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Steven M. Holland

Professor

Stratigraphy Lab
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Research Interests

I am a paleontologist and a stratigrapher, and I'm interested in the long-term response of marine invertebrate communities and sedimentary environments to sea-level change and climate change. I use a combination of field work and computer simulation in my research. In my field work, I've often used the extraordinarily fossiliferous Ordovician (445-466 million year old) deposits of North America to test a wide range of hypotheses about the controls on the diversity and structure of marine communities. My graduate students study the paleoecology of marine invertebrate communities of a variety of ages, as well as the stratigraphy and sedimentology of the rocks in which they are found.

Currently, I am concentrating on an NSF-funded project on the common-cause problem, that both biodiversity and the completeness of the stratigraphic record are controlled by the same factors, such as eustatic sea-level change. The project includes computer simulation to make predictions about how sea-level change would affect the diversity of marine invertebrate communities, the structure of the stratigraphic record, and our perceptions of the fossil record. The project also includes a field study and a database study to test the predictions of these models. The grant has support for a research assistant, and if you're looking for graduate study, please email me at stratum@uga.edu.

I am also working with a graduate student and Robin O'Keefe of Marshall University on the controls on fossil occurrence in the Jurassic Sundance Formation of Wyoming. We are finding a strong sequence stratigraphic control on the distribution of fossils, not only on the widely abundant marine invertebrates (primarily bivalves, gastropods, and ammonoids), but also the much rarer vertebrates: plesiosaurs and ichthyosaurs. Many more projects like this are possible, and I am looking for enthusiastic students who enjoy field work.

Awards

Charles Schuchert Award, Paleontological Society, 2003
James Lee Wilson Award, Society for Sedimentary Geology, 2000

Selected Recent Publications

Holland, S.M., in press, Sea-level change and the area of shallow marine habitat: Implications for marine biodiversity. *Paleobiology*.

Zaffos, A., and S.M. Holland, in press, Abundance and extinction in Ordovician-

Silurian brachiopods, Cincinnati Arch, Ohio and Kentucky, USA. *Paleobiology*.

Holland, S.M., and A. Zaffos, 2011, Niche conservatism along an onshore-offshore gradient. *Paleobiology* v. 37, p. 270-286.

Holland, S.M., 2010, Additive diversity partitioning in paleobiology: revisiting Sepkoski's question. *Palaeontology*.

Holland, S.M., and M.E. Patzkowsky, 2009, Stratigraphic architecture of a tropical carbonate platform and its effect on the distribution of fossils: Ordovician Bighorn Dolomite, Wyoming, USA. *Palaios* v. 24, p. 303-317.

Holland, S.M., 2008. The type Cincinnati Series: An overview. In P.I. McLaughlin, C.E. Brett, S.M. Holland, and G.W. Storrs, eds., *Stratigraphic Renaissance in the Cincinnati Arch: Implications for Upper Ordovician Paleontology and Paleoecology*, Cincinnati Museum Center Scientific Contributions No. 2, p. 174-184.

Holland, S.M., and M.E. Patzkowsky, 2007, Gradient ecology of a biotic invasion: biofacies of the type Cincinnati Series (Upper Ordovician), Cincinnati, Ohio region, USA. *Palaios* v. 22, p. 392-407.

Patzkowsky, M.E., and S.M. Holland, 2007, Diversity partitioning of a Late Ordovician marine biotic invasion: controls on diversity in regional ecosystems. *Paleobiology* v. 33, p. 295-309.

Allullee, J.L., and S.M. Holland, 2005. The sequence stratigraphic and environmental context of primitive vertebrates: Harding Sandstone, Upper Ordovician, Colorado, USA. *Palaios* v. 20, p. 518-533.

Holland, S.M., and M.E. Patzkowsky, 2004. Ecosystem structure and stability: middle Upper Ordovician of central Kentucky, USA. *Palaios* v. 19, p. 316-331.

Holland, S.M., and M.E. Patzkowsky, 2002. Stratigraphic variation in the timing of first and last occurrences. *Palaios*, v. 17, p. 134-146.

Holland, S.M., 2001. The detection and importance of subtle biofacies in monotonous lithofacies: the Upper Ordovician Kope Formation of the Cincinnati, Ohio region. *Palaios*, v. 16, p. 205-217.

Holland, S.M., 2000, The quality of the fossil record: a sequence stratigraphic perspective. In D.H. Erwin and S.L. Wing, eds., *Deep Time: Paleobiology's Perspective*. Lawrence, Kansas: The Paleontological Society, p. 148-168.

Holland, S.M., D.L. Meyer, and A.I. Miller, 2000. High-resolution correlation in apparently monotonous rocks: Upper Ordovician Kope Formation, Cincinnati Arch. *Palaios*, v. 15, p. 73-80.