

A map of Turkey with several colored dots (orange, yellow, red) indicating archaeological sites. The dots are located in various regions including Istanbul, Bursa, Izmir, Antalya, and Konya. The title text is overlaid on the map.

# Publishing and Pushing: Mixing Models for Communicating Research Data in Archaeology

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& Open Context

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The Alexandria Archive Institute  
& Open Context

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University of North Carolina,  
Chapel Hill



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## Challenges in Reusing Data

1. Background
2. Data publishing workflow
3. Data curation and dynamism





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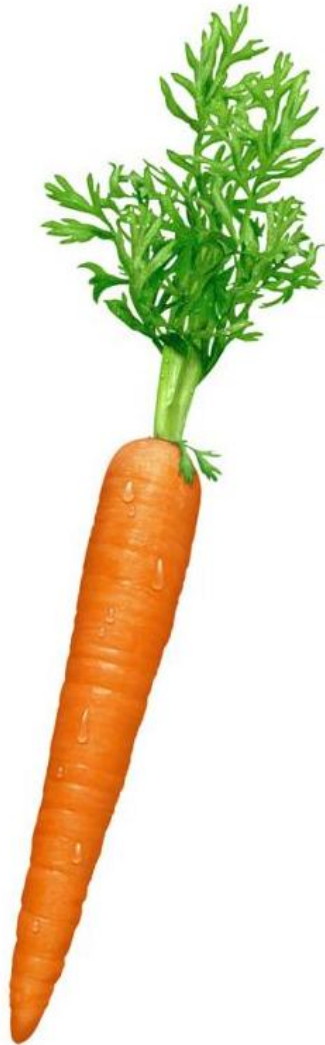
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Congratulations to Katia Schultz and Dave Huth, the winner and runner-up of [EOL Flickr Contest #99](#) for their great ... [more](#)

[wfish](#)  
and a role in distributing plant and animal species can claim the title of circumnavigator. In journeys to the Gulf Coast of the U.S. to ... [more](#)

[Flickr Contest #98: Beaks](#)  
David Bygott, the winner and runner-up of [EOL Flickr Contest #98](#) for their great ... [more](#)



[Jose Fernandez-Triana](#) added text to "[Dolichogenidea clavata](#)" on "[Apanteles clavatus](#) ([Provancher, 1881](#))". The species *Apanteles clavatus* ([Provancher, 1881](#)) has also been considered as...  
41 MINUTES AGO  
[reply](#)



[Jennifer Hammock](#) added "[blue spotted ray](#)" to the collection "[Best High Resolution Images on EOL](#)".  
ABOUT 1 HOUR AGO  
[reply](#)

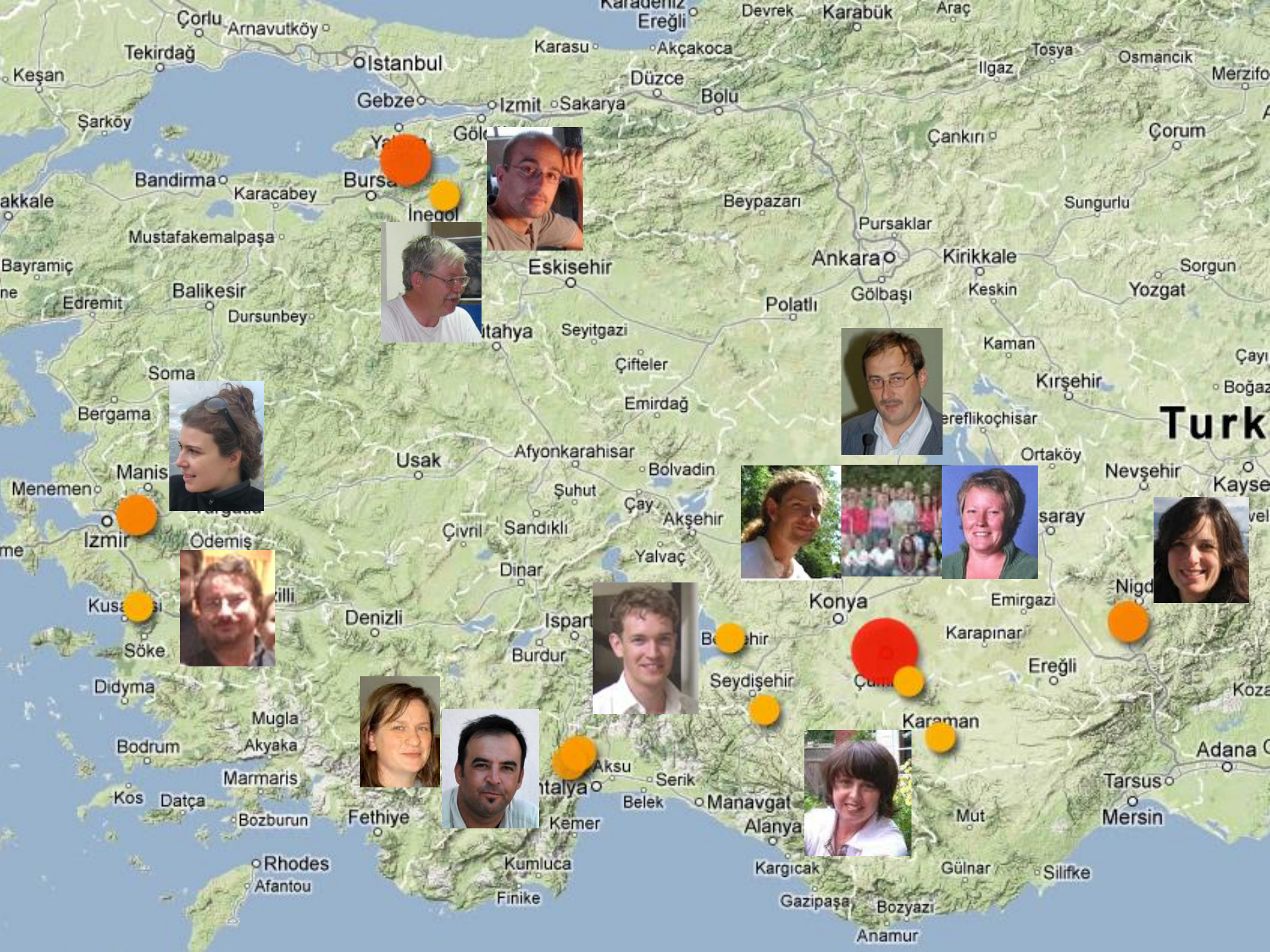


[Hans-Martin Braun](#) added the German common name "[Rodrigues-Riesengecko](#)" to "[Phelsuma qoas LIÉNARD 1842](#)".

## EOL Computable Data Challenge

(Ben Arbuckle, Sarah W. Kansa, Eric Kansa)

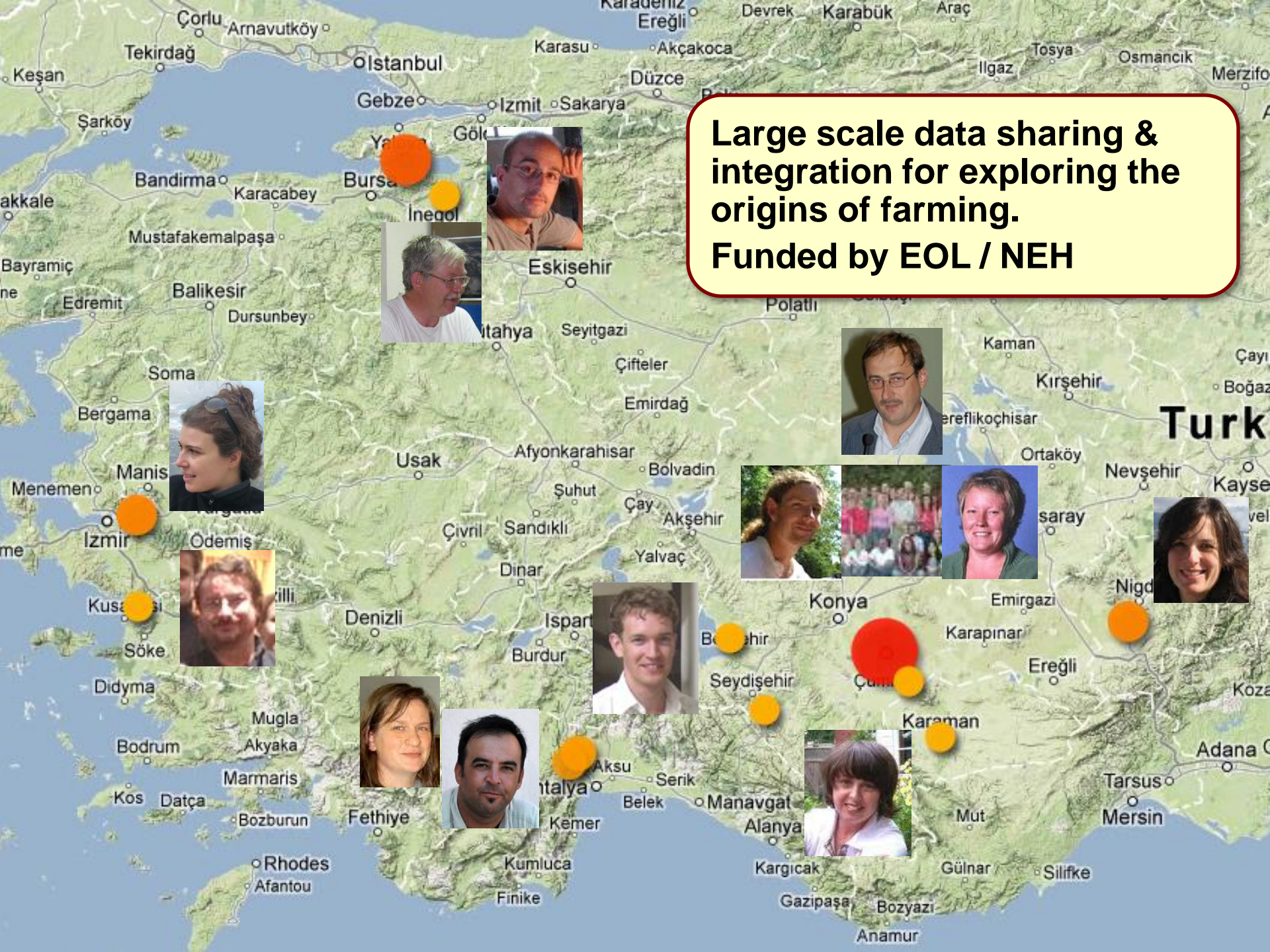






**Large scale data sharing & integration for exploring the origins of farming.**

**Funded by EOL / NEH**

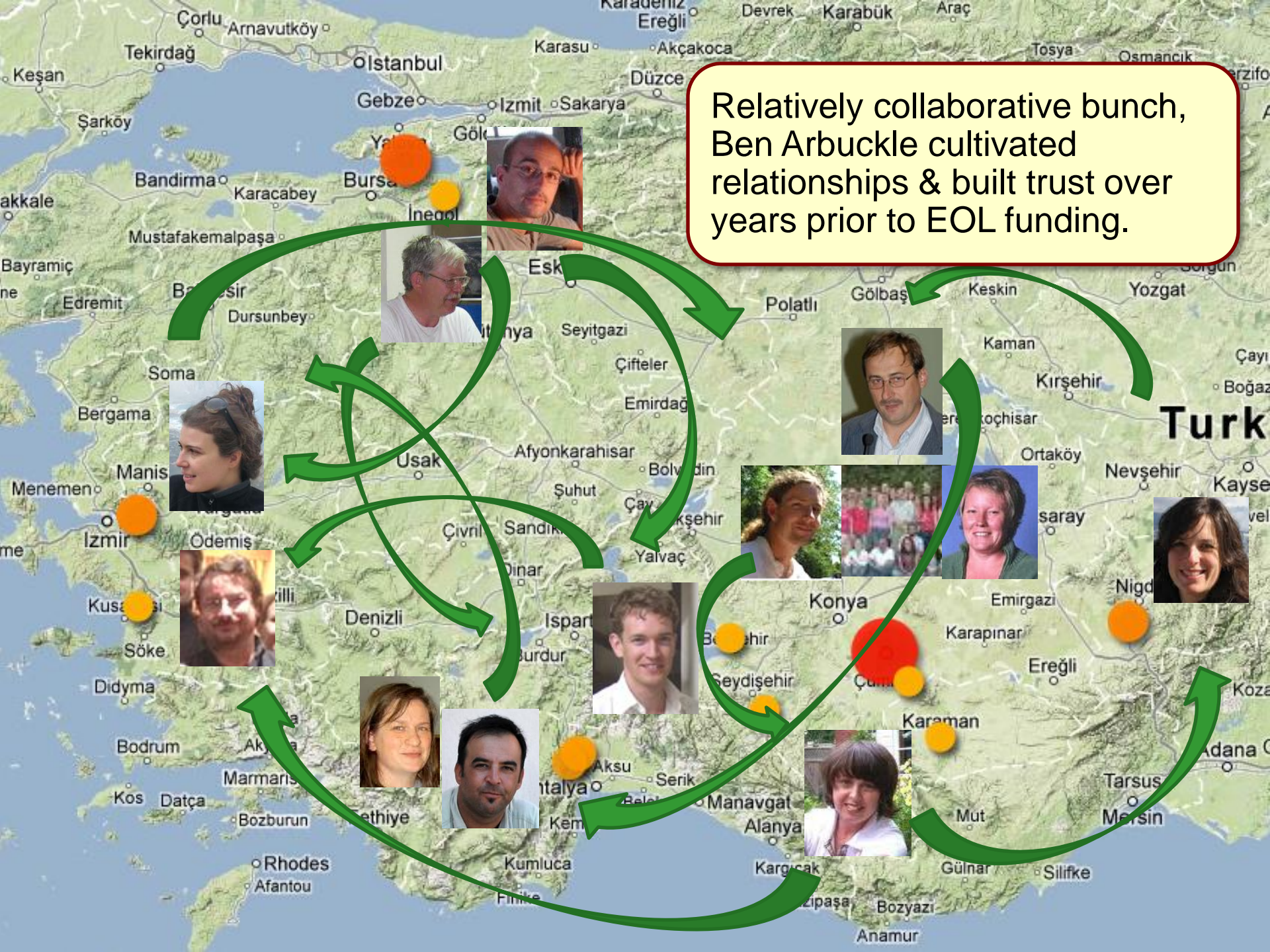








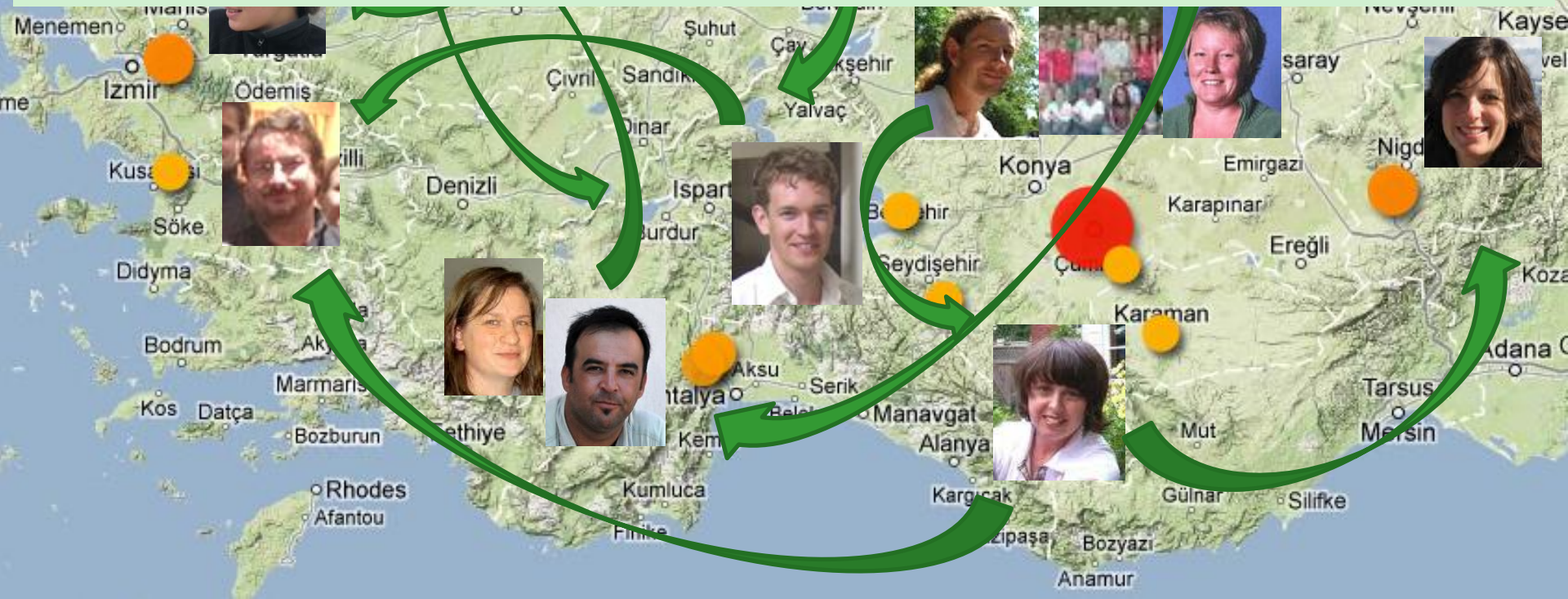
Relatively collaborative bunch,  
Ben Arbuckle cultivated  
relationships & built trust over  
years prior to EOL funding.







**Elizabeth Yakel; Ixchel Faniel; Rebecca Frank**





## Challenges in Reusing Data

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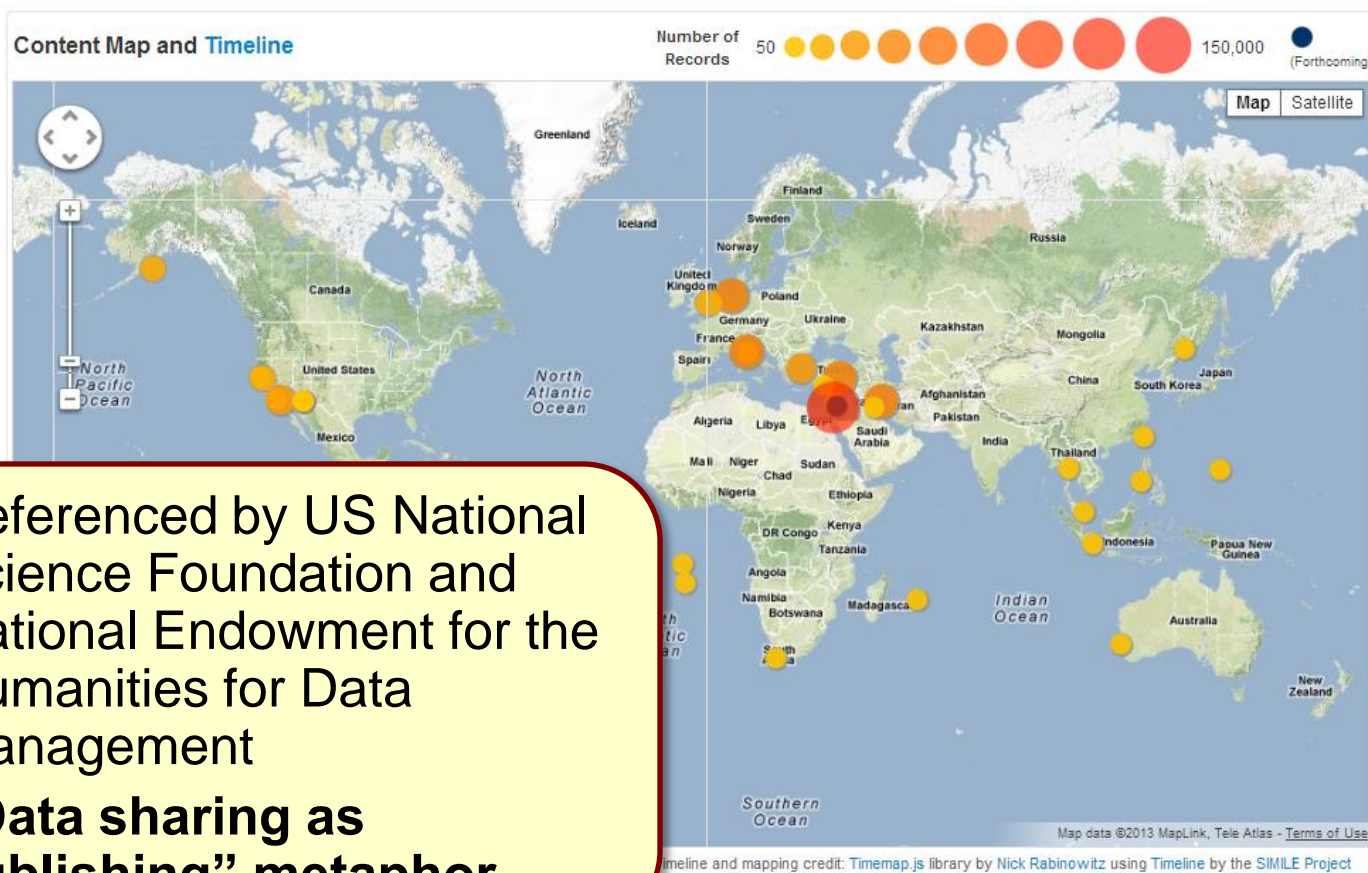


## Welcome to Open Context

Open Context reviews, edits, and publishes archaeological research data and archives data with university-backed repositories, including the California Digital Library.

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1. Referenced by US National Science Foundation and National Endowment for the Humanities for Data Management
2. **“Data sharing as publishing” metaphor**

**Raw Data: Idiosyncratic, sometimes highly coded, often inconsistent**

H8 dry sieved at 4 mm										sieved at 4 mm									
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
225	224	TP	7814.F144	7814	F	144		sieved	1	Skull									
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227	226	TP	7814.F146	7814	F	146		sieved	1	Skull									
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229	228	TP	7814.F148	7814	F	148		sieved	1	Skull									
230	229	TP	7814.F149	7814	F	149		sieved	1	Skull									
231	230	TP	7814.F150	7814	F	150		sieved	1	Maxilla with teeth									
232	231	TP	7814.F151	7814	F	151		sieved	1	Mandible with teeth									
233	232	TP	7814.F152	7814	F	152		sieved	1	teeth									
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239	238	TP	7814.F158	7814	F	158		sieved	1	Loose upper tooth									
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244	243	TP	7814.F163	7814	F	163		sieved	1	Tooth fragment									
245	244	TP	7814.F164	7814	F	164	2	n, 4 mm	1	Plot. fragments									
246	245	TP	7814.F165	7814	F	165		sieved	1	Loose lower tooth									
247	246	TP	7814.F166	7814	F	166	2	n, 4 mm	1	Rb									
248	247	TP	7814.F167	7814	F	167	2	n, 4 mm	1	(scaphoid)									
249	248	TP	7814.F168	7814	F	168	2	n, 4 mm	1	(pisiform)									
250	249	TP	7814.F169	7814	F	169	2	n, 4 mm	1	(cuneiform)									
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252	251	TP	7814.F171	7814	F	171	2	n, 4 mm	1	Tibia									

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14	TP	6764.F13	6764	F	13	0													
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25	OK	50002	5000	2000	W/100	5000	W/100	5000	W/100	5000	W/100	5000	W/100	5000	W/100	5000	W/100	5000	W/100
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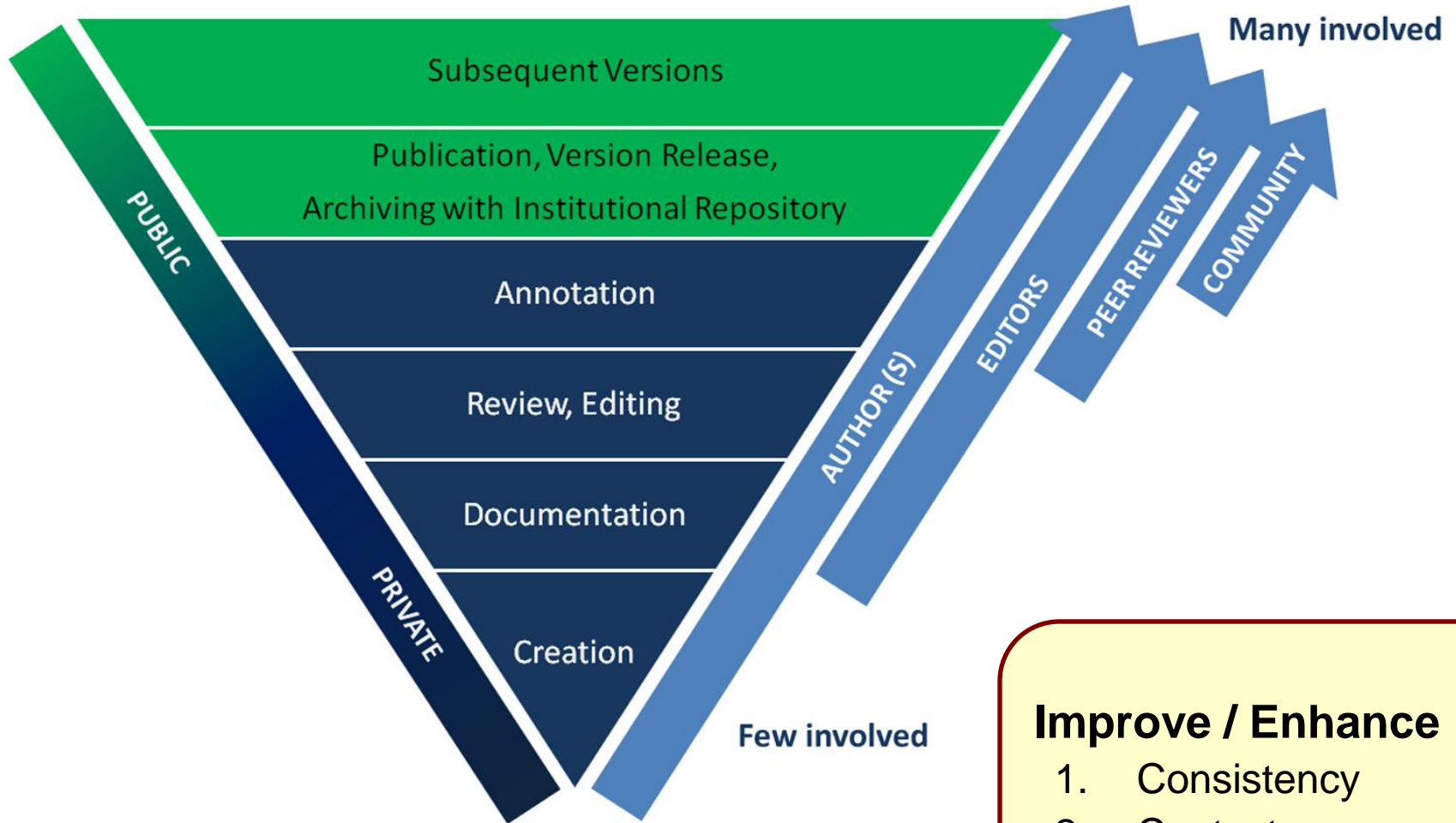
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1	Area	Basic Fauna	Faunal	Faunal	Faunal	Sample number	Metrich	Element	Taxon	Certainty	Symmetry	Process	Core	Fracture	Number of pier	of elef	diagno	Weight	Length	Pictures	Location	Condition	Faunal Port	Size	Class	Faunal Data														
2	TP	6764.F1	6764.F1			1	0	1	116	3	1			4	2	1		1	3																					
3	TP	6764.F2	6764.F2			2	0	1	33	7	1			2	9	1		1	0																					
4	TP	6764.F3	6764.F3			3	0	2	39	25	1		2	3	2	1		1	14	4	1	DZ	mb	07 size	28-June-06															
5	TP	6764.F4	6764.F4			4	0	8	39	25	1	2	3	2	1	1		12	4	1		mb	07 size	28-June-06																
6	TP	6764.F5	6764.F5			5	0	10	116	7	1		3	2	1	1		5	3	1		fied	07 size	28-June-06																
7	TP	6764.F6	6764.F6			6	0	10	116	7	1		3	8	1	1		15	6	1		fied	07 size	28-June-06																
8	TP	6764.F7	6764.F7			7	0	1	116	7	1		2	2	1	1		1	3	1		fied	07 size	28-June-06																
9	TP	6764.F8	6764.F8			8	0	1	116	5	1		2	2	1	1		6	4	1	g has	fied	05 size	28-June-06																
10	TP	6764.F9	6764.F9			9	0	1	33	3	1		2	2	1	1		1	2	1		Axial	03 size	28-June-06																
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25	TP	6764.F24	6764.F24			24	0	1	95	15	1	2	2	8	1	1	2	13	10	1		mb	03 size	28-June-06																
26	TP	6764.F25	6764.F25			25	0	1	76	15	1	1	1	2	1	1		5	6	1		mb	03 size	28-June-06																



Raw Data Can Be Unappetizing



# Publishing Workflow



## Improve / Enhance

1. Consistency
2. Context (intelligibility)





**Sometimes data is better  
served cooked**

Project / Collection Overview

### Introduction

Understanding Epipaleolithic hunter-gatherer lifestyles and changes in their subsistence patterns in relation to environmental fluctuations is pivotal in understanding one of the milestones in the human evolution, namely, the transformation from exploitation of wild plant and animal resources to the production of domestic variants of these resources.

Öküzini Cave was initially subject to limited and occasional investigation by İsmail Kılıç Kökten from the mid-1950s to 1973. Excavations were resumed by a short-lived Turkish-German collaboration in 1985. Large-scale and systematic excavations in Öküzini were conducted by a large international team under the direction of the Museum of Antalya and supervised by Işın Yalçinkaya between 1989 and 1999. The last project resulted in exhaustive studies including geology, lithic techno-typology, archaeobotany, archaeometry, malacology, and palynology of the site, and was published as a monograph. The new excavations revealed 13 discrete geological horizons (GH 0 through XII) within a 3.5-meter Epipaleolithic sequence including a mixed protohistoric or Neolithic/Chalcolithic level disturbed by human burials preceded by Epipaleolithic layers that have been subdivided into four cultural phases or archaeological units (AUs 1, 2, 3, 4) based on characteristics of the lithic assemblages. The designated AUs at Öküzini cover a temporal range from 16,460 to 12,000 uncalibrated years BP or from 19,790 to 12,900 calibrated years BP.

The primary focus of the zooarchaeological research at Öküzini was to examine a series of related topics such as: (1) Assemblage composition and characterization, (2) Changes in animal exploitation patterns and hunting strategies through time, (3) Mobility patterns, site function and inter-site variation, and (4) Periodicity in animal exploitation.

### Methodology

The recording process involved two stages:

1. General documentation of the entire assemblage for the purpose of assemblage characterization (e.g., degree of fragmentation, skeletal part representation, etc.). This level included every element, element portion, and nonidentified fragments and splinters recovered.
2. Particular documentation of pre-determined attributes in relation to the particular questions that are being asked (e.g., kill-off patterns, seasonality, etc.). This level targeted selected elements and portions such as mandibles with teeth, loose mandibular teeth, pelvic acetabula, and all limb epiphyses.

### Potential Applications of Data

These data add to the increasing body of evidence for epipaleolithic subsistence in western Anatolia.

### Related Publications

Atici, Levent	
2011	<i>Before the Revolution: Epipaleolithic Subsistence in the Western Taurus</i> . British Archaeological Reports International Monograph Series 2251. Oxford: Archaeopress. <a href="#">[WorldCat]</a>
Atici, Levent	
2011	Epipaleolithic Archaeology in Turkey. <i>Studies in Honour of Işın Yalçinkaya</i> pp. 27-47. Kızılay, Ankara: Bilgin Kültür Sanat Yayınları, 2011. <a href="#">[WorldCat]</a>
Atici, Levent	
2009	Implications of Age Structures for Epipaleolithic Hunting Strategies in the Western Taurus Mountains, Southwest Turkey. <i>Anthropozoologica</i> 44(1):13-39. <a href="#">[DOI]</a> <a href="#">[Open Access]</a>
Atici, Levent	
2009	Specialization & diversification: animal exploitation strategies in the terminal Pleistocene, Mediterranean Turkey. <i>Before Farming</i> 2009(7) article 1. <a href="#">[WorldCat]</a> <a href="#">[Publisher Version]</a> <a href="#">[Open Access]</a>
Atici, Levent	
2007	<i>Before the revolution: a comprehensive zooarchaeological approach to terminal Pleistocene forager adaptations in the western Taurus Mountains</i> . Turkey Thesis (Ph. D.)—Harvard University, 2007. <a href="#">[WorldCat]</a> <a href="#">[ProQuest]</a>
Atici, Levent., and Stutz, Aaron, J.	
2002	Mortality Profile Analysis of the Ungulate Fauna from Öküzini: A Preliminary Reconstruction of Site Use, Seasonality, and Mobility Patterns. <i>La Grotte öküzini: Évolution du Paléolithique Final du Sud-Ouest de l'Anatolie (Öküzini: Final Paleolithic Evolution in Southwest Anatolia)</i> . ERAUL 96, pp. 101-108. Liège: Université de Liège. <a href="#">[WorldCat]</a>
Yalçinkaya, I., Otte, M., Kozłowski, J., and Bar-Yosef, O. (Editors)	
2002	<i>La Grotte öküzini: Évolution du Paléolithique Final du Sud-Ouest de l'Anatolie (Öküzini: Final Paleolithic Evolution in Southwest Anatolia)</i> . ERAUL 96, pp. 101-108. Liège: Université de Liège. <a href="#">[WorldCat]</a>

**Suggested Citation for this Project Overview:**  
Levent Atici. "Zooarchaeology of Öküzini Cave: (Overview)" (Released 2013-03-02). Levent Atici (Ed.) Open Context. <<http://opencontext.org/projects/8894EEC0-DC96-4304-1EFC-4572FD91717A>> DOI:10.5078/M73X84X

Content Associated with this Project		
Items in these categories have been viewed: 2202 times. (Ranked: 26 of 29)		
	Animal Bone	6388 items contained in this category.
	Square	70 items contained in this category.
	Stratum	12 items contained in this category.
	Site	1 items contained in this category.

### Associated People

Levent Atici

### Project Editorial Status

★★★★ Managing editor reviewed

### Suggested Citation

Levent Atici. "Zooarchaeology of Öküzini Cave: (Overview)" (Released 2013-03-02). Levent Atici (Ed.) Open Context. <<http://opencontext.org/projects/8894EEC0-DC96-4304-1EFC-4572FD91717A>> DOI:10.5078/M73X84X

### Browse this Project

6474 items contained in this context. Dating between: -17840 to -10950

### Keywords for this Project

Öküzini Cave, Western Taurus Mountains, South West Anatolia, Turkey, Epipaleolithic, Terminal Pleistocene, Zooarchaeology, Forager adaptations, Hunting, Subsistence

### Linked Media (0 files)

Version-control ([Github](#), [XML](#), [Data](#))

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# - Documentation - Review, editing - Annotation

## Introduction

Understanding Epipaleolithic hunter-gatherer lifestyles and changes in their subsistence patterns in relation to environmental fluctuations is pivotal in understanding one of the milestones in the human evolution, namely, the transformation from exploitation of wild plant and animal resources to the production of domestic variants of these resources.

Öküzini Cave was initially subject to limited and occasional investigation by İsmail Kılıç Kökten from the mid-1950s to 1973. Excavations were resumed by a short-lived Turkish-German collaboration in 1985. Large-scale and systematic excavations in Öküzini were conducted by a large international team under the direction of the Museum of Antalya and supervised by Işın Yalçinkaya between 1989 and 1999. The last project resulted in exhaustive studies including geology, lithic techno-typology, archaeobotany, archaeometry, malacology, and palynology of the site, and was published as a monograph. The new excavations revealed 13 discrete geological horizons (GH 0 through XII) within a 3.5-meter Epipaleolithic sequence including a mixed protohistoric or Neolithic/Chalcolithic level disturbed by human burials preceded by Epipaleolithic layers that have been subdivided into four cultural phases or archaeological units (AUs 1, 2, 3, 4) based on characteristics of the lithic assemblages. The designated AUs at Öküzini cover a temporal range from 16,460 to 12,000 uncalibrated years BP or from 19,790 to 12,900 calibrated years BP.

The primary focus of the zooarchaeological research at Öküzini was to examine a series of related topics such as: (1) Assemblage composition and characterization, (2) Changes in animal exploitation patterns and hunting strategies through time, (3) Mobility patterns, site function and inter-site variation, and (4) Periodicity in animal exploitation.

## Methodology

The recording process involved two stages:

1. General documentation of the entire assemblage for the purpose of assemblage characterization (e.g., degree of fragmentation, skeletal part representation, etc.). This level included every element, element portion, and nonidentified fragments and splinters recovered.
2. Particular documentation of pre-determined attributes in relation to the particular questions that are being asked (e.g., kill-off patterns, seasonality, etc.). This level targeted selected elements and portions such as mandibles with teeth, loose mandibular teeth, pelvic acetabula, and all limb epiphyses.

## Potential Applications of Data

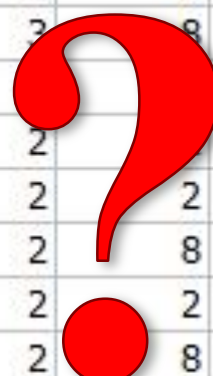
These data add to the increasing body of evidence for epipaleolithic subsistence in western Anatolia.



I	J	L	M	W	X	Y	Z	AA	AB	AE
Element	Taxon	Certainty	Symmetry	ace Cond	of fragmen	ber of				
116	3	1		4	2					
33	7	1		2	9					
39	25	1	2	3	2					
39	25	1	2	3	2					
116	7	1		3	2					
116	7	1		3	8					
116	7	1		2	2	1	1		1	3
116	5	1		2	2	1	1		6	4
33	3	1		2	2	1	1		1	2
33	3	1		2	8	1	1		2	4
30	3	1	3	2	2	1	1		3	4
116	3	1		2	8	1	1		1	3
116	3	1		4	2	1	1		1	5
116	3	1		2	8	1	1		1	5
116	3	1		2	2	1	1		1	2
95	25	1	2	2	2	1	1		31	9
64	25	1	4	2	2	1	1	0.5	15	6
21	15	1	1	2	8	1	1		9	8

- Documentation
- Review, editing
- Annotation

I	J	L	M	W	X	Y	Z	AA	AB	AE
Element	Taxon	Certainty	Symmetry	Trace Cond	of fragment	ber of				
116	3	1		4	2					
33	7	1		2	9					
39	25	1	2	3	2					
39	25	1	2	3	2					
116	7	1		3	2					
116	7	1		3	8					
116	7	1				1	1		1	3
116	5	1		2		1	1		6	4
33	3	1		2	2	1	1		1	2
33	3	1		2	8	1	1		2	4
30	3	1	3	2	2	1	1		3	4
116	3	1		2	8	1	1		1	3
116	3	1		4	2	1	1		1	5
116	3	1		2	8	1	1		1	5
116	3	1		2	2	1	1		1	2
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64	25	1	4	2	2	1	1	0.5	15	6
21	15	1	1	2	8	1	1		9	8



- Documentation
- Review, editing
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J	L	P	R	U	V
Element	Taxon	Symmetry	Age	Location of burning	Type of burning
Long bone	Sheep-size (medium dog to medium sheep)				
Rib	Cow-size (cattle/red deer/horse)				
Radius	Bos sp.	Left			
Radius	Bos sp.	Left			
Long bone	Cow-size (cattle/red deer/horse)				
Long bone	Cow-size (cattle/red deer/horse)				
Long bone	Cow-size (cattle/red deer/horse)				
Long bone	Pig-size				
Rib	Sheep-size (medium dog to medium sheep)				
Rib	Sheep-size (medium dog to medium sheep)				
Lumbar vertebra	Sheep-size (medium dog to medium sheep)	Central	Young		Burnt
Long bone	Sheep-size (medium dog to medium sheep)			Shaft	Partly burnt
Long bone	Sheep-size (medium dog to medium sheep)				
Long bone	Sheep-size (medium dog to medium sheep)		Young		
Long bone	Sheep-size (medium dog to medium sheep)				
Metatarsal III+IV	Bos sp.	Left			
phalanx	Bos sp.	Left lateral			
teeth	Ovis/Capra	Right			
teeth	Ovis/Capra	Left	Juvenile		
Loose upper tooth	Ovis/Capra	Left	t		
Loose upper tooth	Ovis/Capra	Right	Infantile		
Loose lower tooth	Ovis/Capra	Left	Old		
Metacarpal III+IV	Ovis/Capra	Right			
Metatarsal III+IV	Ovis/Capra	Left	Infantile/juvenile		
Tibia	Ovis/Capra	Right			

- Documentation  
- Review, editing  
- Annotation

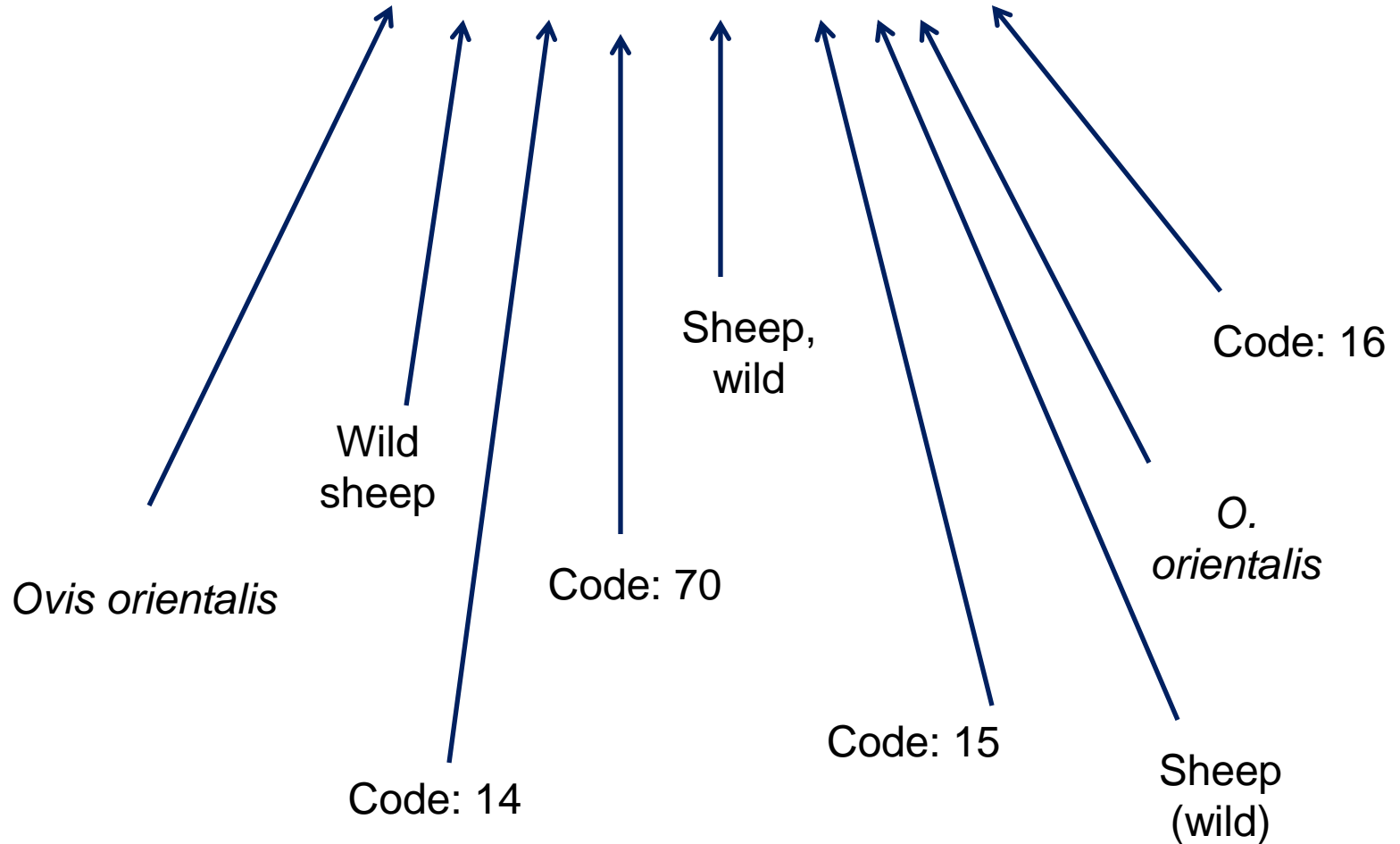
J	L	P	R	U	V
Element	Taxon	Symmetry	Age	Location of burning	Type of burning
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Long bone	Sheep-size (medium dog to medium sheep)			Shaft	Partly burnt
Long bone	Sheep-size (medium dog to medium sheep)				
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Loose upper tooth	Ovis/Capra	Left	t		
Loose upper tooth	Ovis/Capra	Right	Infantile		
Loose lower tooth	Ovis/Capra	Left	Old		
Metacarpal III+IV	Ovis/Capra	Right			
Metatarsal III+IV	Ovis/Capra	Left	Infantile/juvenile		
Tibia	Ovis/Capra	Right			

- Documentation  
- Review, editing  
- Annotation

**Decoding: Time consuming effort;  
10 times (!) longer...**



# “Ovis orientalis”



Urial - *Ovis orientalis* - Ovi x

← → ↺ ↻ [eol.org/pages/11021638/overview](https://eol.org/pages/11021638/overview) 🔍 ☆ ☰

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**eol**  
Encyclopedia of Life






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# *Ovis orientalis*

Urial [learn more about names for this taxon](#)

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*Ovis orientalis* **TRUSTED**  
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IUCN threat status: **Vulnerable (VU)**

## Brief Summary [read full entry](#)

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### Biology

Mouflon tend to feed early in the morning and in the evening, resting during the day under an overhanging bush or rock, where they are well hidden. Mouflon are gregarious and form non-territorial herds grazing on grasses, unless food is scarce when they will turn to browse on leaves and fruits. The species are well developed as the

Found in 2 classifications [see all](#)

Species recognized by NCBI Taxonomy:

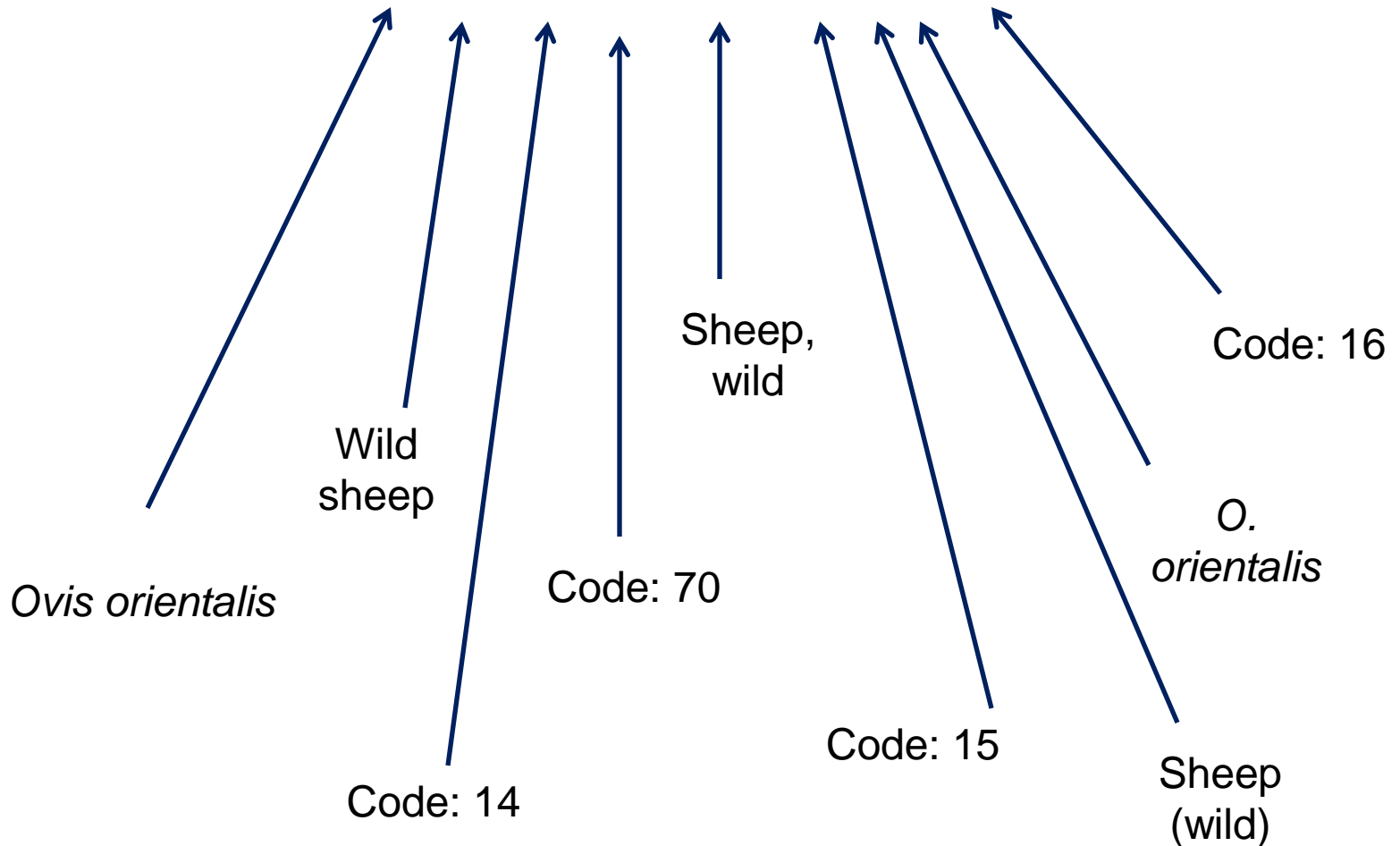
- Cellular organisms
- Eukaryota
- Opisthokonta
- Metazoa
- Eumetazoa
- Bilateria
- Deuterostomia
- Chordata
- Craniata
- Vertebrata
- Gnathostomata
- Teleostomi
- Euteleostomi
- Sarcopterygii
- Tetrapoda
- Amniota
- Mammalia
- Theria
- Eutheria
- Laurostheria
- Cetartiodactyla
- Ruminantia
- Bovidae
- Ovis
- Ovis orientalis*
- Ovis orient*
- Ovis orient*
- Ovis orient*
- Ovis orient*
- Ovis ammon*
- Ovis aries*
- Ovis canad*

- Documentation
- Review, editing
- Annotation



# “Ovis orientalis”

<http://eol.org/pages/311906/>



Urial - *Ovis orientalis* - Ovi x

eol.org/pages/11021638/overview

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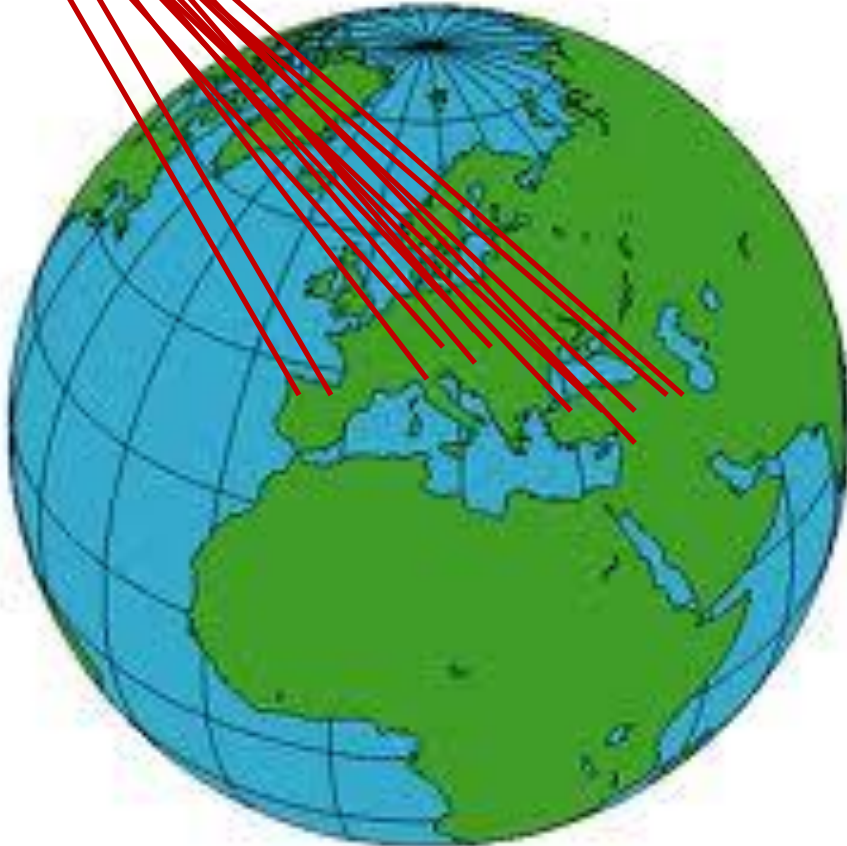
*Ovis orientalis*

Urial [learn more about names for this taxon](#)

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Overview Detail 3 Media 0 Maps Names





add to a collection

- Controlled vocabulary
- Linked Data applications

Urial tend to feed early in the morning and in the evening, resting during the day under an overhanging bush or rock, where they are well hidden. Mouflon are gregarious and form non-territorial herds grazing on grasses, unless feed in areas where they will have to traverse tundra and fields. The species are well developed as the

[Ovis ammon](#)  
[Ovis aries](#)  
[Ovis canadensis](#)



eOL Encyclopedia of Life

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# Sheep/goat


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“Sheep/goat”  
<http://eol.org/pages/32609438/>



Sheep/goat **TRUSTED**  
 (cc) by J. Morris  
 Source: EOL Rapid Response Team

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IUCN threat status: [Not evaluated](#)


Classification not normally visible on EOL

Taxon recognized by [EOLspecies](#):  
 Sheep/goat

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[Sarah Kansa](#) added text to "[Brief Summary](#)" on "[Sheep/goat](#)".  
 The term "sheep/goat" is used commonly by zooarchaeologists to refer to

## Brief Summary [read full entry](#)

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The term "sheep/goat" is used commonly by zooarchaeologists to refer to an archaeological specimen that cannot be identified as either coming from sheep or goat. Its use stems from the fact that the bones of sheep and goats can be very difficult to distinguish. This is particularly the case for archaeological specimens, which can be highly fragmented.

Specimens that zooarchaeologists identify as "sheep/goat" commonly occur in faunal assemblages comprised of domestic sheep (*Ovis aries*) and goats (*Capra hircus*). However, the difficulty in distinguishing sheep from goat pertains also to their wild progenitors, *Ovis orientalis* and *Capra aegagrus*. The similarities occur also with other species in the two genera.

The use of the term by zooarchaeologists does not imply ancient attempts at hybridization. It is merely a grouping of terms to facilitate zooarchaeological analysis and recording.

**Background:** Sheep and goats have different dietary needs and social behavior, and they produce different products, necessitating different management strategies by humans. In spite of these differences, their bones and teeth are very similar morphologically. Distinguishing between the two taxa has been a long-recognized problem (see Corns and Leslie, 1991) and many studies have attempted to define morphological landmarks and statistical approaches for making reliable identifications of bones or goat specimens (e.g., for example,

1. Needed to mint new concepts like "sheep/goat"
2. Vocabularies need to be responsive for multidisciplinary applications



**Item: Bone J8c22-31**  
**Class: Animal Bone**

**Project: Zooarchaeology of Öküzini Cave**  
**Number of Views: 5**

Context (click to view):

[Turkey / Öküzini Cave / VII / Square J8c](#)

#### Descriptive Properties (23)

Variable	Value
Archaeological Horizon	<a href="#">22</a>
Osteo Id	<a href="#">Metatarsus III + IV</a>
Taxonomic Id	<a href="#">Ovis orientalis</a>
Articulation	<a href="#">Separate</a>
Symmetry	<a href="#">Right</a>
Sex	<a href="#">Nonidentified</a>
Pathology	<a href="#">No pathology</a>

#### Linked Data:

Open Context Zooarchaeology Annotations-Has anatomical identification :: [UBERON \(Uber Anatomy Ontology\)- fused metatarsal bones 3 and 4](#)

Biological Taxonomy Vocabulary-Has Biological Taxonomy :: [Encyclopedia of Life- Ovis orientalis](#)

Open Context Zooarchaeology Annotations-Has fusion character :: [Open Context Zooarchaeology Annotations- Distal epiphysis unfused](#)

Depth of the medial trochlear condyle (B)	<a href="#">11.7</a>
Greatest depth of the distal end (Dd)	<a href="#">17.5</a>
Greatest breadth of the distal end (Bd)	<a href="#">27.2</a>

#### Linked Persons / Organizations (1)

[Levent Atici](#), Principle Author / Analyst

#### Project Editorial Status

★★★★★ Managing editor reviewed

#### Suggested Citation

Levent Atici. "Zooarchaeology of Öküzini Cave: Bone J8c22-31 (Animal Bone)" (Released 2013-02-27). Levent Atici (Ed.) Open Context. <<http://opencontext.org/subjects/0CF37A48-3C8D-45CA-C7D8-58C2B9F03889>>

#### Editorial Description (1)

[\(18K BCE - 11K BCE\)](#)

**Editor's Note:** Date ranges are approximate and do not necessarily reflect the opinion of data contributors. These dates are provided only to facilitate searches.

#### Linked Data:

Open Context Zooarchaeology Annotations-Has anatomical identification :: [UBERON \(Uber Anatomy Ontology\)- fused metatarsal bones 3 and 4](#)

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#### Linked Media (0)

[ArchaeoML \(XML\) Version](#)

[Version-control \(Github, XML Data\)](#)

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### [Uber anatomy ontology](#)

Keywords:  Class: [fused metacarpal bones 3 and 4](#)

- Term IRI: [http://purl.obolibrary.org/obo/UBERON\\_0013587](http://purl.obolibrary.org/obo/UBERON_0013587)
- definition: An element formed from the fusion of metacarpal 3 and metacarpal 4. [database\_cross\_reference: <http://oroid.org/0000-0001-7920-5321>]

#### Annotations

- has\_obo\_namespace: uberon
- has\_exact\_synonym: fused metacarpal 3/4
- has\_related\_synonym: metacarpal 3+4
- id: UBERON:0013587
- comment: In many artiodactyls, the 3rd & 4th metapodials are fused, creating a main metapodial.

#### Equivalents

- [metacarpal bone](#) and (has\_fused\_element some [metacarpal bone of digit 3](#)) and (has\_fused\_element some [metacarpal bone of digit 4](#))

#### Class Hierarchy

Thing

- + [anatomical entity](#)
  - + [material anatomical entity](#)
    - + [anatomical structure](#)
      - + [organ](#)
        - + [skeletal element](#)
          - + [bone element](#)
            - + [bone of appendage girdle complex](#)
              - + [bone of free limb or fin](#)
                - + [limb bone](#)
                  - + [autopod bone](#)
                    - + [digitopodium bone](#)
                      - + [metapodium bone](#)
                        - + [fused metapodial bones 3 and 4](#)
                          - [fused metatarsal bones 3 and 4](#)
                          - [fused metacarpal bones 3 and 4](#)

#### Superclasses & Asserted Axioms

- [fused metapodial bones 3 and 4](#)

obo:UBERON\_0013587, fu x

www.ontobee.org/browser/rdf.php?o=UBERON&iri=http://purl.obolibrary.org/obo/UB

# Ontobee

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## Uber anatomy ontology

Keywords:  Search terms

Class: fused metacarpal bones 3 and 4

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- comment: In many artiodactyls, the 3rd & 4th metapodials are fused, creating a main metapodial.

### Equivalents

- [metacarpal bone](#) and (has\_fused\_element some [meta](#)

### Class Hierarchy

Thing

- + [anatomical entity](#)
- + [material anatomical entity](#)
- + [anatomical structure](#)
- + [organ](#)
- + [skeletal element](#)
- + [bone element](#)
- + [bone of appendage girdle complex](#)
- + [bone of free limb or fin](#)
- + [limb bone](#)
- + [autopod bone](#)
- + [digitopodium bone](#)
- + [metapodium bone](#)
- + [fused metapodium](#)
- [fused metatarsal bones 3 and 4](#)
- [fused metacarpal bones 3 and 4](#)

### Superclasses & Asserted Axioms

- [fused metapodial bones 3 and 4](#)

## Linking to UBERON

1. Needed a controlled vocabulary for bone anatomy
2. *Better data modeling than common in zooarchaeology, adds quality.*



obo:UBERON\_0013587, fu... x

www.ontobee.org/browser/rdf.php?o=UBERON&iri=http://purl.obolibrary.org/obo/UB

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### Class Hierarchy

Thing

- + [anatomical entity](#)
- + [material anatomical entity](#)
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- + [bone of free limb or fin](#)
- + [limb bone](#)
- + [autopod bone](#)
- + [digitopodium bone](#)
- + [metapodium bone](#)
- + [fused metapodium bone](#)
- [fused metatarsal bones 3 and 4](#)
- [fused metacarpal bones 3 and 4](#)

### Superclasses & Asserted Axioms

- [fused metapodial bones 3 and 4](#)

## Linking to UBERON

1. Models links between anatomy, developmental biology, and genetics
2. Unexpected links between the **Humanities and Bioinformatics!**





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- EOL linked Biological Taxa

Select Multiple

- [Sus scrofa domesticus \(Encyclopedia of Life\)](#) 8155
- [Sus scrofa \(Encyclopedia of Life\)](#) 1346
- [Sus \(Encyclopedia of Life\)](#) 1236

- Descriptive Properties

Select Multiple

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- [Side](#) 5394
- [Taxon](#) 5299
- [Species](#) 5157
- [Class](#) 4901
- [Element Name](#) 4901
- [Period](#) 4901
- [Probable Species](#) 4901
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- [Sex](#) 3205
- [Fusion](#) 3118
- [Age \(rough\)](#) 1847

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- [Domuztepe](#) 1745
- [Ulucak](#) 1263
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- [Erbaba Höyük](#) 394
- [Çukuriçi Höyük](#) 207
- [Barcın Höyük](#) 67
- [Köşk Höyük](#) 32
- [Suberde](#) 32

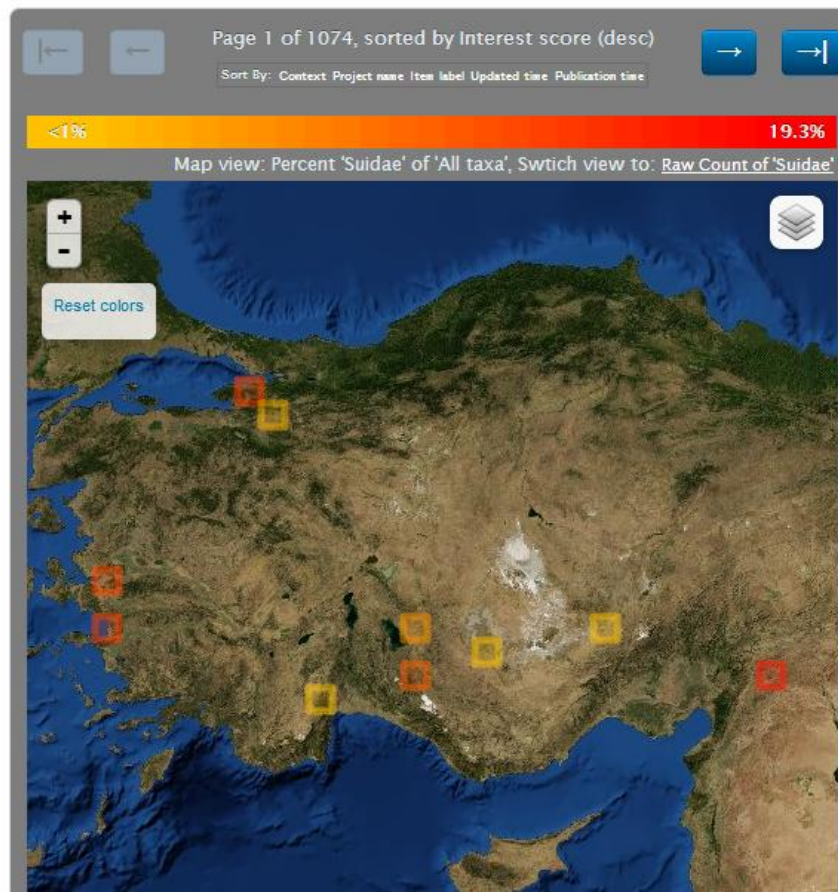
More...

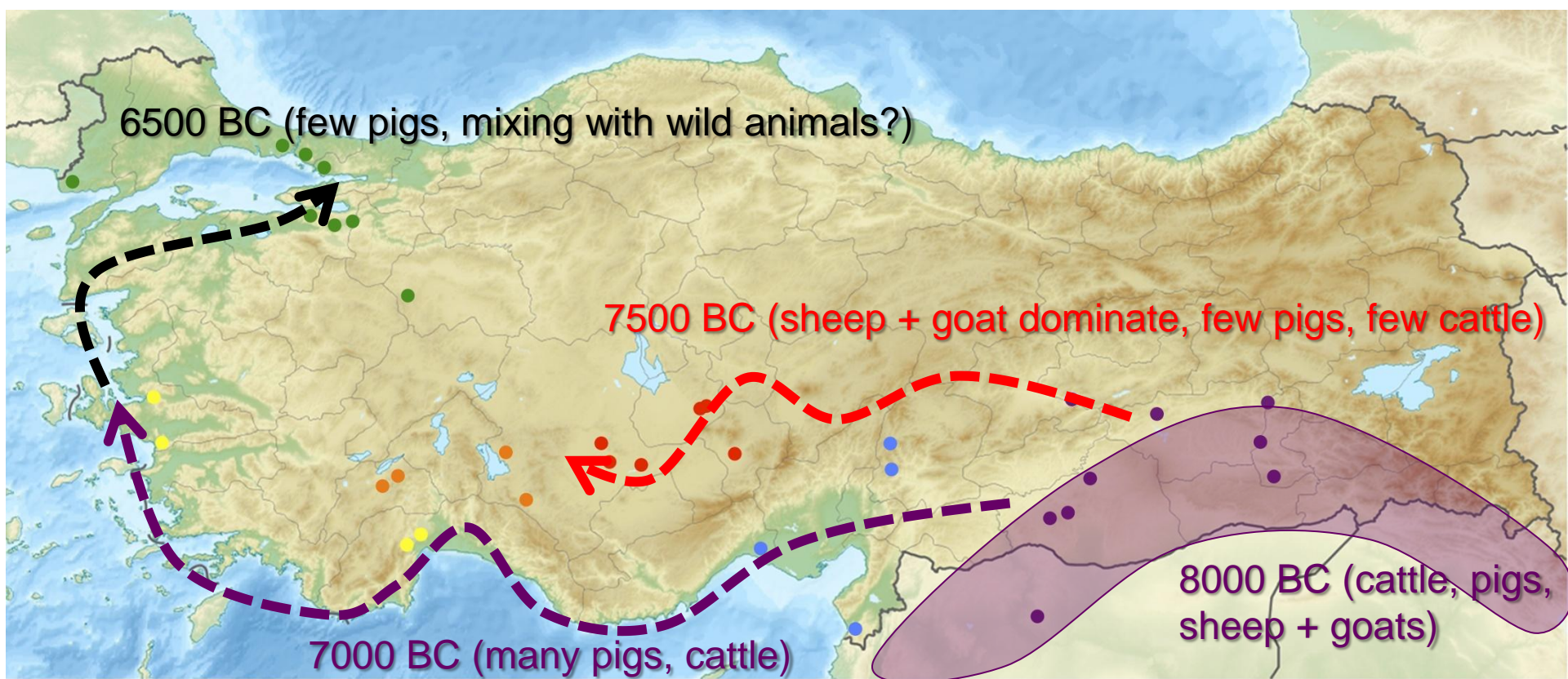
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- (3) Biological Taxa: [Suidae \(Hogs, pigs\)](#) (from [Encyclopedia of Life](#)); includes more specific sub-taxa 

Last Updated: *October 29, 2013, 9:28 am*

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- *Not* a neat model of progress to adopt a more productive economy. Very different, sometimes piecemeal adoption in different regions.
- Separate coastal and inland routes for the spread of domestic animals, over a 1000-year time period.



[illegible]

- Animal taxonomy
- Bone anatomy
- Sex determination
- Side of the animal
- Fusion (bone growth)

## 1. Animal taxonomy


- [illegible]

|       |                                  |       |                |  |  |              |  |                   |
|-------|----------------------------------|-------|----------------|--|--|--------------|--|-------------------|
|       | Oxw-side (cattle/red deer/horse) |       |                |  |  |              |  |                   |
|       | Oxw-side (cattle/red deer/horse) |       |                |  |  |              |  |                   |
|       | Rid sp.                          |       |                |  |  |              |  |                   |
|       | Dors/Capra                       | Left  |                |  |  |              |  |                   |
|       | Dors/Capra                       | Right |                |  |  |              |  |                   |
| With  | Dors/Capra                       | Right | Juvenile       |  |  |              |  |                   |
| Tooth | Dors/Capra                       | Right | Infantile      |  |  |              |  |                   |
|       | Dors/Capra                       | Right | Youling        |  |  |              |  |                   |
|       | Dors/Capra                       |       |                |  |  |              |  |                   |
|       | Oxw-side (cattle/red deer/horse) |       |                |  |  |              |  |                   |
|       | Rid sp.                          |       |                |  |  |              |  |                   |
|       | Rid sp.                          |       |                |  |  |              |  |                   |
| Teeth | Dors/Capra                       | Adult |                |  |  |              |  |                   |
|       | Dors/Capra                       | Left  |                |  |  |              |  |                   |
| Teeth | Dors/Capra                       | Right | Subadult       |  |  |              |  |                   |
|       | Dors/Capra                       | Right | Juvenile       |  |  |              |  |                   |
| Teeth | Huma                             | Left  | t              |  |  |              |  |                   |
|       | Dors/Capra                       | Left  |                |  |  |              |  |                   |
| Teeth | adolemanente                     |       |                |  |  |              |  |                   |
|       | Dors/Capra                       | Right | Subadult/adult |  |  |              |  |                   |
|       | Rd sp.                           |       | Youling        |  |  |              |  |                   |
|       | Dors/Capra                       | Right |                |  |  | Proximal end |  | Partly carbonized |
| Teeth | Dors/Capra                       | Right |                |  |  |              |  |                   |
|       | Dors/Capra                       | Left  | Youling        |  |  |              |  |                   |
|       | Dors/Capra                       | Left  |                |  |  |              |  |                   |
|       | Dors/Capra                       | Left  |                |  |  |              |  |                   |

## Hard to Align (poor modeling, recording)

1. Tooth wear (age)
2. Fusion data
3. Measurements

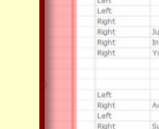
*Despite common research methods!!*

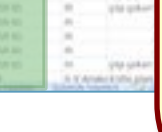


## Hard to Align (poor modeling, recording)

1. Tooth wear (age)
2. Fusion data
3. Measurements

*Despite common research methods!!*

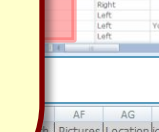




## Hard to Align (poor modeling, recording)

1. Tooth wear (age)
2. Fusion data
3. Measurements

*Despite common research methods!!*



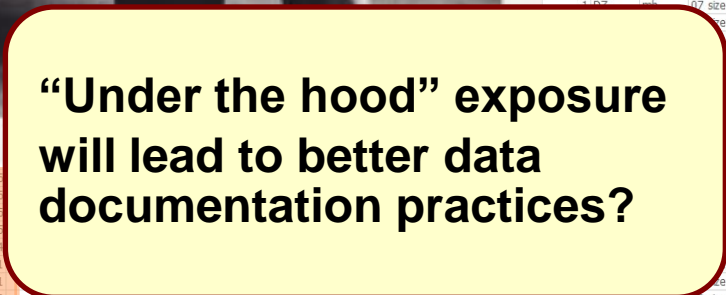


| F   | G      | H | I                   | J       | K                                     |
|-----|--------|---|---------------------|---------|---------------------------------------|
| 144 | sieved | 1 | cul                 | S       | oop-size (medium dog to medium horse) |
| 145 | sieved | 1 | cul                 | C       | cattle/red deer/horse                 |
| 146 | sieved | 1 | cul                 | C       | oop-size (cattle/red deer/horse)      |
| 147 | sieved | 1 | cul                 | B       | B.P.                                  |
| 148 | sieved | 1 | cul                 | Ow/Cpra |                                       |
| 149 | sieved | 1 | cul                 | Ow/Cpra |                                       |
| 150 | sieved | 1 | axilla with teeth   | Ow/Cpra |                                       |
| 151 | sieved | 1 | mandible with teeth | Ow/Cpra |                                       |
| 152 | sieved | 1 | teeth               | Ow/Cpra |                                       |
| 153 | sieved | 1 | teeth               | Ow/Cpra |                                       |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 5 | 1 |   | 2 | 2 | 1 |
| 3 | 1 |   | 2 | 2 | 1 |
| 3 | 1 |   | 2 | 8 | 1 |
| 3 | 1 | 3 | 2 | 2 | 1 |
| 3 | 1 |   | 2 | 8 | 1 |
| 3 | 1 |   | 4 | 2 | 1 |
| 3 | 1 |   | 2 | 8 | 1 |
| 3 | 1 |   | 2 | 2 | 1 |
| 5 | 1 | 2 | 2 | 2 | 1 |
| 5 | 1 | 4 | 2 | 2 | 1 |
| 5 | 1 | 1 | 2 | 8 | 1 |
| 5 | 1 | 2 | 2 | 2 | 1 |
| 5 | 1 | 2 | 2 | 1 | 1 |
| 5 | 1 | 1 | 2 | 1 | 1 |
| 5 | 1 | 2 | 2 | 1 | 1 |
| 5 | 1 | 1 | 2 | 2 | 1 |
| 5 | 1 | 2 | 2 | 8 | 1 |
| 5 | 1 | 1 | 1 | 2 | 1 |

|     |                |              |                   |
|-----|----------------|--------------|-------------------|
| eft |                |              |                   |
| eft |                |              |                   |
| ght | Juvenile       |              |                   |
| ght | Infantile      |              |                   |
| ght | Young          |              |                   |
|     |                |              |                   |
|     |                |              |                   |
| eft |                |              |                   |
| ght | Adult          |              |                   |
| eft |                |              |                   |
| ght | Subadult       |              |                   |
| ght | Juvenile       |              |                   |
| eft | t              |              |                   |
| eft |                |              |                   |
|     |                |              |                   |
| ght | Subadult/adult |              |                   |
|     | Young          |              |                   |
| ght |                |              |                   |
| ght |                | Proximal end | Partly carbonized |
|     |                |              |                   |
|     | Young          |              |                   |
| eft |                |              |                   |
| eft |                |              |                   |
| eft |                |              |                   |

Downloaded from <http://ajph.org/> on November 10, 2015

[illegible]

**“Under the hood” exposure  
will lead to better data  
documentation practices?**

[illegible]

|      |   |    |   |   |     |
|------|---|----|---|---|-----|
| 6764 | F | 13 | 0 | 1 | 116 |
| 6764 | F | 14 | 0 | 1 | 116 |
| 6764 | F | 15 | 0 | 1 | 116 |
| 6764 | F | 16 | 0 | 1 | 95  |
| 6764 | F | 17 | 0 | 1 | 64  |
| 6764 | F | 18 | 0 | 1 | 21  |
| 6764 | F | 19 | 0 | 1 | 21  |
| 6764 | F | 20 | 0 | 1 | 13  |
| 6764 | F | 21 | 0 | 1 | 13  |
| 6764 | F | 22 | 0 | 1 | 14  |
| 6764 | F | 23 | 0 | 1 | 57  |
| 6764 | F | 24 | 0 | 1 | 95  |
| 6764 | F | 25 | 0 | 1 | 76  |

|    |   |   |   |   |   |   |   |   |    |    |   |   |       |         |           |
|----|---|---|---|---|---|---|---|---|----|----|---|---|-------|---------|-----------|
| 15 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0  | 5  | 1 | 1 | Skull | 03 size | 28-Jun-06 |
| 15 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3  | 2  |   | 1 | Skull | 03 size | 28-Jun-06 |
| 15 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1  | 2  |   | 1 | Skull | 03 size | 28-Jun-06 |
| 15 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 3  | 5  |   | 1 | mb    | 03 size | 28-Jun-06 |
| 15 | 1 | 2 | 2 | 8 | 1 | 1 | 1 | 2 | 13 | 10 |   | 1 | mb    | 03 size | 28-Jun-06 |
| 15 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 5  | 6  |   | 1 | mb    | 03 size | 28-Jun-06 |



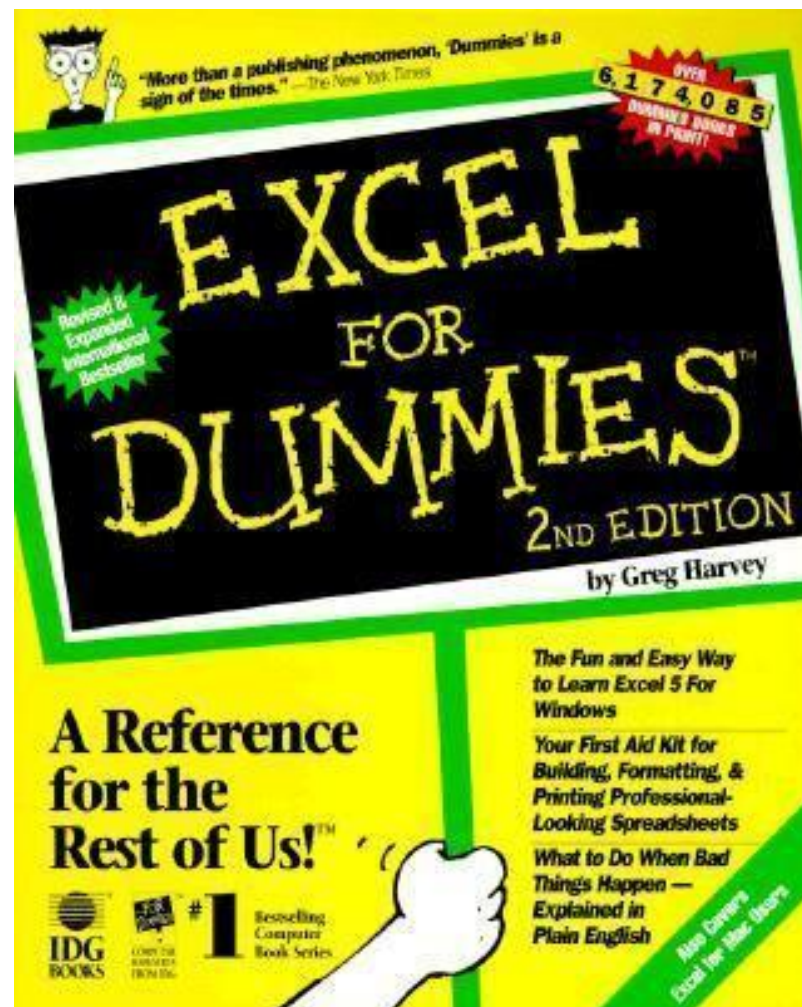
**Nobody expects  
the Spanish Inquisition.**

**Nobody expected their data  
to see wider scrutiny either..**



# Professional expectations for data reuse

1. Need better data modeling (than feasible with, cough, Excel)
2. Data validation, normalization
3. Requires training & incentives for researchers to care more about quality of their data!



## EOL Summary of Datasets

Summary of specimen counts in zooarchaeological datasets documenting animal bone assemblages f... more >>

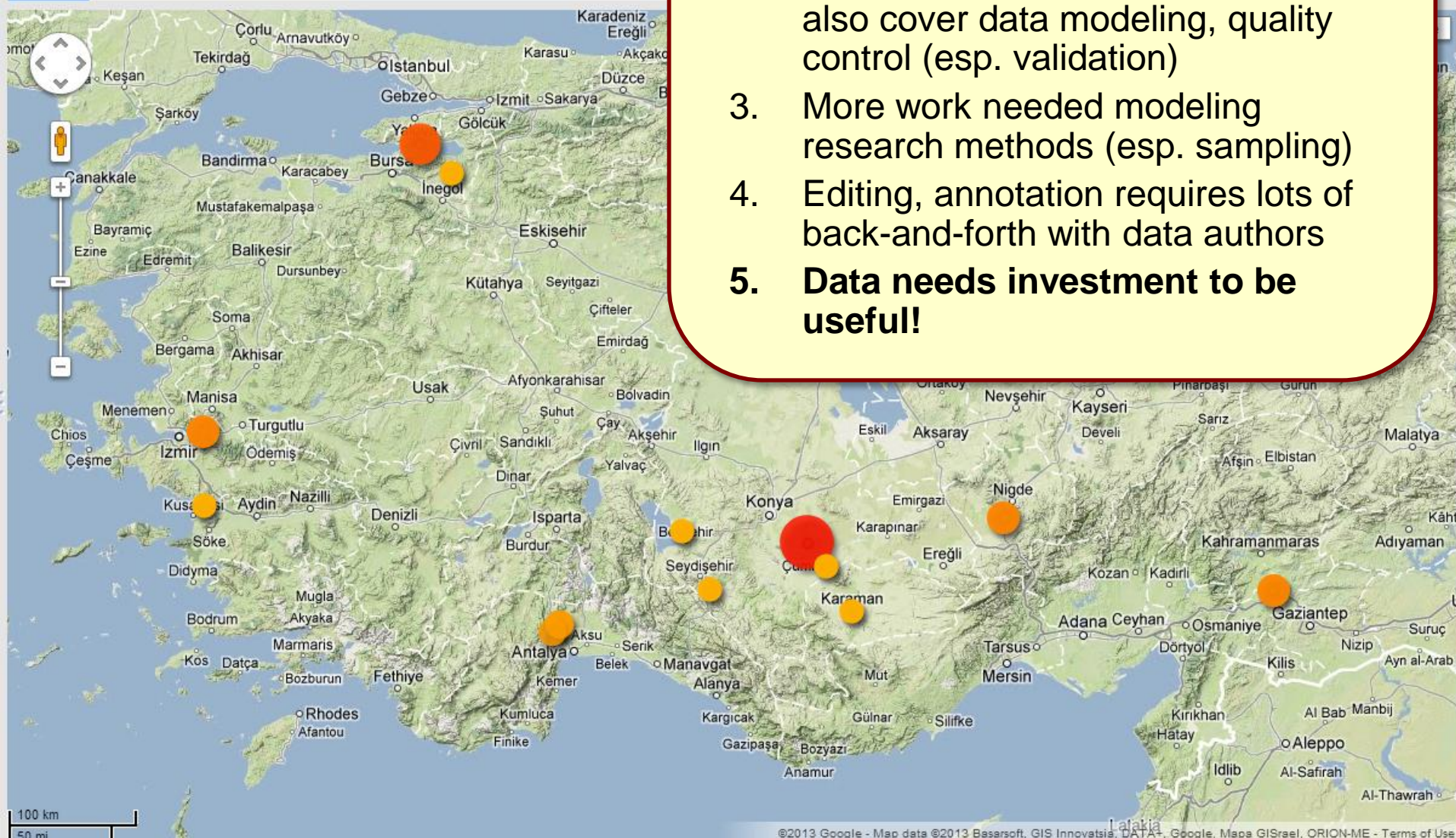
<http://opencontext.org> - Edited at 10:29 AM

File Edit Tools Help

Rows 1

Map of EOL Sites

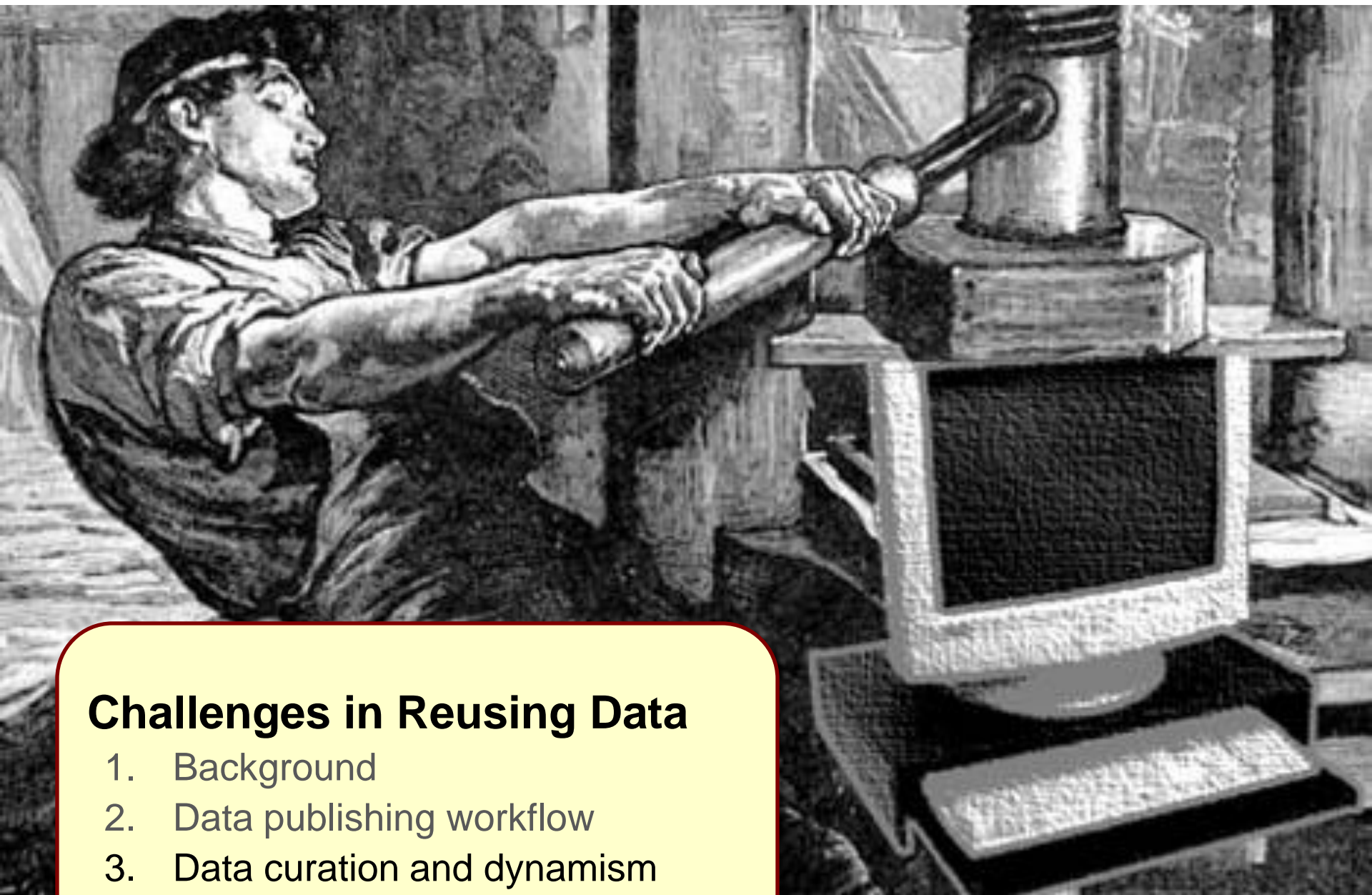
Filter No filters applied



## Data are challenging!

1. Decoding takes 10x longer
2. Data management plans should also cover data modeling, quality control (esp. validation)
3. More work needed modeling research methods (esp. sampling)
4. Editing, annotation requires lots of back-and-forth with data authors
5. **Data needs investment to be useful!**





## Challenges in Reusing Data

1. Background
2. Data publishing workflow
3. Data curation and dynamism

# EOL Summary of Datasets

Summary of specimen counts in zooarchaeological datasets documenting animal bone assemblages f... more >>

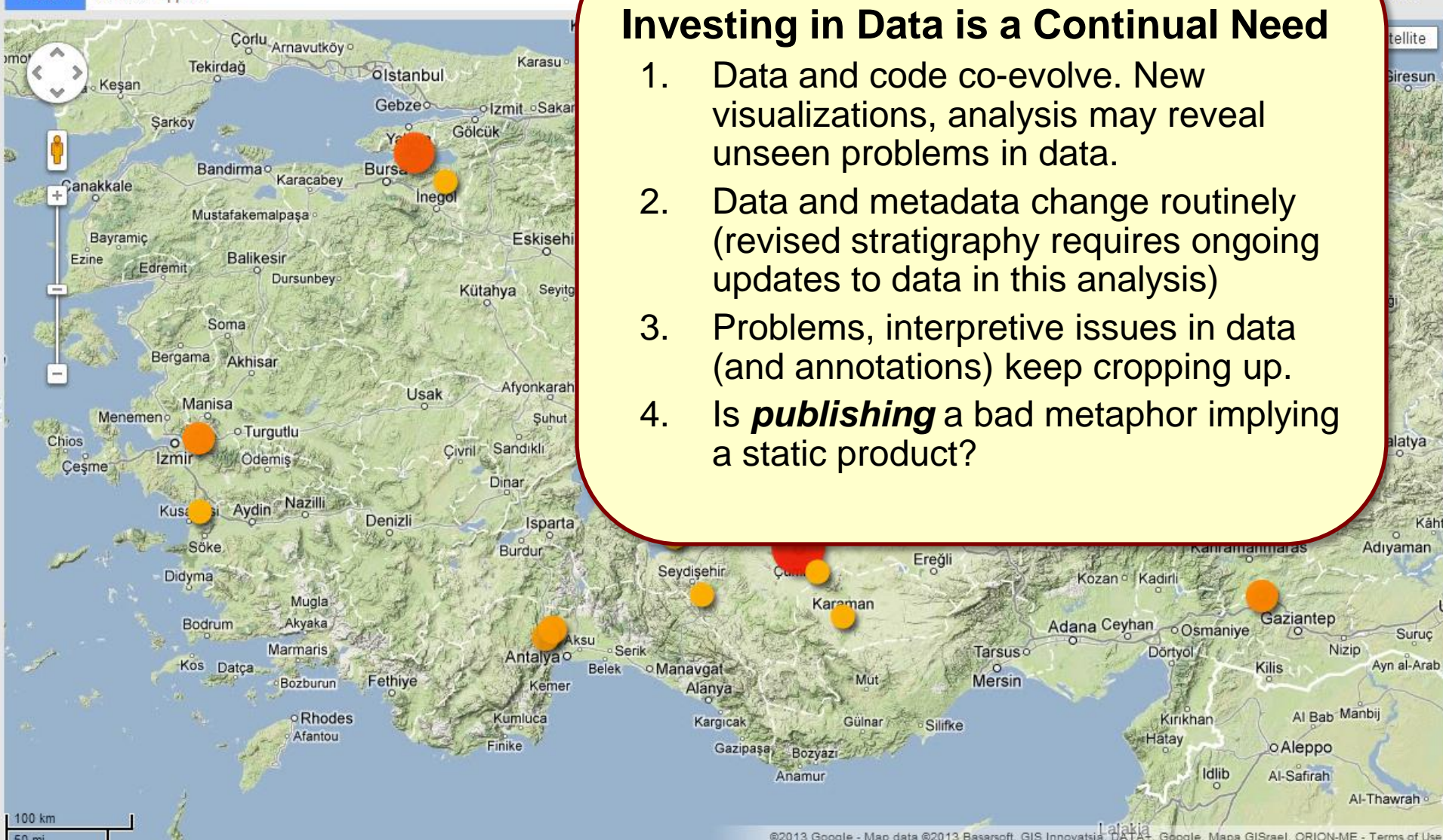
<http://opencontext.org> - Edited at 10:29 AM

File Edit Tools Help

Rows 1

Map of EOL Sites

Filter No filters applied



## Investing in Data is a Continual Need

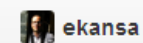
1. Data and code co-evolve. New visualizations, analysis may reveal unseen problems in data.
2. Data and metadata change routinely (revised stratigraphy requires ongoing updates to data in this analysis)
3. Problems, interpretive issues in data (and annotations) keep cropping up.
4. Is ***publishing*** a bad metaphor implying a static product?





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Aug 28, 2013

**Corrected citations on Çatalhöyük tables** ...

ekansa authored 7 days ago

8c0f8c99c2 +

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Aug 26, 2013

**Update West Mound Chronology, fixed trench labels** ...

This update concern fixes to the chronology of different trenches in the West Mound of Çatalhöyük. Revised dating suggested by David Orton via an email.

ekansa authored 9 days ago

7925df49d9 +

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Aug 25, 2013

**Commit with published versions of data** ...

ekansa authored 10 days ago

2b173e57f6 +

[Browse code](#) ➔

Mar 06, 2013

**EOL all specimen data** ...

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Mar 05, 2013

**Fixed column headings** ...

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[Browse code](#) ➔**Update README.md**

ekansa authored 6 months ago

49e3e82eb6 +

[Browse code](#) ➔**Added CSV file of measurement data** ...

ekansa authored 6 months ago

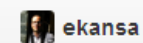
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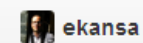
# Data sharing as publication





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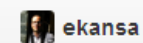
~~Data sharing as publication~~

Data sharing as open source  
release cycles?



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**Data sharing as publication  
AND  
Data sharing as open source  
release cycles**





One does not simply  
walk into Morder  
Academia and share  
usable data...

Image Credit: Copyright Newline Cinema

# Final Thoughts

**Data require intellectual investment, methodological and theoretical innovation.**

**Institutional structures poorly configured to support data powered research**

**New professional roles needed, but who will pay for it?**





# Thank you!



**IDCC reviewers  
(excellent, very helpful  
comments!)**