

The PALEONICHES - TCN



Ordovician
Cincinnati Region



Pennsylvanian
Midcontinent U.S.



Neogene
Southeastern U.S.

B.S. Lieberman, J.R. Hendricks, A.L. Stigall,
U.C. Farrell, S. Butts, A. Molineux, J.H.
Beach, R. Portell, B. Hunda, K. Hauer

*U. of Kansas, Paleontological Research Institution, Ohio U., U. of Texas, Yale
U., Cincinnati Museum, Miami University, Florida Museum*

PALEONICHES – TCN : Data

> 975,000 specimens databased, original goal 450,000

> 9,200 fossil localities georeferenced

> 1,200 images of fossil species

Data shared/published via iDigBio and institutional websites

PALEONICHES – TCN: Outreach



www.digitalatlasofancientlife.org

 @PaleoDigAtlas

Digital Atlas App

Free for iPhone/iPad



PALEONICHES – TCN: Outreach

Digital Atlas of Ancient Life Website:

www.digitalatlasofancientlife.org

Described in Hendricks, Stigall, and Lieberman. 2015. *Palaeontologia Electronica*

More than 1,200 species represented with information, images, and maps

> 700,000 visits; > 3,200,000 hits



Digital Atlas of Ancient Life

Electronic Field Guide

Explore taxonomic information, images and maps for three Paleontological time periods.

▶ **START**

🕒 **BROWSE**

🕒 **TIME PERIOD**



Ordovician



Pennsylvanian



Neogene

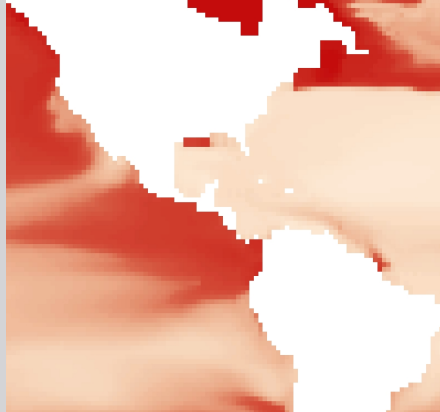
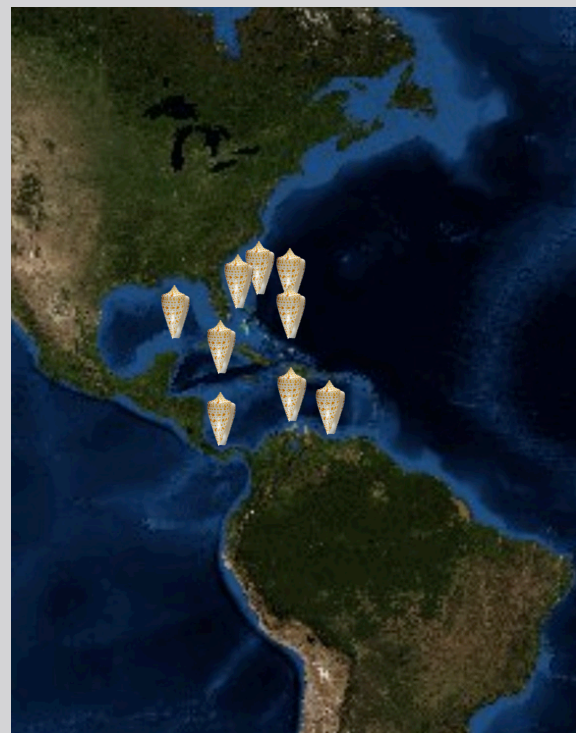


PALEONICHES – TCN: Research

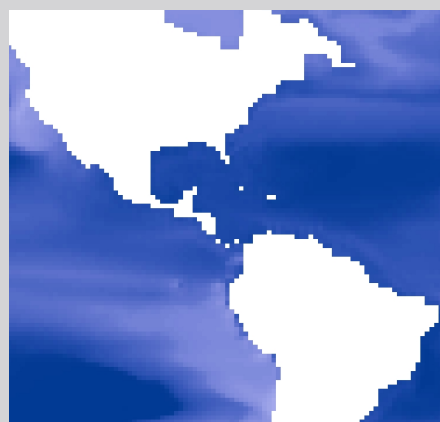
Scientific publications in various journals including:

Global Ecology and Biogeography, Proceedings of the Royal Society, Series B, Journal of Biogeography, and Paleobiology

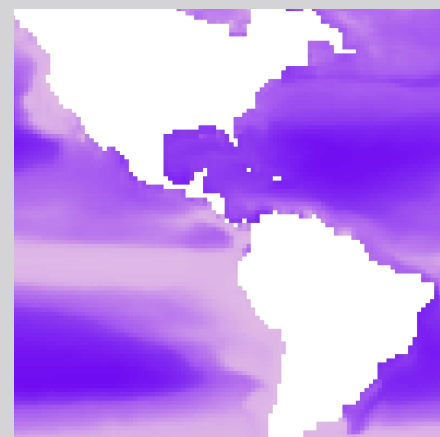
Used GIS and Ecological Niche Modeling to study macroevolutionary effects of climate change



SSS



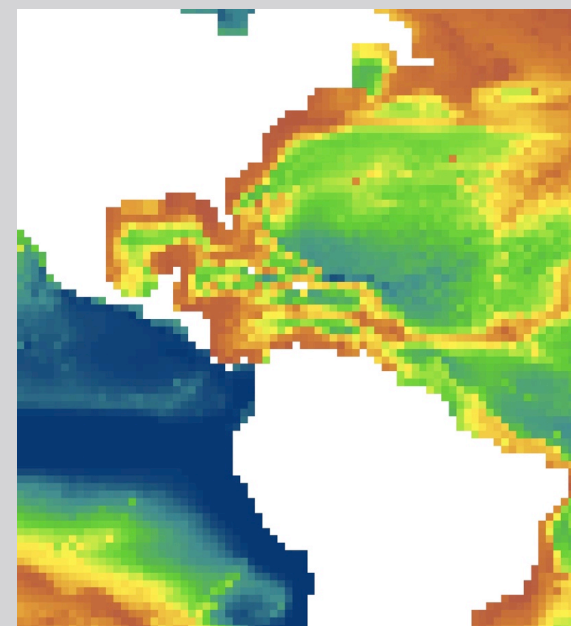
Nitrogen



Diatom Phytoplankton



$$p(x) = e^{(\lambda_1 x_1 + \dots + \lambda_n x_n)}$$



Dinocardium robustum



Maxent

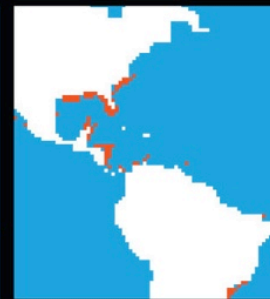
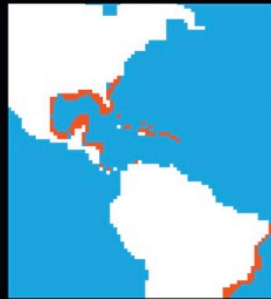
GARP

Present

2021-2040

2041-2060

2081-2100

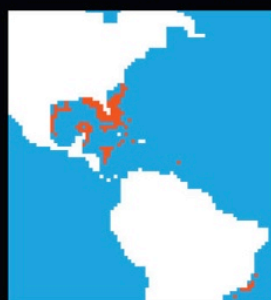
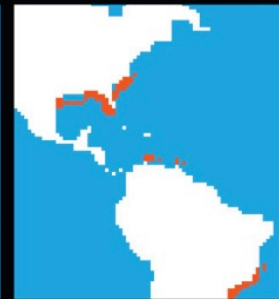
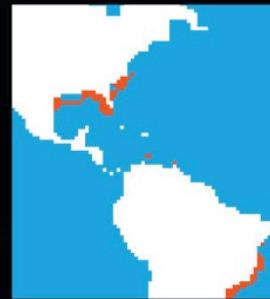


Terebra dislocata

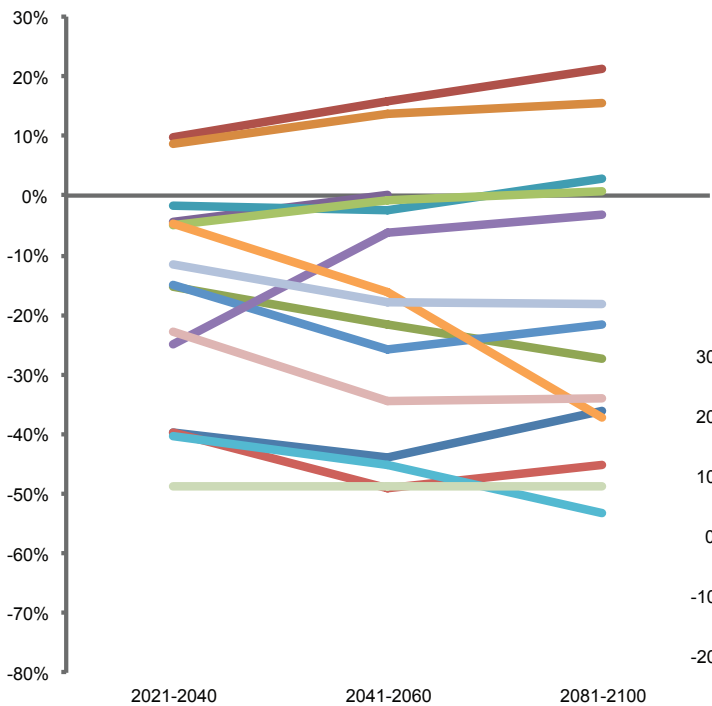


Maxent

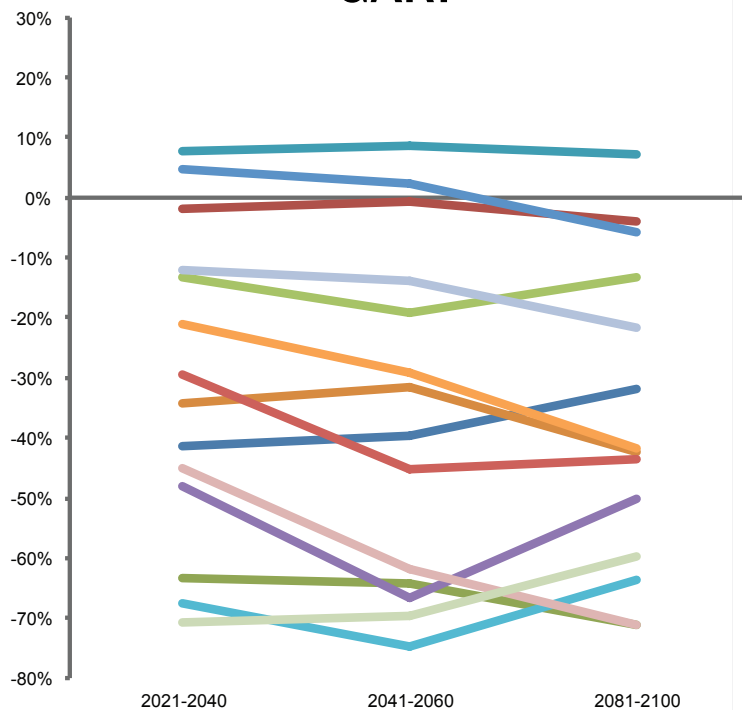
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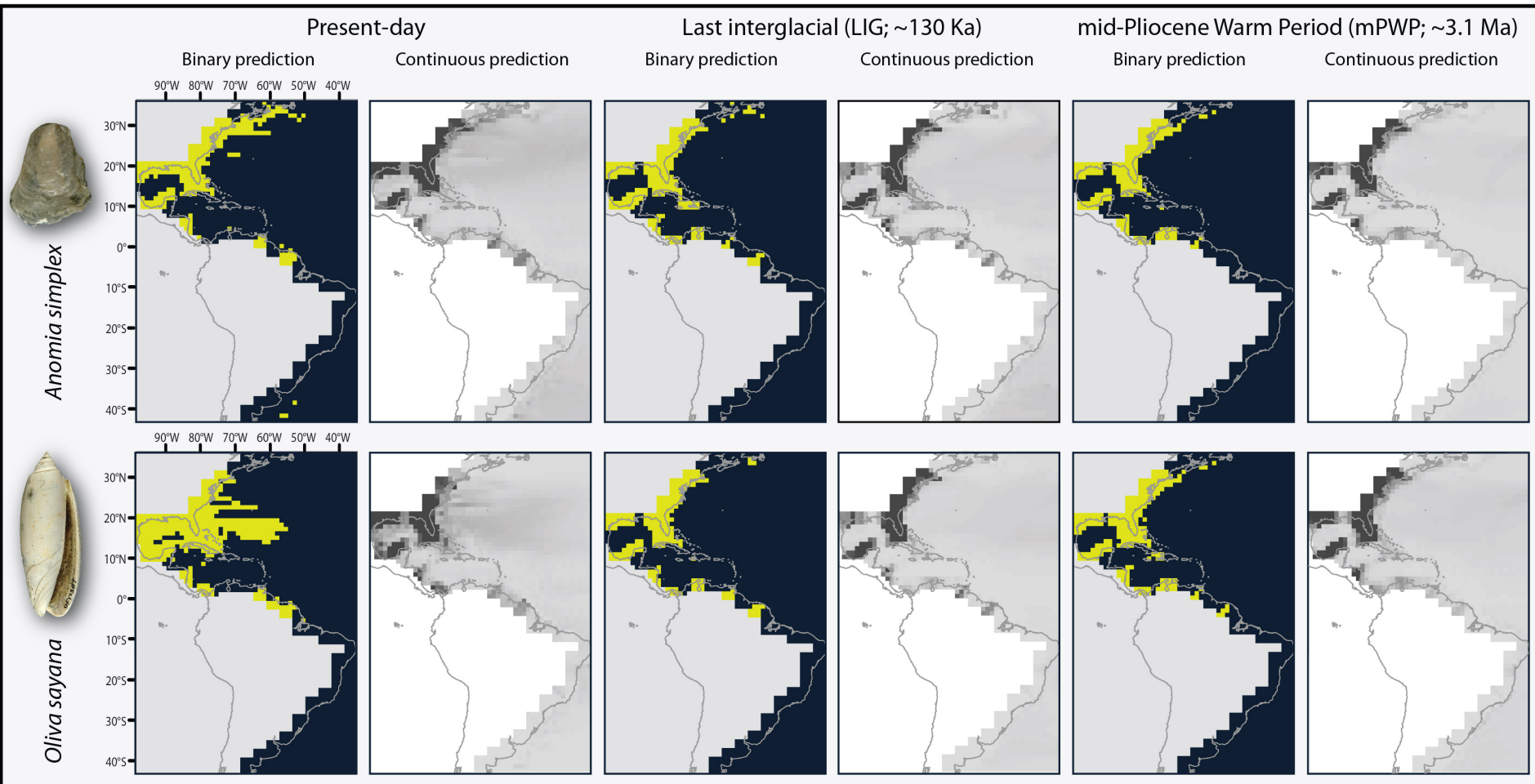
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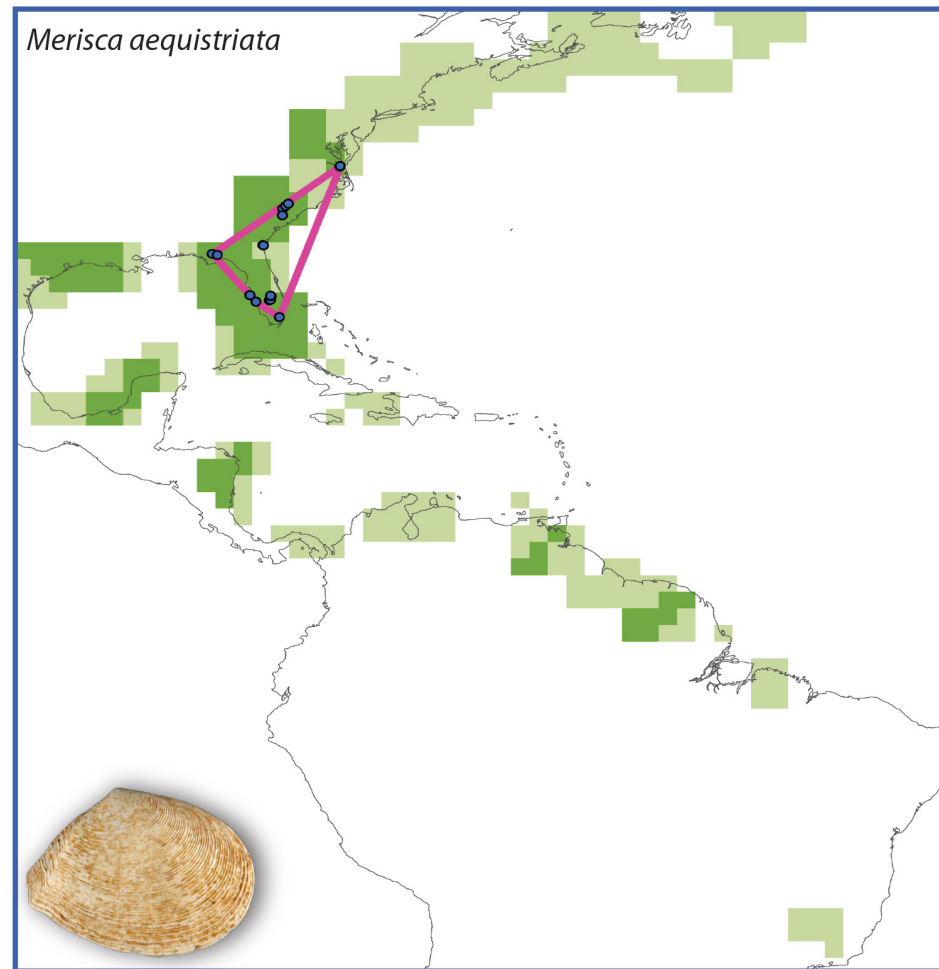
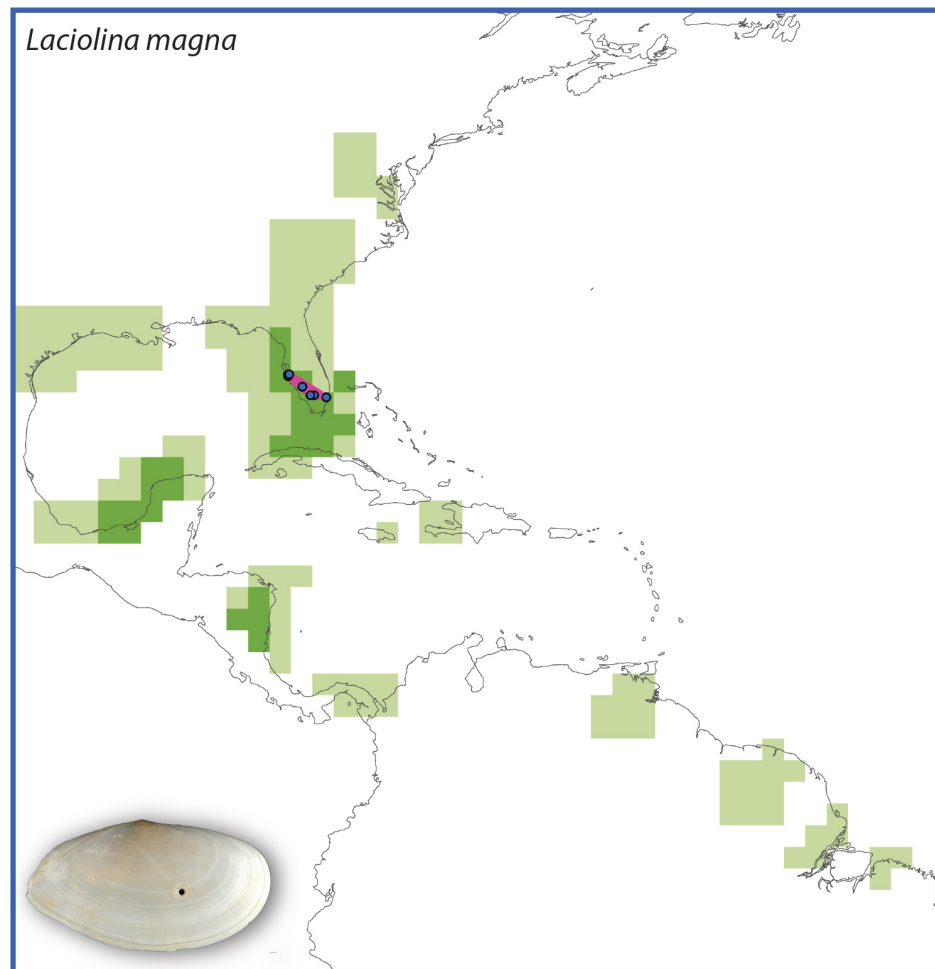
- *A. simplex*
- *B. occidentalis*
- *C. floridanus*
- *C. spurius*
- *C. virginica*
- *C. fornicata*
- *D. robustum*
- *L. pensylvanica*
- *M. corona*
- *M. campechensis*
- *O. sayana*
- *N. duplicatus*
- *S. alatus*
- *T. dislocata*

% CHANGE FROM PRESENT

Species Niches Conserved Over Millions of Years and Major Climate Changes



The Major Factor that Determines Where Species Occur is Climate, with Biotic Factors Playing a Much More Limited Role



PALEONICHES – TCN: Research

Species niches conserved over millions of years and through major climate changes

Climate is the primary factor controlling geographic distributions over millions of years, with biotic factors playing a much more limited role

Many species of modern marine mollusks, some of them pivotal to marine ecosystems and the human economy, are at significant risk of extinction by 2100

Lesson Learned

Approach digitization of fossils same way you would digitization of extant taxa



Thanks to:

iDigBio

Julien Kimmig (U. of Kansas)

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Alycia Stigall (Ohio U.)

Cori Myers (U. of New Mexico)

Harry Dowsett (USGS)

Roger Portell (U. of Florida)

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NSF Emerging Frontiers

NSF Advancing the Digitization of Biological Collections

