

Supporting research pipelines through the creation of stratigraphic and taxonomic concordances



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Collaborator Map



UCMP PIs: Charles Marshall (Lead PI, UCMP Director), Seth Finnegan, Pat Holroyd, Lisa White **Collaborating PIs**: Pat Druckenmiller (UAM), Liz Nesbitt (Burke), Edward Davis (UO), Peter Roopnarine (CAS), Jann Vendetti (LACM), Greg Dietl (PRI)

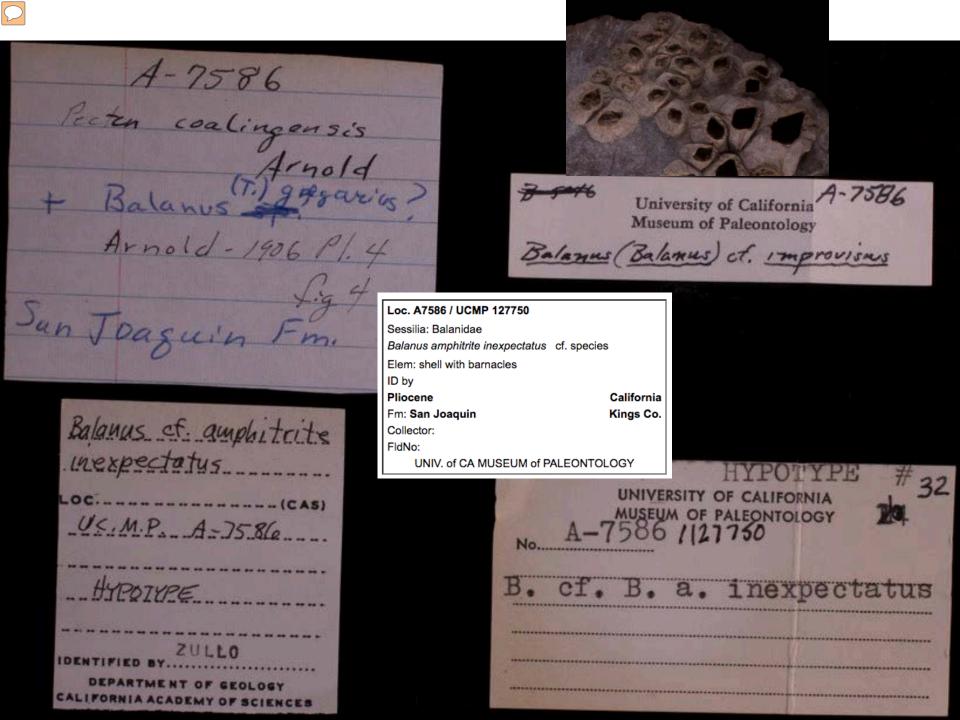
Unfunded collaborators: Cooper Center (Nicole Bonuso), Smithsonian NMNH (Kathy Hollis)



EPICC TCN

- Eastern Pacific Invertebrate Communities of the Cenozoic
- NSF funded initiative to catalog 1.6 million marine invertebrates over 66 million years of Earth's history
- Currently 665k digitized specimens, 21k photographed specimens, 14k georeferenced localities







Existing taxonomic standards

- World Register of Marine Species focused on recent specimens
- Paleobiology Database incomplete





EPICC Taxonomic concordance

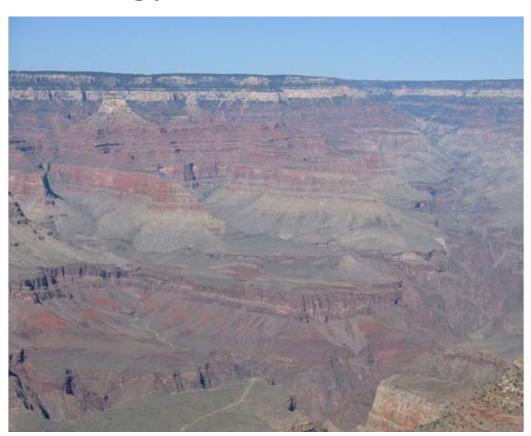
- 5300+ entries to date
- Based on taxonomic authority papers
- Started with Recent and Quaternary mollusks (Austin Hendy, LACM); provides robust framework for introduction of taxonomic names from older fossil literature
- Collaboration with taxonomic experts to add additional groups (i.e., Decapoda, Echinodermata, Patellogastropoda) and reconcile outdated taxonomic concepts

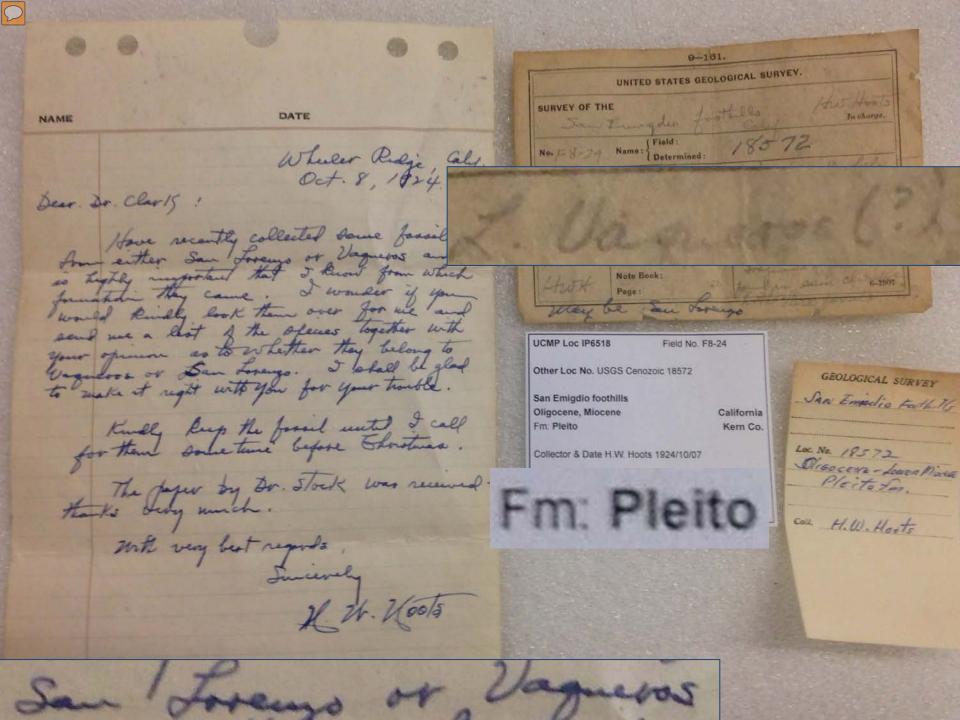
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	DATE										
CREATED BY	CREATED	CATEGORY	REFERENCE	KINGDOM	PHYLUM	CLASS	ORDER	FAMILY	GENUS	SUBGENUS	SPECIES
LACMIP LACMIP	2/7/2017 2/7/2017	С	McLean (2013) McLean (2013)	Animalia Animalia	Mollusca Mollusca	Gastropoda Gastropoda	Cephalaspidea	Acmaeidae Acteocinidae	Acmaea Tornastra		mitra cerealis
LACMIP	2/7/2017		McLean (2013)	Animalia	Mollusca	Gastropoda	Cephalaspidea		Tornastra		culcitella
LACMIP	2/7/2017		Hall (2002)	Animalia	Mollusca	Gastropoda	Cephalaspidea		Acteocina		eximia
LACMIP LACMIP	2/7/2017 2/7/2017		McLean (2013) McLean (2013)	Animalia Animalia	Mollusca Mollusca	Gastropoda Gastropoda	Cephalaspidea Cephalaspidea		Acteocina Acteocina		harpa inculta
LACMIP	2/7/2017		McLean (2013)	Animalia	Mollusca	Gastropoda	Cephalaspidea		Tornastra		infrequens
LACMIP	2/7/2017		McLean (2013)	Animalia	Mollusca	Gastropoda	Cephalaspidea		Acteocina		oldroydi
LACMIP	2/7/2017		Moore (1976)	Animalia	Mollusca	Gastropoda	Cephalaspidea		Acteon		chehalisensis
LACMIP	2/7/2017	С	McLean (2013)	Animalia	Mollusca	Gastropoda	Cephalaspidea	Acteonidae	Rictaxis		painei
LACMIP	2/7/2017	С	Moore (1976)	Animalia	Mollusca	Gastropoda	Cephalaspidea	Acteonidae	Acteon		parvuum
FAMILY	GENUS	SUBGENUS	SPECIES	AUTHOR	ORIGINAL	SYNO	NYMS	AGE RANGE		EOSSI	. DISTRIBUTION
TAIVILLI	CLITOS	JODGERGS	J. Ecies	AOTHOR	ONIGINAL	31110		AGE RAITGE	California: Pico [various sources], San Diego [Powell e		
	Acmaea Tornastra			Rathke, 1833 (Gould, 1853)	Acmaea mitra	Acmaea mitra Tornastra cerea	ulis	IPI-R R	?late Pleistocene [Addicott & Emerson, 1959].		
Acteocinidae Acteocinidae Acteocinidae Acteocinidae Acteocinidae	Tornastra Acteocina Acteocina Acteocina Tornastra Acteocina		culcitella eximia harpa inculta infrequens	(Gould, 1853) (Baird, 1863) (Dall, 1871) (Gould, 1855) (Adams, 1852)		Acteocina culcitella, Tornatina a Acteocina eximia Coleophysis harpa Acteocina inculta Acteocina anomala Acteocina oldroydi		ePI-R IQ-R ePI-R R IQ-R R	California: Careaga Sandstone [Powell, unpubl. dat data], Pico [various sources]. California: Fernando [Powell, unpubl. data].		
					Acteocina cheha				Washinhgton: †Lincoln Creek [Moore, 1976]. Orego		e, 1976]. Oregon: I
	Acteon				Acteocina chena			E(p)-M(a)	1976].		
Acteonidae	Rictaxis		painei	(Dall, 1903)		Rictaxis painei,	Rictaxis painei g	IPI-R	California: Pico [various sources].		
Acteonidae	Acteon		parvuum	Dickerson, 1917	Acteon parvuum	Acteon parvuui	m	E(p)-O(r)	Washinhgton: †Gries Ranch [Moore, 1976]. Oregon		1976]. Oregon: Pi



Marking occurrences by stratigraphy

 Stratigraphy is how paleontologists represent time and ecology of an animal's occurrence







Stratigraphic concordances

- Updating outdated stratigraphic units
- Based on: USGS geologic lexicon, unpublished USGS geologic names committee archives, Macrostrat, with updates from recent literature
- Script-ready data tables uploaded to Data Dryad
- Written descriptions of problematic formations



Stratigraphic concordances

 California (250+ stratigraphic units; Peter Kloess, UC Berkeley/UCMP)

Name_(in_Geolex)	Lithostratigraphic_Unit	Ages_(in_Geolex)	Formal Name? Yes_No	Non-marine? (per N
Gualala Fm	Formation	Late Cretaceous	Formal	Marine
Hambre Sst of Monterey Grp* (recognized locally in San				
Francisco region)	Formation	Miocene*	Formal	Marine
Hookton Fm	Formation	Pleistocene	Formal	non-marine: fluvial
Howard Canyon= no record			Informal	Not in Macrostrat
Hungry Valley Fm; Hungry Valley Fm of Ridge Basin Grp	Formation	Miocene, late; Pliocene, early	Formal	non-marine: lacust
Hurricane Deck Fm	Formation	Tertiary; Miocene	Formal	Not given
Imperial Fm*	Formation	Miocene, late* to Pliocene, late(?)*	Formal	Marine
Ione Fm*	Formation	early Tertiary (Eocene)*	Formal	Marine
Irvington Grv	Formation	Pleistocene	Formal	Not given
Jacalitos Fm	Formation	Miocene; Pliocene	Formal	Marine
Jewett Sd*; /Freeman-Jewett Sh	Formation	Tertiary; Miocene, early*	Formal	Marine
Juncal Fm*	Formation	Eocene*	Formal	Not given
Kellogg Mbr of Nortonville Sh; Kellogg Sh Mbr of				
Markley Fm; Kellogg Sh	Member	Eocene	Formal	Not given
Kinton Point= no record			Informal	Not in Macrostrat
Kirker Tuff*	Formation	Oligocene*	Formal	Marine



Stratigraphic concordances

 OR, WA, British Columbia (66 units; Liz Nesbitt, Burke Museum)

	recording a sire recording								
	Geolex Name	State	Other names used in	First published	Geolex recongnized	Epoch	ICS Age*		
			literature	description &	Members and/or				
				redefinitions	Group names				
57	Lookingglass Formation	OR		Baldwin (1974)	Umpqua Group.	Early Eocene	Yprisian-Bartonian		
					Bushnell Rock, Olalla				
					Creek and Tenmile				
					members.				
58	Roseburg Formation	OR	Umpqua Formation	Baldwin (1974)	Umpqua Group	Early-Middle Eocene	Yprisian		
		ļ							
59		_							
60	Siletz River Volcanics	OR	Metchosin Volcanics	Snavely and Baldwin	Kings Valley Siltstone	Eocene	Yprisian		
				(1948)	Member				
61	Fraser lowland glacial-marine	WA			No official name	Pleistocene			
	deposits						at		
62	Sooke Formation	BC		Richardson (1876-1877);	Carmanah	Late Oligocene	Chattian		
	_			Clapp and Cook (1917)					
63	Formation	BC		Clapp and Cook (1917)		Oligocene - Miocene	Rupelian-Chattian		
64	Hesquiate Formation	BC		Jeletsky (1975)	Carmanah	Oligocene	Rupelian-Chattian		
65	Escalente Formation	BC		Bancroft (1837)	Carmanah	Eocene/Oligocene	Bartonain-Priabonaian		
						boundary			
66	Metchosin Volcanics	BC	Metchosin Igneous Complex	Clapp (1910)		Paleocene-Eocene			



Research uses of data

- TCN data served via individual IPT or VertNet IPT to iDigBio, GBIF, etc.
- Ecological and evolutionary response of marine species and communities to major environmental changes such as:
 - Paleocene-Eocene Thermal Maximum
 - Greenhouse-icehouse transitions
 - Opening of Bering Strait, closing of Panama Seaway
 - Contraction of the tropics



Already available

- Have feedback on our approach or methods?
- Interested in using our data?
- Let me know: <u>eclites@berkeley.edu</u>
- Or visit us @ https://epicctcn.org

- TCN products available
 - Setting up GeoLocate collaborative portal
 - Guide to labeling marine invertebrates
 - Standard views of marine invertebrates for photography



Acknowledgements

- Pls, students, staff and volunteers of EPICC
- iDigBio staff and trainings
- Chuck Powell (USGS, retired) for access to Geographic Names Committee archives and contributions to CA stratigraphic units.
- NSF DBI awards 1502500, 1503065, 1503545, 1503611, 1503613, 1503628 and 1503678







