

References

- Ahlberg, P. E. 1991. Tetrapod or near-tetrapod fossils from the Upper Devonian of Scotland. *Nature* 354: 298–301.
- . 1995. *Elginerpeton pancheni* and the earliest tetrapod clade. *Nature* 373: 420–425.
- . 1998. Postcranial stem tetrapod remains from the Devonian of Scat Craig, Morayshire, Scotland. *Zoological Journal of the Linnean Society* 122: 99–141.
- Ahlberg, P. E., J. A. Clack, E. Lukševičs, H. Blom, and I. Zupinš. 2008. *Ventastega curonica* and the origin of tetrapod morphology. *Nature* 453: 1199–1204.
- Ahlberg, P. E. and Z. Johanson. 1998. Osteolepiforms and the ancestry of tetrapods. *Nature* 395: 792–794.
- Algeo, T. J., R. A. Berner, J. B. Maynard, and S. E. Scheckler. 1995. Late Devonian oceanic anoxic events and biotic crisis: “Rooted” in the evolution of vascular land plants? *GSA Today* 5: 63–66.
- Algeo, T. J. and E. Ingall. 2007. Sedimentary C_{org} : P ratios, paleocean ventilation, and Phanerozoic atmospheric pO_2 . *Palaeogeography, Palaeoclimatology, Palaeoecology* 256: 130–155.
- Algeo, T. J., S. E. Scheckler, and J. B. Maynard. 2001. Effects of the Middle to Late Devonian spread of vascular land plants on weathering regimes, marine biotas, and global climate. In *Plants Invade the Land*. ed. P. G. Gensel and D. Edwards. New York: Columbia University Press, pp. 213–236.
- Alvarez, L. W., W. Alvarez, F. Asaro, and H. V. Michel. 1980. Extraterrestrial cause for the Cretaceous–Tertiary extinction. *Science* 208: 1095–1108.
- Alvarez, W. 2003. Comparing the evidence relevant to impact and flood basalt at times of major mass extinctions. *Astrobiology* 3: 153–161.

- Andrews, H. N. 1960. Notes on Belgian specimens of *Sporogonites*. *Palaeobotanist* 7: 85–89.
- Astin, T. R., J. E. A. Marshall, H. Blom, and C. M. Berry. 2010. The sedimentary environment of the Late Devonian East Greenland tetrapods. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 93–109.
- Averbuch, O., N. Tribovillard, X. Devleeschouwer, L. Riquier, B. Mistiaen, and B. van Vliet-Lanoe. 2005. Mountain building-enhanced continental weathering and organic carbon burial as major causes for climatic cooling at the Frasnian–Famennian boundary (c. 376 Ma)? *Terra Nova* 17: 25–34.
- Babarro, J. M. F. and A. De Zwaan. 2008. Anaerobic survival potential of four bivalves from different habitats: A comparative survey. *Comparative Biochemistry and Physiology, Part A* 151: 108–113.
- Bailey, M. E., S. V. M. Clube, G. Hahn, W. M. Napier, and G. B. Valsechi. 1994. Hazards due to giant comets: Climate and short-term catastrophism. In *Hazards due to Comets and Asteroids*. ed. T. Gehrels. Tucson, Ariz.: University of Arizona Press, pp. 479–536.
- Bambach, R. K., A. H. Knoll, and S. C. Wang. 2004. Origination, extinction, and mass depletions of marine diversity. *Paleobiology* 30: 522–542.
- Barrett, P. 2003. Cooling a continent. *Nature* 421: 221–223.
- Benton, M. J. 2005. *Vertebrate Palaeontology, Third Edition*. Oxford, England: Blackwell Publishing.
- Berner, R. A. 2006. GEOCARBSULF: A combined model for Phanerozoic atmosphere O₂ and CO₂. *Geochimica et Cosmochimica Acta* 70: 5653–5664.
- Berner, R. A., D. J. Beerling, R. Dudley, J. M. Robinson, and R. A. Wildman. 2003. Phanerozoic atmospheric oxygen. *Annual Review of Earth and Planetary Sciences* 31: 105–134.
- Berner, R. A., J. M. VandenBrooks, and P. D. Ward. 2007. Oxygen and evolution. *Science* 316: 557–558.
- Berry, C. M. and M. Fairon-Demaret. 2001. The Middle Devonian flora revisited. In *Plants Invade the Land*. ed. P. G. Gensel and D. Edwards. New York: Columbia University Press, pp. 120–139.
- Blicek, A., G. Clément, H. Blom, H. Lelievre, E. Luksevics, M. Streel, J. Thorez, and G. C. Young. 2007. The biostratigraphical and palaeogeographical framework of the earliest diversification of tetrapods (Late Devonian). In *Devonian Events and Correlations*. ed. R. T. Becker and W. T. Kirchgasser. Geological Society, London, Special Publications 278: 219–235.
- Blicek, A., G. Clément, and M. Streel. 2010. The biostratigraphical distribution of earliest tetrapods (Late Devonian): A revised version with comments on biodiversification. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and

- B. Meyer–Berthaud. Geological Society, London, Special Publications 339: 129–138.
- Blom, H. 2005. Taxonomic revision of the Late Devonian tetrapod *Ichthyostega* from East Greenland. *Palaeontology* 48(1): 111–134.
- Blom, H., J. A. Clack, P. E. Ahlberg, and M. Friedman. 2007. Devonian vertebrates from East Greenland: A review of faunal composition and distribution. *Geodiversitas* 29(1): 119–141.
- Bond, D. 2006. The fate of the homocutenids (*Tentaculitoidea*) during the Frasnian–Famennian mass extinction (Late Devonian). *Geobiology* 4: 167–177.
- Bond, D. P. G. and P. B. Wignall. 2005. Evidence for Late Devonian (Kellwasser) anoxic events in the Great Basin, western United States. In *Understanding Late Devonian and Permian–Triassic Biotic and Climatic Events*. ed. D. J. Over, J. R. Morrow, and P. B. Wignall. Amsterdam, Netherlands: Elsevier B.V., pp. 225–262.
- . 2008. The role of sea-level change and marine anoxia in the Frasnian–Famennian (Late Devonian) mass extinction. *Palaeogeography, Palaeoclimatology, Palaeoecology* 263: 107–118.
- Brainerd, E. L. 1994. The evolution of lung-gill bimodal breathing and the homology of vertebrate respiratory pumps. *American Zoologist* 34: 289–299.
- Brand, U. 1989. Global climatic changes during the Devonian–Mississippian: Stable isotope biogeochemistry of brachiopods. *Palaeogeography, Palaeoclimatology, Palaeoecology (Global and Planetary Change Section)* 75: 311–329.
- Brezinski, D. K., C. B. Cecil, and V. W. Skema. 2010. Late Devonian glacial and associated facies from the central Appalachian Basin, eastern United States. *Geological Society of America Bulletin* 122(1/2): 265–281.
- Brezinski, D. K., C. B. Cecil, V. W. Skema, and C. A. Kertis. 2009. Evidence for long-term climate change in Upper Devonian strata of the central Appalachians. *Palaeogeography, Palaeoclimatology, Palaeoecology* 284: 315–325.
- Brocks, J. J., G. A. Logan, R. Buick, and R. E. Summons. 1999. Archaean molecular fossils and the early rise of eukaryotes. *Science* 285: 1033–1036.
- Buick, R. 2001. Life in the Archaean. In *Palaeobiology II*, ed. D. E. G. Briggs and P. R. Crowther. Oxford, England: Blackwell Science, pp. 13–21.
- Campbell, K. S. W. and M. W. Bell. 1977. A primitive amphibian from the Late Devonian of New South Wales. *Alcheringa* 1: 369–381.
- Caputo, M. V., J. H. G. Melo, M. Streel, and J. L. Isbell. 2008. Late Devonian and Early Carboniferous glacial records of South America. In *Resolving the Late Paleozoic Ice Age in Time and Space*. ed. C. R. Fielding, T. D. Frank, and J. L. Isbell. Boulder, Colo.: Geological Society of America Special Paper 441, pp. 161–173.
- Carroll, R. 2009. *The Rise of Amphibians: 365 Million Years of Evolution*. Baltimore, Md.: The Johns Hopkins University Press.
- Chen, D. and M. E. Tucker. 2003. The Frasnian–Famennian mass extinction: Insights from high-resolution sequence stratigraphy and cyclostratigraphy in South China. *Palaeogeography, Palaeoclimatology, Palaeoecology* 193: 87–111.

- . 2004. Palaeokarst and its implication for the extinction event at the Frasnian–Famennian boundary (Guilin, South China). *Journal of the Geological Society, London* 161: 895–898.
- Clack, J. A. 1998. A new Early Carboniferous tetrapod with a *mélange* of crown-group characters. *Nature* 394: 66–69.
- . 2002. *Gaining Ground: The Origin and Evolution of Tetrapods*. Bloomington, Ind.: Indiana University Press.
- . 2006. The emergence of early tetrapods. *Palaeogeography, Palaeoclimatology, Palaeoecology* 232: 167–189.
- . 2007. Devonian climate change, breathing, and the origin of the tetrapod stem group. *Integrative and Comparative Biology* 47(4): 510–523.
- . 2009. The fin to limb transition: New data, interpretations, and hypotheses from paleontology and developmental biology. *Annual Review of Earth and Planetary Sciences* 37: 163–179.
- . 2012. *Gaining Ground: The Origin and Evolution of Tetrapods, Second Edition*. Bloomington, Ind.: Indiana University Press.
- Clack, J. A., P. E. Ahlberg, H. Blom, and S. M. Finney. 2012. A new genus of Devonian tetrapod from north-east Greenland, with new information on the lower jaw of *Ichthyostega*. *Palaeontology* 55(1): 73–86.
- Clack, J. A. and S. M. Finney. 2005. *Pederpes finneyae*, an articulated tetrapod from the Tournaisian of western Scotland. *Journal of Systematic Palaeontology* 2(4): 311–346.
- Clément, G., P. E. Ahlberg, A. Blicek, H. Blom, J. A. Clack, E. Potytl, J. Thorezil, and P. Janvier. 2004. Devonian tetrapod from western Europe. *Nature* 427: 412–413.
- Coates, M. I. and J. A. Clack. 1995. Romer's gap: Tetrapod origins and terrestriality. *Bulletin du Muséum National d'Histoire Naturelle, Paris* 17: 373–388.
- Coates, M. I., M. Ruta, and M. Friedman. 2008. Ever since Owen: Changing perspectives on the early evolution of tetrapods. *Annual Review of Ecology, Evolution, and Systematics* 39: 571–592.
- Copper, P. 1977. Paleolatitudes in the Devonian of Brazil and the Frasnian–Famennian mass extinction. *Palaeogeography, Palaeoclimatology, Palaeoecology* 21: 165–207.
- . 1994. Ancient reef ecosystem expansion and collapse. *Coral Reefs* 13: 3–11.
- Courtillot, V. E. 1999. *Evolutionary Catastrophes: The Science of Mass Extinction*. Cambridge, England: Cambridge University Press.
- Courtillot, V. E., V. A. Kravchinsky, X. Quidelleur, P. R. Renne, and D. P. Gladkochub. 2010. Preliminary dating of the Viluy traps (Eastern Siberia): Eruption at the time of Late Devonian extinction events? *Earth and Planetary Science Letters* 300: 239–245.
- Courtillot, V. E. and P. R. Renne. 2003. On the ages of flood basalt events. *Comptes Rendus Geoscience* 335: 113–140.
- Cowen, R. 2000. *History of Life* (3rd edition). Oxford, England: Blackwell Science.

- Cressler, W. L. 2001. Evidence of earliest known wildfires. *Palaios* 16(2): 171–174.
- Cressler, W. L., E. B. Daeschler, R. Slingerland, and D. A. Peterson. 2010. Terrestrialization in the Late Devonian: A palaeoecological overview of the Red Hill site, Pennsylvania, USA. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere–Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 111–128.
- Crosswell, K. 2003. *Magnificent Mars*. New York: Free Press.
- Daeschler, E. B. 2000. Early tetrapod jaws from the Late Devonian of Pennsylvania, USA. *Journal of Paleontology* 74(2): 301–308.
- Daeschler, E. B., J. A. Clack, and N. H. Shubin. 2009. Late Devonian tetrapod remains from Red Hill, Pennsylvania, USA: How much diversity? *Acta Zoologica* 90(Supplement 1): 306–317.
- Daeschler, E. B., N. H. Shubin, K. S. Thomson, and W. W. Amaral. 1994. A Devonian tetrapod from North America. *Science* 265: 639–642.
- Darwin, C. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. London, England: John Murray.
- Dauphas, N., M. van Zuilen, M. Wadhwa, A. M. Davis, B. Marty, and P. E. Janney. 2004. Clues from Fe isotope variations on the origin of Early Archean BIFs from Greenland. *Science* 306: 2077–2080.
- DeConto, R. M. and D. Pollard. 2003. Rapid Cenozoic glaciation of Antarctica induced by declining atmospheric CO₂. *Nature* 421: 245–249.
- DiMichele, W. A. and R. W. Hook. 1992. Paleozoic terrestrial ecosystems. In *Terrestrial Ecosystems through Time*. ed. A. K. Behrensmeyer, J. D. Damuth, W. A. DiMichele, R. Potts, H.–D. Sues, and S. L. Wing. Chicago, Ill.: University of Chicago Press, pp. 205–325.
- Donoghue, M. J. 2005. Key innovations, convergence, and success: Macroevolutionary lessons from plant phylogeny. In *Macroevolution: Diversity, Disparity, Contingency*. ed. E. S. Vrba and N. Eldredge. *Paleobiology* 31(2) Supplement, pp. 77–93.
- Draganits, E., S. J. Braddy, and D. E. G. Griggs. 2001. A Gondwanan coastal arthropod ichnofauna from the Muth Formation (Lower Devonian, Northern India): Palaeoenvironment and tracemaker behavior. *Palaios* 16(2): 126–147.
- Dudley, R. 1998. Atmospheric oxygen, giant Paleozoic insects and the evolution of aerial locomotor performance. *Journal of Experimental Biology* 201: 1043–1050.
- Duncker, H.–R. 2004. Vertebrate lungs: Structure, topography and mechanics; a comparative perspective of the progressive integration of respiratory system, locomotor apparatus and ontogenetic development. *Respiratory Physiology and Neurobiology* 114: 111–124.
- Dunlop, J. A. 2010. Geological history and phylogeny of Chelicerata. *Arthropod Structure and Development* 39: 124–142.

- Edwards, D. 1970. Fertile Rhyniophytina from the Lower Devonian of Britain. *Palaeontology* 13: 451–461.
- Edwards, D. S. 1980. Evidence for the sporophytic status of the Lower Devonian plant *Rhynia gwynne-vaughanii* Kidston and Lang. *Review of Palaeobotany and Palynology* 29: 177–188.
- Edwards, D. and C. Wellman. 2001. Embryophytes on land: The Ordovician to Lochkovian (Lower Devonian) record, in *Plants Invade the Land*. ed., P. G. Gensel and D. Edwards. Columbia University Press, New York, 3–28.
- Engel, M. S. and D. A. Grimaldi. 2004. New light shed on the oldest insect. *Nature* 427: 627–630.
- Erwin, D. H. 2001. Metazoan origins and early evolution. In *Palaeobiology II*. ed. D. E. G. Briggs and P. R. Crowther. Oxford, England: Blackwell Science, pp. 25–31.
- Erwin, D. H., M. Laflamme, S. M. Tweedt, E. A. Sperling, D. Pisani, and K. J. Peterson. 2011. The Cambrian conundrum: Early divergence and later ecological success in the early history of animals. *Science* 334: 1091–1097.
- Falcon-Lang, H. J. 2000. Fire ecology of the Carboniferous tropical zone. *Palaeogeography, Palaeoclimatology, Palaeoecology* 164: 339–355.
- Falkowski, P., M. Katz, A. Milligan, K. Fennel, B. Cramer, M. P. Aubry, R. A. Berner, and W. M. Zapol. 2005. The rise of atmospheric oxygen levels over the past 205 million years and the evolution of large placental mammals. *Science* 309: 2202–2204.
- Fielding, C. R., T. D. Frank, and J. L. Isbell. 2008. *Resolving the Late Paleozoic Ice Age in Time and Space*. Boulder, Colorado: Geological Society of America Special Paper 441: 1–354.
- Filer, J. K. 2002. Late Frasnian sedimentation cycles in the Appalachian basin: Possible evidence for high frequency eustatic sea-level changes. *Sedimentary Geology* 154: 31–52.
- Filipiak, P. 2004. Miospore stratigraphy of Upper Famennian and Lower Carboniferous deposits of the Holy Cross Mountains (central Poland). *Review of Palaeobotany and Palynology* 128: 291–322.
- Flügel, E. and G. D. Stanley. 1984. Re-organization, development and evolution of post-Permian reefs and reef-organisms. *Paleontographica Americana* 54: 177–186.
- Fois, E. and M. Gaetani. 1984. The recovery of reef-building communities and the role of cnidarians in carbonate sequences of the Middle Triassic (Anisian) in the Italian Dolomites. *Paleontographica Americana* 54: 191–200.
- Frank, T. D., L. P. Birgenheier, I. P. Montañez, C. R. Fielding, and M. C. Rygel. 2008. Late Paleozoic climate dynamics revealed by comparison of ice-proximal stratigraphic and ice-distal isotopic records. In *Resolving the Late Paleozoic Ice Age in Time and Space*. ed. C. R. Fielding, T. D. Frank, and J. L. Isbell. Boulder, Colorado: Geological Society of America Special Paper 441, pp. 331–342.

- Friedman, M. and L. C. Sallan. 2012. Five hundred years of extinction and recovery: A Phanerozoic survey of large-scale diversity patterns in fishes. *Palaeontology* 55: 707–742.
- George, D. and A. Blicek. 2011. Rise of the earliest tetrapods: An Early Devonian origin from marine environment. *PLoS ONE* 6(7): e22136. doi: 10.1371/journal.pone.0022136
- Gerrienne, P., B. Meyer–Berthaud, H. Lardeux, and S. Régnault. 2010. First record of *Rellimia* Leclerq & Bonamo (Aneurophytales) from Gondwana, with comments on the earliest lignophytes. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 81–92.
- Goddéris, Y. and M. M. Joachimski. 2004. Global change in the Late Devonian: Modelling the Frasnian–Famennian short-term carbon isotope excursions. *Palaeogeography, Palaeoclimatology, Palaeoecology* 202: 309–329.
- Gong, Y.–M. and R. Xu. 2003. Conodont apatite $\delta^{18}\text{O}$ signatures indicate climatic cooling as a trigger of the Late Devonian mass extinction: Comment. *Geology* 31(4): 383.
- Gould, S. J. 1989. *Wonderful Life: The Burgess Shale and the Nature of History*. New York: W. W. Norton & Company.
- Gradstein, F., J. Ogg, and A. Smith. 2004. *A Geologic Time Scale 2004*. Cambridge, England: Cambridge University Press.
- Grahn, Y. and F. Paris. 2011. Emergence, biodiversification and extinction of the chitinozoan group. *Geological Magazine* 148(2): 226–236.
- Grimaldi, D. and M. S. Engel. 2005. *Evolution of the Insects*. Cambridge, England: Cambridge University Press.
- Grinspoon, D. 2003. *Lonely Planets: The Natural Philosophy of Alien Life*. New York: HarperCollins Publishers.
- Gulbranson, E. L., I. P. Montañez, M. D. Schmitz, C. O. Limarino, J. L. Isbell, S. A. Marensi, and J. L. Crowley. 2010. High-precision U–Pb calibration of Carboniferous glaciation and climate history, Paganzo Group, NW Argentina. *Geological Society of America Bulletin* 122(9/10): 1480–1498.
- Hallam, A. and P. B. Wignall. 1997. *Mass Extinctions and their Aftermath*. Oxford, England: Oxford University Press.
- Harfoot, M. B., J. A. Pyle, and D. J. Beerling. 2008. End-Permian ozone shield unaffected by oceanic hydrogen sulphide and methane releases. *Nature Geoscience* 1(4): 247–252.
- Hartkopf-Fröder, C., M. Kloppisch, U. Mann, P. Neumann-Mahlkau, R. G. Schaefer, and H. Wilkes. 2007. The end-Frasnian mass extinction in the Eifel Mountains, Germany: New insights from organic matter composition and preservation. *Geological Society of London Special Publications* 278: 173–196.
- Hartmann, W. K. 2003. *A Traveler's Guide to Mars*. New York: Workman Publishing.

- Hayward, B. W. 2002. Late Pliocene to Middle Pleistocene extinctions of deep-sea benthic foraminifera (*Stilostomella* extinction) in the southwest Pacific. *Journal of Foraminiferal Research* 32(3): 274–307.
- Hofmann, H. J., K. Grey, A. H. Hickman, and R. I. Thorpe. 1999. Origin of 3.45 Ga coniform stromatolites in Warrawoona Group, Western Australia. *Geological Society of America Bulletin* 111(8): 1256–1262.
- House, M. R. 1985. Correlation of mid-Palaeozoic ammonoid evolutionary events with global sedimentary perturbations. *Nature* 313: 17–22.
- . 2002. Strength, timing, setting and cause of mid-Palaeozoic extinctions. *Palaeogeography, Palaeoclimatology, Palaeoecology* 181: 5–25.
- Irving, E. 2008. Why Earth became so hot 50 million years ago and why it then cooled. *Proceedings of the National Academy of Sciences USA* 105(42): 16061–16062.
- Isaacson, P. E., E. Díaz-Martínez, G. W. Grader, J. Kalvoda, O. Babek, and F. X. Devuyst. 2008. Late Devonian–earliest Mississippian glaciation in Gondwanaland and its biogeographic consequences. *Palaeogeography, Palaeoclimatology, Palaeoecology* 268: 126–142.
- Isbell, J. L., M. F. Miller, K. L. Wolfe, and P. A. Lenaker. 2003. Timing of late Paleozoic glaciation in Gondwana: Was glaciation responsible for the development of Northern Hemisphere cyclothems? In *Extreme Depositional Environments: Mega End Members in Geologic Time*. ed. M. A. Chan and A. W. Archer. Boulder, Colo.: Geological Society of America Special Paper 370, pp. 5–24.
- Janvier, P. and G. Clément. 2010. Muddy tetrapod origins. *Nature* 463: 40–41.
- Joachimski, M. M., S. Breisig, W. Buggisch, J. A. Talent, R. Mawson, M. Gereke, J. R. Morrow, J. Day, and K. Weddige. 2009. Devonian climate and reef evolution: Insights from oxygen isotopes in apatite. *Earth and Planetary Science Letters* 284: 599–609.
- Joachimski, M. M. and W. Buggisch. 2002. Conodont apatite $\delta^{18}\text{O}$ signatures indicate climatic cooling as a trigger of the Late Devonian mass extinction. *Geology* 30(8): 711–714.
- . 2003. Conodont apatite $\delta^{18}\text{O}$ signatures indicate climatic cooling as a trigger of the Late Devonian mass extinction: Reply. *Geology* 31(4): 384.
- Joachimski, M. M., R. van Gelden, S. Breisig, W. Buggisch, and J. Day. 2004. Oxygen isotope evolution of biogenic calcite and apatite during the Middle and Late Devonian. *International Journal of Earth Science* 93: 542–553.
- John, E. H., P. B. Wignall, R. J. Newton, and S. H. Bottrell. 2010. $\delta^{34}\text{S}_{\text{CAS}}$ and $\delta^{18}\text{O}_{\text{CAS}}$ records during the Frasnian–Famennian (Late Devonian) transition and their bearing on mass extinction models. *Chemical Geology* 275: 221–234.
- Johnson, J. G., G. Klapper, and C. A. Sandberg. 1985. Devonian eustatic fluctuations in Euramerica. *Geological Society of America Bulletin* 96: 567–587.
- Kaiser, S. I., T. Steuber, and R. T. Becker. 2008. Environmental change during the late Frasnian and early Tournaisian (Late Devonian–Early Carboniferous):

- Implications from stable isotopes and conodont biofacies in southern Europe. *Geological Journal* 43: 241–260.
- Kaiser, S. I., T. Steuber, R. T. Becker, and M. M. Joachimski. 2006. Geochemical evidence for major environmental change at the Devonian-Carboniferous boundary in the Carnic Alps and the Rhenish Massif. *Palaeogeography, Palaeoclimatology, Palaeoecology* 240: 146–160.
- Kammer, T. W. and W. I. Ausich. 2006. The “Age of Crinoids”: A Mississippian biodiversity spike coincident with widespread carbonate ramps. *Palaios* 21: 238–248.
- Kammer, T. W. and D. L. Matchen. 2008. Evidence for eustasy at the Kinderhookian–Osagean (Mississippian) boundary in the United States: Response to late Tournaisian glaciation? In *Resolving the Late Paleozoic Ice Age in Time and Space*. ed. C. R. Fielding, T. D. Frank, and J. L. Isbell. Boulder, Colo.: Geological Society of America Special Paper 441, pp. 261–274.
- Kaufmann, B., E. Trapp, and K. Mezger. 2004. The numerical age of the Upper Frasnian (Upper Devonian) Kellwasser horizons: A new U-Pb zircon date from Steinbruch Schmidt (Kellerwald, Germany). *Journal of Geology* 112: 495–501.
- Kenrick, P. and P. R. Crane. 1997a. The origin and early evolution of plants on land. *Nature* 389: 33–39.
- . 1997b. *The Origin and Early Diversification of Land Plants: A Cladistic Study*. Washington, D.C.: Smithsonian Institution Press.
- Kent, D. V. and G. Muttoni. 2008. Equatorial convergence of India and early Cenozoic climate trends. *Proceedings of the National Academy of Sciences USA* 105(42): 16065–16070.
- Kerr, R. A. 2012. More than one way for invaders to wreak havoc. *Science* 335: 646.
- Kessler, W. and G. Müller. 1988. Minor and trace-element data from iron oxides from iron-formations of the Iron Quadrangle, Minas Gerais, Brazil. *Mineralogy and Petrology* 39: 245–250.
- King, H. M., N. H. Shubin, M. I. Coates, and M. E. Hale. 2011. Behavioral evidence for the evolution of walking and bounding before terrestriality in sarcopterygian fishes. *Proceedings of the National Academy of Sciences USA* 108(52): 21146–21151.
- Kraus, O. and C. Brauckmann. 2003. Fossil giants and surviving dwarfs: Arthropleurida and Pselaphognatha (Atelocerata, Diplopoda); characters, phylogenetic relationships and construction. *Verhandlungen des naturwissenschaftlichen Vereins in Hamburg* 40: 5–50.
- Kump, L. R., A. Pavlov, and M. A. Arthur. 2005. Massive release of hydrogen sulfide to the surface ocean and atmosphere during intervals of oceanic anoxia. *Geology* 33(5): 397–400.
- Labandeira, C. C. 2005. Invasion of the continents: Cyanobacterial crusts to tree-inhabiting arthropods. *Trends in Ecology and Evolution* 20(5): 253–262.
- Lane, N. 2002. *Oxygen: The Molecule that Made the World*. Oxford, England: Oxford University Press.

- Laurin, M. and R. Soler-Gijón. 2010. Osmotic tolerance and habitat of early stegocephalians: Indirect evidence from parsimony, taphonomy, palaeobiogeography, physiology, and morphology. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 151–179.
- Lebedev, O. A. 2004. A new tetrapod *Jakubsonia livnensis* from the early Famennian (Devonian) of Russia and palaeoecological remarks on the Late Devonian tetrapod habitats. *Acta Universitatis Latviensis, Series Earth and Environment Sciences* 679: 79–98.
- Lebedev, O. A. and J. A. Clack. 1993. Upper Devonian tetrapods from Andreyevka, Tula, Russia. *Palaeontology* 36(6): 721–734.
- Lecointre, G. and H. Le Guyader. 2006. *The Tree of Life: A Phylogenetic Classification*. Cambridge, Mass.: Belknap Press of Harvard University Press.
- Lewis, A. R., D. R. Marchant, A. C. Ashworth, L. Hedenäs, S. R. Hemming, J. V. Johnson, M. J. Leng, M. L. Machlus, A. E. Newton, J. I. Raine, J. K. Willenbring, M. Williams, and A. P. Wolfe. 2008. Mid-Miocene cooling and the extinction of tundra in continental Antarctica. *Proceedings of the National Academy of Sciences USA* 105(31): 10676–10680.
- Long, J. A., G. C. Young, T. Holland, T. J. Senden, and E. M. G. Fitzgerald. 2006. An exceptional Devonian fish from Australia sheds light on tetrapod origins. *Nature* 444: 199–202.
- Lutz, R. A. and D. C. Rhoads. 1977. Anaerobiosis and theory of growth line formation. *Science* 198: 1222–1227.
- MacNaughton, R. B., J. M. Cole, R. W. Dalrymple, S. J. Braddy, D. E. G. Briggs, and T. D. Lukie. 2002. First steps on land: Arthropod trackways in Cambrian–Ordovician eolian sandstone, southeastern Ontario, Canada. *Geology* 30(5): 391–394.
- Marynowski, L. and P. Filipiak. 2007. Water column euxinia and wildfire evidence during the deposition of the Upper Famennian Hangenberg event horizon from the Holy Cross Mountains (central Poland). *Geological Magazine* 144(3): 569–595.
- Marynowski, L., P. Filipiak, and A. Pisarzowska. 2008. Organic geochemistry and palynofacies of the Early-Middle Frasnian transition (Late Devonian) of the Holy Cross Mountains, southern Poland. *Palaeogeography, Palaeoclimatology, Palaeoecology* 269: 152–165.
- Marynowski, L., P. Filipiak, and M. Zatoń. 2010. Geochemical and palynological study of the Upper Famennian Dasberg event horizon from the Holy Cross Mountains (central Poland). *Geological Magazine* 147(4): 527–550.
- Maziane, N., K. T. Higgs, and M. Streel. 1999. Revision of the late Famennian miospore zonation scheme in eastern Belgium. *Journal of Micropaleontology* 18: 17–25.

- McGhee, G. R. 1981. The Frasnian–Famennian extinctions: A search for extraterrestrial causes. *Bulletin of the Field Museum of Natural History* 52(7): 3–5.
- . 1982. The Frasnian–Famennian extinction event: A preliminary analysis of Appalachian marine ecosystems. In *Geological Implications of Impacts of Large Asteroids and Comets on the Earth*. ed. L. T. Silver and P. H. Schultz. Boulder, Colo.: Geological Society of America Special Paper 190, pp. 491–500.
- . 1984. Tempo of the Frasnian–Famennian biotic crisis. *Geological Society of America, Abstracts with Program* 16(1): 49.
- . 1988. The Late Devonian extinction event: Evidence for abrupt ecosystem collapse. *Paleobiology* 14: 250–257.
- . 1996. *The Late Devonian Mass Extinction*. New York: Columbia University Press.
- . 1997. Late Devonian bioevents in the Appalachian Sea: Immigration, extinction, and species replacements. In *Paleontological Events: Stratigraphic, Ecological, and Evolutionary Implications*. ed. C. E. Brett and G. C. Baird. New York: Columbia University Press, pp. 493–508.
- . 2001a. Late Devonian extinction. In *Palaeobiology II*. ed. D. E. G. Briggs and P. R. Crowther. Oxford, England: Blackwell Science, pp. 223–226.
- . 2001b. The “multiple impacts hypothesis” for mass extinction: A comparison of the Late Devonian and the late Eocene. *Palaeogeography, Palaeoclimatology, Palaeoecology* 176: 47–58.
- . 2005. Modelling Late Devonian extinction hypotheses. In *Understanding Late Devonian and Permian–Triassic Biotic and Climatic Events*. ed. D. J. Over, J. R. Morrow, and P. B. Wignall. Amsterdam, The Netherlands: Elsevier B.V., pp. 37–50.
- . 2011. *Convergent Evolution: Limited Forms Most Beautiful*. Cambridge, Mass.: Vienna Series in Theoretical Biology; Massachusetts Institute of Technology Press.
- McGhee, G. R., M. E. Clapham, P. M. Sheehan, D. J. Bottjer, and M. L. Droser. 2013. A new ecological-severity ranking of major Phanerozoic biodiversity crises. *Palaeogeography, Palaeoclimatology, Palaeoecology* 370: 260–270.
- McGhee, G. R., J. S. Gilmore, C. J. Orth, and E. J. Olsen. 1984. No geochemical evidence for an asteroidal impact at Late Devonian mass extinction horizon. *Nature* 308: 629–631.
- McGhee, G. R., C. J. Orth, L. R. Quintana, J. S. Gilmore, and E. J. Olsen. 1986. The Late Devonian “Kellwasser Event” mass extinction horizon in Germany: No geochemical evidence for a large-body impact. *Geology* 14(9): 776–779.
- McGhee, G. R., P. M. Sheehan, D. J. Bottjer, and M. L. Droser. 2012. Ecological ranking of Phanerozoic biodiversity crises: The Serpukhovian (Early Carboniferous) crisis had a greater ecological impact than the end-Ordovician. *Geology* 40(2): 147–150.

- McKay, C. 1996a. Oxygen and the rapid evolution of life on Mars. In *Chemical Evolution: Physics of the Origin and Evolution of Life*. ed. J. Chela-Flores and F. Raulin. Amsterdam, The Netherlands: Kluwer Academic Publishers, pp. 177–184.
- . 1996b. Time for intelligence on other planets. In *Circumstellar Habitable Zones*. ed. L. R. Doyle. Menlo Park, Travis House Publications, pp. 405–419.
- McKay, D. S., E. K. Gibson, K. L. Thomas-Keprta, H. Vali, C. S. Romanek, S. J. Clemett, X. D. F. Chillier, C. R. Maechling, and R. N. Zare. 1996. Search for past life on Mars: Possible relic biogenic activity in Martian meteorite ALH84001. *Science* 273: 924–930.
- McKinney, M. L., and J. L. Lockwood. 1999. Biotic homogenization: A few winners replacing many losers in the next mass extinction. *Trends in Ecology and Evolution* 14(11): 450–453.
- Meyer-Berthaud, B., A. Soria, and A.-L. Decombeix. 2010. The land plant cover in the Devonian: A reassessment of the evolution of the tree habit. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 59–70.
- Mii, H.-S., E. L. Grossman, and T. E. Yancey. 1999. Carboniferous isotope stratigraphies of North America: Implications for Carboniferous paleoceanography and Mississippian glaciation. *Geological Society of America Bulletin* 111(7): 960–973.
- Miller, H. 1858. *The Old Red Sandstone*. New York: Hurst and Company, Publishers.
- Mojzsis, S. J., G. Arrhenius, K. D. McKeegan, T. M. Harrison, A. P. Nutman, and C. R. L. Friend. 1996. Evidence for life on Earth before 3,800 million years ago. *Nature* 384: 55–59.
- Morgan, J. P., T. J. Reston, and C. R. Ranero. 2004. Contemporaneous mass extinctions, continental flood basalts, and “impact signals”: Are mantle plume-induced lithospheric gas explosions the causal link? *Earth and Planetary Sciences Letters* 217: 263–284.
- Murphy, A. E., B. B. Sageman, and D. J. Hollander. 2000. Eutrophication by decoupling of the marine biogeochemical cycles of C, N, and P: A mechanism for the Late Devonian mass extinction. *Geology* 28(5): 427–430.
- . 2001. Eutrophication by decoupling of the marine biogeochemical cycles of C, N, and P: A mechanism for the Late Devonian mass extinction: Reply. *Geology* 29(5): 470–471.
- Newell, N. 1967. Revolutions in the history of life. *Geological Society of America Special Paper* 89: 63–91.
- Niedźwiedzki, G., P. Szrek, K. Narkiewicz, M. Narkiewicz, and P. E. Ahlberg. 2010. Tetrapod trackways from the early Middle Devonian period of Poland. *Nature* 463: 43–48.
- Pagani, M., J. C. Zachos, K. H. Freeman, B. Tipple, and S. Bohaty. 2005. Marked decline in atmospheric carbon dioxide concentrations during the Paleogene. *Science* 309: 600–603.

- Paton, R. L., T. R. Smithson, and J. A. Clack. 1999. An amniote-like skeleton from the Early Carboniferous of Scotland. *Nature* 398: 508–513.
- Poty, E. 1999. Famennian and Tournaisian recoveries of shallow water Rugosa following late Frasnian and late Strunian major crises, southern Belgium and surrounding areas, Hunan (South China) and the Omolon region (NE Siberia). *Palaeogeography, Palaeoclimatology, Palaeoecology* 154: 11–26.
- Prave, A. R. 2002. Life on land in the Proterozoic: Evidence from the Torridonian rocks of northwest Scotland. *Geology* 30(9): 811–814.
- Prestianni, C. and P. Gerrienne. 2010. Early seed plant radiation: An ecological hypothesis. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 71–80.
- Pritchard, G., M. H. McKee, E. M. Pike, G. J. Scrimgeour, and J. Zloty. 1993. Did the first insects live in water or in air? *Biological Journal of the Linnean Society* 49: 31–44.
- Prokop, J., A. Nel, and I. Hoch. 2005. Discovery of the oldest known Pterygota in the Lower Carboniferous of the Upper Silesian Basin in the Czech Republic (Insecta: Archaeoptera). *Geobios* 38: 383–387.
- Prothero, D. R. 2007. *Evolution: What the Fossils Say and Why It Matters*. New York: Columbia University Press.
- Racki, G. 2005. Toward understanding Late Devonian global events: Few answers, many questions. In *Understanding Late Devonian and Permian–Triassic Biotic and Climatic Events*. ed. D. J. Over, J. R. Morrow, and P. B. Wignall. Amsterdam, Netherlands: Elsevier B.V., pp. 5–36.
- Racki, G., M. Racka, H. Matyja, and X. Devleeschouwer. 2002. The Frasnian–Famennian boundary interval in the South Polish–Moravian shelf basins: Integrated event-stratigraphic approach. *Palaeogeography, Palaeoclimatology, Palaeoecology* 181: 251–297.
- Racki, G. and P. Wignall. 2001. Eutrophication by decoupling of the marine biogeochemical cycles of C, N, and P: A mechanism for the Late Devonian mass extinction: Comment. *Geology* 29(5): 469–470.
- Raup, D. M. and J. J. Sepkoski. 1982. Mass extinctions in the marine fossil record. *Science* 215: 1501–1503.
- Raymo, M. E. and W. F. Ruddiman. 1992. Tectonic forcing of late Cenozoic climate. *Nature* 359: 117–122.
- Raymond, A., P. Gensel, and W. E. Stein. 2006. Phytogeography of Late Silurian macrofloras. *Review of Palaeobotany and Palynology* 142: 165–192.
- Raymond, A., and C. Metz. 1995. Laurussian land-plant diversity during the Silurian and Devonian: Mass extinction, sampling bias, or both? *Paleobiology* 21(1): 74–91.
- Redecker, D., R. Kodner, and L. E. Graham. 2000. Glomalean fungi from the Ordovician. *Science* 289: 1920–1921.

- Reimold, W. U., S. P. Kelley, S. C. Sherlock, H. Henkel, and C. Koeberl. 2005. Laser argon dating of melt breccias from the Siljan impact structure, Sweden: Implications for a possible relationship to Late Devonian extinction events. *Meteoritics and Planetary Science* 40(4): 591–607.
- Retallack, G. J., R. R. Hunt, and T. S. White. 2009. Late Devonian tetrapod habitats indicated by palaeosols in Pennsylvania. *Journal of the Geological Society of London* 166: 1143–1156.
- Rimmer, S. M., J. A. Thompson, S. A. Goodnight, and Thomas L. Robl. 2004. Multiple controls on the preservation of organic matter in Devonian–Mississippian marine black shales: Geochemical and petrographic evidence. *Palaeogeography, Palaeoclimatology, Palaeoecology* 215: 125–154.
- Riquier, L., N. Tribouvillard, O. Averbuch, X. Devleeschouwer, and A. Riboulleau. 2006. The late Frasnian Kellwasser horizons of the Harz Mountains (Germany): Two oxygen-deficient periods resulting from different mechanisms. *Chemical Geology* 233: 137–155.
- Rothwell, G. W., S. E. Scheckler, and W. H. Gillespie. 1989. *Elkinsia* gen. nov., a Late Devonian gymnosperm with cupulate ovules. *Botanical Gazette* 150: 170–189.
- Rubinstein, C. V., P. Gerriene, G. S. de la Puente, R. A. Astini, and P. Steemans. 2010. Early Middle Ordovician evidence for land plants in Argentina (eastern Gondwana). *New Phytologist* 188: 365–369.
- Sageman, B. B., A. E. Murphy, J. P. Werne, C. A. Ver Straeten, D. J. Hollander, and T. W. Lyons. 2003. A tale of shales: The relative roles of production, decomposition, and dilution in the accumulation of organic-rich strata, Middle-Upper Devonian, Appalachian basin. *Chemical Geology* 195: 229–273.
- Sallan, L. C. and M. I. Coates. 2010. End-Devonian extinction and a bottleneck in the early evolution of modern jawed vertebrates. *Proceedings of the National Academy of Sciences USA* 107(22): 10131–10135.
- Sallan, L. C., T. W. Kammer, W. I. Ausich, and L. A. Cook. 2011. Persistent predator-prey dynamics revealed by mass extinction. *Proceedings of the National Academy of Sciences USA* 108(20): 8335–8338.
- Saltzman, M. R., L. A. González, K. C. Lohman. 2000. Earliest Carboniferous cooling triggered by the Antler orogeny? *Geology* 28(4): 347–350.
- Sandberg, C. A., J. R. Morrow, and W. Ziegler. 2002. Late Devonian sea-level changes, catastrophic events, and mass extinctions. *Geological Society of America Special Paper* 356: 473–487.
- Scheckler, S. E. 1986. Floras of the Devonian–Mississippian Transition. In *Land Plants: Notes for a Short Course*. ed. T. W. Broadhead. Knoxville, Tenn.: University of Tennessee Department of Geological Sciences Studies in Geology Number 15, pp. 81–96.
- Schieber, J. 2009. Discovery of agglutinated benthic foraminifera in Devonian black shales and their relevance for the redox state of ancient seas. *Palaeogeography, Palaeoclimatology, Palaeoecology* 271: 292–300.

- Schindler, E. 1990. Die Kellwasser-Krise (hohe Frasn-Stufe, Ober-Devon). *Göttinger Arbeiten zur Geologie und Paläontologie* 46: 1–115.
- . 1993. Event-stratigraphic markers within the Kellwasser Crisis near the Frasnian–Famennian boundary (Upper Devonian) in Germany. *Palaeogeography, Palaeoclimatology, Palaeoecology* 104: 115–125.
- Schopf, J. W. 1993. Microfossils of the Early Archean Apex Chert: New evidence of the antiquity of life. *Science* 260: 640–646.
- Scott, A. C. and I. J. Glasspool. 2006. The diversification of Paleozoic fire systems and fluctuations in atmospheric oxygen concentration. *Proceedings of the National Academy of Sciences USA* 103(29): 10861–10865.
- Sepkoski, J. J. 1986. Patterns of Phanerozoic extinction: A perspective from global data bases. In *Global Events and Event Stratigraphy*. ed. O. H. Walliser. Berlin, Germany: Springer-Verlag, pp. 35–51.
- . 2002. A compendium of fossil marine animal genera. *Bulletin of American Paleontology* 363: 1–560.
- Shear, W. A. and G. D. Edgecombe. 2010. The geological record and phylogeny of the Myriapoda. *Arthropod Structure and Development* 39: 174–190.
- Shear, W. A. and P. A. Selden. 2001. Rustling in the undergrowth: Animals in early terrestrial ecosystems. In *Plants Invade the Land*. ed. P. G. Gensel and D. Edwards. New York: Columbia University Press, pp. 29–51.
- Shubin, N. H. 2009. *Your Inner Fish*. New York: Vintage Books.
- Shubin, N. H., C. Tabin, and S. Carroll. 1997. Fossils, genes and the evolution of animal limbs. *Nature* 388: 639–648.
- Sierwald, P. and J. E. Bond. 2007. Current status of the myriapod Class Diplopoda (millipedes): Taxonomic diversity and phylogeny. *Annual Review of Entomology* 52: 401–420.
- Snitting, D. 2008. *Morphology, Taxonomy and Interrelationships of Tristichopterid Fishes (Sarcopterygii, Tetrapodomorpha)*. Uppsala, Sweden: Acta Universitatis Uppsalensis (PhD dissertation, 54 pp.)
- Stanley, S. M. 2007. An analysis of the history of marine animal diversity. *Paleobiology Memoir* 4: 1–55.
- Stemans, P., C. H. Wellman, and P. Gerrienne. 2010. Palaeogeographic and palaeoclimatic considerations based on Ordovician to Lochkovian vegetation. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere–Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 49–58.
- Stein, W. E., C. M. Berry, L. V. Hernick, and F. Mannolini. 2012. Surprisingly complex community discovered in the Mid-Devonian fossil forest at Gilboa. *Nature* 483: 78–81.
- Stein, W. E., F. Mannolini, L. V. Hernick, E. Landing, and C. M. Berry. 2007. Giant cladoxylopsid trees resolve the enigma of the Earth's earliest forest stumps at Gilboa. *Nature* 446: 904–907.

- Stigall, A. L. 2010. Invasive species and biodiversity crises: Testing the link in the Late Devonian. *PLoS ONE* 5(12): e15584. doi: 10.1371/journal.pone.0015584
- Stössel, I. 1995. The discovery of a new Devonian tetrapod trackway in SW Ireland. *Journal of the Geological Society of London* 152: 407–413.
- Streel, M. 2009. Upper Devonian miospore and conodont zone correlation in Western Europe. In *Devonian Change: Case Studies in Palaeogeography and Palaeoecology*. ed. P. Königshof. Geological Society, London, Special Publications 314: 163–176.
- Streel, M., M. V. Caputo, S. Loboziak, and J. H. G. Melo. 2000. Late Frasnian–Famennian climates based on palynomorph analyses and the question of the Late Devonian glaciations. *Earth-Science Reviews* 52: 121–173.
- Streel, M., K. Higgs, S. Loboziak, W. Riegel, and P. Steemans. 1987. Spore stratigraphy and correlation with faunas and floras in the type marine Devonian of the Ardenne-Rhenish regions. *Review of Palaeobotany and Palynology* 50: 211–229.
- Strother, P. K., T. Servais, and M. Vecoli. 2010. The effects of terrestrialization on marine ecosystems: The fall of CO₂. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 37–48.
- Taylor, T. N., H. Hass, W. Remy, and H. Kerp. 1995. The oldest fossil lichen. *Nature* 378: 244.
- Taylor, T. N. and J. M. Osborn. 1996. The importance of fungi in shaping a paleoecosystem. *Review of Palaeobotany and Palynology* 90: 249–262.
- Taylor, T. N. and E. L. Taylor. 1993. *The Biology and Evolution of Fossil Plants*. New Jersey: Prentice Hall.
- Toon, O. B., K. Zahnle, R. P. Turco, and C. Covey. 1994. Environmental perturbations caused by asteroid impacts. In *Hazards due to Comets and Asteroids*. ed. T. Gehrels. Tucson, Ariz.: University of Arizona Press, pp. 791–826.
- Veizer, J., D. Ala, K. Azmy, P. Bruckschen, D. Buhl, F. Bruhn, G. A. F. Carden, A. Diener, S. Ebner, Y. Godderis, T. Jasper, C. Korte, F. Pawellek, O. G. Podlaha, and H. Strauss. 1999. ⁸⁷Sr/⁸⁶Sr, δ¹³C and δ¹⁸O evolution of Phanerozoic seawater. *Chemical Geology* 161: 59–88.
- Versteegh, G. J. M. and A. Riboulleau. 2010. An organic geochemical perspective on terrestrialization. In *The Terrestrialization Process: Modelling Complex Interactions at the Biosphere-Geosphere Interface*. ed. M. Vecoli, G. Clément, and B. Meyer-Berthaud. Geological Society, London, Special Publications 339: 11–36.
- Voigt, S. and M. Ganzewski. 2010. Toward the origin of amniotes: Diadectomorph and synapsid footprints from the early Late Carboniferous of Germany. *Acta Palaeontologica Polonica* 55(1): 57–72.
- Wade, N. 2006. *Before the Dawn: Recovering the Lost History of Our Ancestors*. New York: Penguin Press.

- Walker, J. D. and J. W. Geissman. 2009. Geologic time scale. Geological Society of America, doi: 10.1130/2009.CTS004R2C.
- Walliser, O. H. 1996. Global events in the Devonian and Carboniferous. In *Global Events and Event Stratigraphy*. ed. O. H. Walliser. Berlin, Germany: Springer-Verlag, pp. 225–250.
- Ward, P. D. 2005. *Life as We Do Not Know It*. New York: Viking Penguin.
- Ward, P., C. Labandeira, M. Laurin, and R. A. Berner. 2006. Confirmation of Romer's Gap as a low oxygen interval constraining the timing of initial arthropod and vertebrate terrestrialization. *Proceedings of the National Academy of Sciences USA* 103(45): 16818–16822.
- Webb, G. E. 2002. Latest Devonian and Early Carboniferous reefs: Depressed reef building after the Middle Paleozoic collapse. In *Phanerozoic Reef Patterns*. ed. W. Kiessling, E. Flügel, and J. Golonka. Tulsa, Okla: SEPM Special Publication Number 72: 239–269.
- Wei, F., Y. Gong, and H. Yang. 2012. Biogeography, ecology and extinction of Silurian and Devonian tentaculitoids. *Palaeogeography, Palaeoclimatology, Palaeoecology* 358–360: 40–50.
- Wellman, C. H. 2010. The invasion of the land by plants: When and where? *New Phytologist* 188: 306–309.
- Wellman, C. H., P. L. Osterloff, and U. Mohiuddin. 2003. Fragments of the earliest land plants. *Nature* 425: 282–285.
- Wilson, H. M. 2006. Juliform millipedes from the Lower Devonian of Euramerica: Implications for the timing of millipede cladogenesis in the Paleozoic. *Journal of Paleontology* 80(4): 638–649.
- Wilson, H. M. and L. I. Anderson. 2004. Morphology and taxonomy of Paleozoic millipedes (Diplopoda: Chilognatha: Archipolypoda) from Scotland. *Journal of Paleontology* 78(1): 169–184.
- Wilson, H. M. and J. T. Hannibal. 2005. Taxonomy and trunk-ring architecture of pleurojulid millipedes (Diplopoda: Chilognatha: Pleurojulida) from the Pennsylvanian of Europe and North America. *Journal of Paleontology* 79(6): 1105–1119.
- Wootton, R. J., J. Kukalová-Peck, D. J. S. Newman, and J. Muzón. 1998. Smart engineering in the Mid-Carboniferous: How well could Palaeozoic dragonflies fly? *Science* 282: 749–751.
- Xiong, J., W. M. Fischer, K. Inoue, M. Nakahara, and C. E. Bauer. 2000. Molecular evidence for the early evolution of photosynthesis. *Science* 289: 1724–1730.
- Young, G. C. 2010. Placoderms (armored fish): Dominant vertebrates of the Devonian Period. *Annual Review of Earth and Planetary Sciences* 38: 523–550.
- Yuan, X., S. Xiao, and T. N. Taylor. 2005. Lichen-like symbiosis 600 million years ago. *Science* 308: 1017–1020.
- Zachos, J., M. Pagani, L. Sloan, E. Thomas, and K. Billups. 2001. Trends, rhythms, and aberrations in global climate 65 Ma to present. *Science* 292: 686–693.

- Zhu, M., P. E. Ahlberg, W. Zhao, and L. Jia. 2002. First Devonian tetrapod from Asia. *Nature* 420: 760–761.
- Zhu, M., W. Zhao, L. Jia, J. Lu, T. Qiao, and Q. Qu. 2009. The oldest articulated osteichthyan reveals mosaic gnathostome characters. *Nature* 458: 469–474.
- Ziegler, W. and C. A. Sandberg. 1990. The Late Devonian standard conodont zonation. *Courier Forschungsinstitut Senckenberg* 121: 1–115.
- Zubrin, R. and R. Wagner. 2011. *The Case for Mars* (Revised Edition). New York: Free Press.