sarkar and Moore [151], Langemeyer, Lowman, and Tackley [2054], Gülcher, Golabek, Thielmann, Ballmer, and Tackley [1399], Borgeat and Tackley [331]

2023 Qu, Zhu, Ji, Xie, Zeng, and Zhang [2895], Tian, Tackley, and Lourenço [3606], Li, Zhang, Li, Shi, and Zhao [2165], Adams, Stegman, Mohammadzadeh, Smrekar, and Tackley [6], Guerrero, Deschamps, Li, Hsieh, and Tackley [1385]

- **StreamV** StreamV code

  Samuel [3153] Salvador and Samuel [3145]

- **SubMar** SubMar code

2006 Marotta, Spelta, and Rizzetto [2358]

2007 Marotta and Spalla [2357]

2010 Roda, Marotta, and Spalla [3063]

2012 Roda, Spalla, and Marotta [3065]

2013 Regorda, Marotta, and Spalla [2964]

2017 Regorda, Roda, Marotta, and Spalla [2968]

2018 Marotta, Roda, Conte, and Spalla [2360]

2019 Roda, Regorda, Spalla, and Marotta [3064]

2020 Roda, Zucali, Regorda, and Spalla [3066], Regorda, Lardeaux, Roda, Marotta, and Spalla [2967]

2021 Regorda, Spalla, Roda, Lardeaux, and Marotta [2969]

2022 Bollino, Regorda, Sabadini, and Marotta [318]

- SULEC SULEC code

  https://www.susannebuiter.eu/sulec.html

  SULEC is a 2D/3D arbitrary Lagrangian Eulerian finite-element code developed by Susanne Buiter and Susan Ellis. It solves the equation for conservation of momentum for an incompressible fluid combined with the heat equation. Pressure is calculated as mean stress following an Uzawa iterative penalty formulation (Pelletier *et al.* (1989) [2766]). Materials are tracked with tracers which are advected with a 2nd-order Runge-Kutta scheme. A true free surface is obtained by a slight vertical stretch of the Eulerian mesh to accommodate surface displacements and the effects of surface processes (Fullsack **1995**[1177]). SULEC includes a stabilization term that suppresses numerical overshoot of isostatic restoring forces at interfaces with strong density contrasts (Kaus *et al.* (**2010**) [1867]; Quinquis *et al.* (**2011**) [2906]). The mechanical and thermal equations are solved using the direct sparse solver PARDISO (Schenk and Gaertner (twothousandfour) [3195]).

  Not completely up to date (see website)

  2011 Quinquis, Buiter, and Ellis [2906], Ellis, Little, Wallace, Hacker, and Buiter [1008]

  2012 Buiter [432], Tetreault and Buiter [3572], Crameri et al. [771], Grigull, Ellis, Little, Hill, and Buiter [1376]

  2013 Ghazian and Buiter [1267]

  2014 Ghazian and Buiter [1268], Quinquis and Buiter [2905]

  2015 Naliboff and Buiter [2617]

  2016 Zwaan, Scheurs, Naliboff, and Buiter [4124], Ellis, Williams, Ristau, Reyners, Eberhart-Phillips, and Wallace [1003]

  2017 Naliboff, Buiter, Péron-Pinvidic, Osmundsen, and Tetreault [2621]

  2018 Tetreault and Buiter [3573], Fagereng, Diener, Ellis, and Remitti [1063], Webber, Ellis, and Fagereng [3834]

  2019 Ellis, Ghisetti, Barnes, Boulton, Fagereng, and Buiter [1009], Biemiller, Ellis, Mizera, Little, Wallace, and Lavier [279]

  2020 Peron-Pinvidic and Naliboff [2787]

  2020 Peron-Pinvidic, Fourel, and Buiter [2785]

- **TDPOIS** TDPOIS code

  The numerics are explained in [1629] and the theory in [1621].

  1987 Houseman [1629]

  1990 Houseman [1621] Houseman [1622]

  1995 Schmalzl, Houseman, and Hansen [3219] (check when I have access to pdf)

  1996 Schmalzl, Houseman, and Hansen [3218]

  2002 Schmalzl, Breuer, and Hansen [3216]

  2004 Schmalzl, Breuer, and Hansen [3215]

  2006 Coltice and Schmalzl [722]

- **TERRA** TERRA code The computational grid is based on a projection of the regular icosahedron onto a sphere and successive dyadic refinements, see Baumgardner and Frederickson [160]. Concentric copies of such spherical layers of nodes build the domain in radial direction. The first main improvement was being parallelised Bunge and Baumgardner [456]. Particles were added in Stegman, Richards, and Baumgardner [3433].

  1983 Baumgardner [161]

  1985 Baumgardner [159]

  1988 Glatzmaier [1293]

  1993 Tackley, Stevenson, Glatzmaier, and Schubert [3536]

  1994 Tackley, Stevenson, Glatzmaier, and Schubert [3537]

  1995 Bunge and Baumgardner [456]

  1996 Bunge and Richards [458]

1997 Bunge, Richards, and Baumgardner [453], Yang [3978]

1998 Bunge, Richards, Lithgow-Bertelloni, Baumgardner, Grand, and Romanowicz [452]

1999 Tackley, Baumgardner, Glatzmaier, Olson, and Clune [3533], Richards, Bunge, Ricard, and Baumgardner [3028], Reese, Solomatov, Baumgardner, and Yang [2951]

2001 Bunge and Davies [450], Bunge, Ricard, and Matas [451], Davies and Bunge [875]

2002 Bunge, Richards, and Baumgardner [455], Stegman, Richards, and Baumgardner [3433]

2003 Bunge, Hagelberg, and Travis [457], Stegman, Jellinek, Zatman, Baumgardner, and Richards [3432]

2004 Reese, Solomatov, Baumgardner, Stegman, and Vezolainen [2950], Walzer, Hendel, and Baumgardner [3781]

2005 Reese, Solomatov, and Baumgardner [2948], Phillips and Bunge [2814], Fukao et al. [1169]

2006 Davies and Bunge [874], Gottschaldt, Walzer, Hendel, Stegman, Baumgardner, and Mühlhaus [1333]

2007 Phillips and Bunge [2815]

2008 Heidbach, Iaffaldano, and Bunge [1518], Shahnas, Lowman, Jarvis, and Bunge [3281], Walzer and Hendel [3777]

2009 Phillips, Bunge, and Schaber [2816], Wolstencroft, Davies, and Davies [3921], Gottschaldt, Walzer, Stegman, Baumgardner, and Mühlhaus [1334], Iaffaldano and Bunge [1693], Schaber, Bunge, Schuberth, Malservisi, and Horbach [3177], Schuberth, Bunge, Steinle-Neumann, Moder, and Oeser [3259], Schuberth, Bunge, and Ritsema [3258], Oeser, Bunge, Mohr, and Igel [2699], Davies and Davies [856]

2010 Yanagisawa, Yamagishi, Hamano, and Stegman [3961]

2011 Wolstencroft and Davies [3920], Iaffaldano, Husson, and Bunge [1698]

2012 Davies, Goes, Davies, Schuberth, Bunge, and Ritsema [851], Shephard et al. [3299]

2013 Davies, Davies, Bollada, Hassan, Morgan, and Nithiarasu [853], O'Farrell, Lowman, and Bunge [2679], Walzer and Hendel [3778]

2014 Butterworth et al. [506]

2015 Amodeo, Schuberth, Bunge, Carrez, and Cordier [44], Colli, Bunge, and Schuberth [707]

2016 Heck, Davies, Elliott, and Porcelli [1512], Nerlich, Colli, Ghelichkhan, Schuberth, and Bunge [2643], Price [2866]

2017 Wolstencroft and Davies [3922], Barry et al. [147], Rubey, Brune, Heine, Davies, Williams, and Müller [3109], Walzer and Hendel [3775]

2018 Ghelichkhan and Bunge [1270], Colli, Ghelichkhan, Bunge, and Oeser [709], Price and Davies [2868]

2019 Price, Davies, and Panton [2867]

2020 Colli, Bunge, and Oeser [706]

2021 Ghelichkhan, Bunge, and Oeser [1269]

2022 Lin, Colli, and Wu [2191], Brown, Colli, and Bunge [403]

2023 Taiwo, Bunge, Schuberth, Colli, and Vilacis [3543], Panton, Davies, and Myhill [2741]

- **`TERRA-NEO`** TERRA-NEO

2015 Gmeiner, Rüde, Stengel, Waluga, and Wohlmuth [1299], Weismüller et al. [3851]

2020 Bauer et al. [154]

- **`TerraFERMA`** TerraFERMA code TerraFERMA is the Transparent Finite Element Rapid Model Assembler, a software system for the rapid and reproducible construction and exploration of coupled multi-physics models.

  TerraFERMA leverages three advanced open-source libraries for scientific computation that provide high level problem description (FEniCS), composable solvers for coupled multi-physics problems (PETSc) and a science neutral options handling system (SPuD) that allows the hierarchical management of all model options.

  TerraFERMA inherits most of its functionality from the underlying libraries but adds a layer of control and guidance for building reusable and reproducible applications.

  `http://terraferma.github.io/`

2014 Wilson, Spiegelman, Keken, and Hacker [3906]

2016 Spiegelman, May, and Wilson [3409]

2017 Wilson, Spiegelman, and Keken [3905], Cerpa, Wada, and Wilson [568]

2019 Cerpa, Wada, and Wilson [567], Perry-Hout [2788]

2020 Sim, Spiegelman, Stegman, and Wilson [3316], Abers, Keken, and Wilson [3]

2022 Cerpa, Arcay, and Padrón-Navarta [573]

- **YACC** YACC code This stands for 'Yet Another Convection Code'.

2010 Tosi, Yuen, and Čadek [3631]

2011 Yuen, Tosi, and Čadek [4018]

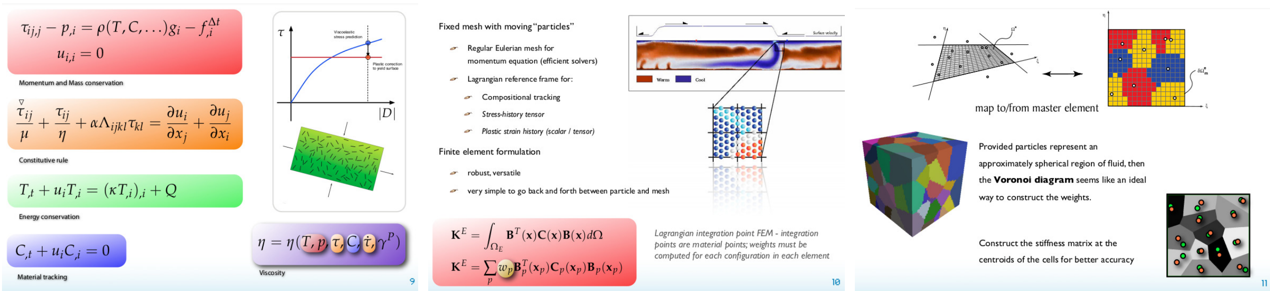
2012 Samuel and Tosi [3155]

2013 Tosi, Yuen, Koker, and Wentzcovitch [3632]

2015 Tosi et al. [3627]

2016 Tosi, Maierová, and Yuen [3625]

- **UNDERWORLD 1&2** Underworld code Section 3 of [2899] presents the evolutionary path which lead to this code. Also check [2346] for Underworld2.



Taken from a presentation by L. Moresi

2006 Stegman, Freeman, Schellart, Moresi, and May [3429], Moresi and Mühlhaus [2525]

2007 Moresi, Quenette, Lemiale, Mériaux, Appelbe, and Mühlhaus [2531], Schellart, Freeman, Stegman, Moresi, and May [3183], Quenette, Moresi, Sunter, and Appelbe [2899]

2008 Lemiale, Mühlhaus, Moresi, and Stafford [2101], OzBench et al. [2730], Goyette, Takatsuka, Clark, Müller, Rey, and Stegman [1347], Stegman et al. [3434], Schellart, Stegman, Farrington, and Moresi [3193]

2009 Stegman, Freeman, and May [3431]

2010 Capitanio, Stegman, Moresi, and Sharples [534], Mason, Moresi, Betts, and Miller [2373], Stegman, Schellart, and Freeman [3430], Stegman, Farrington, Capitanio, and Schellart [3428], Farrington, Stegman, Moresi, Sandiford, and May [1076], Capitanio, Zlotnik, and Faccenna [535]

2011 Mériaux, Mansour, Moresi, Kerr, and May [2446], Capitanio, Faccenna, Zlotnik, and Stegman [532], Lev and Hager [2140]

2012 Capitanio and Faccenda [531], Faccenda and Capitanio [1045]

2013 Betts, Mason, and Moresi [269], Schellart and Moresi [3184], Faccenda and Capitanio [1042], Capitanio and Replumaz [533], Cooper, Moresi, and Lenardic [747]

2014 Farrington, Moresi, and Capitanio [1075], Sharples, Jadamec, Moresi, and Capitanio [3291], Griffin et al. [1368]

2015 Quenette, Xi, Mansour, Moresi, and Abramson [2898], Betts, Moresi, Miller, and Willis [270], Schellart and Spakman [3185], Sharples, Moresi, and Revote [3292], Capitanio, Replumaz, and Riel [541]

2016 Sharples, Moresi, Velic, Jadamec, and May [3293], O'Neill, Lenardic, Weller, Moresi, Quenette, and Zhang [2683], Kiraly, Capitanio, Funiciello, and Faccenna [1956], Salerno, Capitanio, Farrington, and Riel [3141]

2017 Beall, Moresi, and Stern [166], Király, Capitanio, Funiciello, and Faccenna [1959], Schellart [3180], Wang, Kusky, and Capitanio [3809]

2018 Mériaux, D, Mansour, Chen, and Kaluza [2445], Yang, Moresi, Zhao, Sandiford, and Whittaker [3976], Beall, Moresi, and Cooper [167], Mondy, Rey, Duclaux, and Moresi [2500], Wang, Kusky, and Capitanio [3810], Wang, Kusky, and Capitanio [3811]

2019 Sandiford and Moresi [3157], Yang et al. [3972], Capitanio, Nebel, Cawood, Weinberg, and Clos [540], Carluccio, Kaus, Capitanio, and Moresi [547], Sandiford, Moresi, Sandiford, and Yang [3161], Bodur and Rey [314], Smith, Bianchi, and Capitanio [3349], Capitanio, Nebel, Cawood, Weinberg, and Chowdhury [539]

2020 Mansour et al. [2346], Sandiford, Moresi, Sandiford, Farrington, and Yang [3160], Capitanio [542] Ghosh, Bose, Mandal, and Laik [1283], Capitanio, Nebel, and Cawood [545], Gunawardana, Morra, Chowdhury, and Cawood [1405], Schellart [3187]

2021 Korchinski, Teyssier, Rey, Whitney, and Mondy [2011], Qi, Zhang, Xu, and Wang [2891], Strak and Schellart [3493], Zhang, Zlotnik, and Li [4037], Xiang, Wang, and Kusky [3937], Knight, Capitanio, and Weinberg [1976]

2022 Wang, Kusky, and Wang [3812], Almeida, Riel, Rosas, Duarte, and Schellart [40], Peral, Fernàndez, Vergés, Zlotnik, and Jiménez-Munt [2775], Oliveira et al. [2718], Bahadori et al. [106], Capitanio, Nebel, Moyen, and Cawood [546], Wang, Capitanio, Wang, and Kusky [3808], Bahadori et al. [107], Zuhair, Gollapalli, Capitanio, Betts, and Graciosa [4123], Artemieva, Yang, and Thybo [75]

2023 Laik, Schellart, and Strak [2046], Gianni, Likerman, Navarrete, Gianni, and Zlotnik [1284], Yang, Artemieva, and Thybo [3964], Schellart, Strak, Beniest, Duarte, and Rosas [3194], Mondy, Rey, and Duclaux [2499], Li and Gurnis [2169], Li and Gurnis [2170]

2024 Deng, Yang, Zhao, and Zhou [893], Gunawardana, Chowdhury, Morra, and Cawood [1404]

- **`VEMAN`**

Beuchert and Podladchikov [273]

Chapter 7

My publications

2003 [**01**] S Dequand et al. “Simplified models of flue instruments: Influence of mouth geometry on the sound source”. In: *The Journal of the Acoustical Society of America* 113.3 (2003), pp. 1724–1735. DOI: 10.1121/1.1543929

[**02**] Pep Espanol and Cedric Thieulot. “Microscopic derivation of hydrodynamic equations for phase-separating fluid mixtures”. In: *The Journal of chemical physics* 118.20 (2003), pp. 9109–9127. DOI: 10.1063/1.1568333

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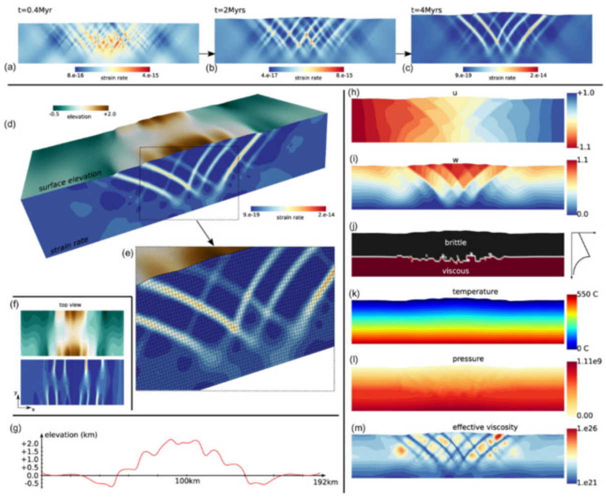
Chapter 8

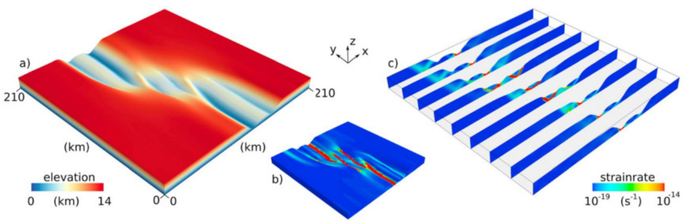
A Fantom , an Elefant and a Ghost

While a post-doctoral researcher at Bergen University I developed the Fantom code. Here is what other people and I have published with it:

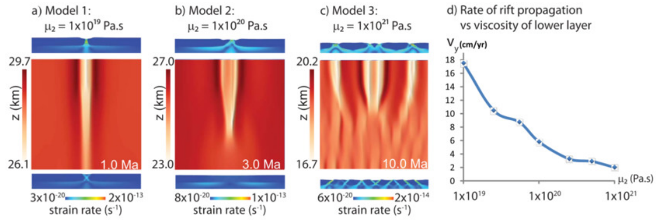
- *FANTOM : two- and three-dimensional numerical modelling of creeping flows for the solution of geological problems*, C. Thieulot, Physics of the Earth and Planetary Interiors, 188, 2011.



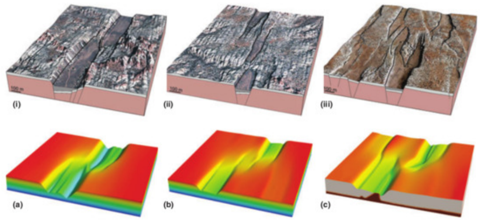
- *Three-dimensional numerical modeling of upper crustal extensional systems*, V. Allken, R.S. Huismans and C. Thieulot, JGR 116, 2011. `https://doi:10.1029/2011JB008319`



- *Factors controlling the mode of rift interaction in brittle-ductile coupled systems: A 3D numerical study*, V. Allken, R.S. Huismans and C. Thieulot, Geochem. Geophys. Geosyst. 13(5), 2012. `https://doi:10.1029/2012GC004077`



- *3D numerical modelling of graben interaction and linkage: a case study of the Canyonlands grabens, Utah*, V. Allken, R.S. Huismans, Haakon Fossen and C. Thieulot, Basin Research, 25, 1-14, 2013. `https://doi:10.1111/bre.12010`



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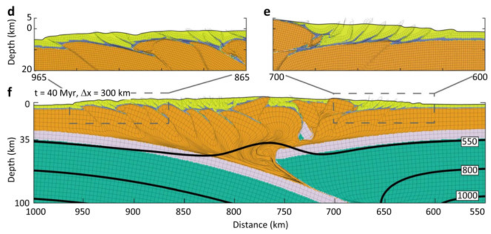
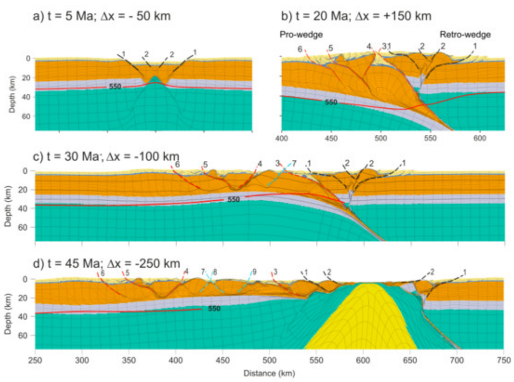
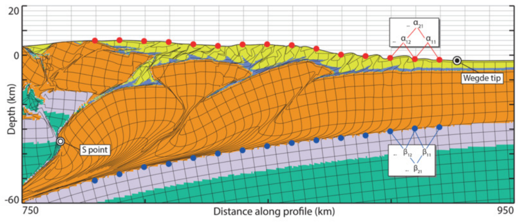
- *Extensional inheritance and surface processes as controlling factors of mountain belt structure*, Z. Erdös, R.S. Huismans, P. van der Beek, and C. Thieulot, J. Geophys. Res. Solid Earth, 119, 2014. doi:10.1002/2014JB011408



- *First-order control of syntectonic sedimentation on crustal-scale structure of mountain belts*, Z. Erdös, R.S. Huismans, P. van der Beek, J. Geophys. Res. Solid Earth, 120, 5362-5377, 2015. doi:10.1002/2014JB011785
- *The Wilson Cycle and Effects of Tectonic Structural Inheritance on Rifted Passive Margin Formation*, C.A. Salazar-Mora, R.S. Huismans, H. Fossen and M. Egydio-Silva, Tectonics, 37, 3085-3101, 2017. 01. doi:10.1029/2018TC004962



- *Control of increased sedimentation on orogenic fold-and-thrust belt structure - insights into the evolution of the Western Alps*, Z. Erdös, R.S. Huismans and P. van der Beek, Solid Earth, 10, 391-404, 2019. `https://doi.org/10.5194/se-10-391-2019`



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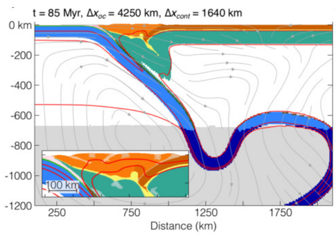

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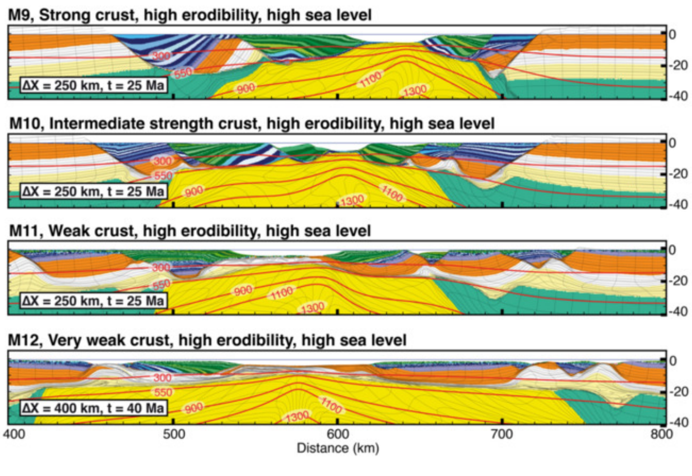

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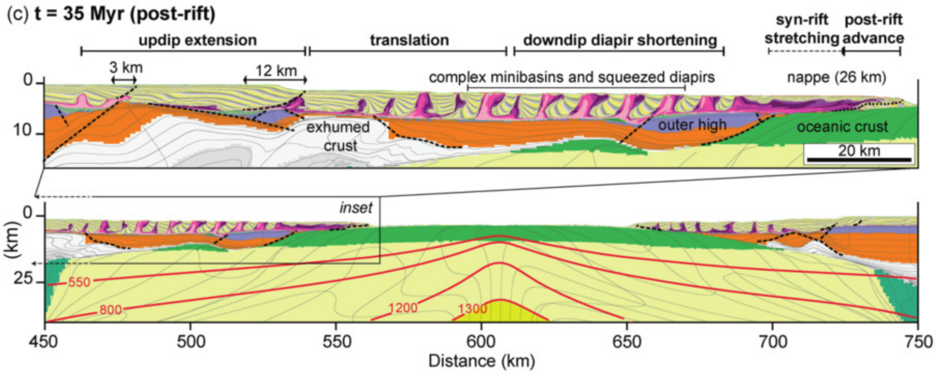
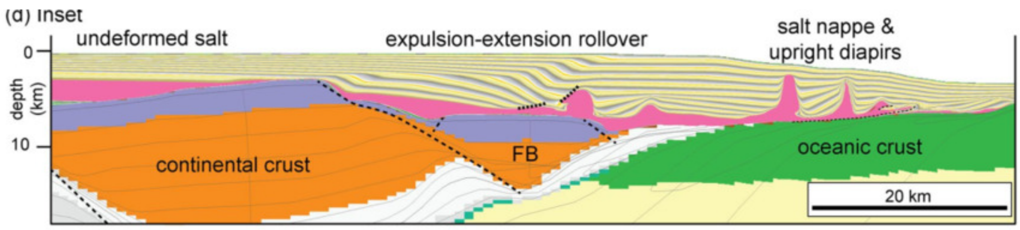
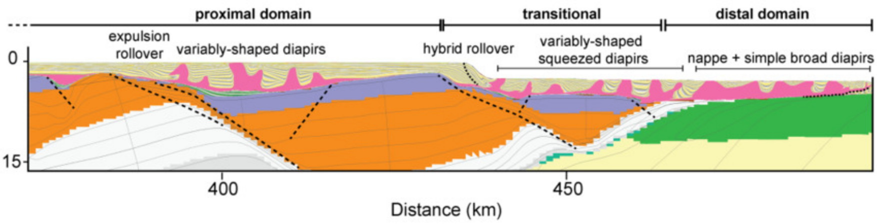


- *Coupling Crustal-Scale Rift Architecture With Passive Margin Salt Tectonics: A Geodynamic Modeling Approach*, L.M. Pichel, R.S. Huismans, R. Gawthorpe, J.I. Faleide and Th. Theunissen, JGR, 127, 2022. [2823]



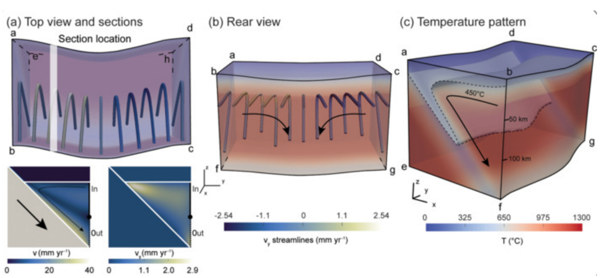
- *How post-salt sediment flux and progradation rate influence salt tectonics on rifted margins: Insights from geodynamic modelling*, L.M. Pichel, R.S. Huismans, R. Gawthorpe and J.I. Faleide, Basin Research, 2023. [2822]



- *A Three-Field Formulation for Two-Phase Flow in Geodynamic Modeling: Toward the Zero-Porosity Limit*, Gang Lu, Dave A. May and Ritske S. Huismans, Journal of Geophysical Research: Solid Earth, 2024. [2283]

Upon my arrival at Utrecht University in 2012 I started working an a more flexible code, called ELEFANT , which has since very much diverged from FANTOM .

- *The effect of obliquity on temperature in subduction zones: insights from 3-D numerical modeling*, A. Plunder, C. Thieulot and D.J.J. van Hinsbergen, Solid Earth 9, 759-776, 2018. https://doi.org/10.5194/se-9-759-2018



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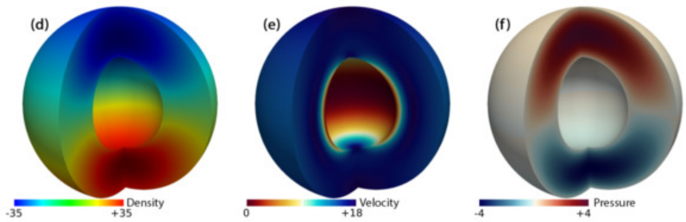

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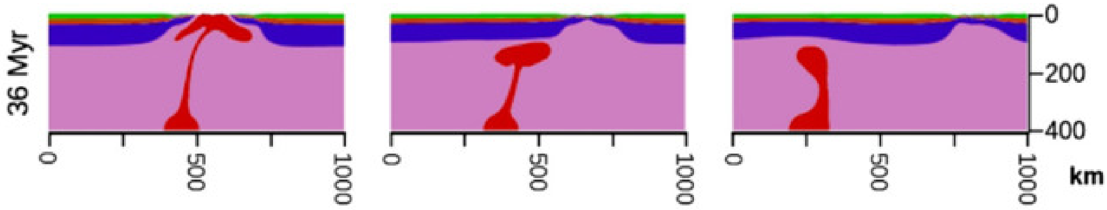

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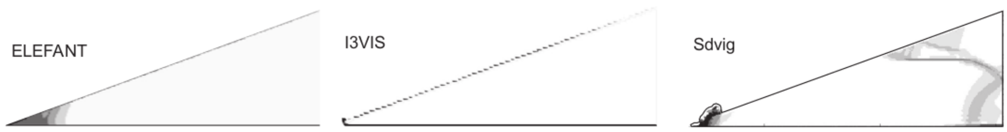
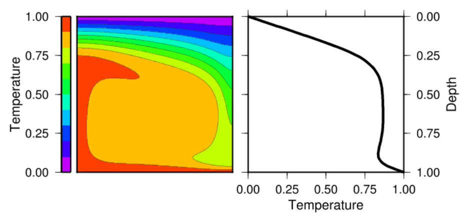
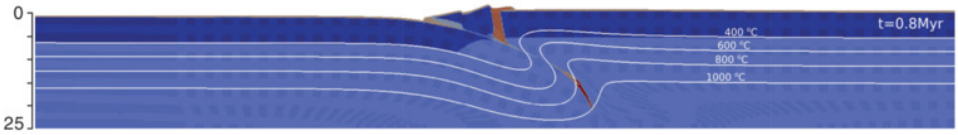


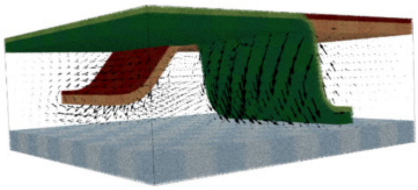
- *A community benchmark for viscoplastic thermal convection in a 2-D square box*, N. Tosi, C. Stein, L. Noack, C. Huettig, P. Maierova, H. Samuel, D.R. Davies, C.R. Wilson, S.C. Kramer, C. Thieulot, A. Glerum, M. Fraters, W. Spakman, A. Rozel, P.J. Tackley, Geochem. Geophys. Geosyst. 16, doi:10.1002/2015GC005807, 2015.



- *Dynamics of intraoceanic subduction initiation: 1. Oceanic detachment fault inversion and the formation of supra-subduction zone ophiolites*, M. Maffione, C. Thieulot, D.J.J. van Hinsbergen, A. Morris, O. Pluemper and W. Spakman, Geochem. Geophys. Geosyst. 16, p1753-1770, 2015.



- *The Geodynamic World Builder: a solution for complex initial conditions in numerical modelling*, M. Fraters, C. Thieulot, A. van den Berg and W. Spakman, Solid Earth, `https://doi.org/10.5194/se-2019-24`, 2019.



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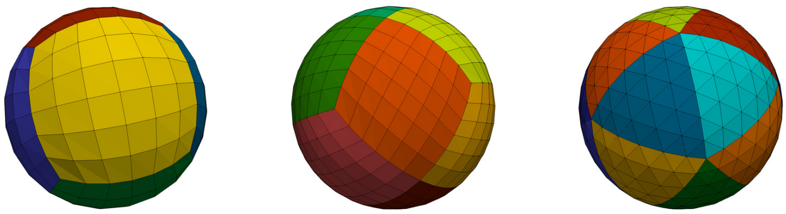

title=Long-term coupling and feedback between tectonics and surface processes during non-volcanic rifted margin formation, author=Theunissen, Thomas and Huismans, Ritske S, journal=Journal of Geophysical Research: Solid Earth,

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