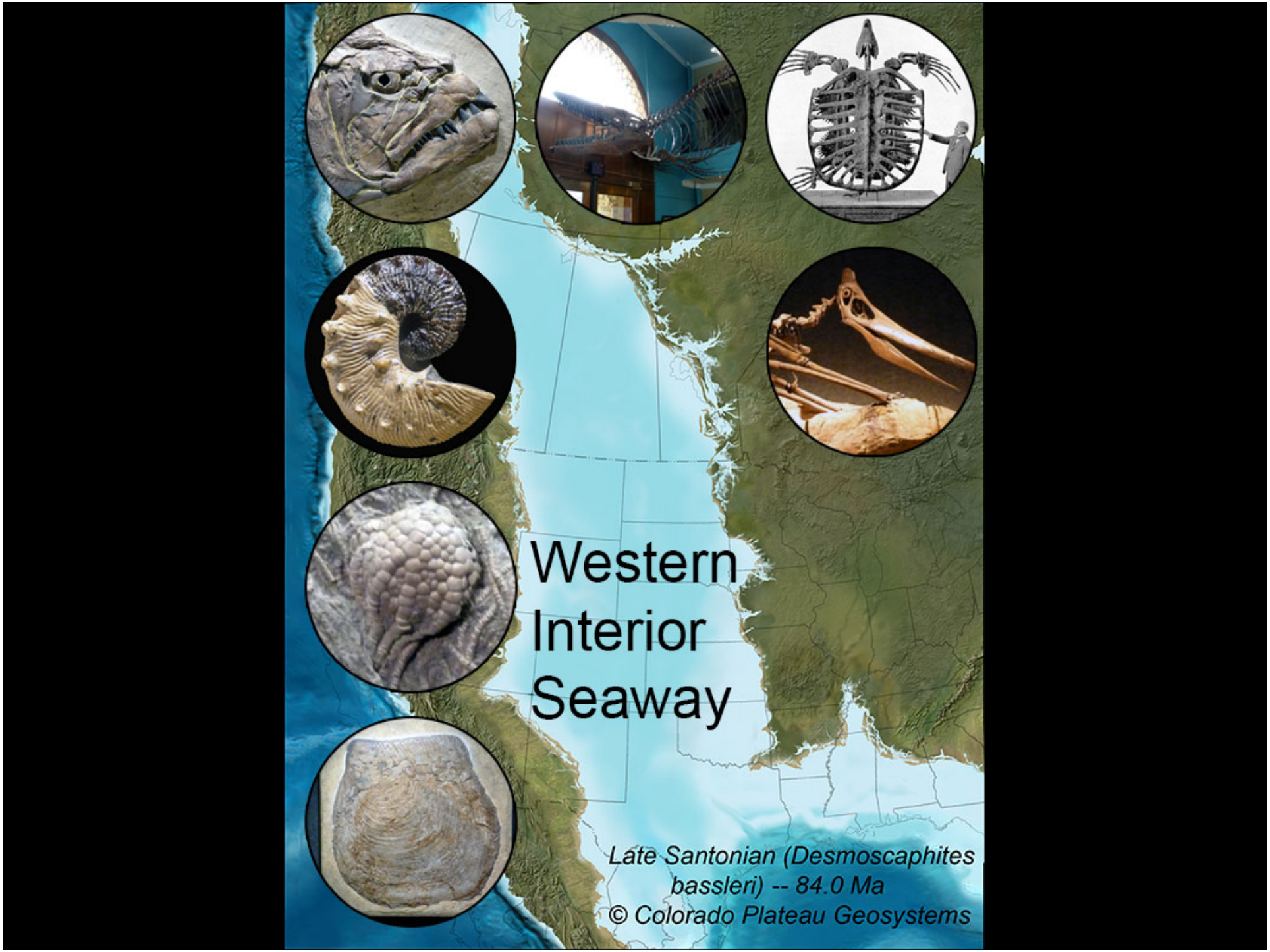
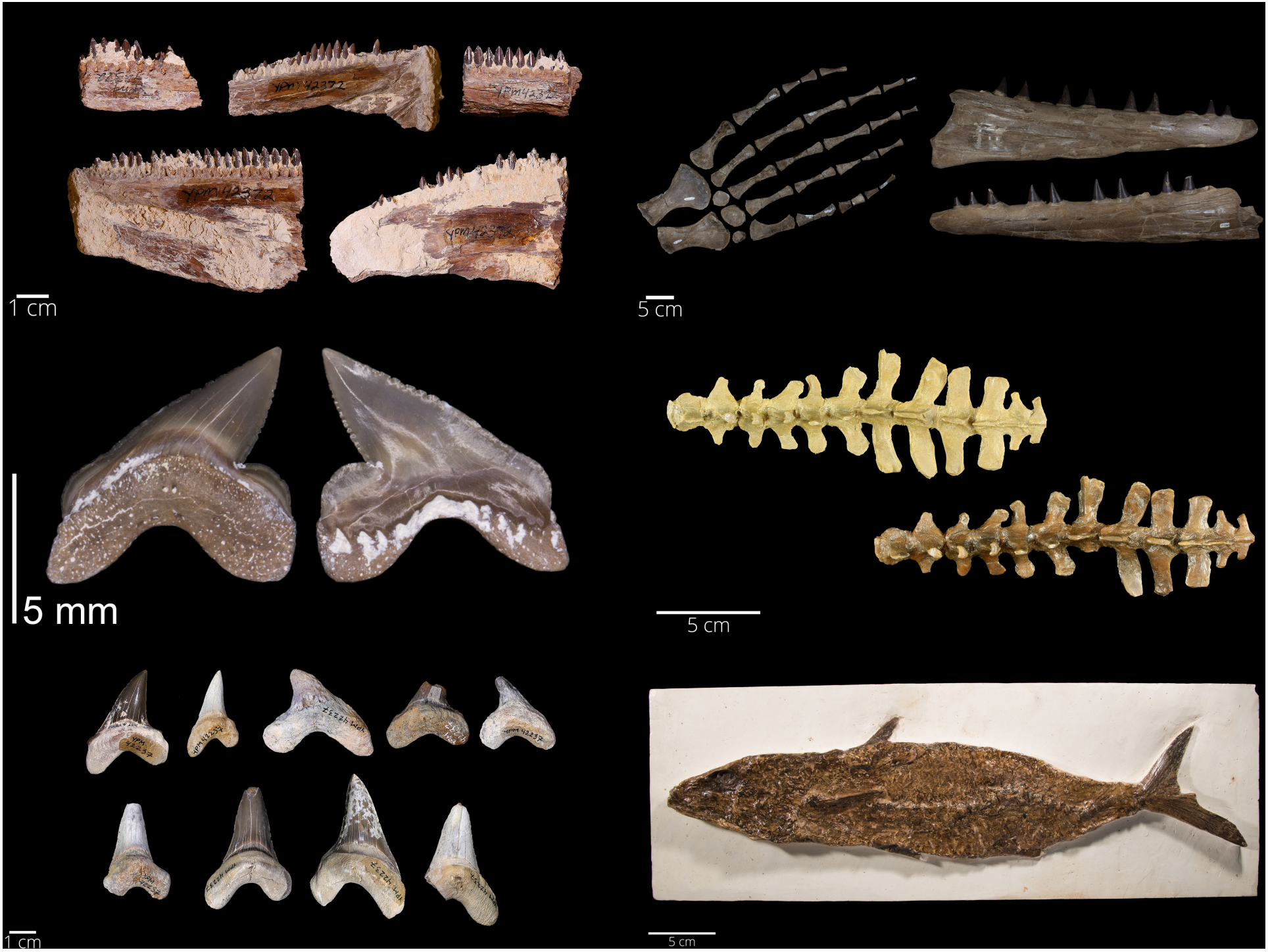
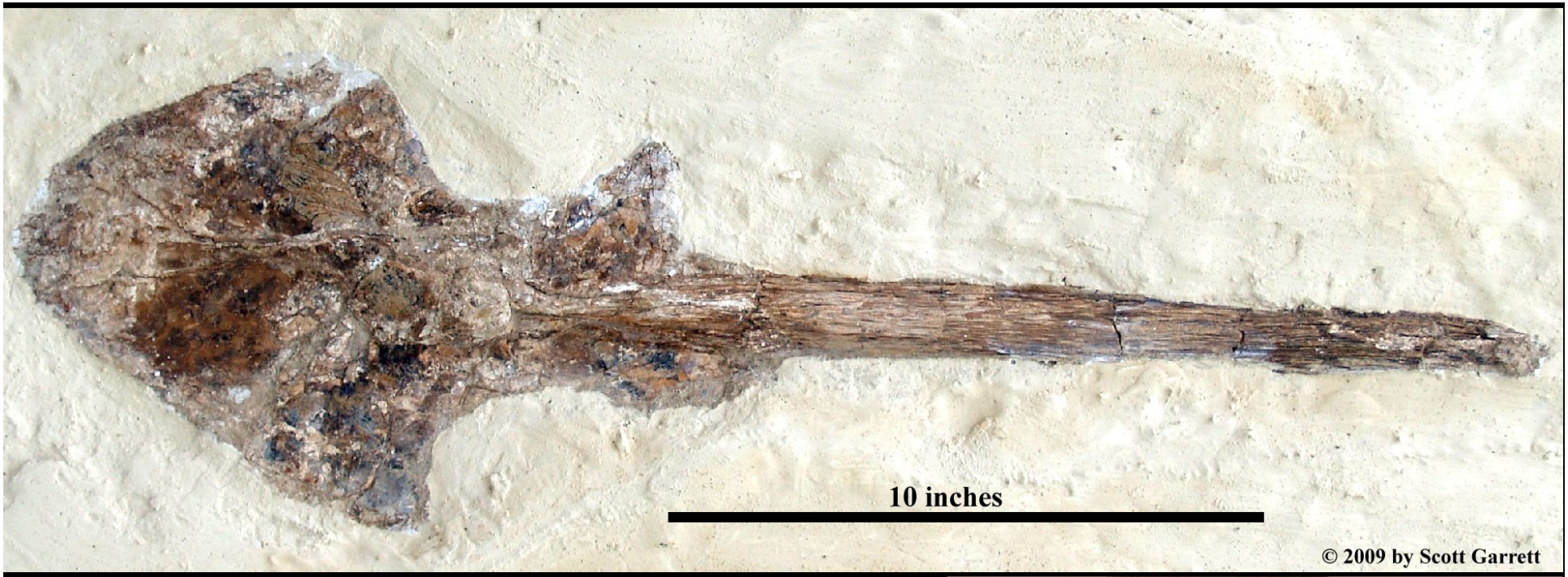
The Cretaceous World - TCN

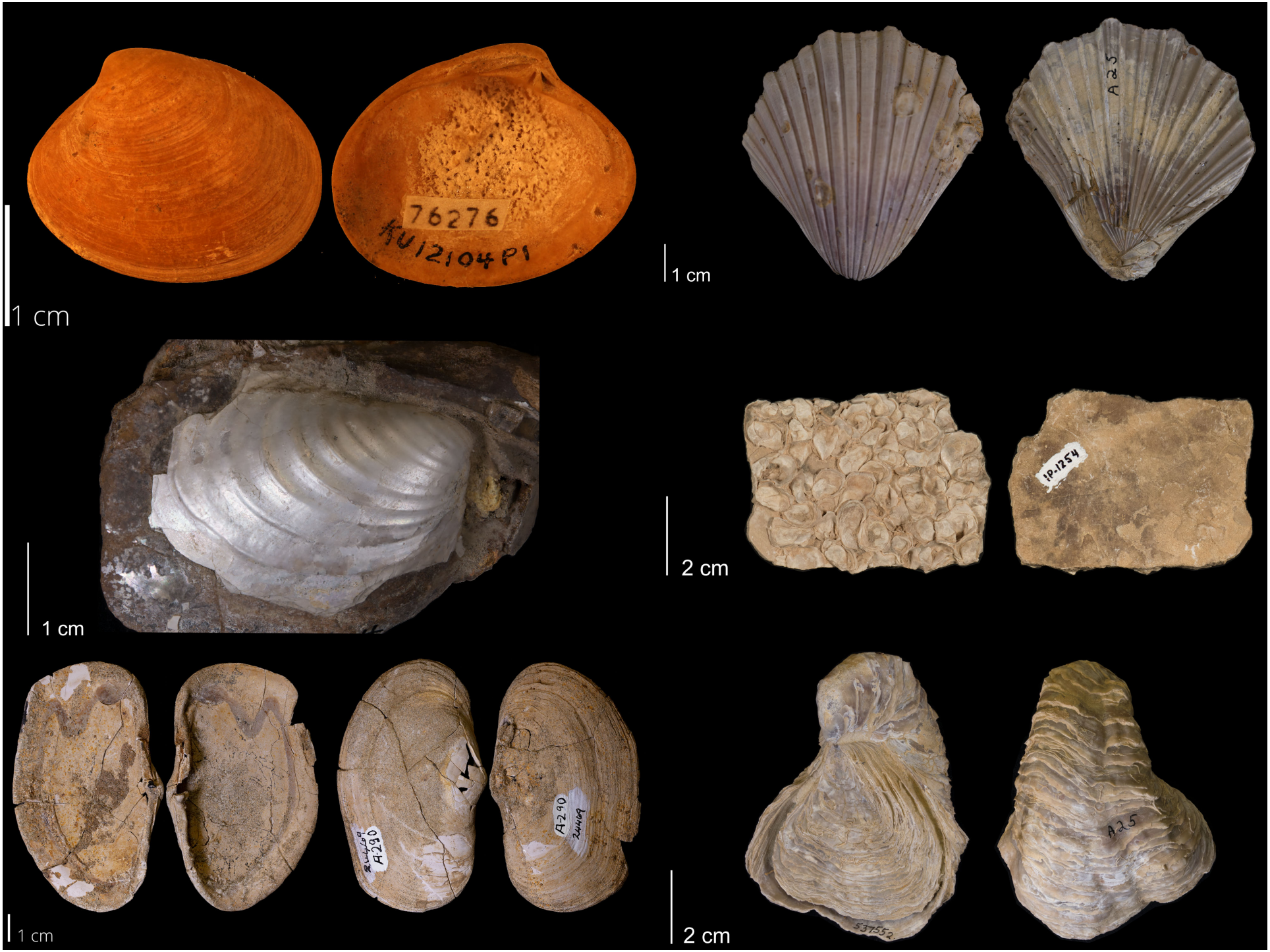
Bruce S. Lieberman

Biodiversity Institute and Department of Ecology & Evolutionary Biology, University of Kansas


Western
Interior
Seaway
Late Santonian (Desmoscaphites bassleri) -- 84.0 Ma
© Colorado Plateau Geosystems


1 cm
5 cm
5 mm
5 cm
1 cm
5 cm

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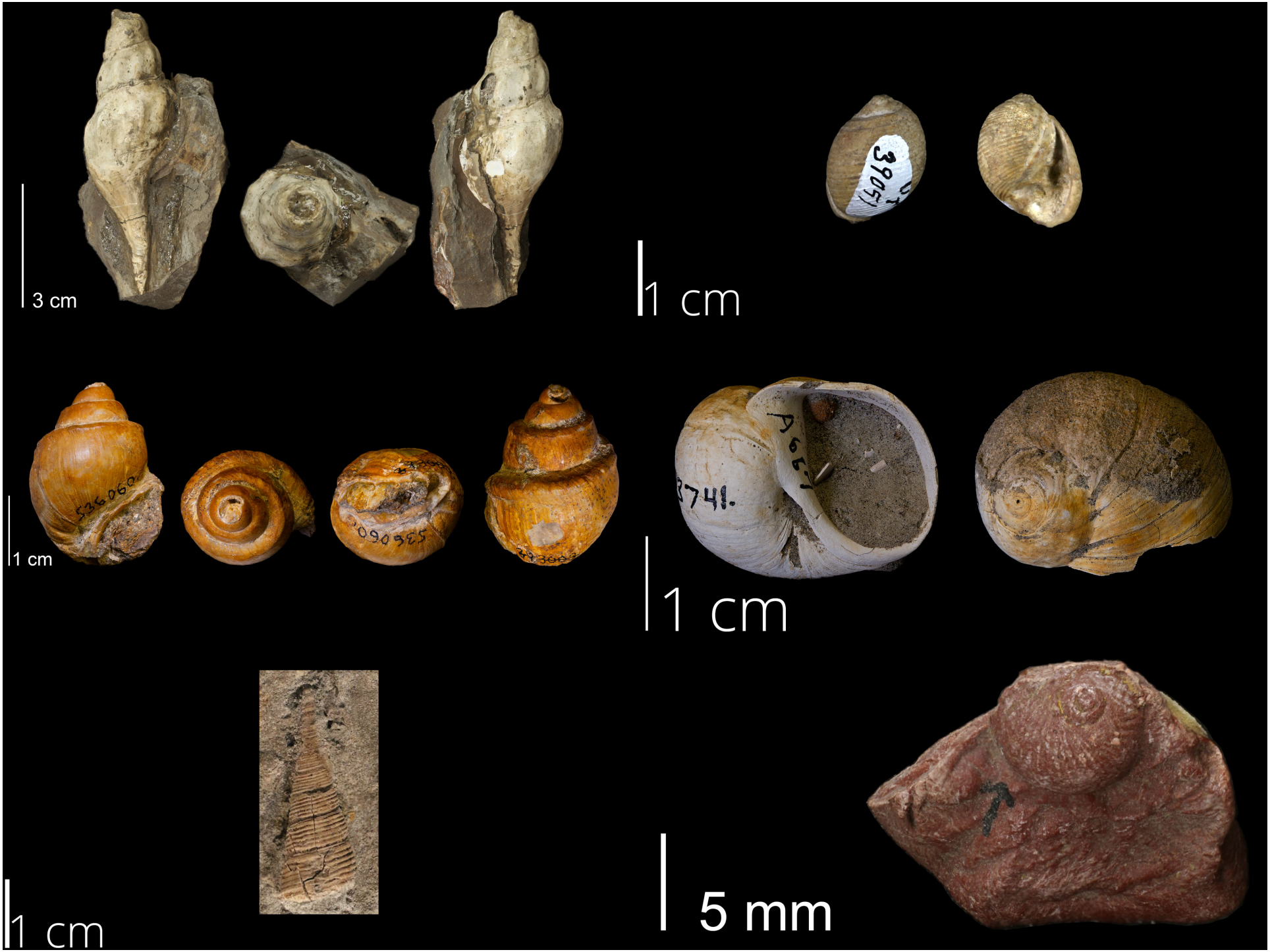
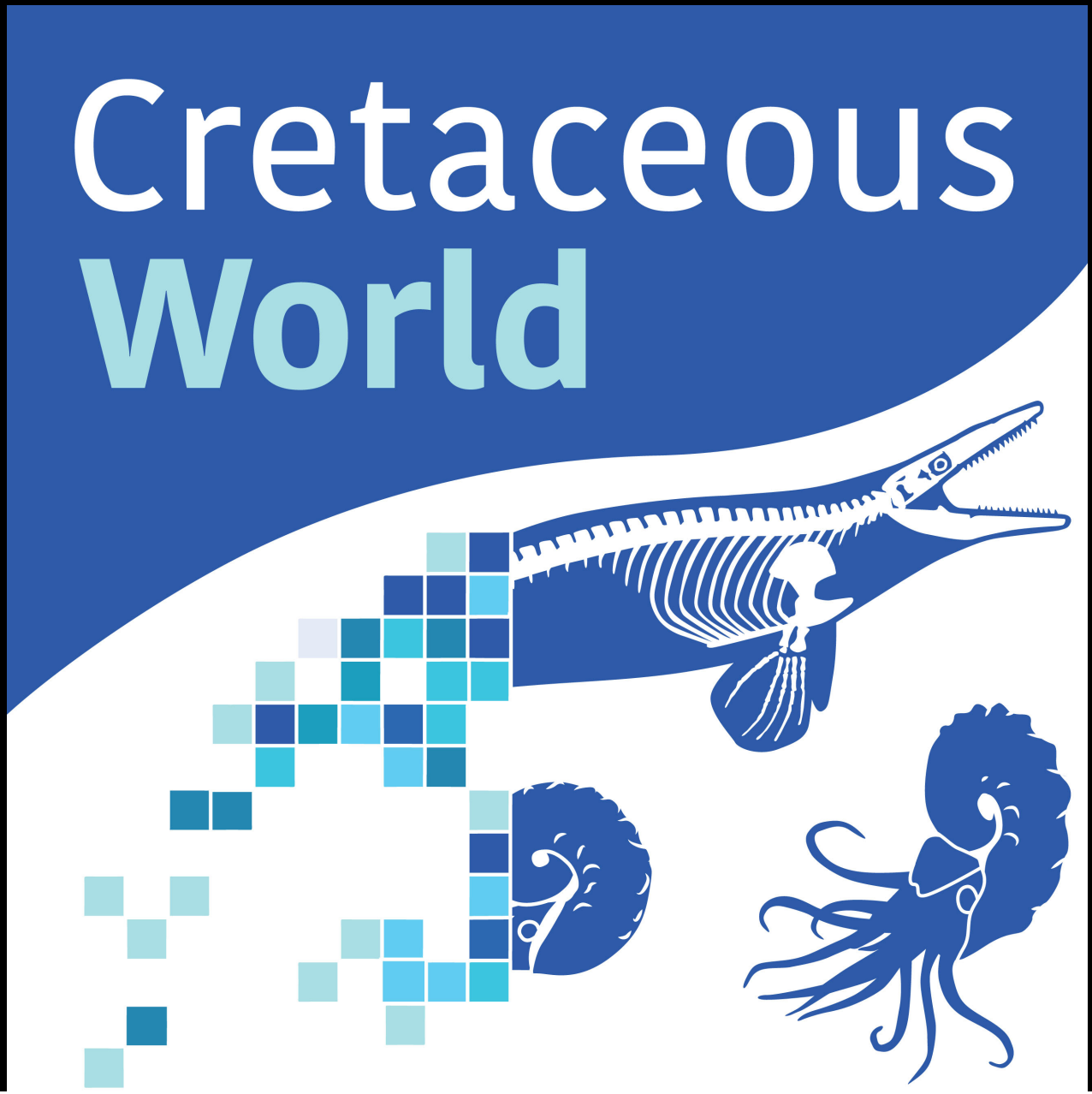
KU12104P1
1 cm
1 cm
A25
1 cm
2 cm
1P.1254
1 cm
A290
244169
244169
A290
2 cm
A25
537553


3 cm
1 cm
1 cm
1 cm
1 cm
5 mm

The Cretaceous World - TCN



Cretaceous World – TCN: Participants and Institutions

University of Kansas – Bruce S. Lieberman, Chris Beard & Jim Beach

Paleontological Research Institution – Jonathan Hendricks

American Museum of Natural History – Neil Landman & Ruth O'Leary

University of Texas– Ann Molineux, Rowan Martindale, Lisa Boucher & Matt Brown

Cretaceous World – TCN: Participants and Institutions, cont.

Yale University Peabody Museum of Natural History – Susan Butts & Chris Norris

University of Colorado – Talia Karim

South Dakota School of Mines & Technology – Laurie Anderson & Maribeth Price

University of New Mexico – Corinne Myers

Sternberg Musem / Fort Hays State University – Laura Wilson

And PENs at *University of Oklahoma* – Steve Westrop & Roger Burkhalter and *LA County Museum* – Austin Hendy & Lindsay Walker

Cretaceous World – TCN: Data

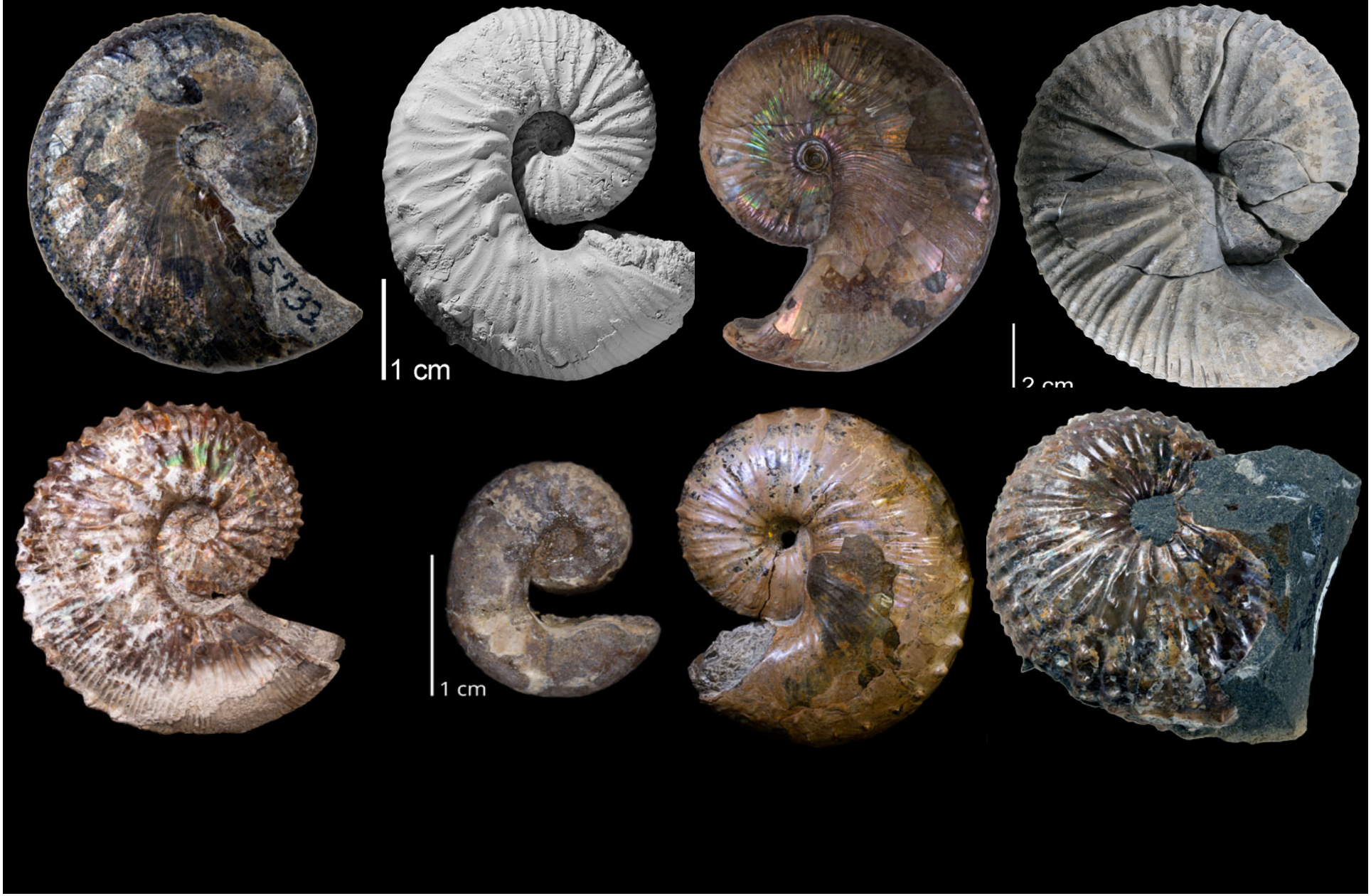
> 396,000 specimens databased (original goal 168,000)

> 14,000 fossil localities georeferenced

> 10,500 images of fossil specimens

Data shared/published via iDigBio and institutional websites

Cretaceous World – TCN: Research



Data

- Data set included ~13,000 individual occurrence points downloaded from Integrated Digitized Biocollections (idigbio.org)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	Basis of R	Bed	Class	Collection	Continent	Uncertain	Country	County	Latitude	Longitude	Stage	Period	Family	Formation	Genus	Group	Abundanc	Stage	Member	Order	Phylum	Scientific	Specific e	State
2	FossilSpecimen		Cephalopoda	KUMIP	North Am	1279	United States	Yuma	39.89289	-102.211	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Discoscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Discoscap	conradi	Colorado
3	FossilSpecimen		Cephalopoda	KUMIP	North Am	6529	United States	Yuma	39.89245	-102.211	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Discoscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Discoscap	abyssinus	Colorado
4	FossilSpecimen		Cephalopoda	KUMIP	North Am	6529	United States	Yuma	39.89245	-102.211	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Discoscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Discoscap	abyssinus	Colorado
5	FossilSpecimen		Cephalopoda	KUMIP	North Am	6529	United States	Yuma	39.89245	-102.211	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Discoscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Discoscap	abyssinus	Colorado
6	FossilSpecimen		Cephalopoda	IP	North Am	8000	USA	Morgan Co	40.41462	-103.93	Maastrichtian	Late Cretaceous	Scaphitidae	Fox Hills F	Hoploscaphites		1	MAASTRICHTIAN		Ammonoi	Mollusca	Hoploscap	birkelund	Colorado
7	FossilSpecimen		Cephalopoda	IP	North Am	8000	USA	Morgan Co	40.41462	-103.93	Maastrichtian	Late Cretaceous	Scaphitidae	Fox Hills F	Hoploscaphites		1	MAASTRICHTIAN		Ammonoi	Mollusca	Hoploscap	birkelund	Colorado
8	FossilSpecimen		Cephalopoda	IP	North America		United States	Routt	40.49833	-107.225	Maastrichtian	Cretaceous	Scaphitidae	"Lewis" Sh	Hoploscaphites		1	MAASTRICHTIAN		Lytoceratı	Mollusca	Hoploscap	sp.	Colorado
9	FossilSpecimen		Cephalopoda	KUMIP	North Am	550	United States	Cheyenne	39.90151	-102.03	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Discoscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Discoscap	abyssinus	Kansas
10	FossilSpecimen		Cephalopoda	KUMIP	North Am	624	United States	Cheyenne	39.99947	-101.717	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Discoscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Discoscap	abyssinus	Kansas
11	FossilSpecimen		Cephalopoda	KUMIP	North Am	624	United States	Cheyenne	39.99947	-101.717	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Hoploscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Hoploscaphites		Kansas
12	FossilSpecimen		Cephalopoda	KUMIP	North Am	624	United States	Cheyenne	39.99947	-101.717	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Hoploscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Hoploscaphites		Kansas
13	FossilSpecimen		Cephalopoda	KUMIP	North Am	624	United States	Cheyenne	39.99947	-101.717	Maastrichtian	Cretaceous	Scaphitidae	Pierre Sha	Hoploscaphites	Montana (	1	MAASTRIC	Beecher	Island Mem	Mollusca	Hoploscaphites		Kansas
14	FossilSpecimen		CEPHALOPODA		North Am	435	UNITED STATES OF AMERICA	DAWSON	46.90798	-104.736	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		2	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA
15	FossilSpecimen		CEPHALOPODA		North Am	435	UNITED STATES OF AMERICA	DAWSON	46.90798	-104.736	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		5	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA
16	FossilSpecimen		CEPHALOPODA		North Am	435	UNITED STATES OF AMERICA	DAWSON	46.90798	-104.736	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		12	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA
17	FossilSpecimen		CEPHALOPODA		North Am	435	UNITED STATES OF AMERICA	DAWSON	46.90798	-104.736	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		13	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA
18	FossilSpecimen		CEPHALOPODA		North Am	435	UNITED STATES OF AMERICA	DAWSON	46.90798	-104.736	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		15	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA
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20	FossilSpecimen		CEPHALOPODA		North Am	435	UNITED STATES OF AMERICA	DAWSON	46.90798	-104.736	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		20	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA
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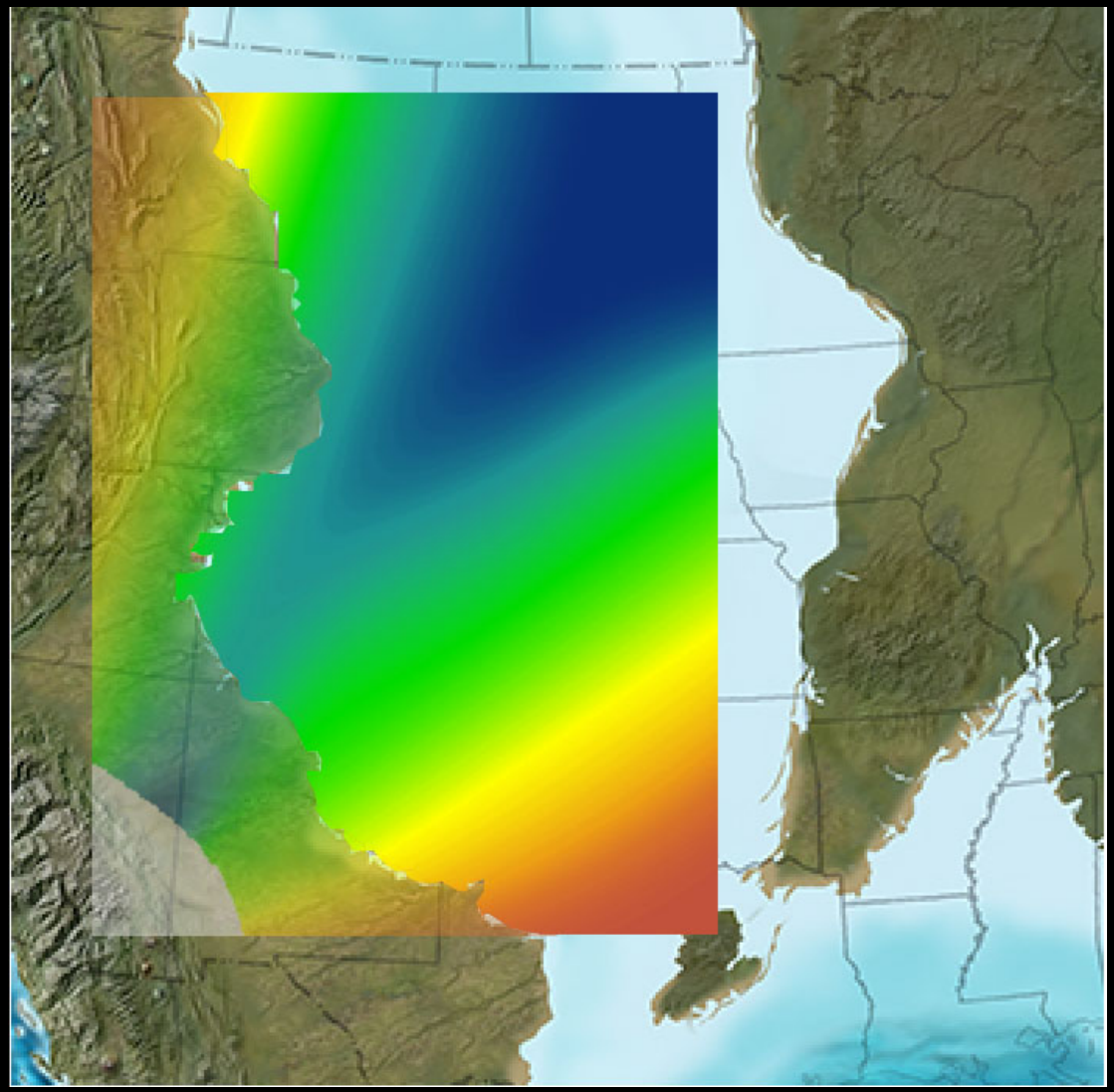
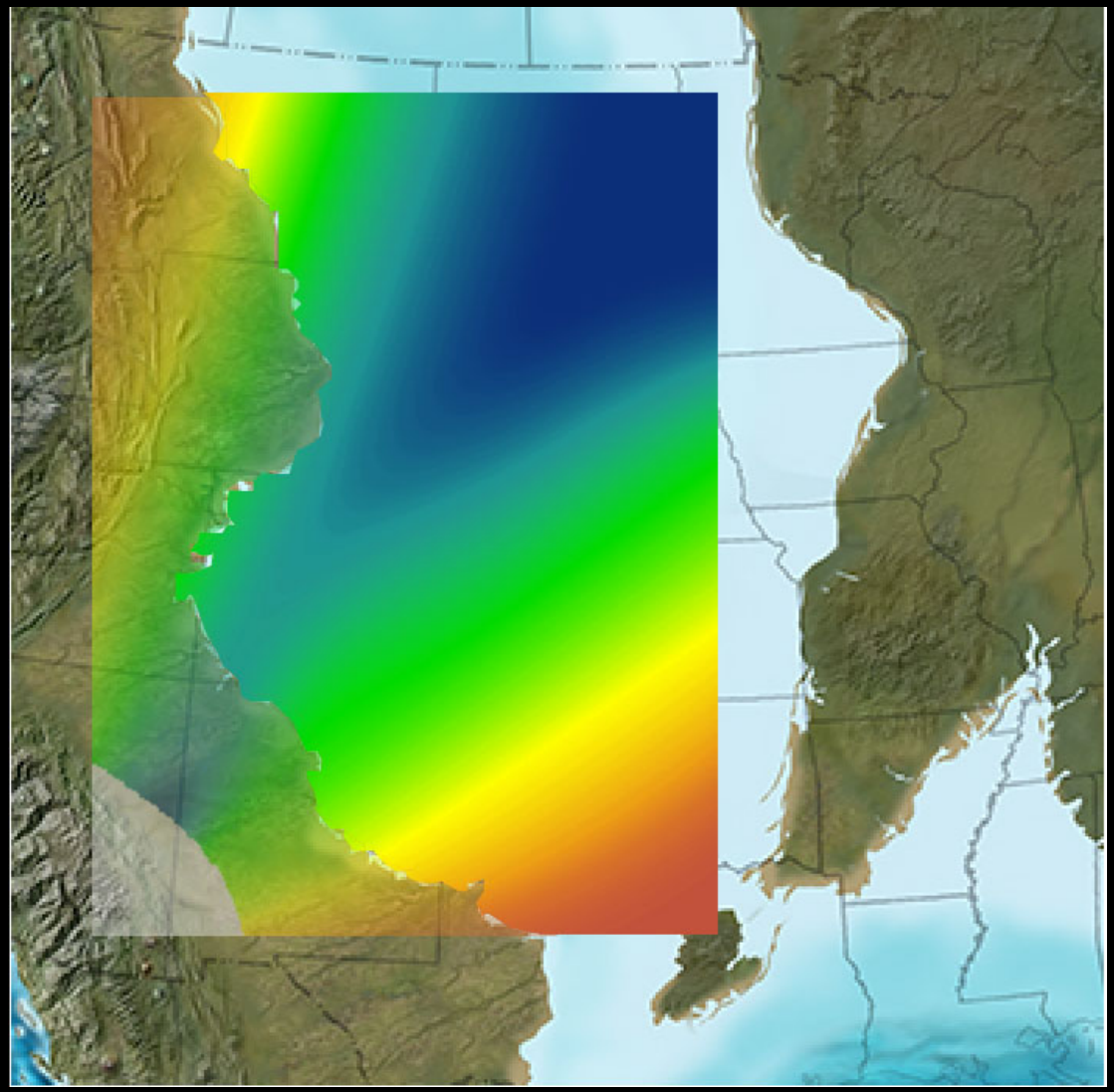
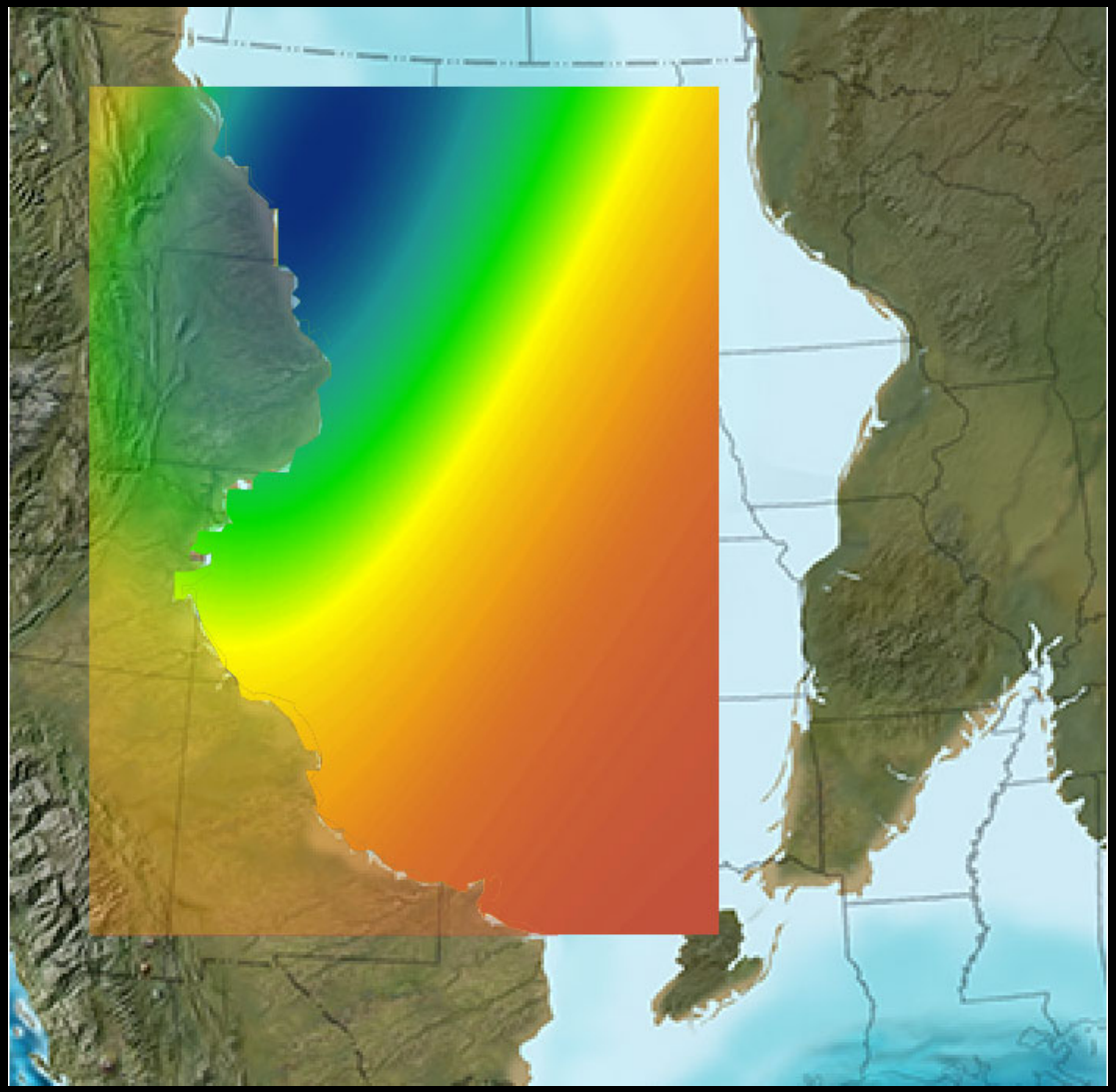
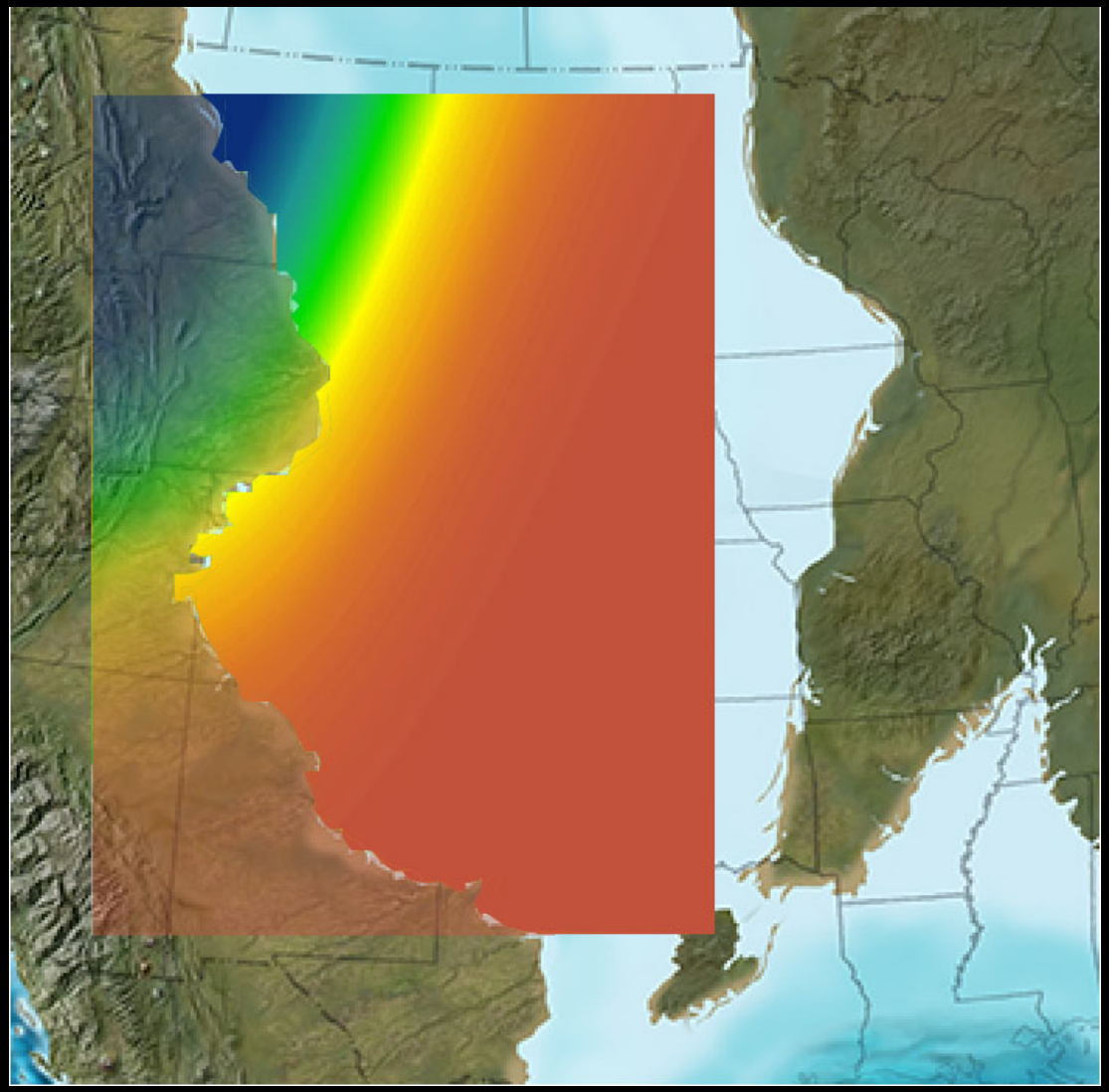
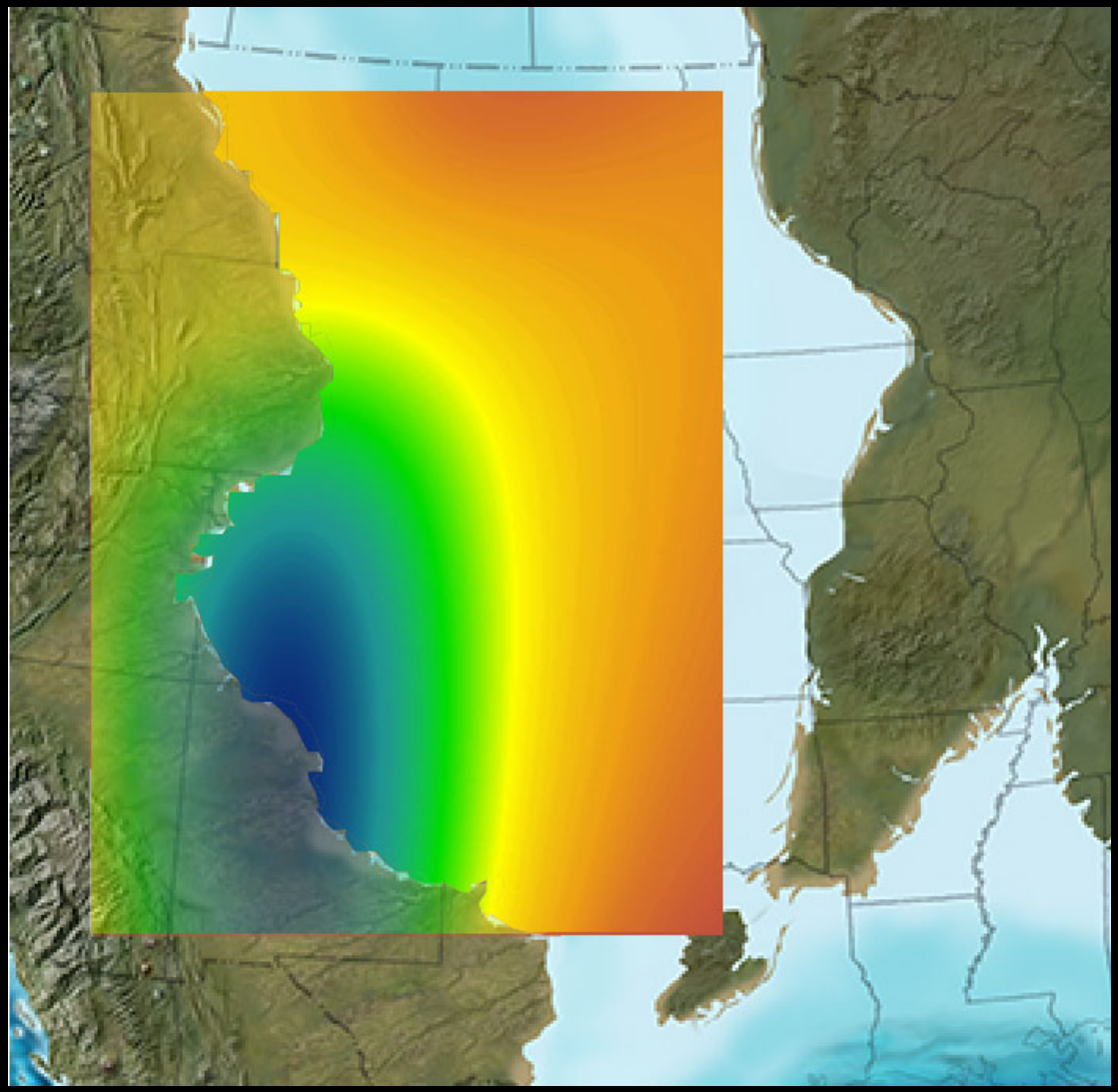
25	FossilSpecimen		CEPHALOPODA		North Am	439	UNITED STATES OF AMERICA	DAWSON	46.9081	-104.682	MAASTRICHTIAN		SCAPHITIDAE	PIERRE SH	Hoploscaphites		1	MAASTRICHTIAN		AMMONC	MOLLUSCA	Hoploscap	sp	MONTANA

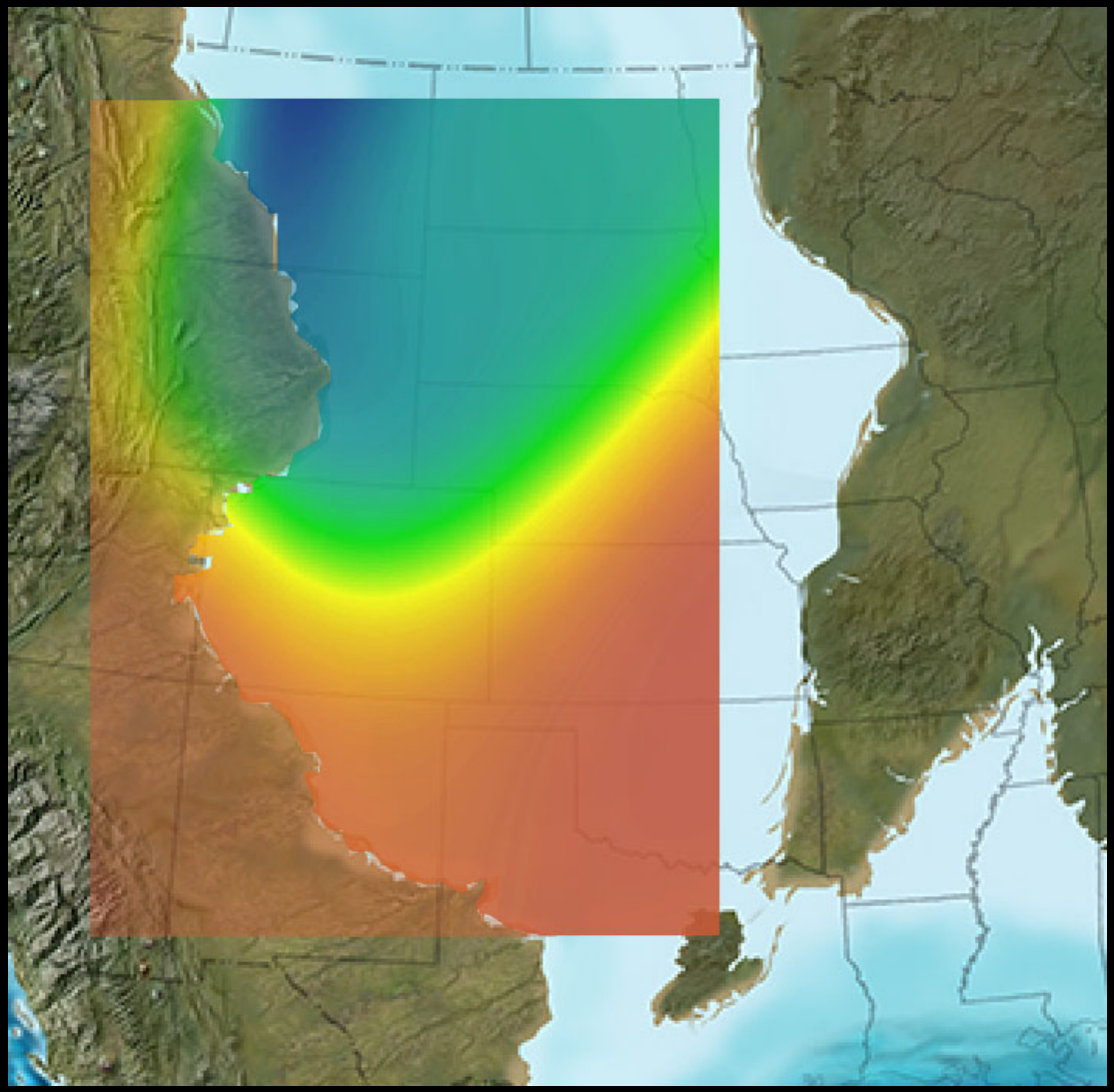


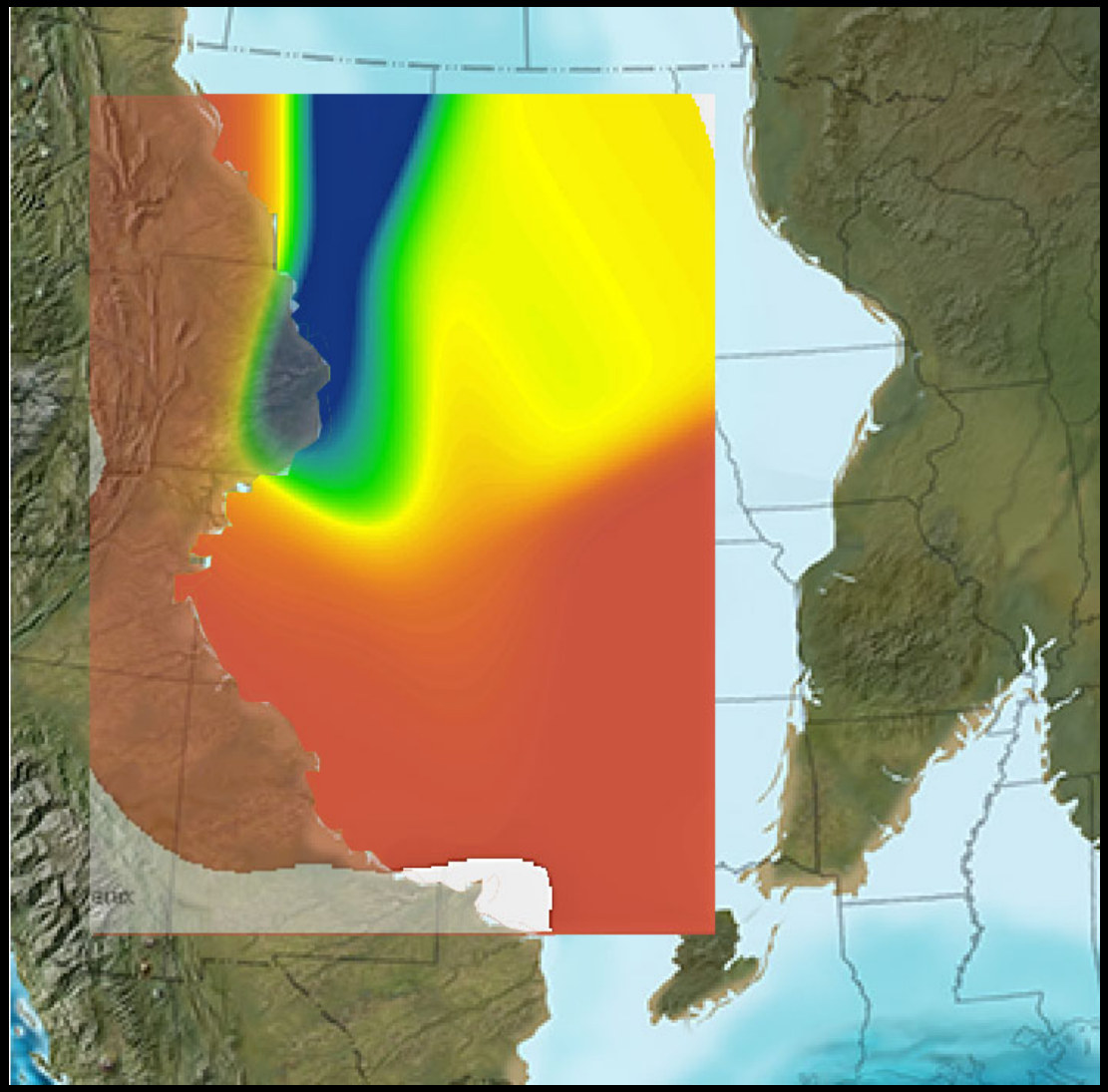


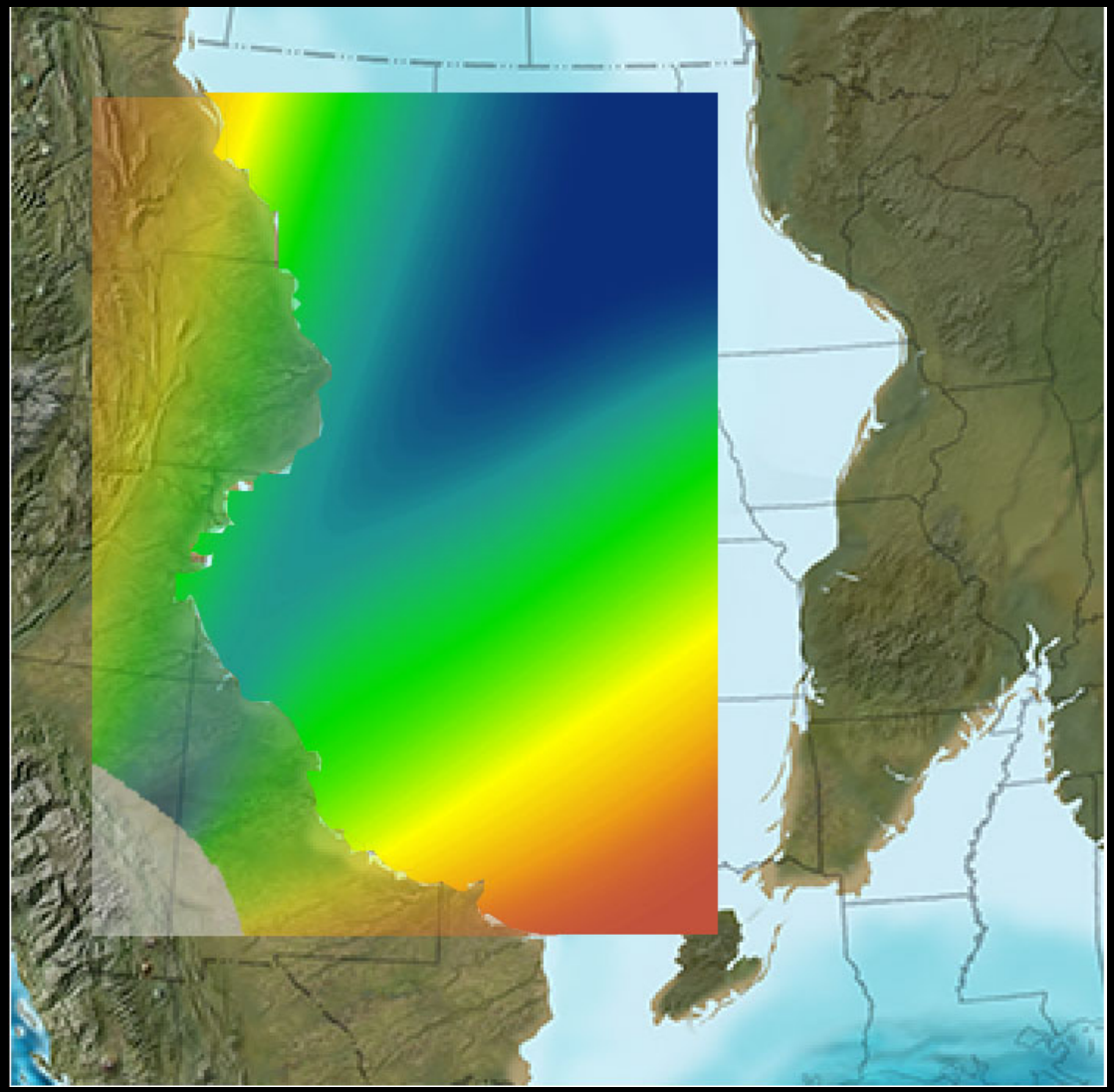


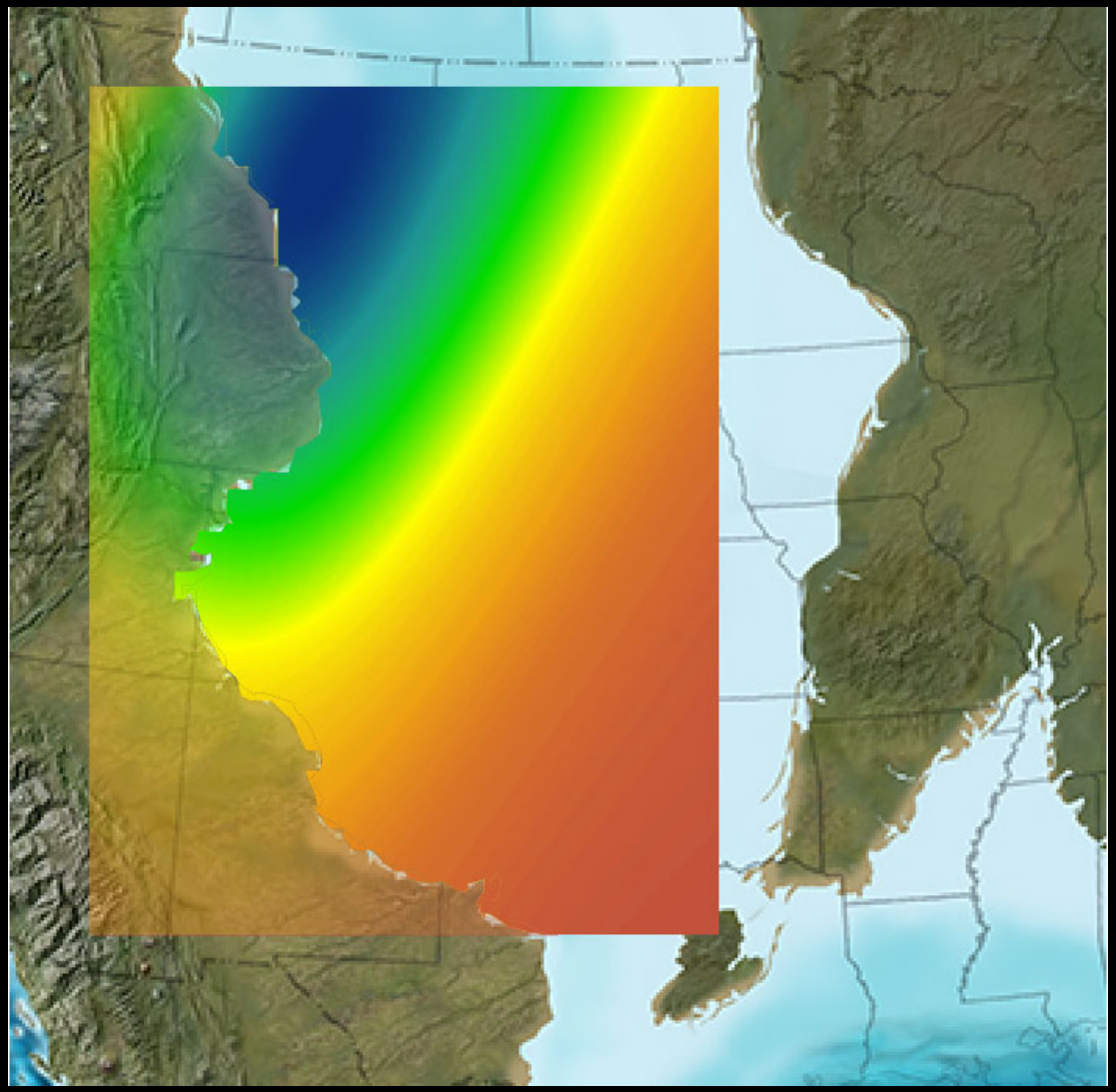


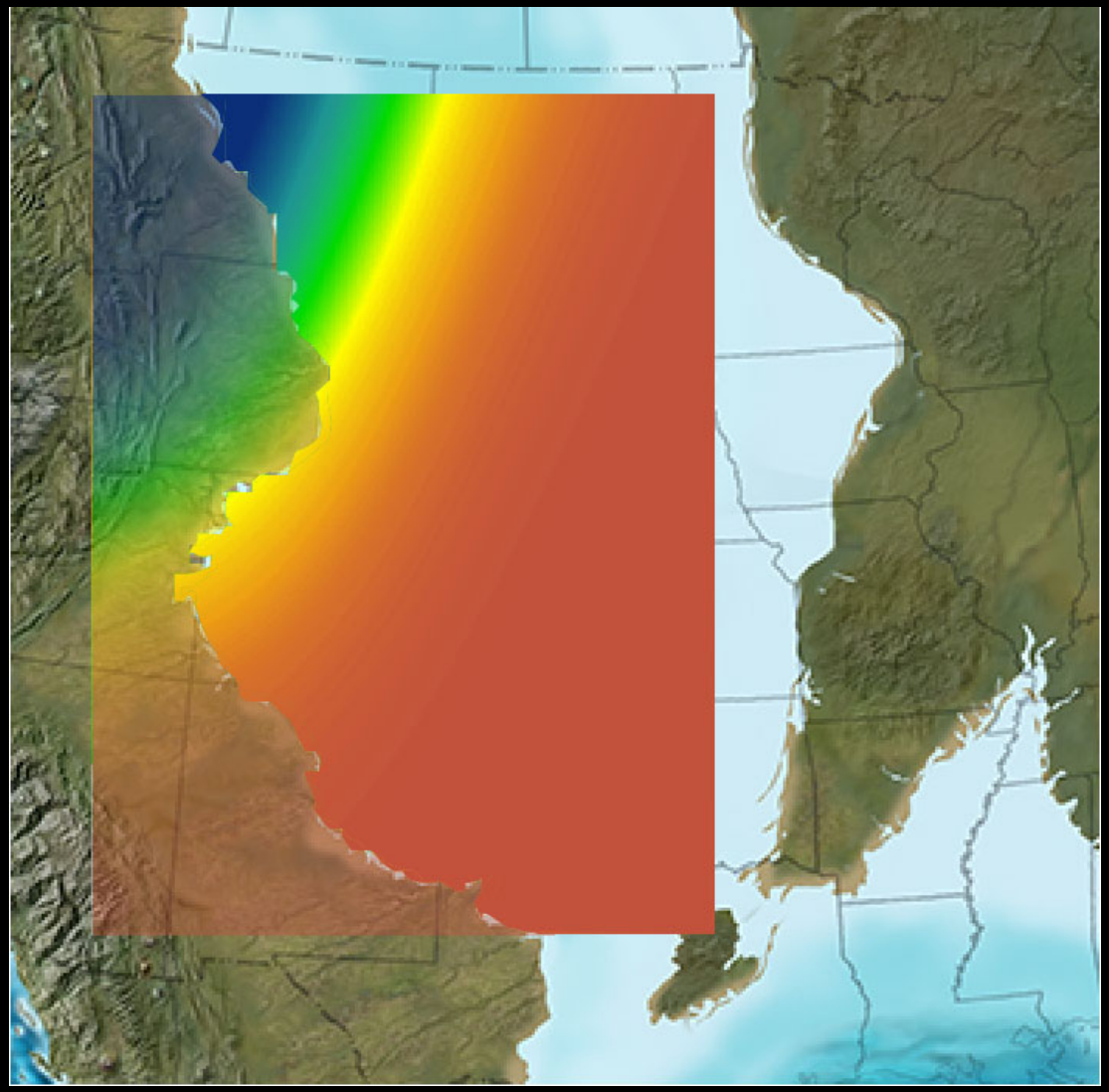


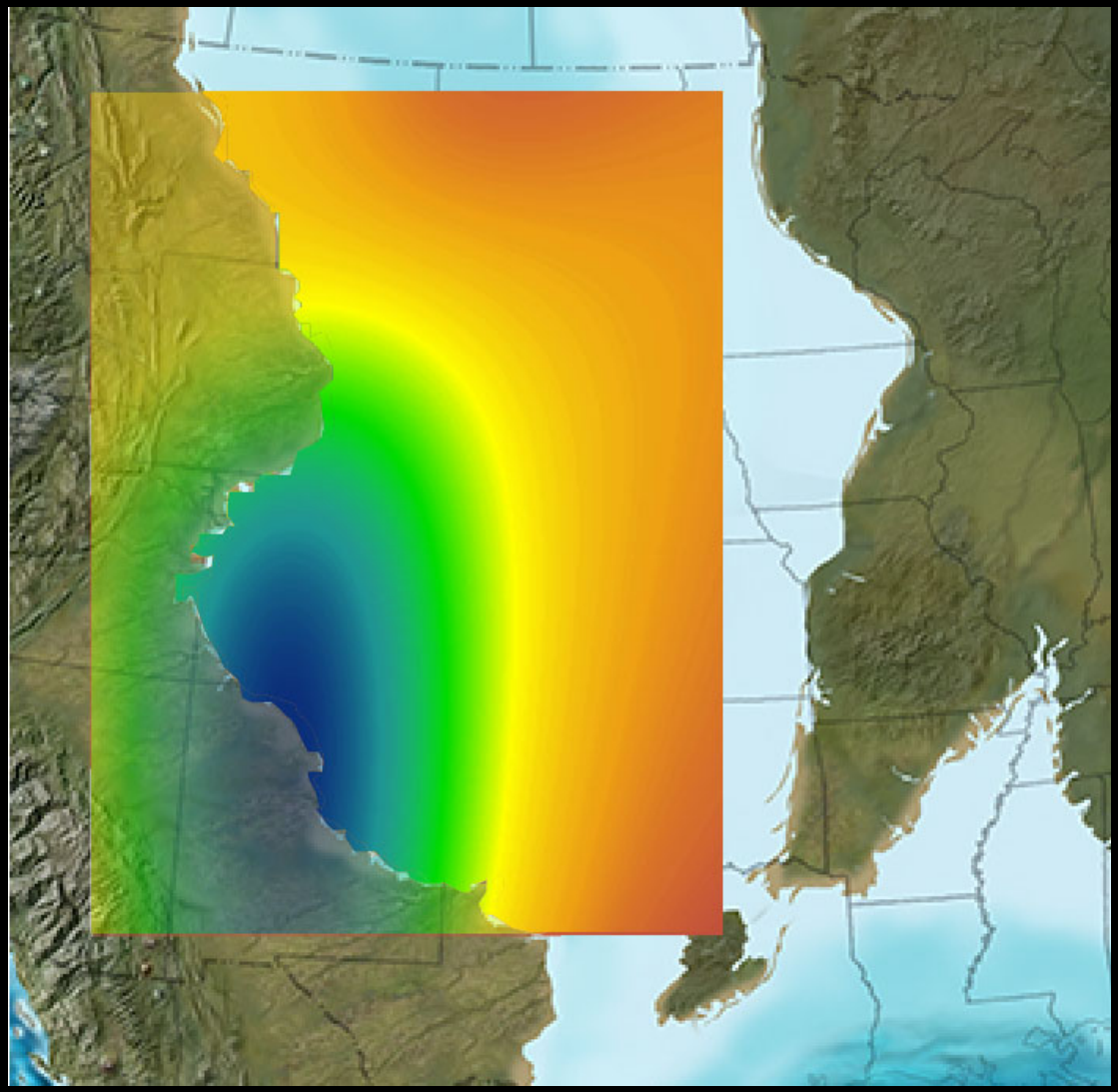


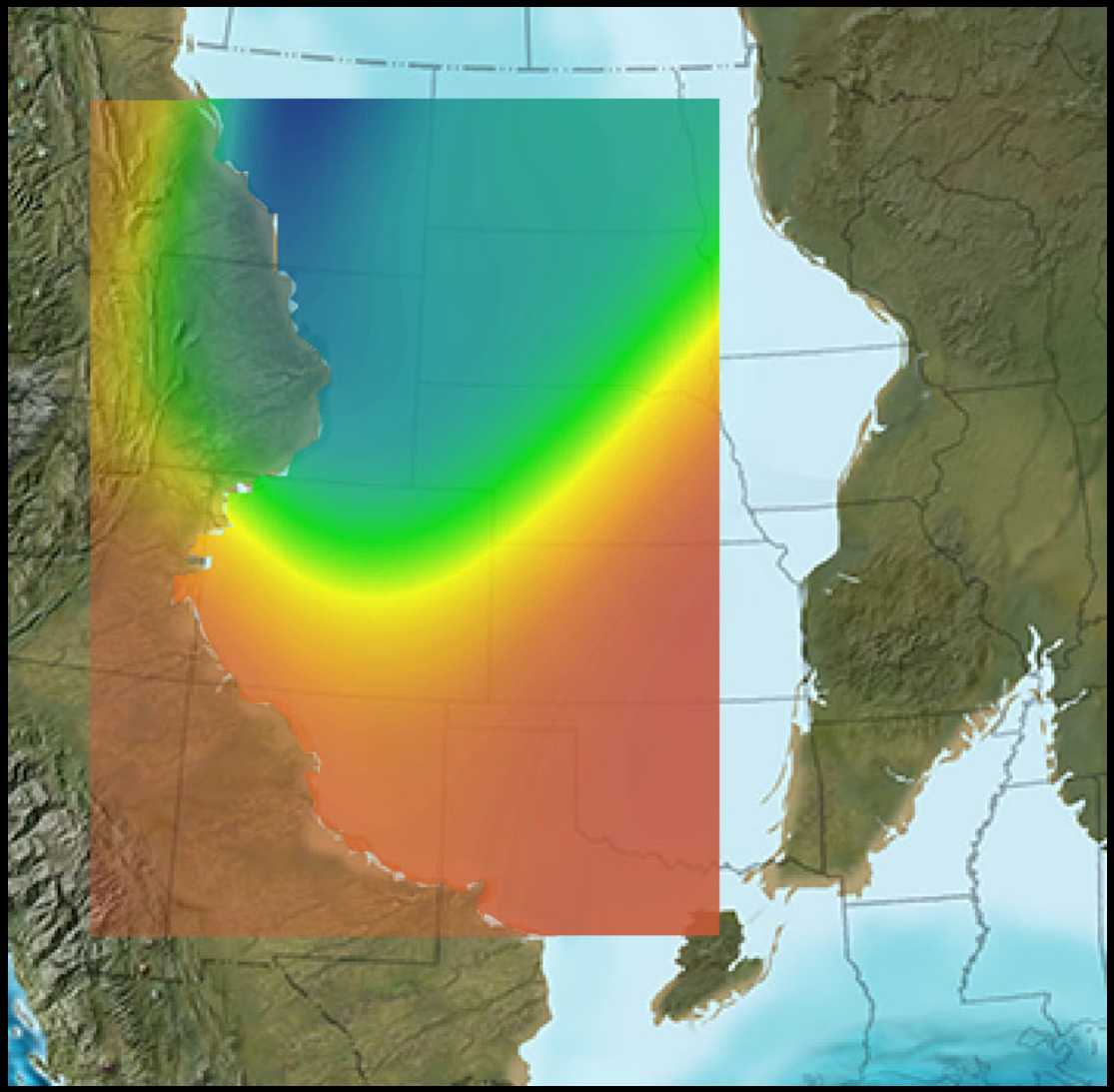


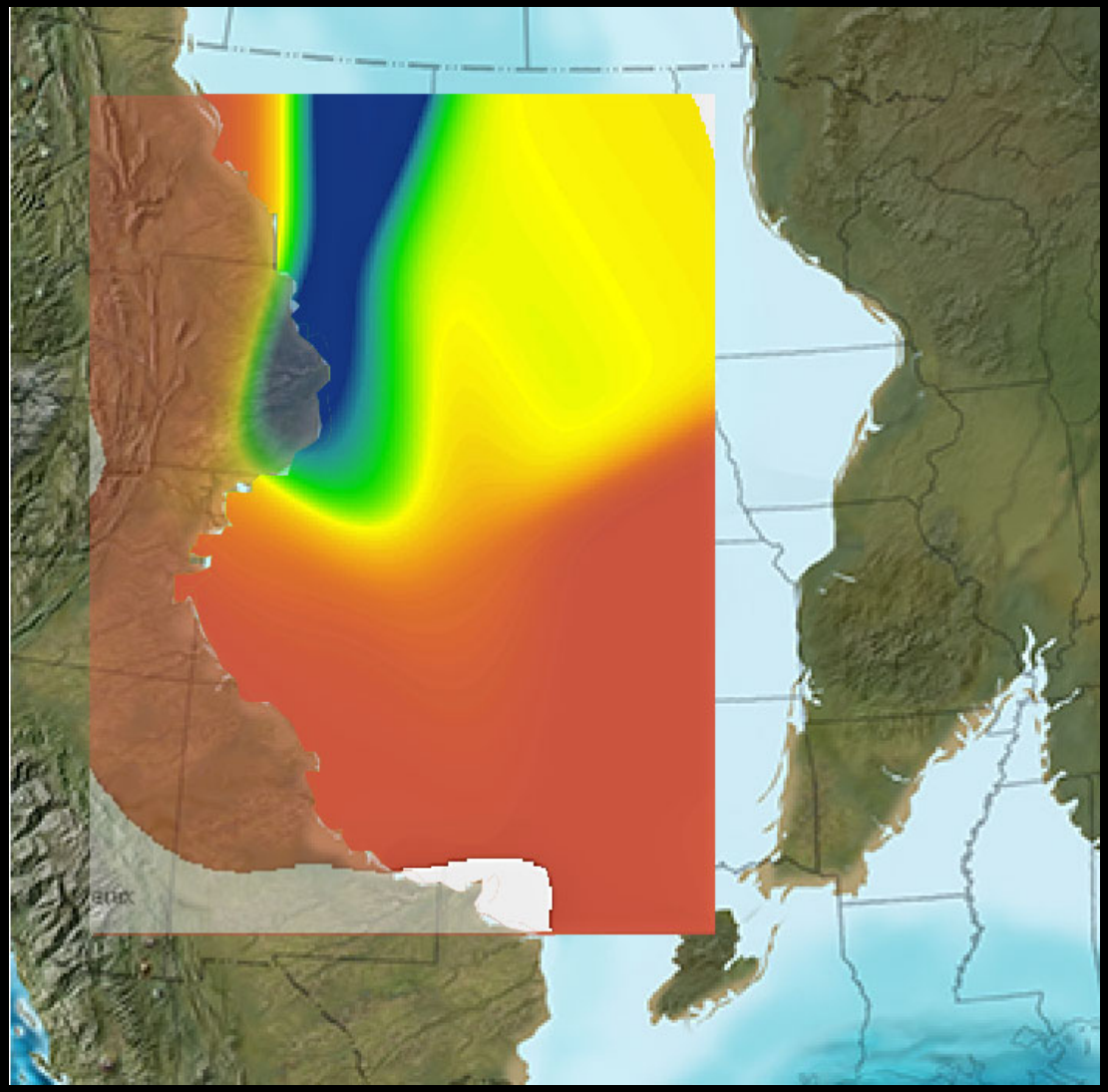


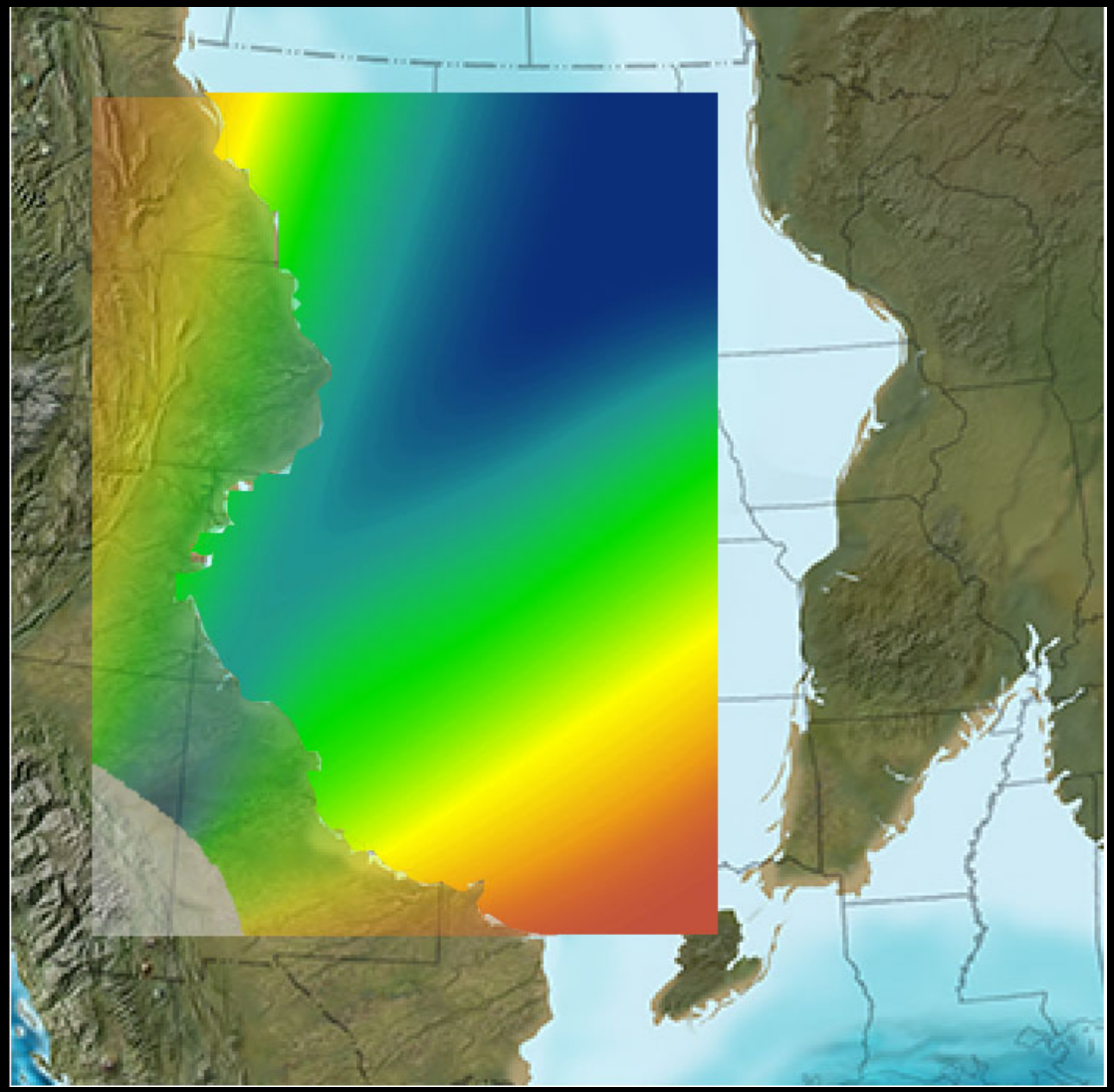


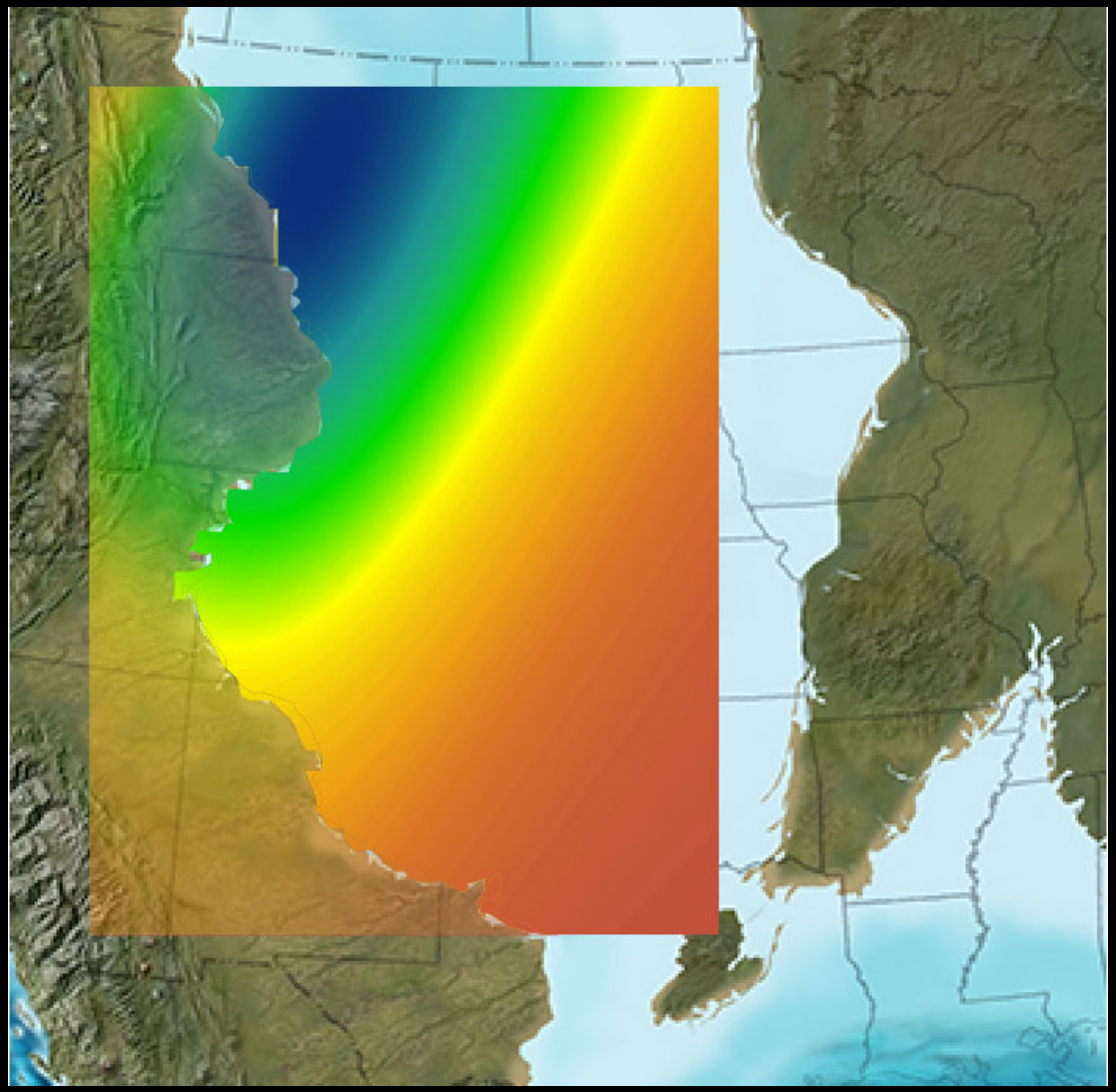


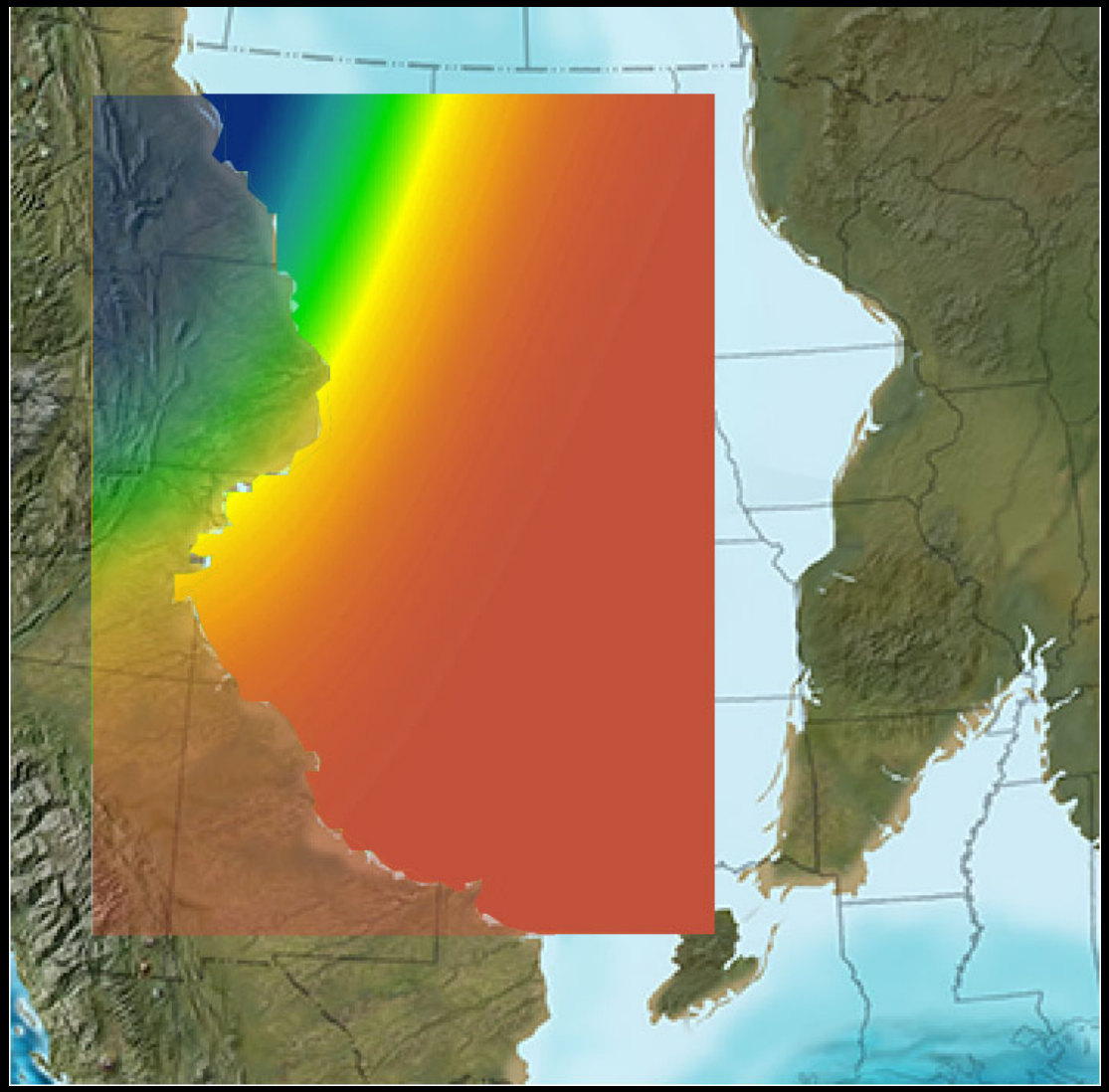


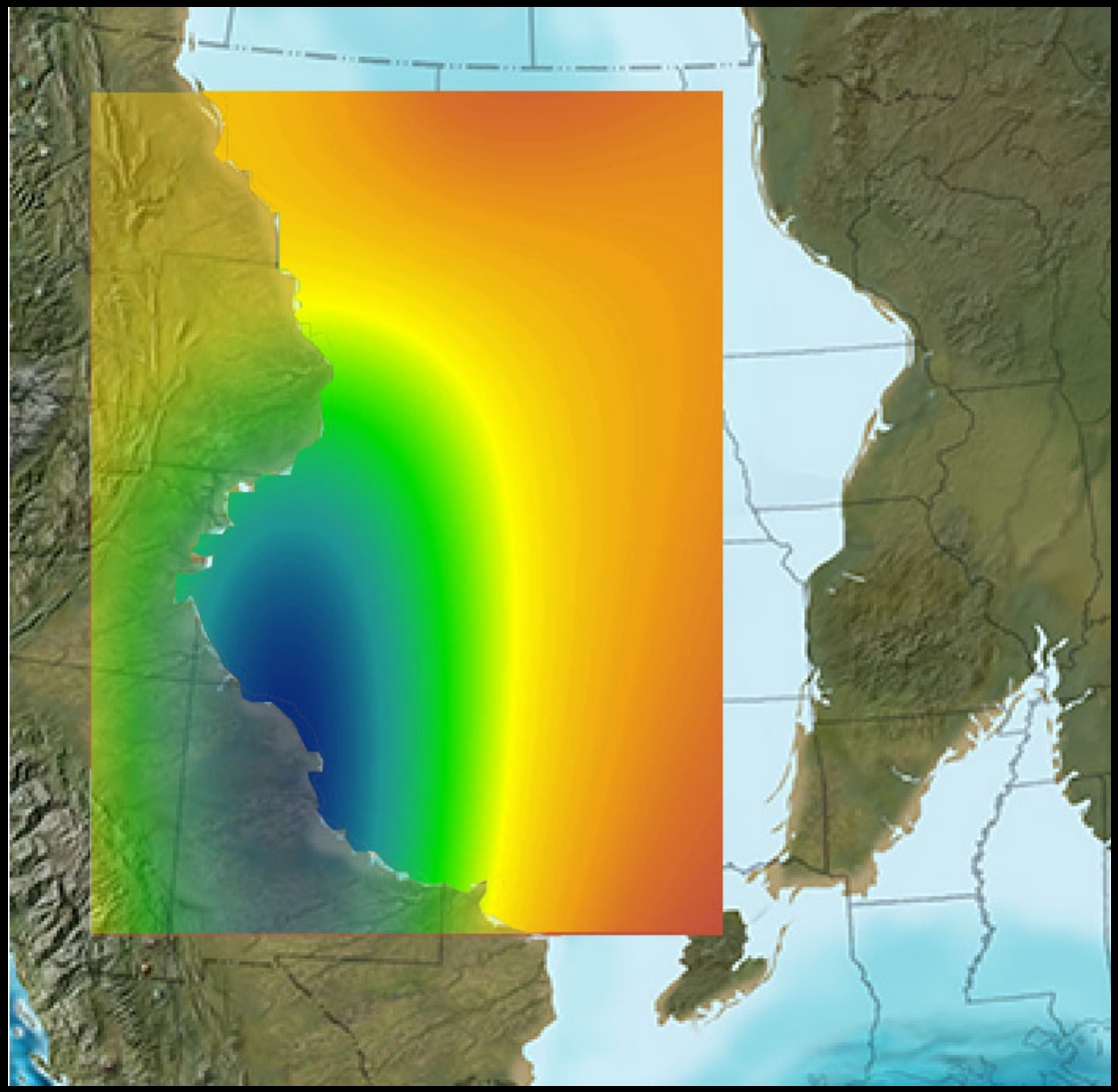


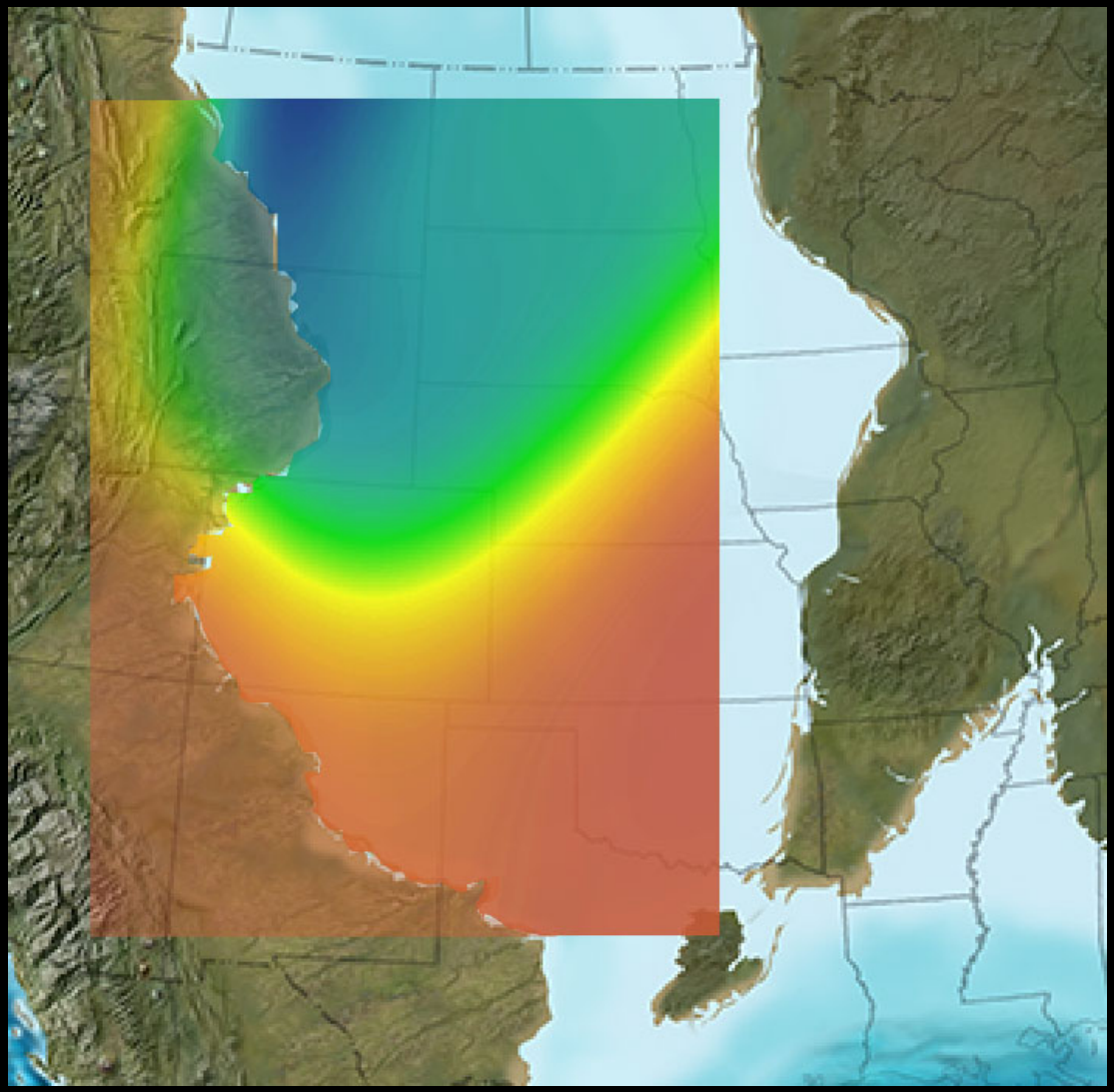


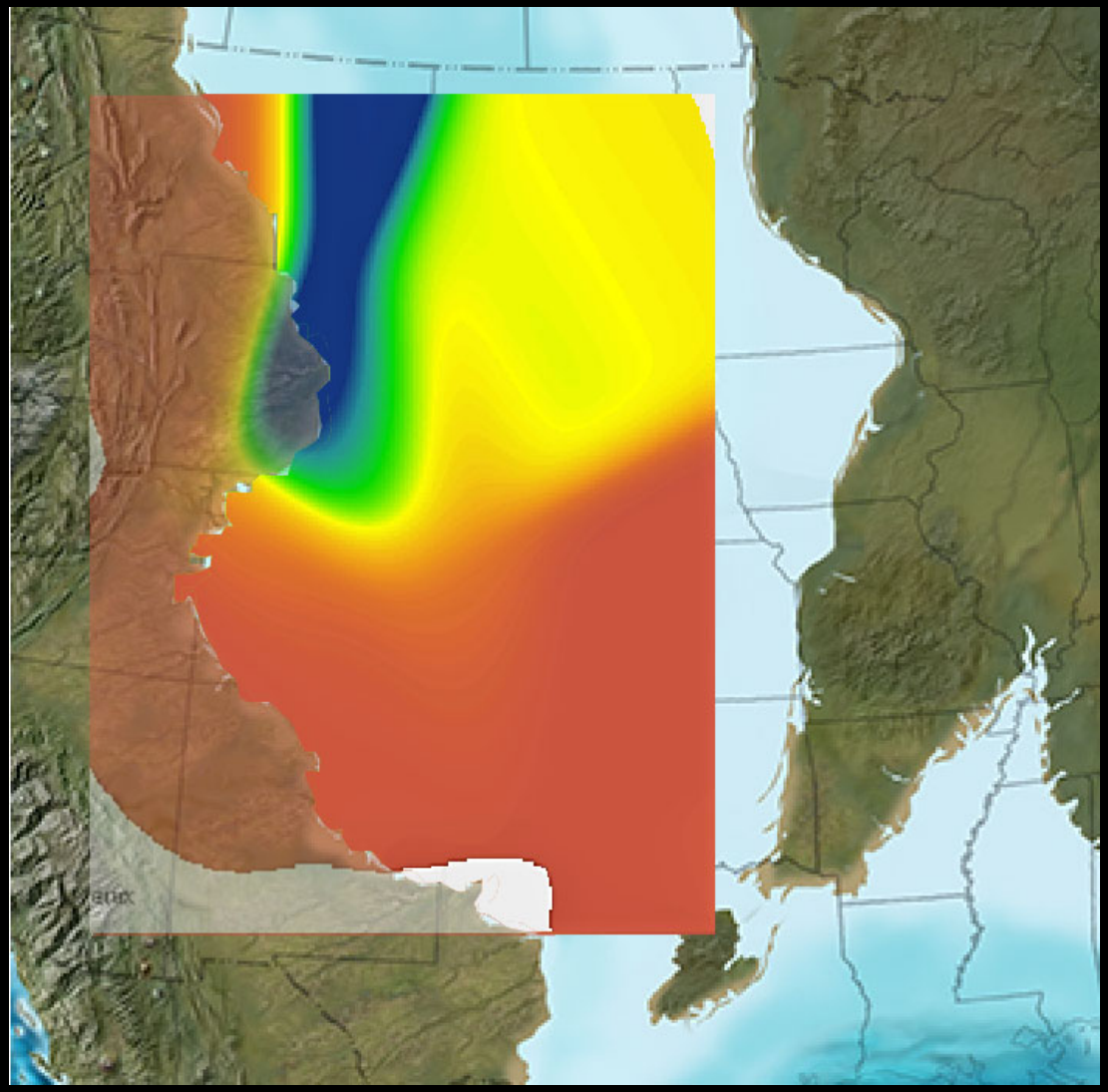




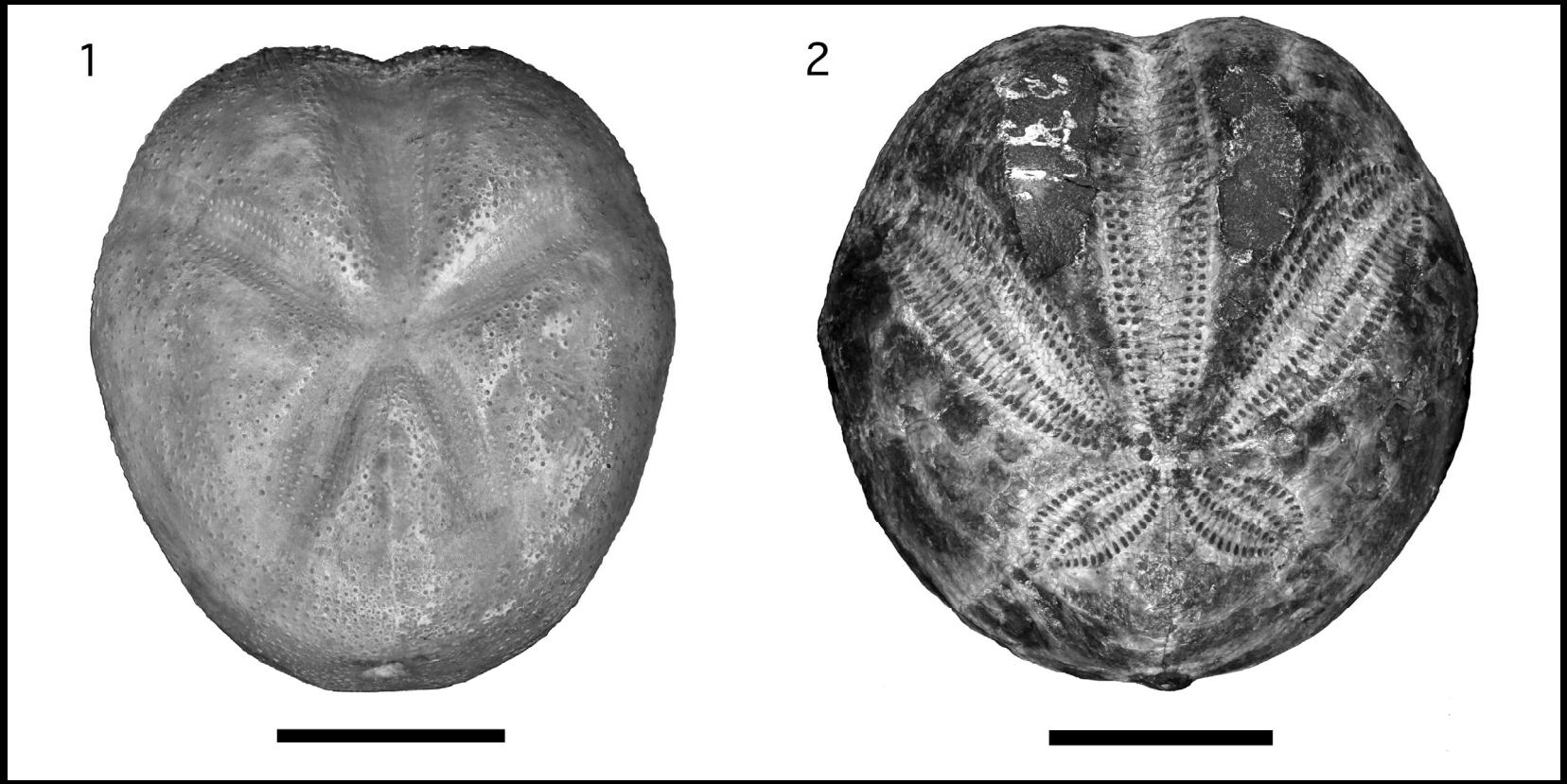






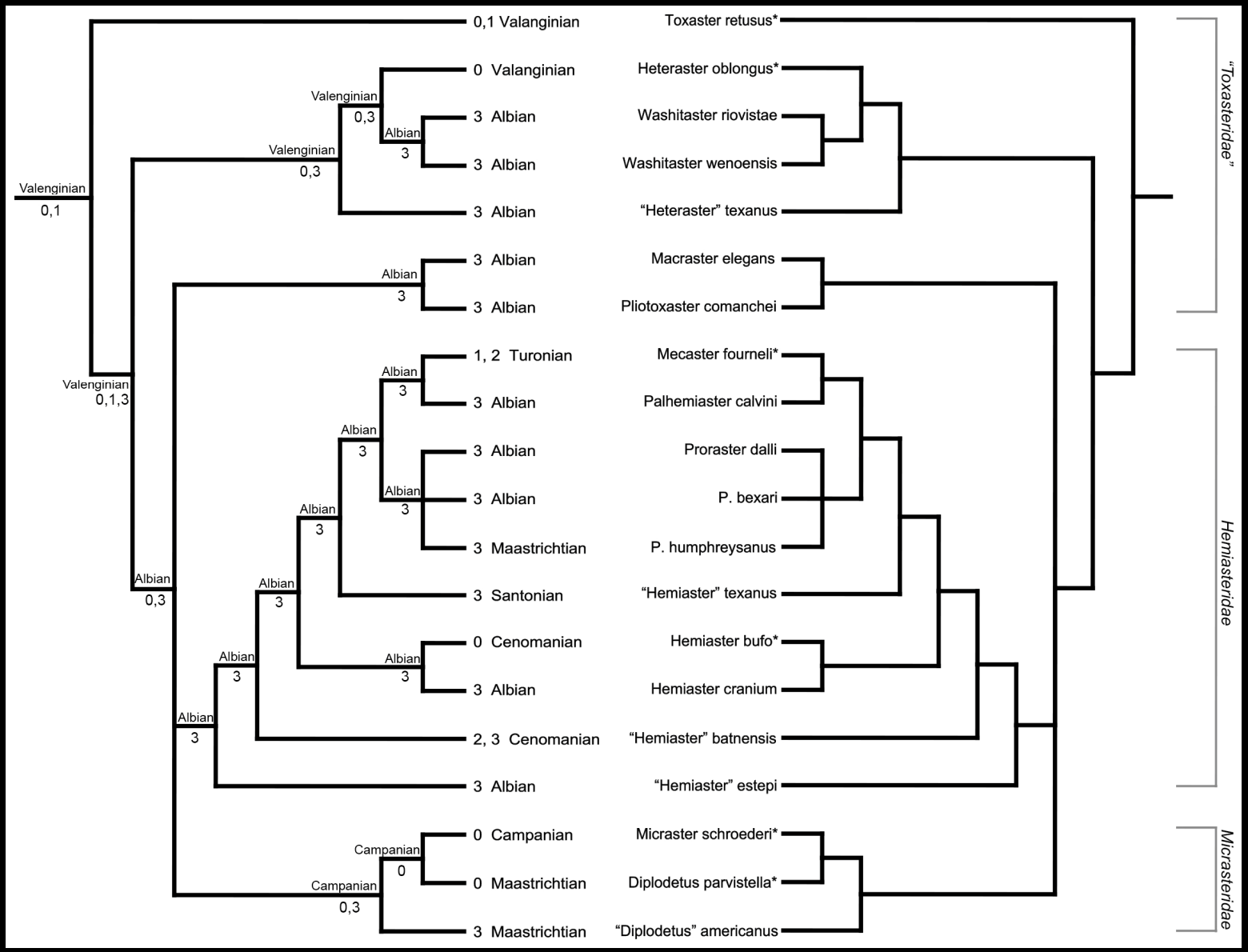


Cretaceous World – TCN: Research

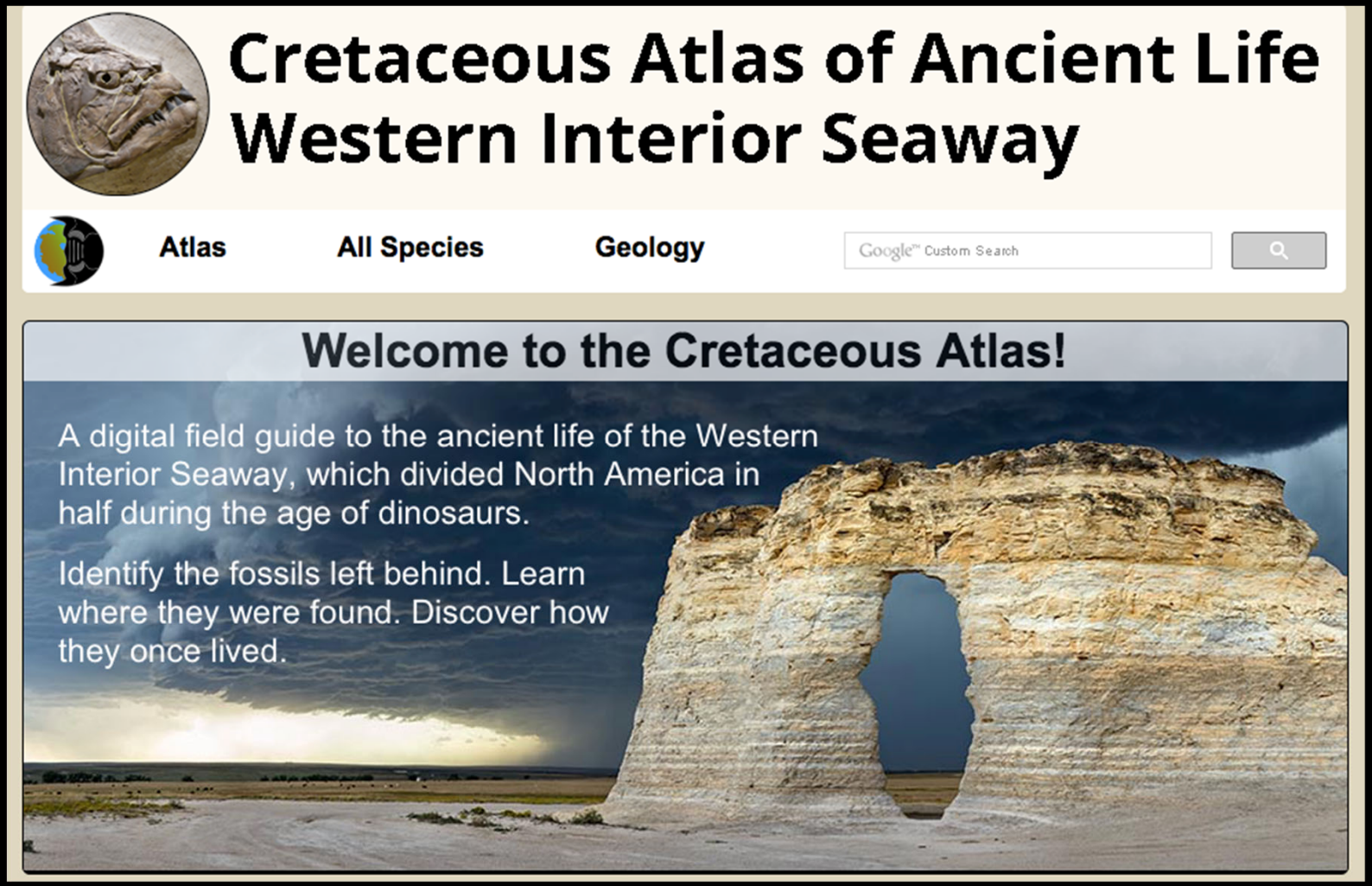


Cretaceous World – TCN: Research

Cretaceous World – TCN: Research



Cretaceous World – TCN: Outreach



Cretaceous World – TCN: Outreach, cont.

Cretaceous Atlas of Ancient Life Website: www.cretaceousatlas.org

More than 675 species represented

- information and images
- maps to come soon

Cretaceous World – TCN: Outreach, cont.

Cretaceous World – TCN: Outreach, cont.

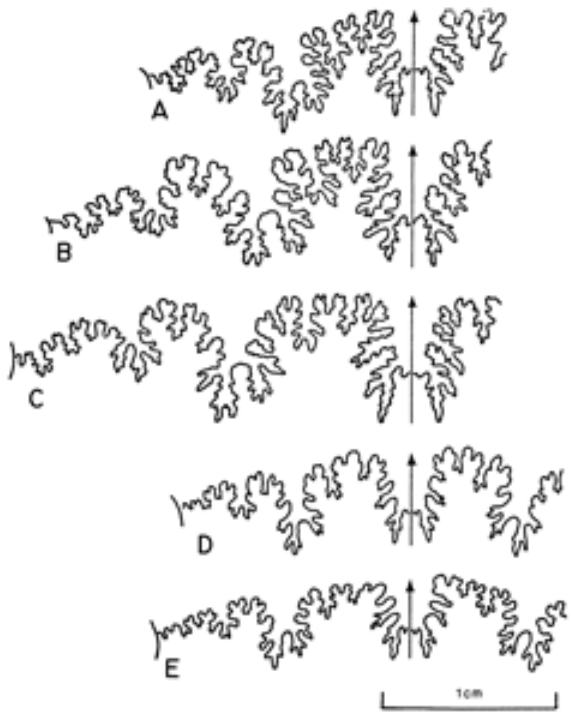


Fig. 61. Sutures of *Hoploscaphites nicolletii* (Morton) macroconchs and microconchs. **A.** Seventh from last suture of an adult macroconch, YPM 34692, loc. 21, LNAZ. **B.** Fifth from last suture of an adult macroconch, YPM 34693, loc. 44, LNAZ. **C.** Third from last suture of an adult macroconch, YPM 23742, loc. 25, LGAZ. **D.** Fifth from last suture of an adult microconch, YPM 34694, loc. 302, UNAZ. **E.** Third from last suture of an adult microconch, YPM 34695, loc. 50, LGAZ.

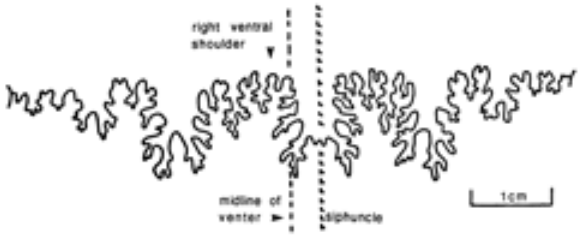


Fig. 62. Fourth from last suture of an adult macroconch of *Hoploscaphites nicolletii* (Morton), YPM 23751, loc. 44, LNAZ, showing asymmetry.

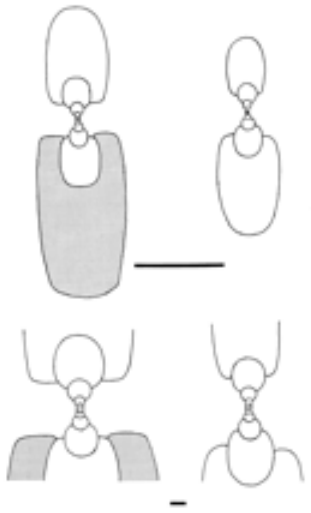


Fig. 63. Dorsoventral, intercostal cross sections through adult dimorphs of *Hoploscaphites nicolletii* (Morton). **Left.** Macroconch, YPM 23053, loc. 44, LNAZ. **Right.** Microconch, AMNH 44226, loc. 3157, TCM. Shaded area demarcates mature body chamber. Upper scale bar = 1 cm; lower scale bar = 1 mm.

Cretaceous World – TCN: Outreach, cont.

Digital Encyclopedia of Ancient Life: www.digitalatlasofancientlife.org/learn

Open Access textbook on History of Life

Chapters on “Geological Time”; “Evolution”; “Systematics”; and more

Cretaceous World – TCN: Outreach, cont.

Contributions to museum exhibits

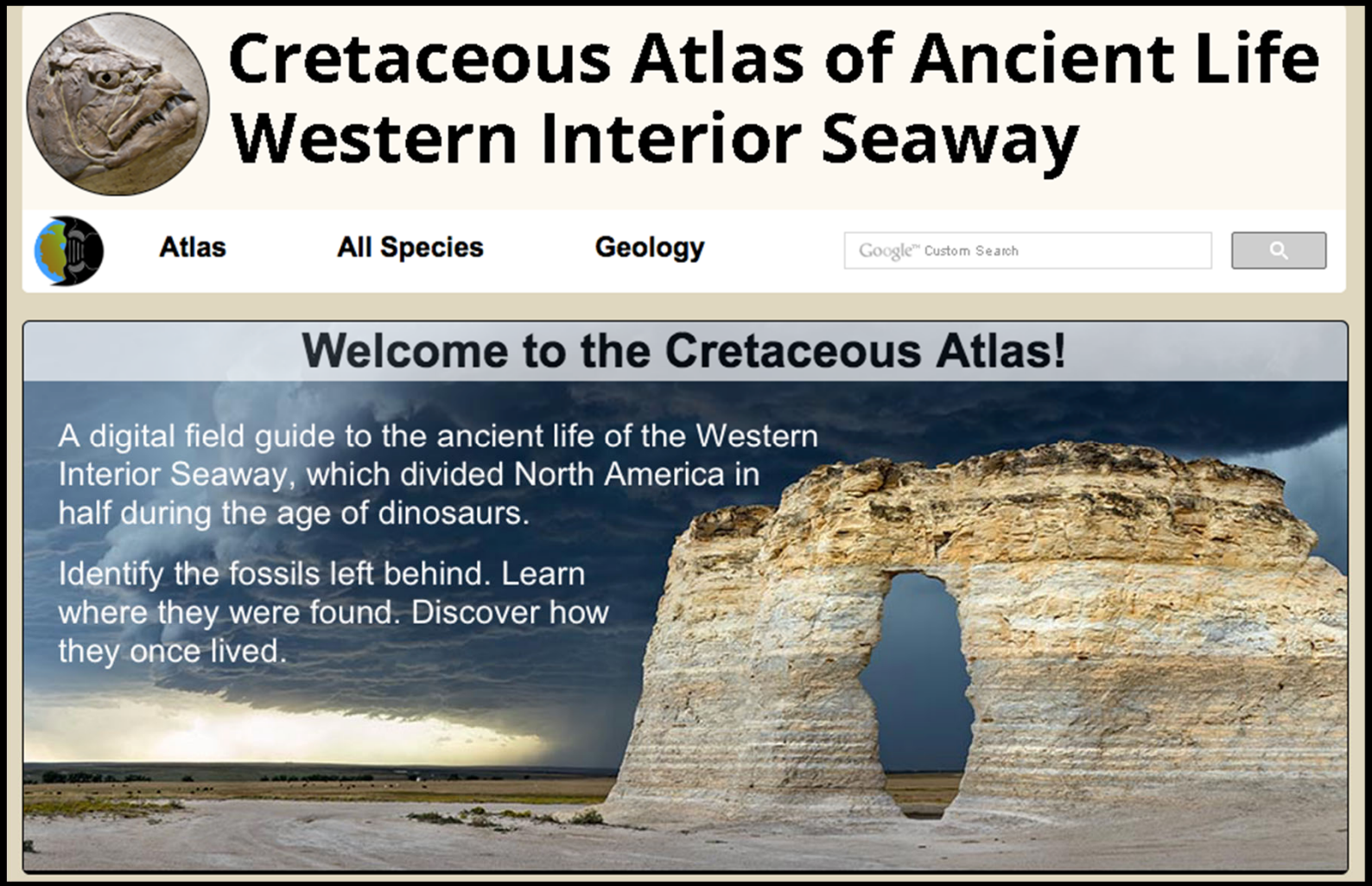
Creating collections for K-12 classrooms

Outreach to K-12 students

Undergraduate, graduate and post-doctoral training

- 1 post-doc
- 12 graduate students
- 20 undergraduate students

Cretaceous World – TCN: Outreach



Hendricks et al. 2015. Palaeontologia Electronica

Conclusions

Digitizing museum collections provides insights into macroevolution and biogeography

Approach digitization of fossils same way as digitization of extant taxa

Thanks to:

Julien Kimmig & Julie Taylor (KU)

Steve Byrum (U. of Florida)

Jon Hendricks (PRI)

Jim Beach & Chris Beard (KU)

<u>Funding</u>

NSF Advancing the Digitization of Biological Collections