Ex Oriente Lux
Early agricultural expansions beyond the Near East

Maxime Brami

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Image credit: Dan Lewandowski

Göbekli Tepe, SE Turkey
c. 9,600-8,000 cal. BC (7,000 years before Stonehenge stone circle)
Complex symbolic system: role in the domestication (no agriculture?)

Reconstruction National Geographic

Childe's 'neolithic revolution' (1936)

Vere Gordon Childe
1892-1957

Shift from an appropriative (or extractive) economy based on **hunting** and **gathering**

To a productive economy based on **farming** and **herding**

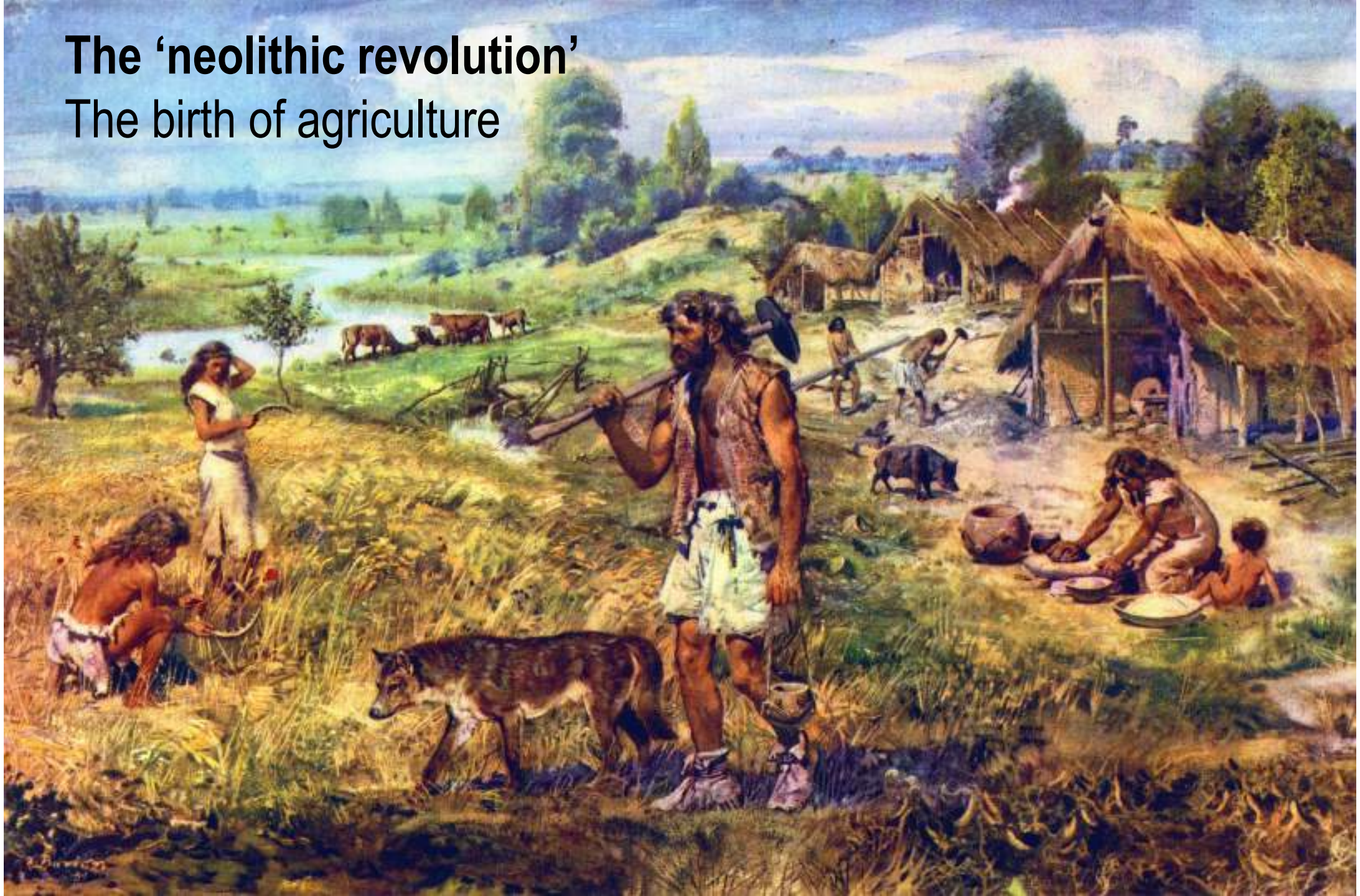
With (as result): demographic uptick (many babies!), storage facilities (pottery), tools to cut trees and open up landscapes for agriculture (polished stone tools) and village communities (sedentism)

Childe's Neolithic ≠ Eastern European Neolithic (pottery)
In Near East: Pre-Pottery Neolithic (Kathleen Kenyon)

Vere Gordon Childe, September 1928. *CREDIT IMAGE: National Portrait Gallery, London*

The ‘neolithic revolution’

The birth of agriculture



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FOCUS

The Invention of Prehistory and the Rediscovery of Europe: Exploring the Intellectual Roots of Gordon Childe's 'Neolithic Revolution' (1936)

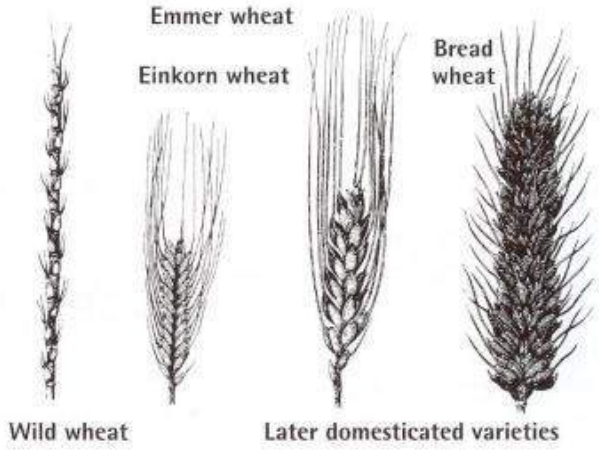
Maxime N. Brami[1]

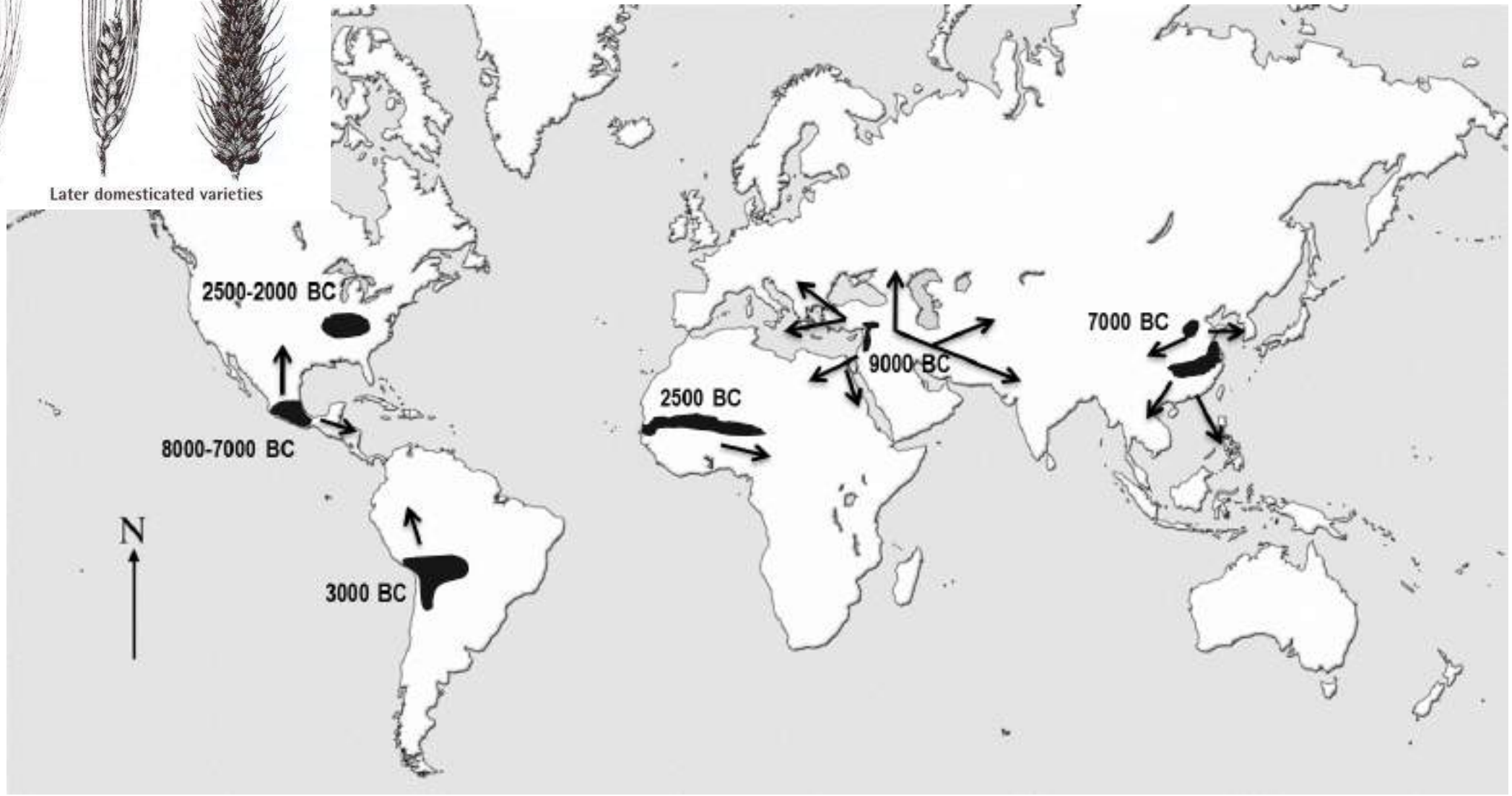
Abstract

This article re-examines the 'neolithic revolution'—Gordon Childe's great contribution to prehistoric archaeology. Childe first articulated his model of three revolutions in history—neolithic, urban and industrial—in 1936. Many authors have sought to understand it in the light of subsequent archaeological theory; here I proceed differently. A broader appreciation of the context in which Childe operated, in Britain and the rest of Europe, is necessary if we are to grasp fully the content of his model and the theoretical strands that influenced it. This article aims to elucidate the Neolithic as a historical construct and Childe's archaeology as a continuation of his politics. The facts are viewed from four perspectives: (a) personal, with biographical information about the young Gordon Childe; (b) institutional, through a description of the 1920s research landscape in London; (c) ideological, through an attempt to retrace the European ***Weltanschauung***; and (d) conceptual, with a discussion of the 'neolithic revolution'. Childe's love-hate relationship with Germany and Austria heavily influenced his model, which is essentially a grand synthesis between the ***Kulturkreislehre*** (of Gräbner) and the ***Dreistufenlehre*** (probably of Karl Bücher, through its critique by the Functionalists in London). The model's revolutionary structure comes from dialectical materialism. All three main building blocks of the 'neolithic revolution'—diffusionist, evolutionist and Marxist—ultimately derive from the great nineteenth century German historical tradition. An anti-fascist his entire life, Childe tried to rescue German ideas in face of the impending catastrophe—Hitler's arrival to power, and the destruction of Central European intellectual traditions.

Keywords Prehistory · Europe · Gordon Childe · Neolithic revolution · History of anthropology · Diffusionism

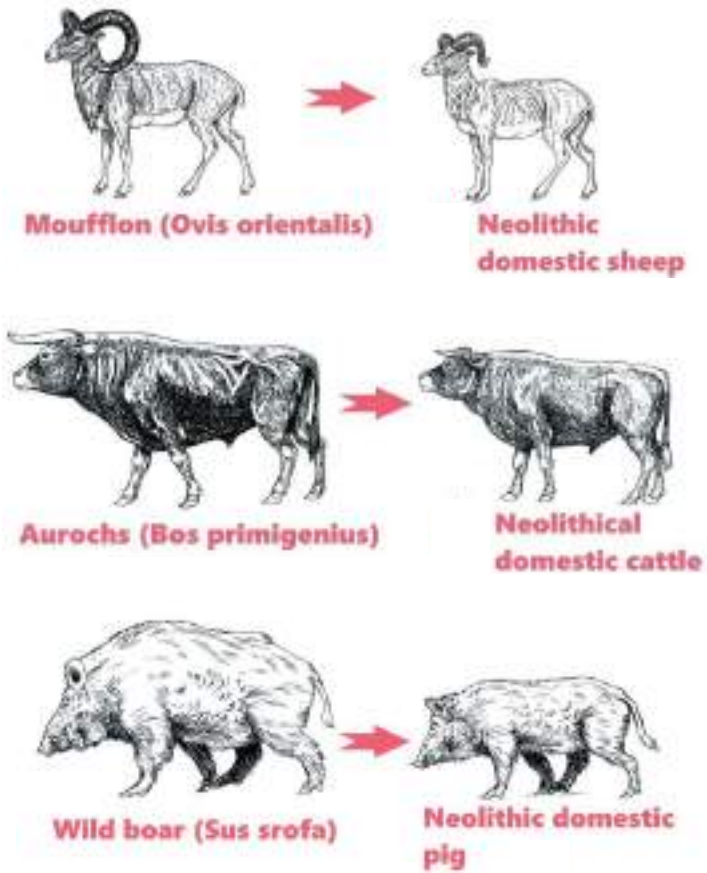
Multiple centres of food-plant domestication

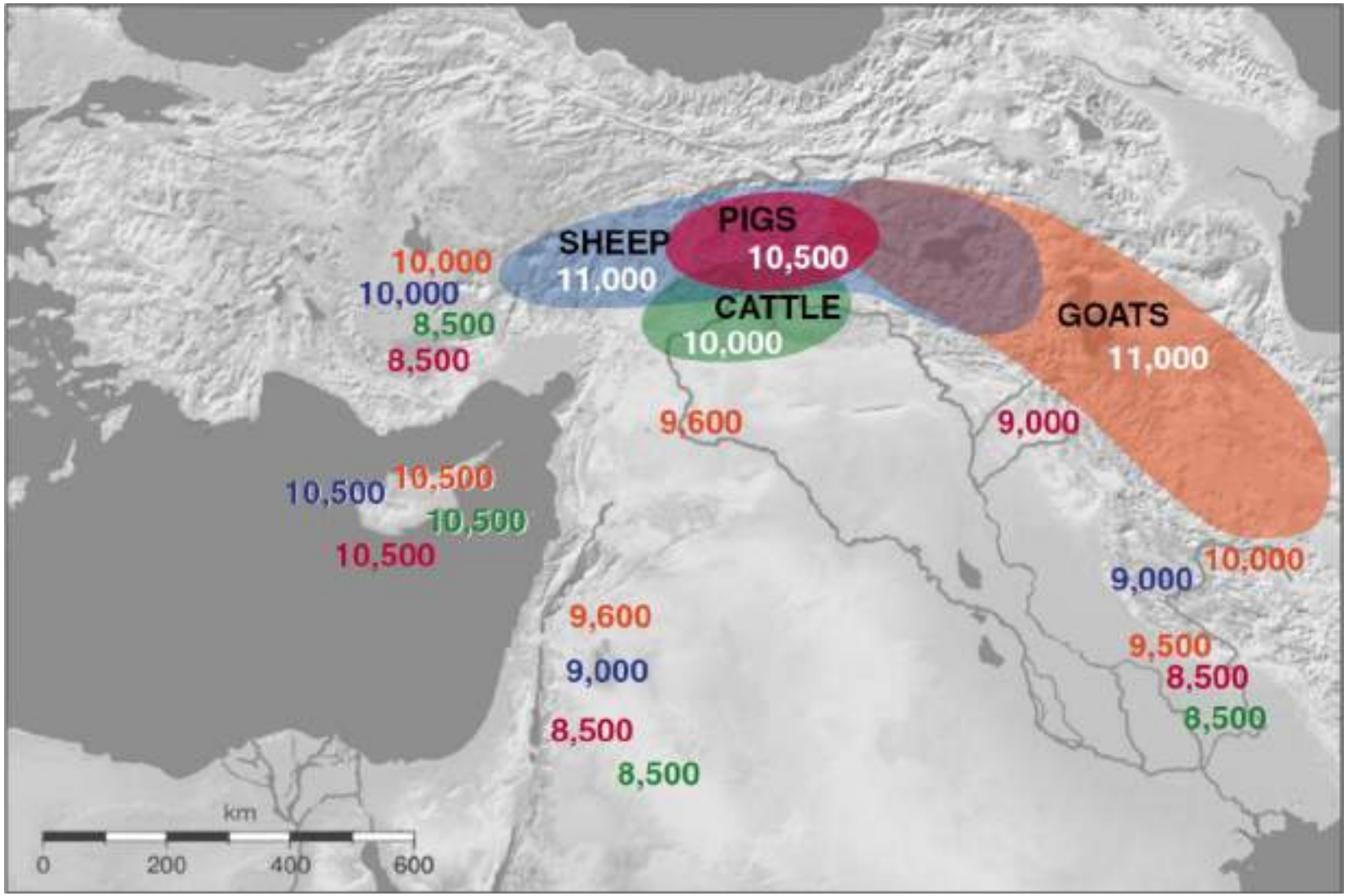




Adapted from Purugganan & Fuller 2009

Unpacking the Neolithic (dates in years BP cal.)





Zeder 2008

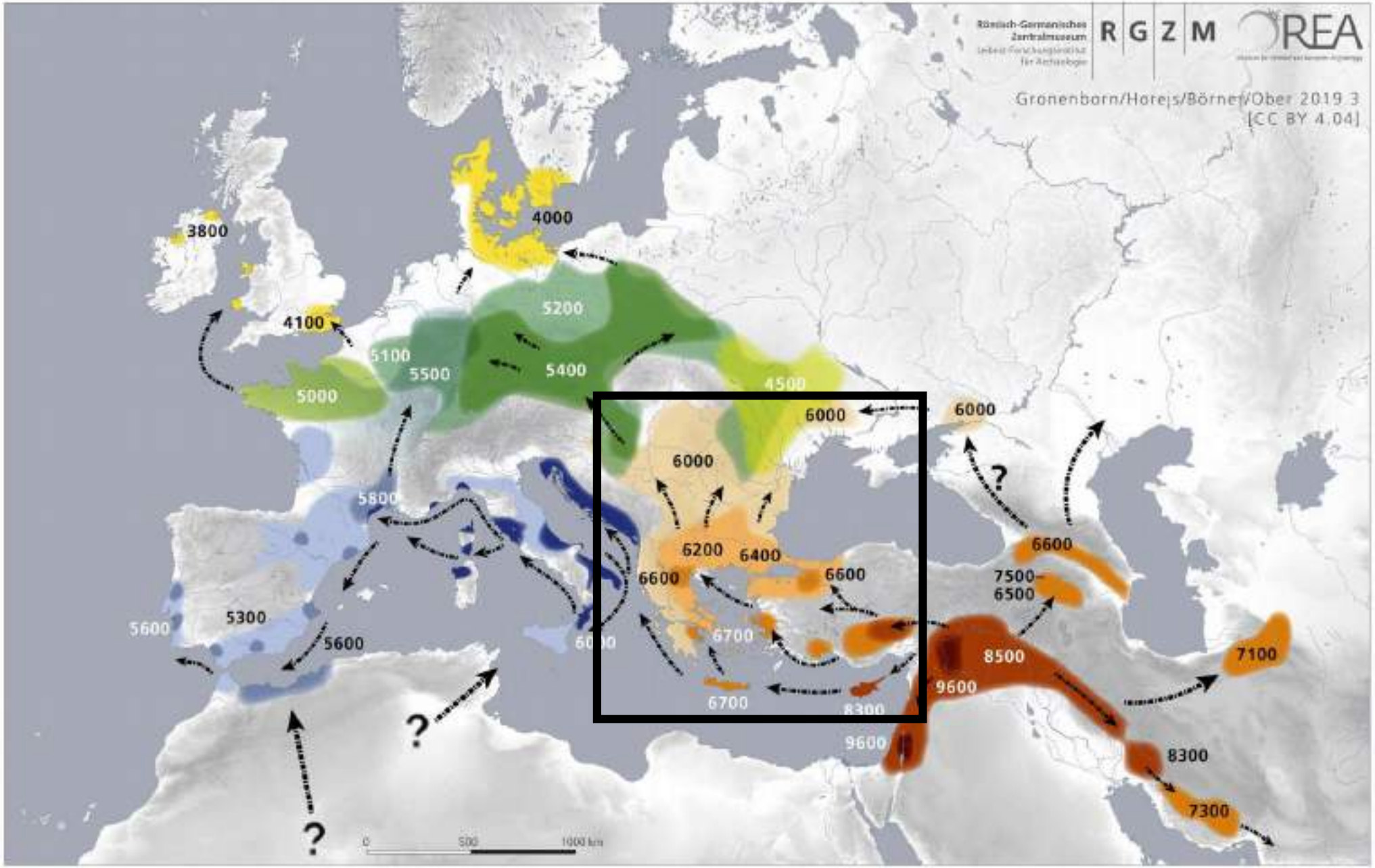


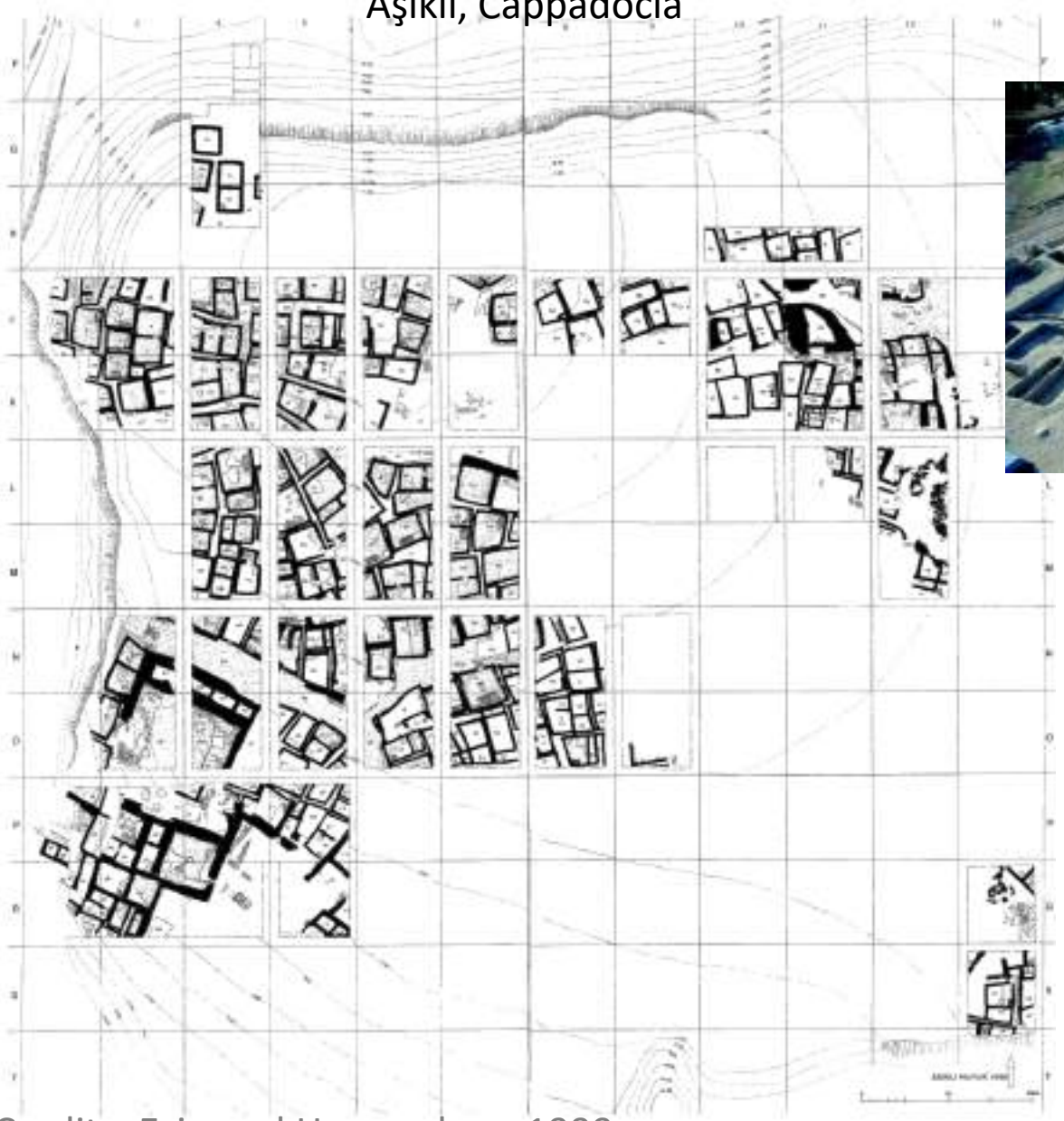
Image credit: Gronenborn et al. 2019

Aim

Revisiting the spread of neolithic lifeways in Anatolia and Southeast Europe based on the latest biomolecular (aDNA, stable isotope) data

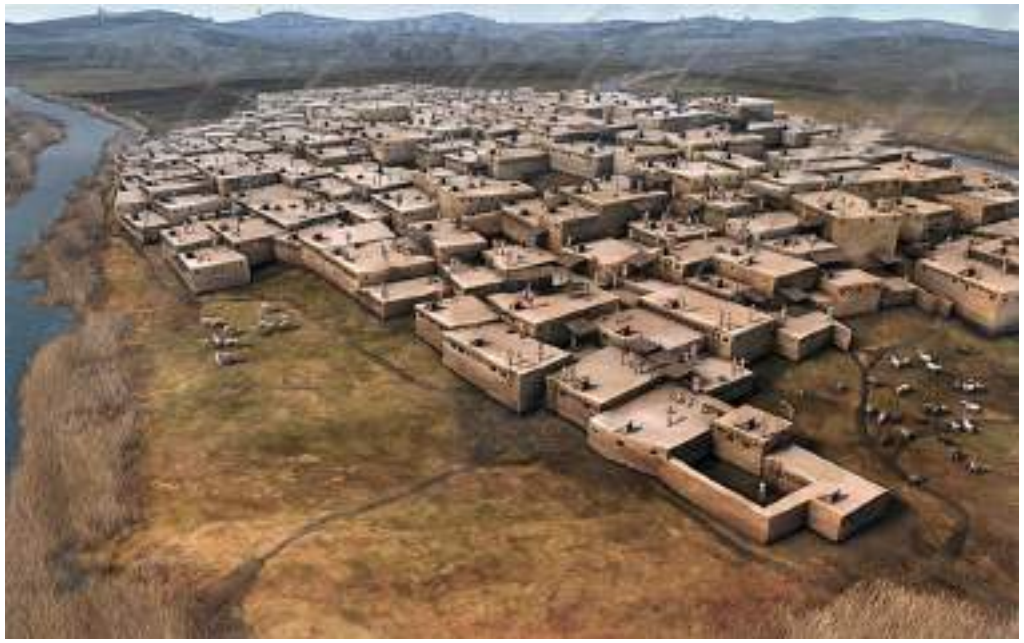
Neolithic mega-sites on the Central Anatolian Plateau (ca. 7,500-6,000 cal. BC)

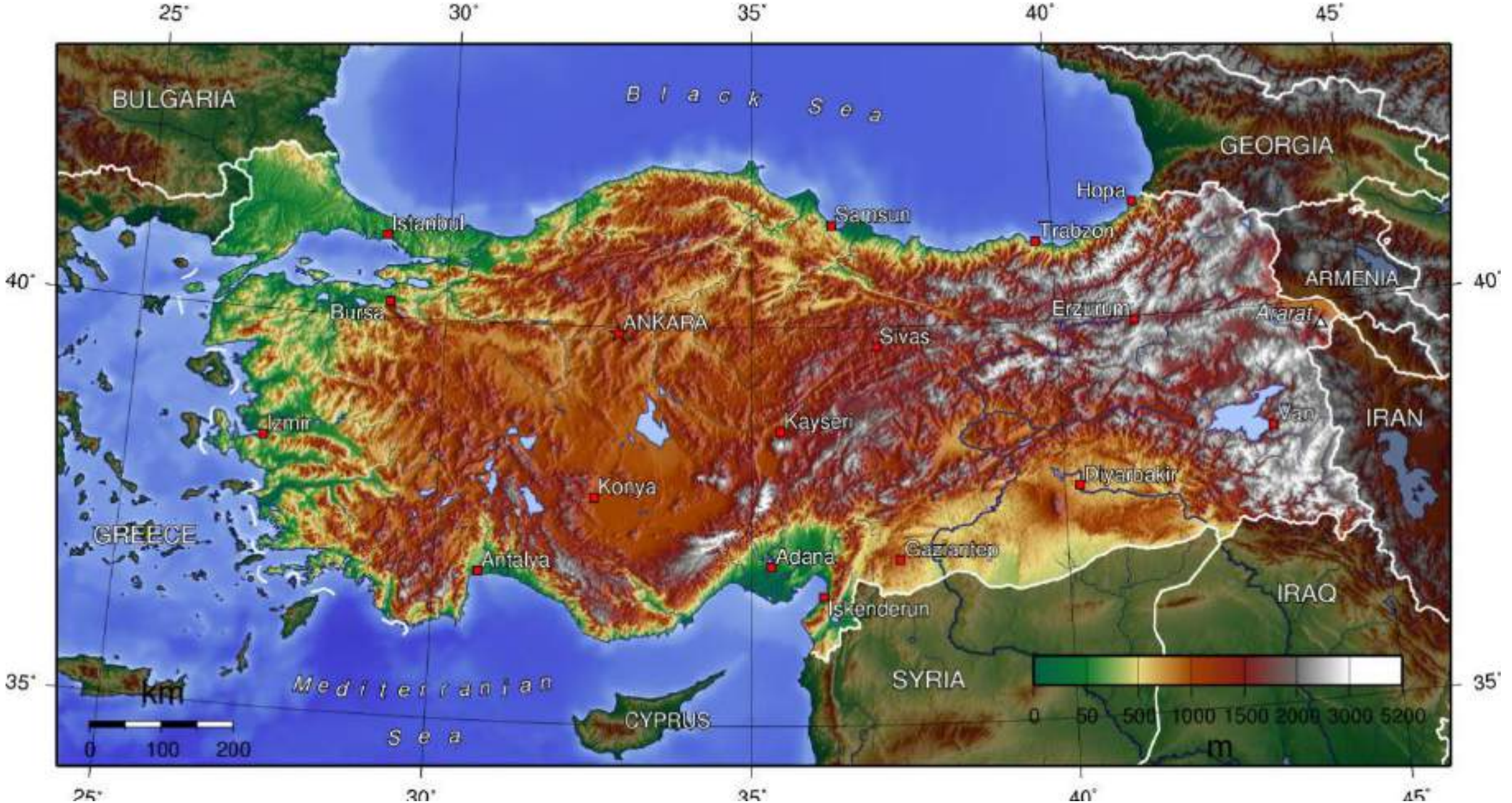
Aşıklı, Cappadocia



Credits: Esin and Harmankaya 1999

Çatalhöyük East, Konya Plain




25°
30°
35°
40°
45°
40°
35°
BULGARIA
Black Sea
GEORGIA
ARMENIA
IRAN
IRAQ
SYRIA
GREECE
CYPRUS
Mediterranian Sea
Istanbul
Bursa
ANKARA
Izmir
Konya
Antalya
Samsun
Hopa
Trabzon
Erzurum
Ararat
Sivas
Kayseri
Van
Diyarbakir
Adana
Gaziantep
Iskenderun
km
0 100 200
0 50 500 1000 1500 2000 3000 5200
m

Boncuklu Höyük,
ca. 8,300-7,800 cal. BC
A ‘transitional’ site in the Konya Plain, Central Anatolia
Boncuklu.org

Western Anatolian Neolithic/Early Chalcolithic (6,600-5,500 cal. BC)

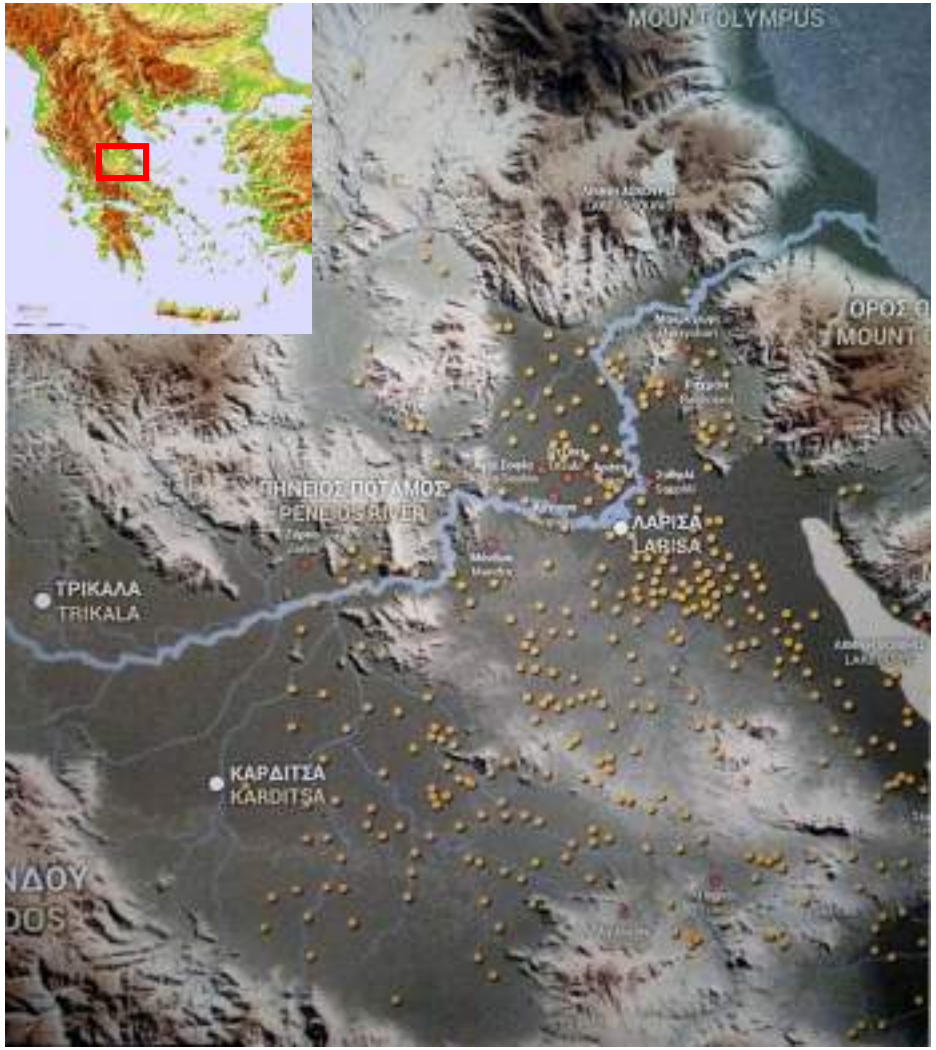
Aktopraklık, NW Anatolia

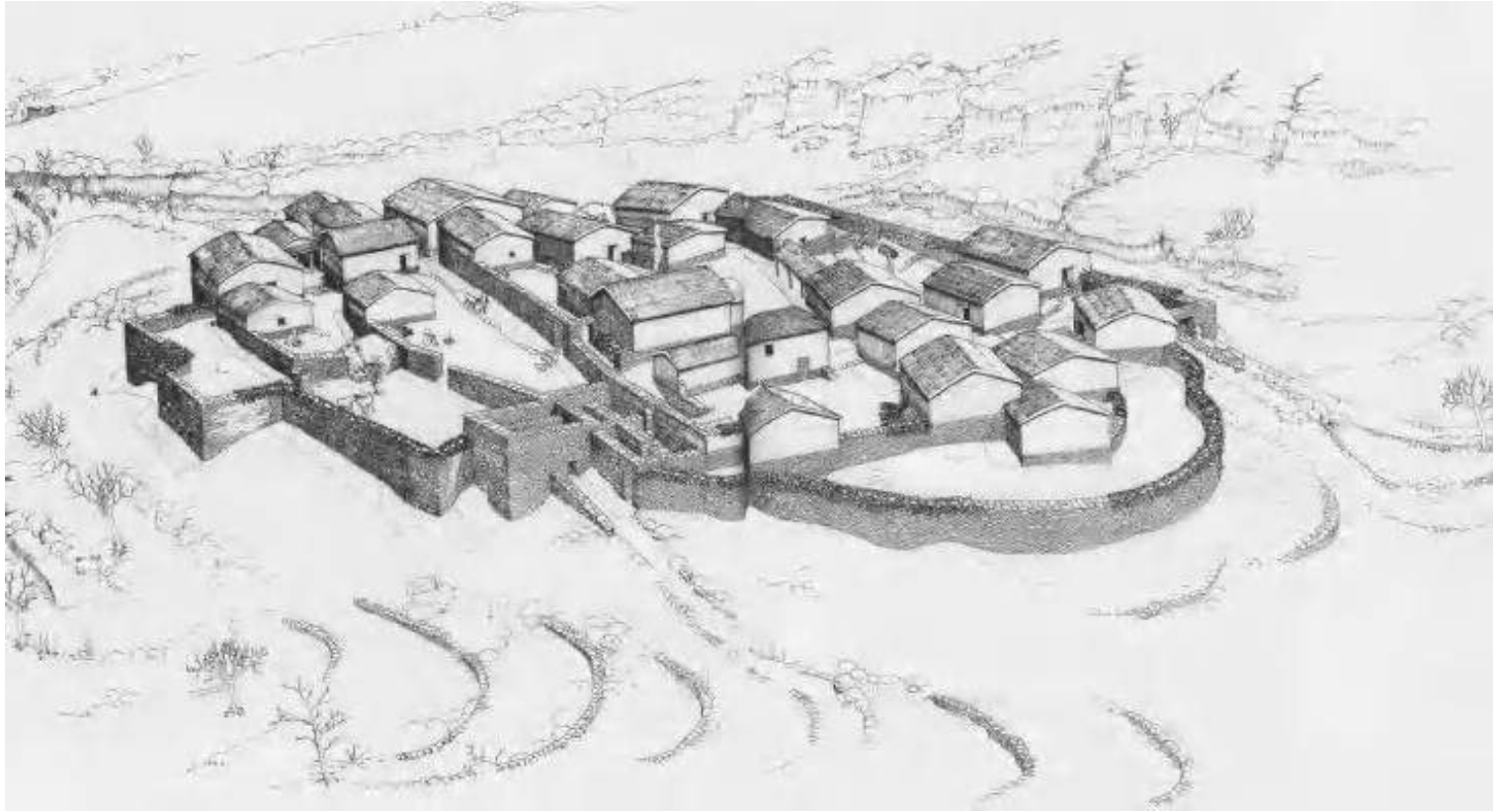
Credit: N. Karul, Atlasdergisi.com

Ulucak, West Anatolia

Credit: Ulucak Research Project,

And in Europe?





Reconstruction of the upper town at Sesklo, Thessaly, Greece, c. 6000 cal. BC (after D.R. Theocharis 1993)

Over 300 Neolithic sites in the Plain of Thessaly, but few excavated (usually less than 2ha, max 200-300 inhabitants)

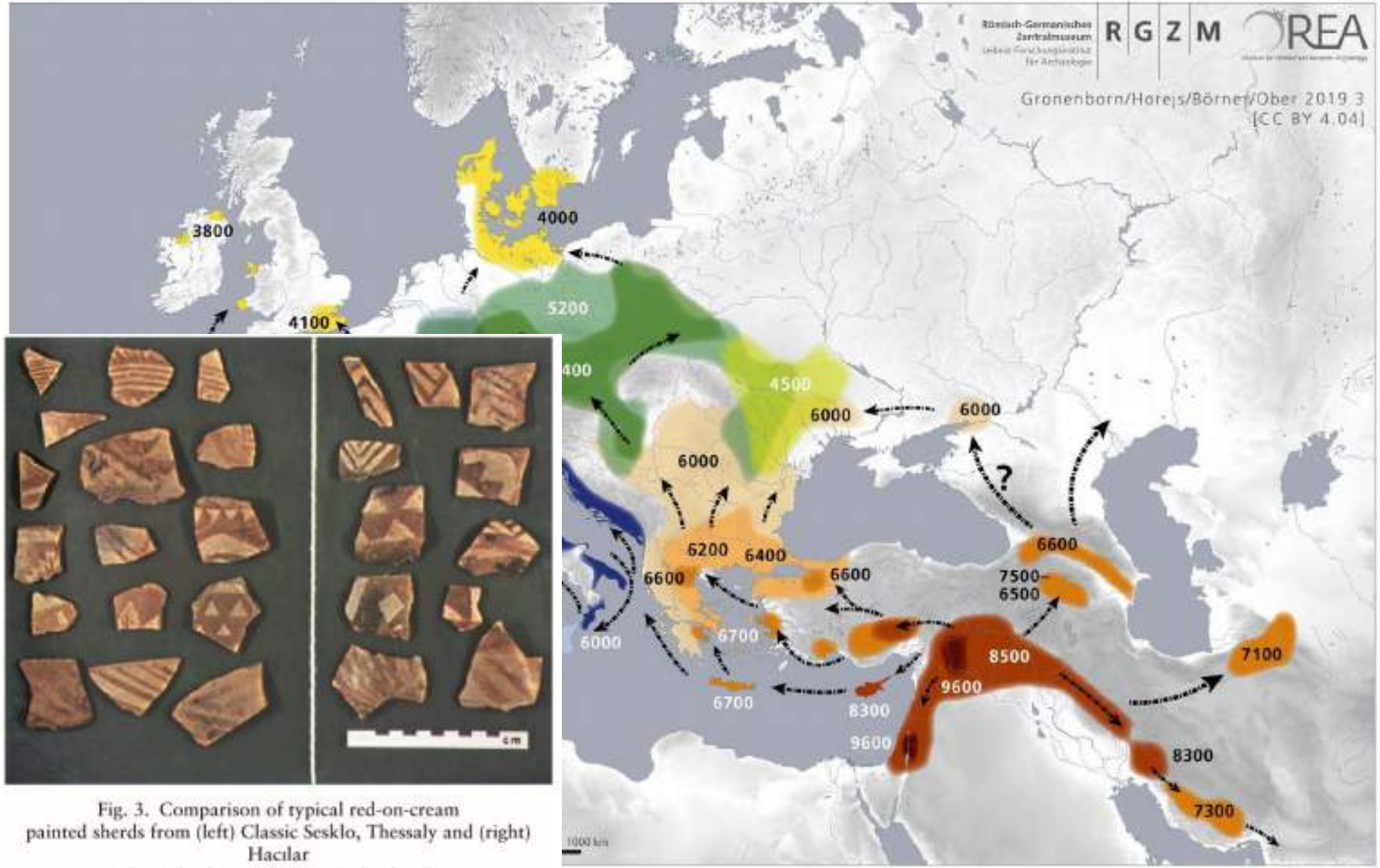


Fig. 3. Comparison of typical red-on-cream painted sherds from (left) Classic Sesklo, Thessaly and (right) Hacılar
(after Schachermeyr 1976, Farbtaf. I; III)

Image credit: Gronenborn et al. 2019

Lepenski Vir, North-East Serbia

A Mesolithic-Neolithic site in the Danube Gorges
Completely excavated in 1965-1970 by Dragoslav Srejović, in advance of the construction of the hydroelectric Đerdap I dam (original site flooded today)

- First occupation by foragers-fishers in the 10th millennium cal. BC
- Pottery introduced to the site around 6,200 cal. BC, when first trapezoidal houses are constructed and burial customs change
- Domesticates introduced after 6000 cal. BC

Outline

When was farming adopted?

How was farming adopted? (Piecemeal? As an integrated package?)

Who spread farming?

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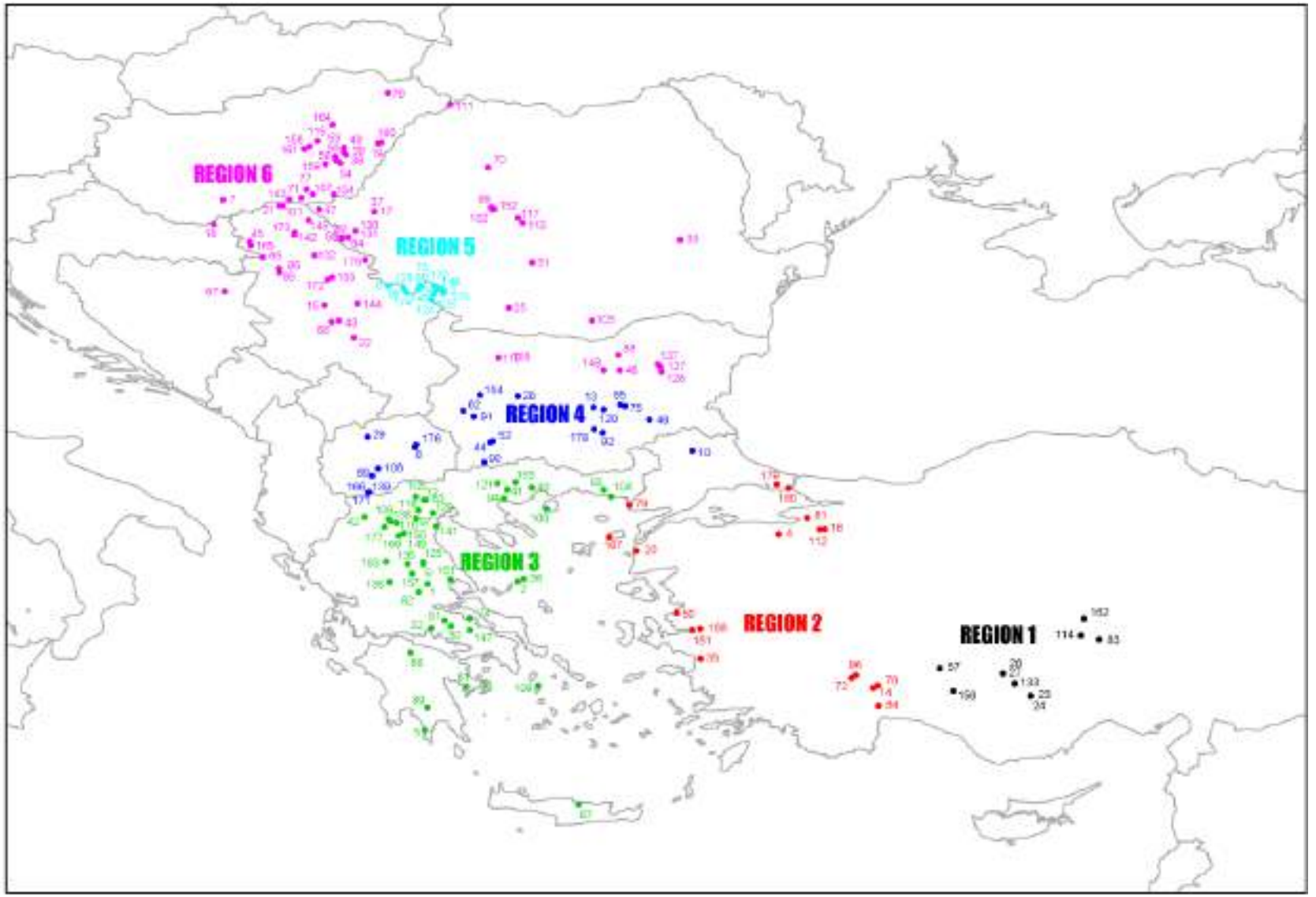
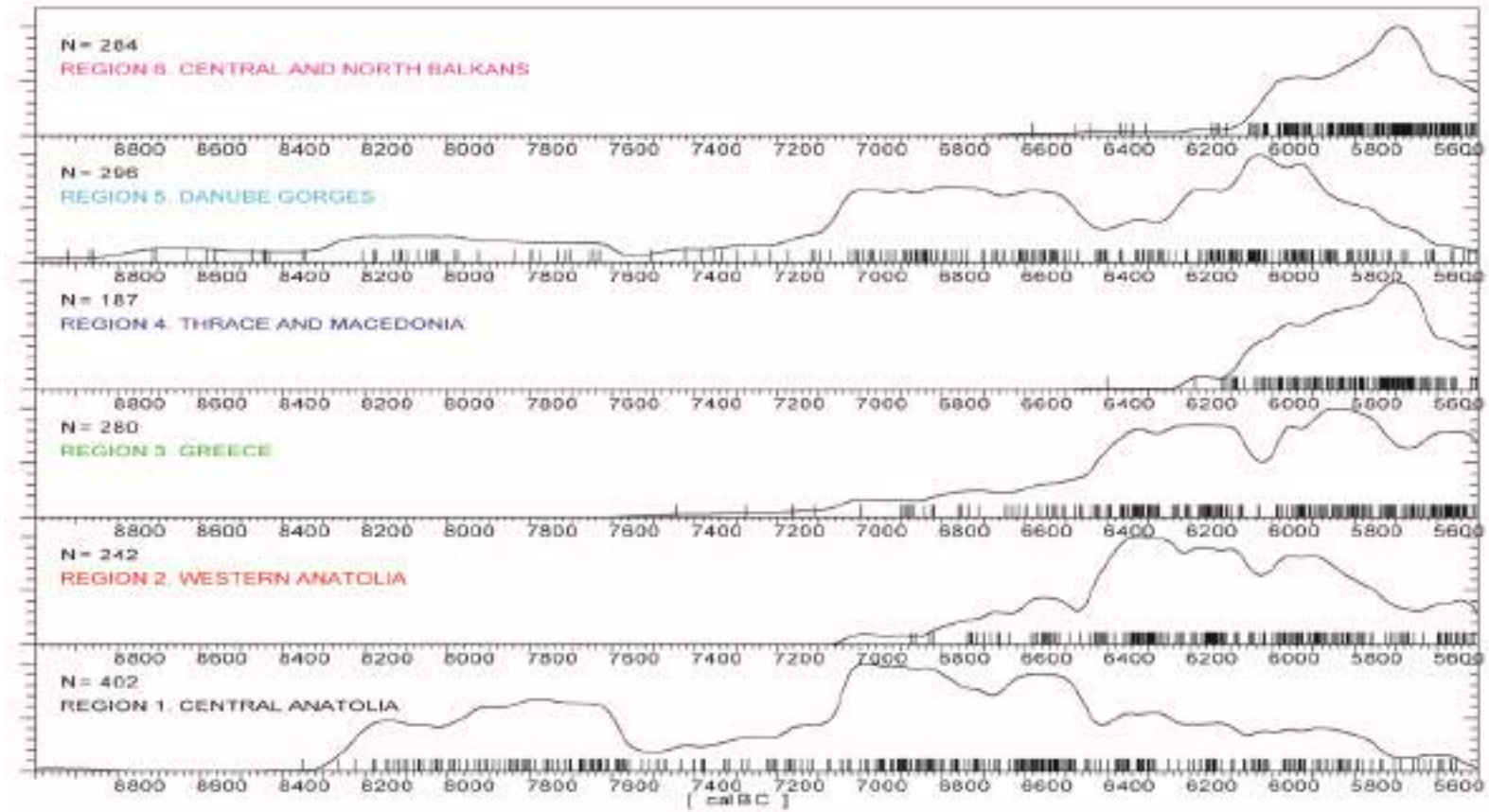
Distribution of 181 radiocarbon-dated sites with ^{14}C dates (n = 1,691) falling within the interval 9,500-5,500 cal. BC at 2σ (95.4% probability) in six regions of Anatolia and Southeast Europe



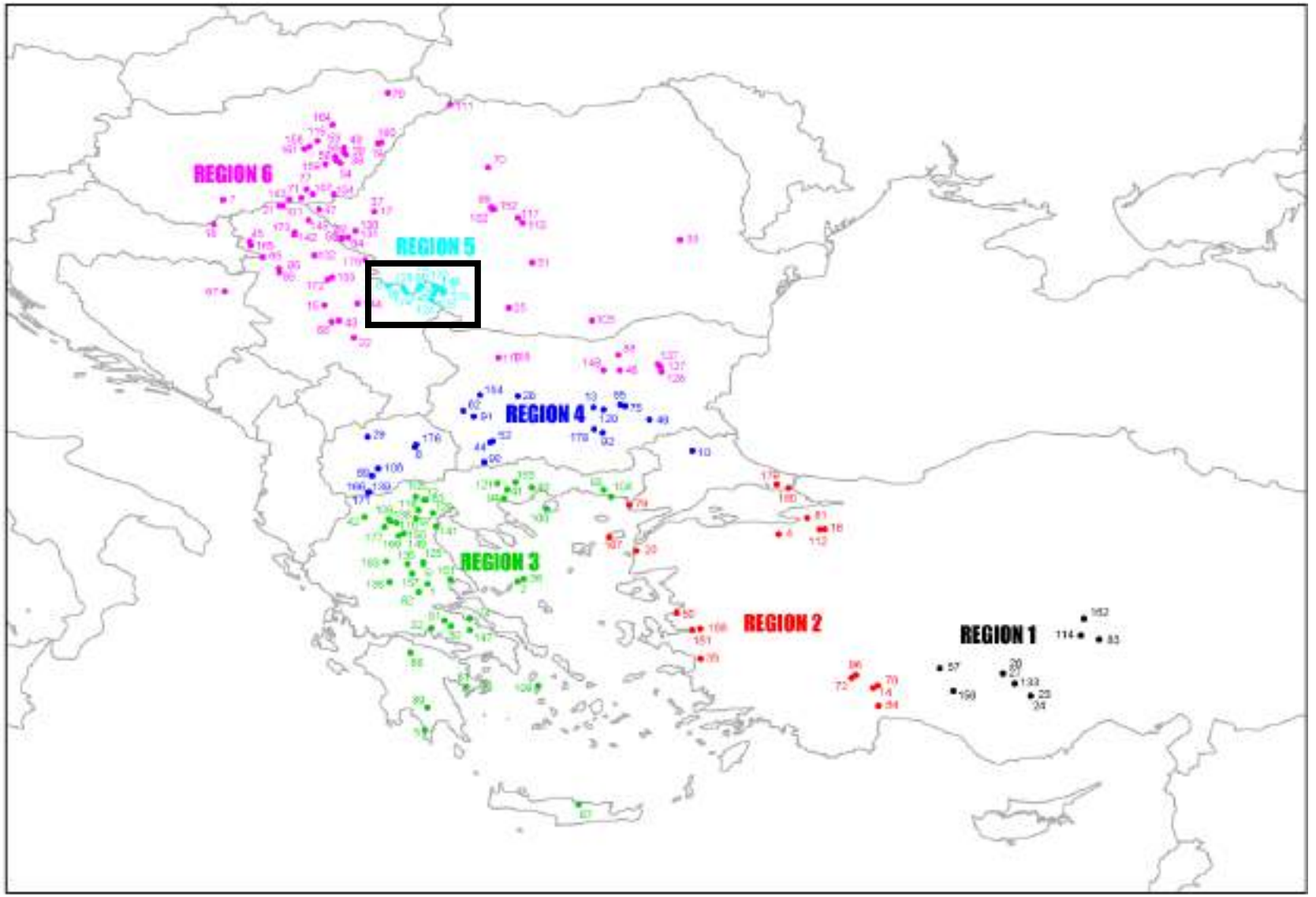
R script: Yoan Diekmann/Leonardo Vallini, geographic coordinates from literature

Summed probability distributions of *n* = 1,691 calibrated radiocarbon dates during the interval 9,500-5,500 cal. BC. Created in CalPal v.2019.3 (Weninger et al. 2019a) using the CalPal-Hulu-2018 Hulu curve (Weninger and Jöris 2008; Weninger et al. 2019b)



For Region 1, 2, 3, 4 and 6, only ^{14}C dates associated with 'neolithic' layers (where food-production is evident or implied) are plotted.

For Region 5, ^{14}C dates associated with both 'mesolithic' and 'neolithic' occupations are plotted.



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Mesolithic/Neolithic transition in the Danube Gorges: Contribution of stable isotopes

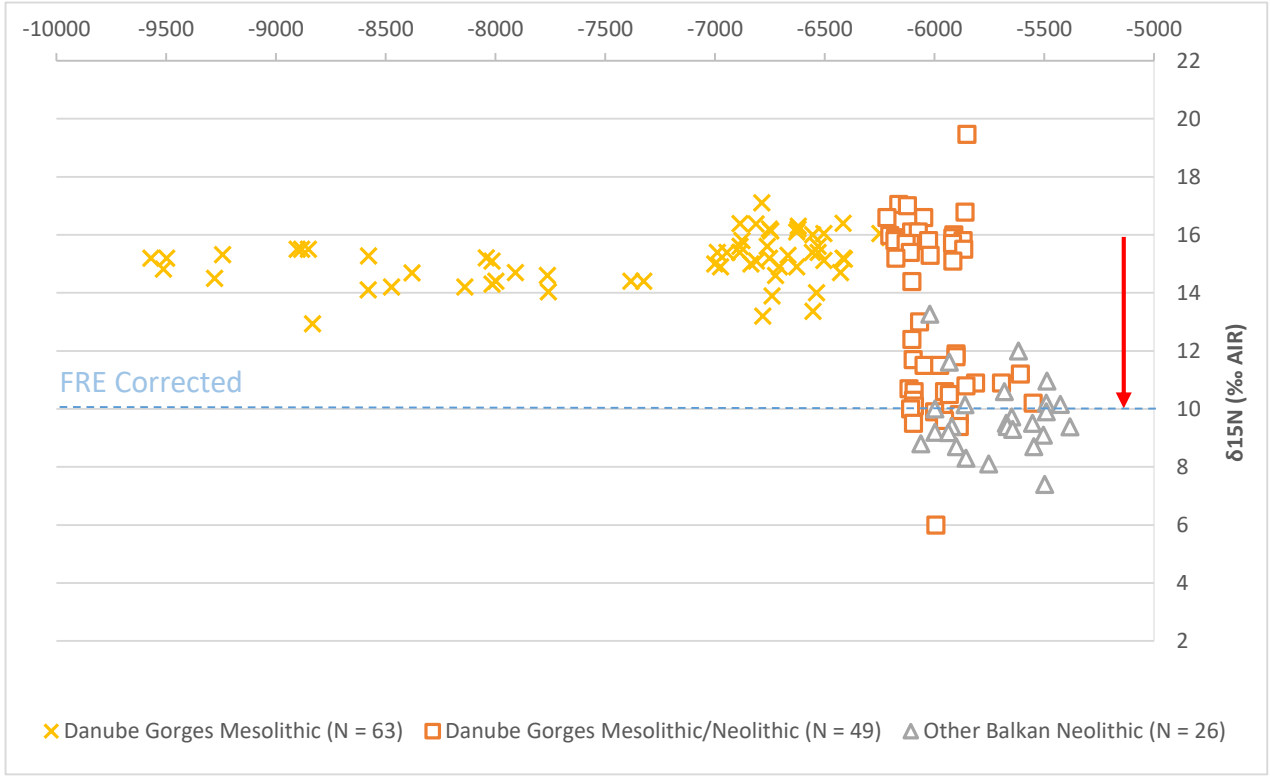
Image credit: Borić 2011, fig.1

Mesolithic: Danube Gorges sites (Cuina Turcului, Hajdučka Vodenica, Lepenski Vir, Ostrovul Corbului, Padina, Schela Clavodei, Vlasac)

Meso/Neo Transition: Danube Gorges sites (Ajmana, Hajdučka Vodenica, Icoana, Lepenski Vir, Padina, Velesnica, Vlasac)

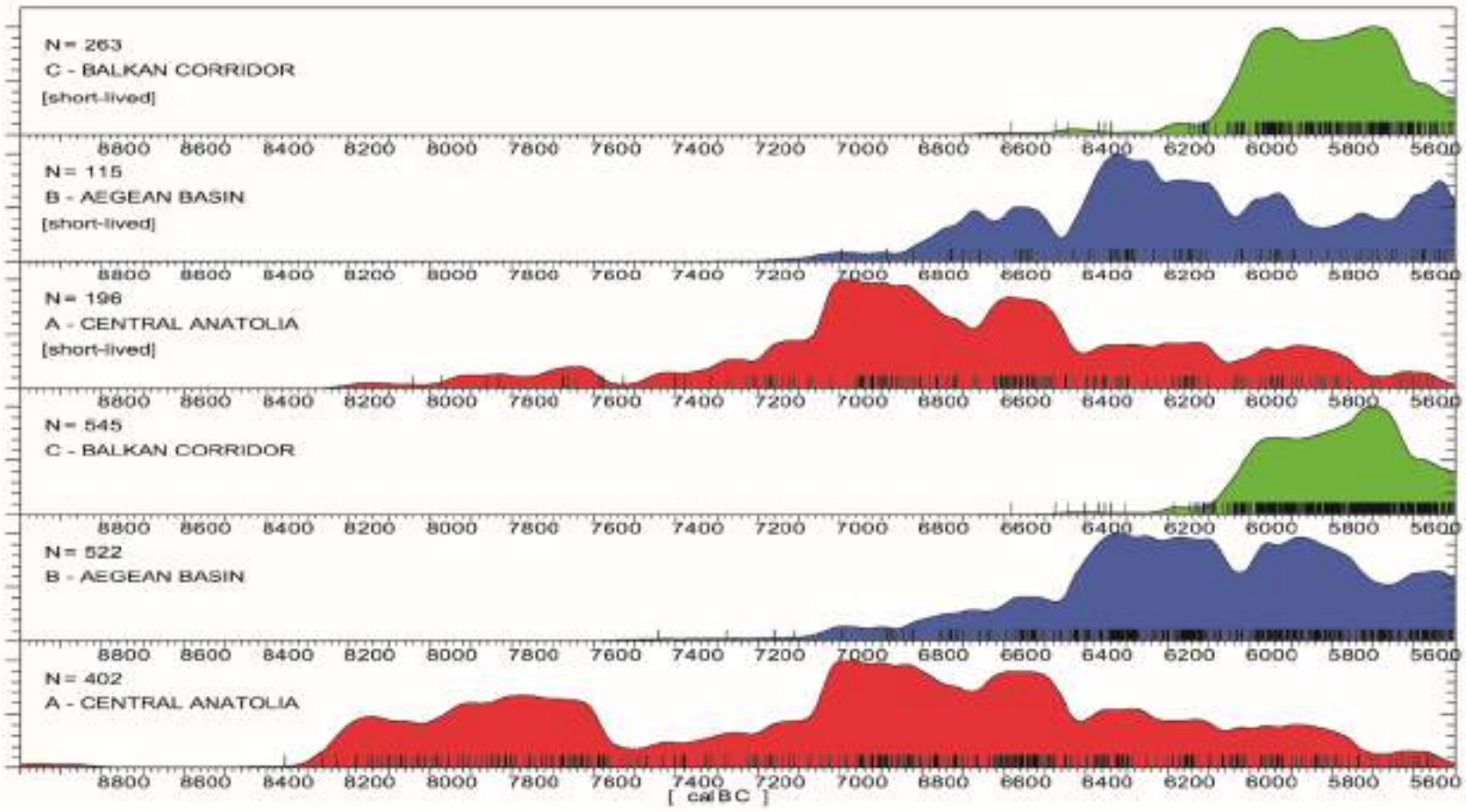
Neolithic: Other Balkan sites (Cârcea-Viaduct, Coțatcu, Deszk, Džuljunica-Smărdeš, Endrőd Varnyai-tanya, Golokut Vizić, Gomolava, Măgura Buduiasca, Maroslele-Pana, Ohoden, Perlez Batka C, Samovodone, Szarvas, Starčevo Grad, Topole Bač, Vinča, Yabalkovo)

Drop in $\delta^{15}N$ values observed in directly-dated humans from the Mesolithic-Neolithic transition in the Danube Gorges – presumably concomitant with the introduction of agriculture & a more restricted terrestrial C_3 plant food diet. Any $\delta^{15}N$ value above 10‰ is likely to indicate some intake of aquatic food



Brami, work in progress

An Arrythmic Spread with Booms and Busts?



14C data from published datasets, including 14SEA, CANeW, and CalPal Holocene database, with additions from the literature.

Not included:

- Dates associated with ‚mesolithic' levels [any date with interval >6,100 cal. BC at 2σ for the Danube Gorges]
- Duplicates
- Dates lacking uncalibrated age BP information
- Dates from same sample that fail chi squared test [performed in OxCal]
- Dates with intervals >150 yrs BP

Further pre-sorting excludes:

- Long-lived samples (unidentified charcoal etc.) to avoid „old wood" effect
- Dates with intervals ≥100 yrs BP to remove non-AMS or suspicious AMS dates

Brami, work in progress

Isochrone Map of Neolithic Europe

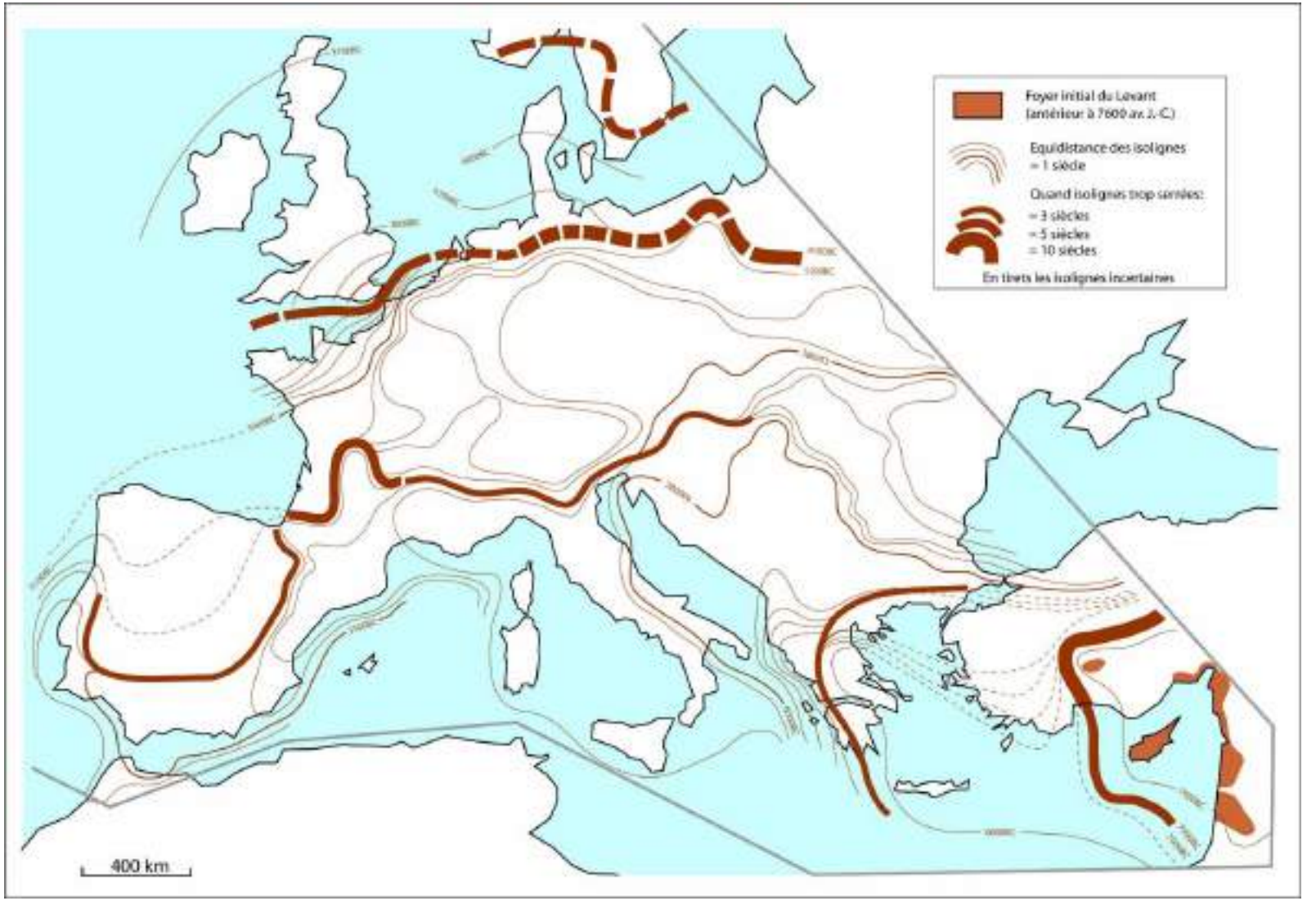


Image credit: Rasse 2014

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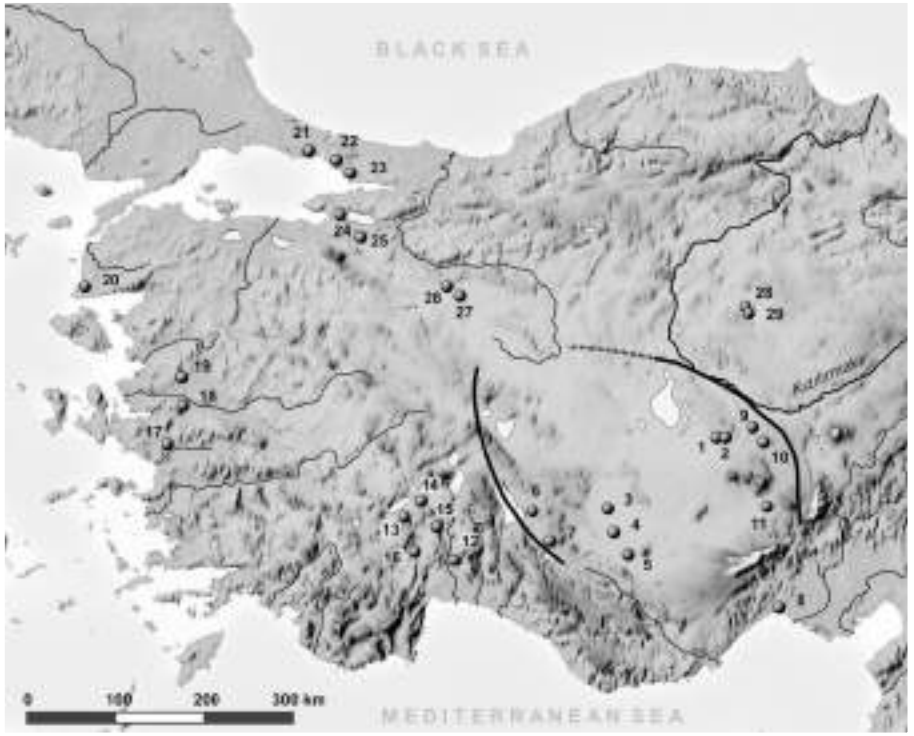
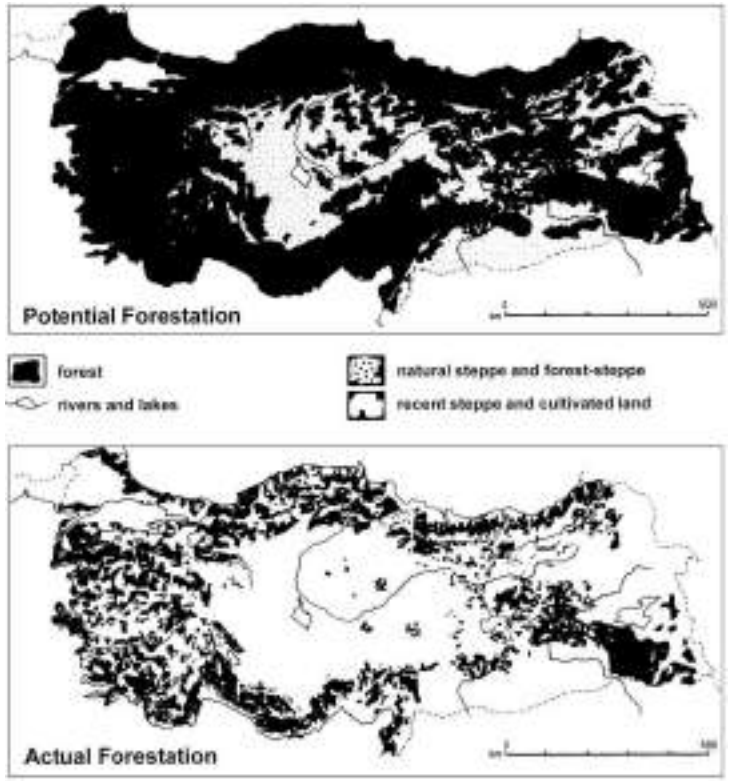
The Late Escape of the Neolithic on the Central Anatolian Plateau



Credits: Schoop 2005

"The bold lines indicate the geographical limits of the Central Plain model"



OREA 13

The adoption of agriculture and settled village life is one of the most important transitions in prehistory, long viewed as one of the most essential 'revolutions' in human history. While traditional grand narratives of agricultural origins and dispersals still remain relevant today, decades of excavation and investigation in western Asia are increasingly challenging and reinterpreting these narratives, revealing diverse pathways in the emergence of Neolithic communities. This volume, arising from a workshop organised at the 2016 ICAANE conference in Vienna, uses new research and theories to shed light on the diversity of early farming communities beyond the Near East, in Anatolia (the Asian part of Turkey) and the Aegean basin. The volume proposes that these regions represent one of the first farming 'frontiers' between the agricultural economies in central Anatolia in the 9th millennium BC and farming communities in western Anatolia and the Aegean, which emerged around two thousand years later. The thirteen contributions collected in this volume highlight the diverse trajectories by which societies transitioned to farming on the periphery of one of the great centres of food-plant and animal domestication of the Old World, and allow for the re-evaluation of long-established models in the field of Neolithic archaeology, integrating the area into broader narratives about one of the essential transformations in human history.

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THE CENTRAL/WESTERN ANATOLIAN FARMING FRONTIER

MAXIME BRAMI – BARBARA HORejs (EDS.)

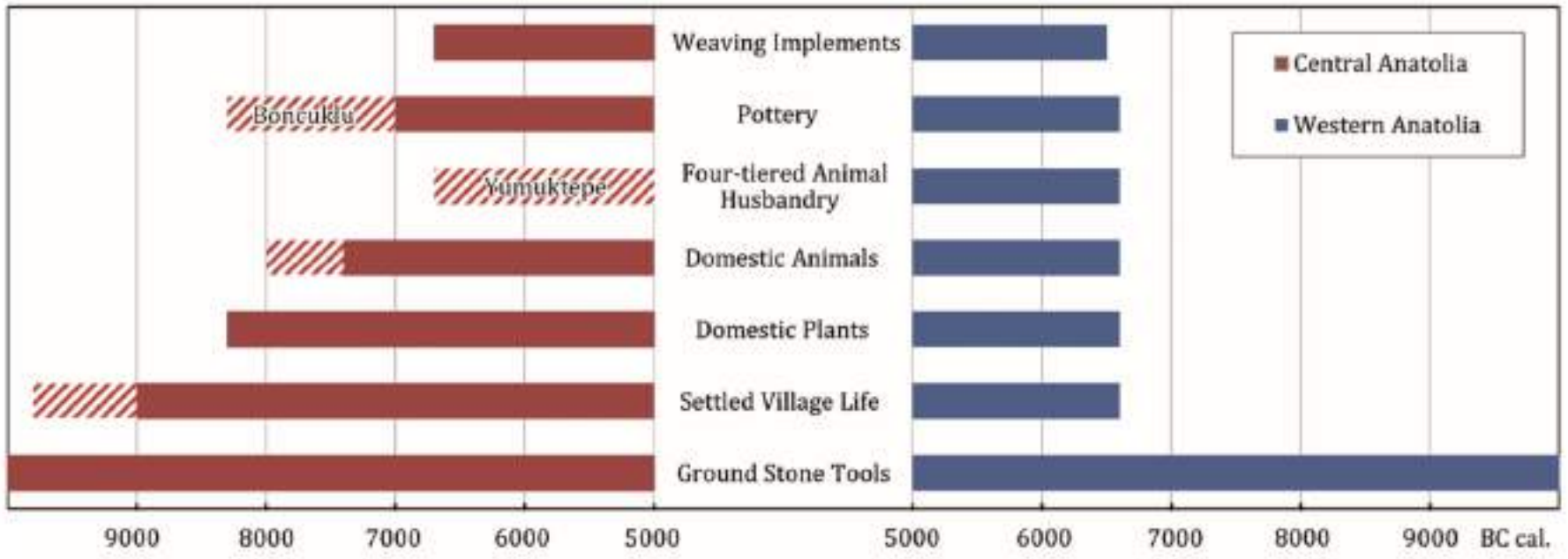
OREA 13

THE CENTRAL/WESTERN ANATOLIAN FARMING FRONTIER

PROCEEDINGS OF THE NEOLITHIC WORKSHOP HELD AT 10TH ICAANE IN VIENNA, APRIL 2016

MAXIME BRAMI
BARBARA HORejs (EDS.)

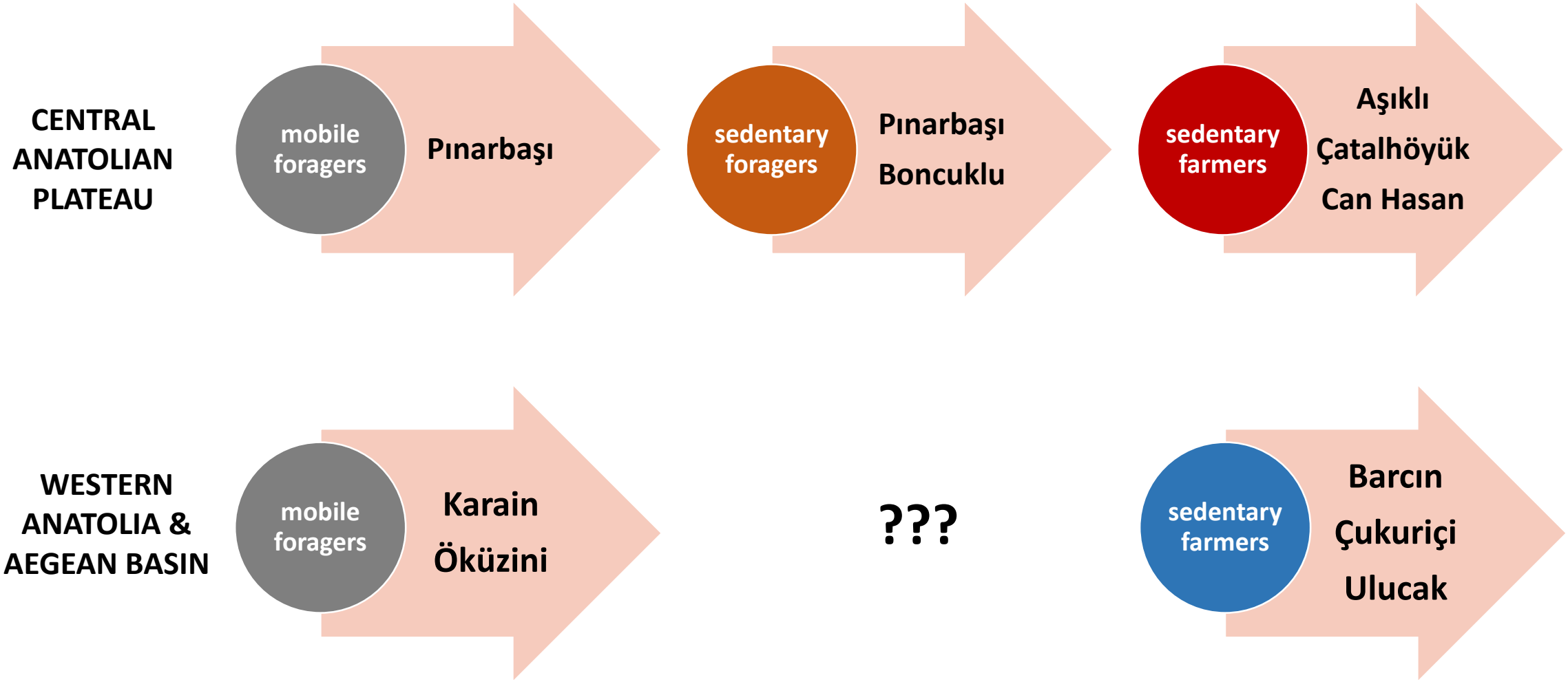
AUSTRIAN ACADEMY OF SCIENCES PRESS



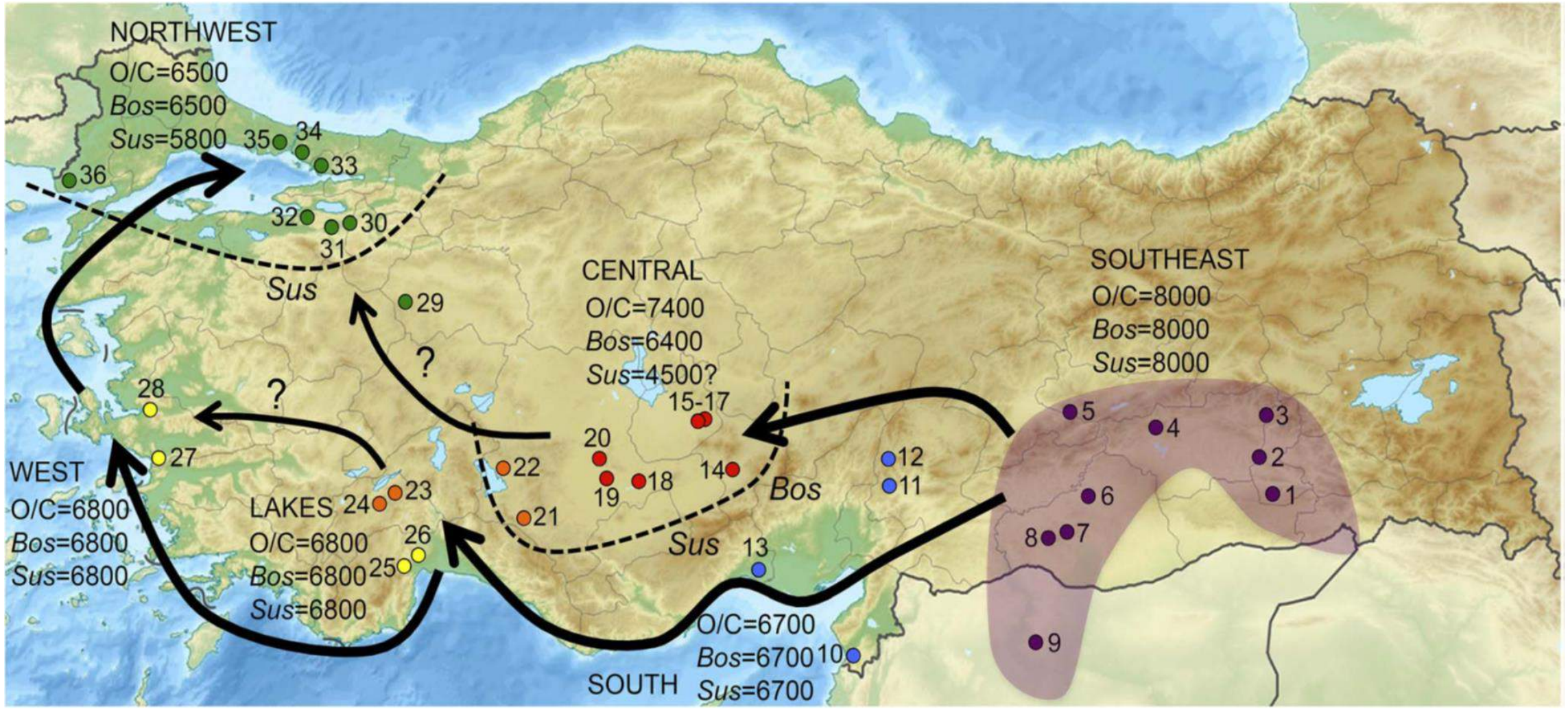
Comparison chart of the advant of selected components of the neolithic pattern of existence in Central and Western Anatolia (modified after Brami 2017, fig. 5). Fired clay vessels have been found in aceramic levels at Boncuklu (Fletcher et al. 2017)

Boncuklu Höyük,
ca. 8,300-7,800 cal. BC
A ‘transitional’ site in the Konya Plain, Central Anatolia
Boncuklu.org

The ‘sedentary revolution’

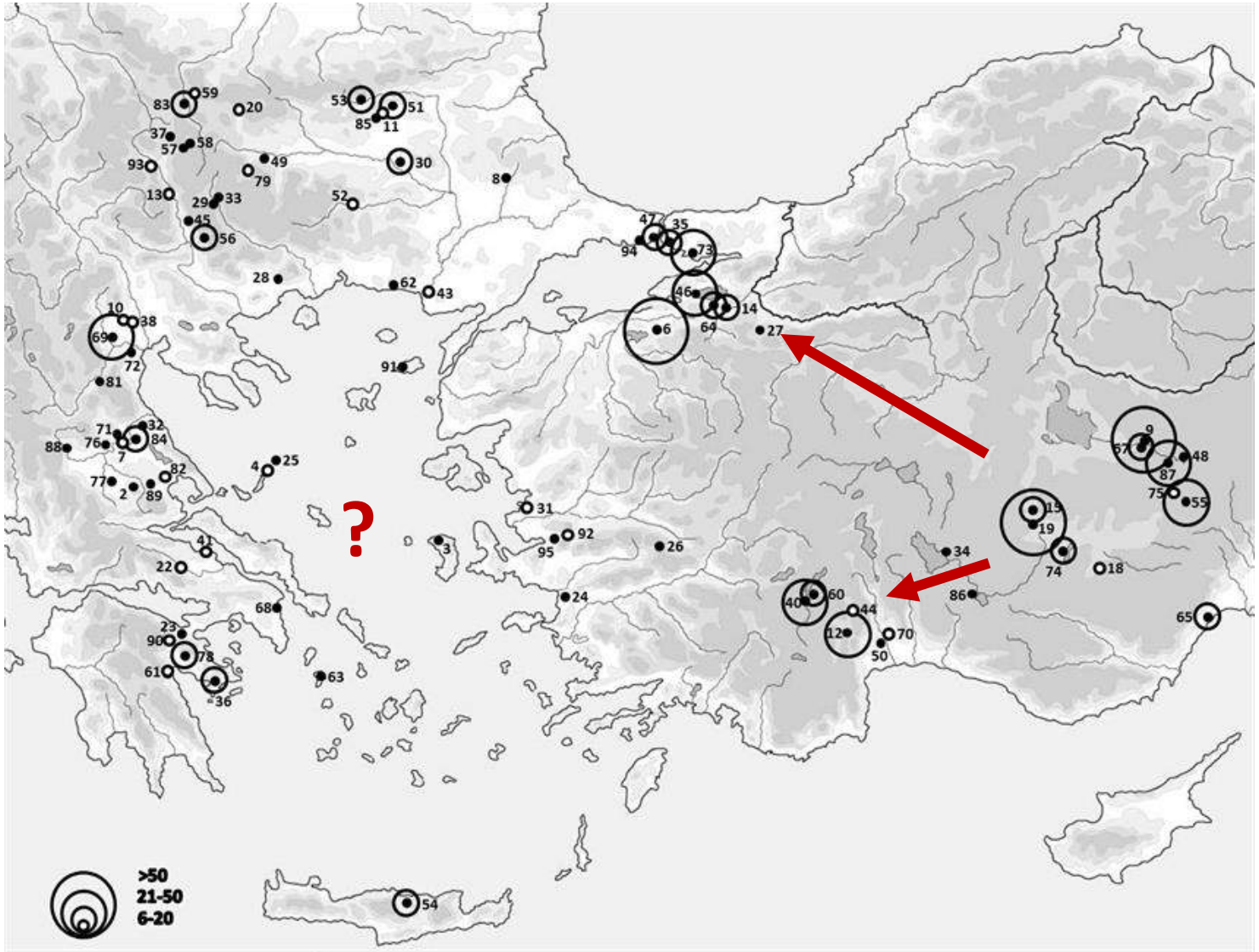


Central Anatolia: where are the pigs?



Credit: Arbuckle, Kansa, Orton, Çakırlar et al. 2014

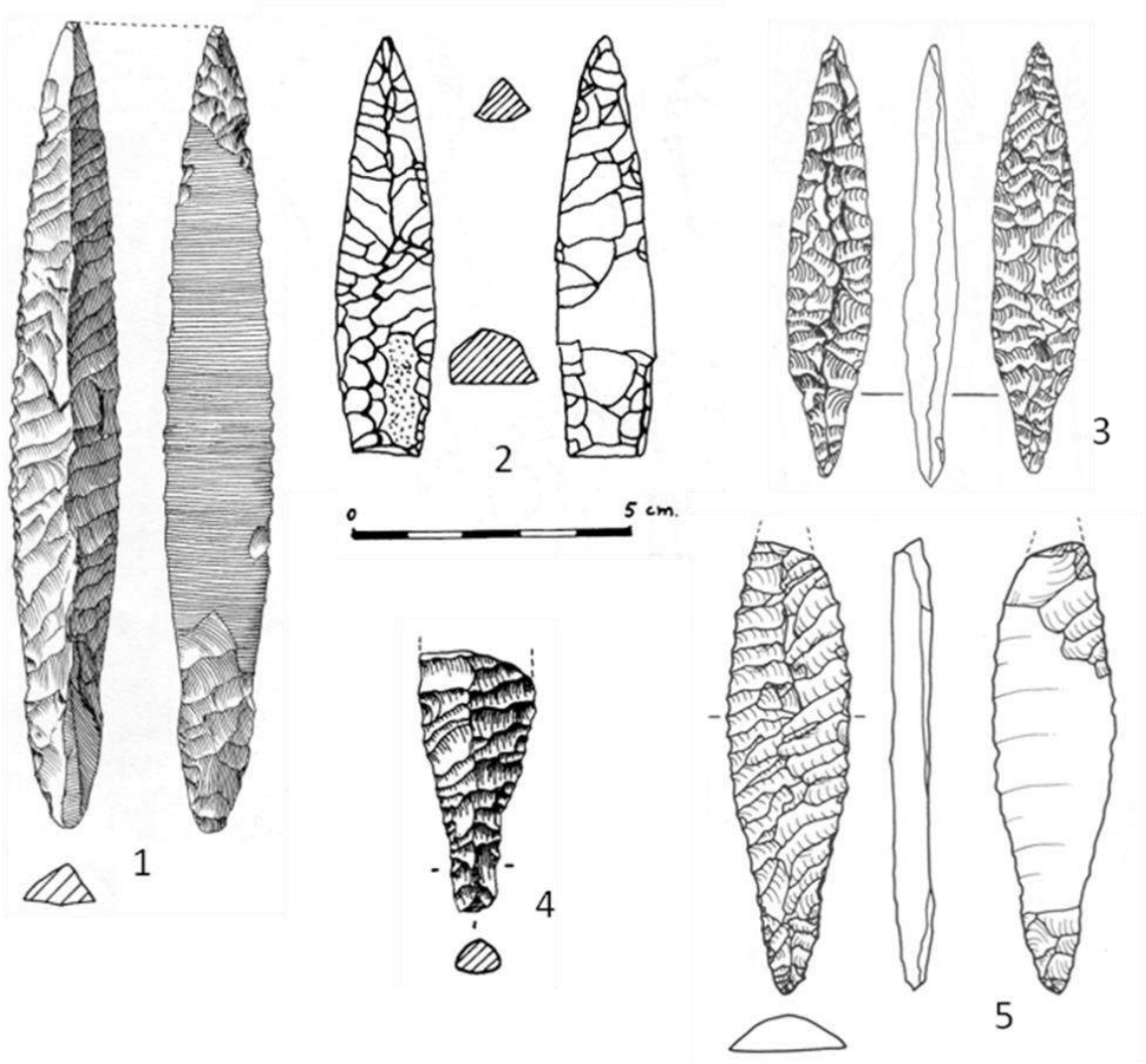
Aegean Basin: where are the dead?



Distribution of Neolithic/Early Chalcolithic ‘burials’ in Anatolia and Southeast Europe during the interval 9,500-5,500 cal. BC. ‘Burial’ refers to discrete burial deposits which may contain multiple individuals. Single dots indicate a lack of burial data or no burial. Brami 2017, figure 19

Elements that do not transfer: the big arrowhead industry

Elongated points (so-called 'Amuq' points) made on blades, with invasive retouch, often done by pressure

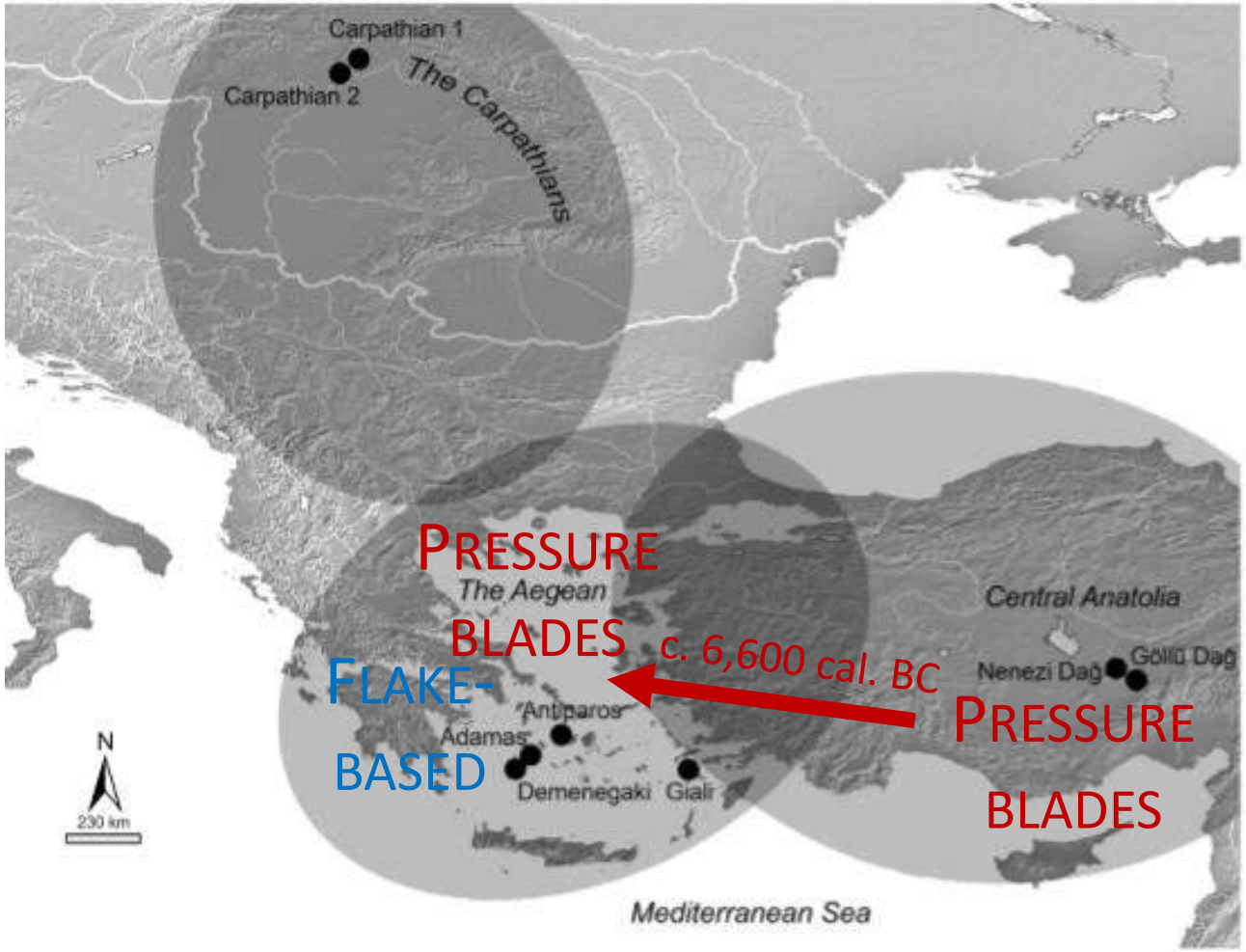


Gopher 1994

A spearhead from Building 80 at Çatalhöyük

Parallel networks

Major obsidian sources in Central Anatolia, the Aegean and the Carpathians and related artefact distribution



Milić 2014

Outline

When was farming adopted?

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Who spread farming?

Genetic Discontinuity Between Local Hunter-Gatherers and Central Europe's First Farmers

B. Bramanti,[1]* M. G. Thomas,[2] W. Haak,[1]† M. Unterlaender,[1] P. Jores,[1]‡ K. Tambets,[3] I. Antanaitis-Jacobs,[4] M. N. Haidle,[5] R. Jankauskas,[4] C.-J. Kind,[6] F. Lueth,[7] T. Terberger,[8] J. Hiller,[9]§ S. Matsumura,[10,11]‖ P. Forster,[12] J. Burger[1]

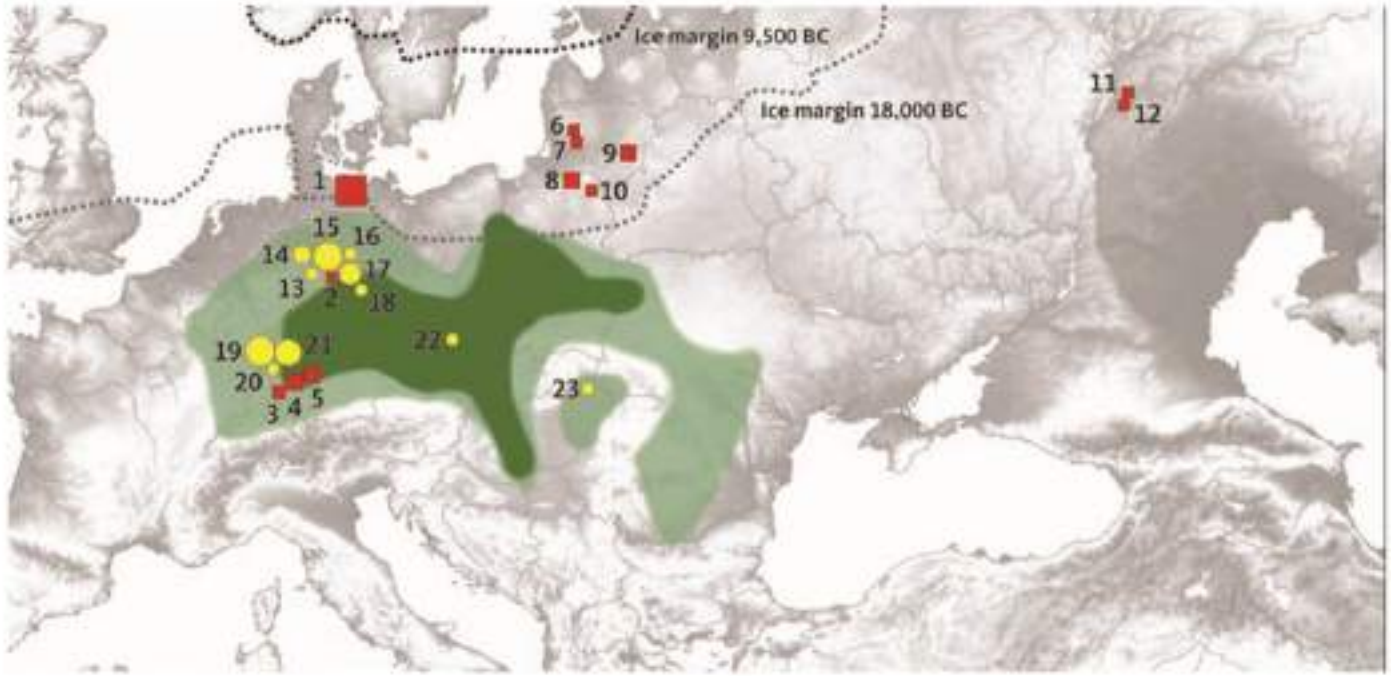
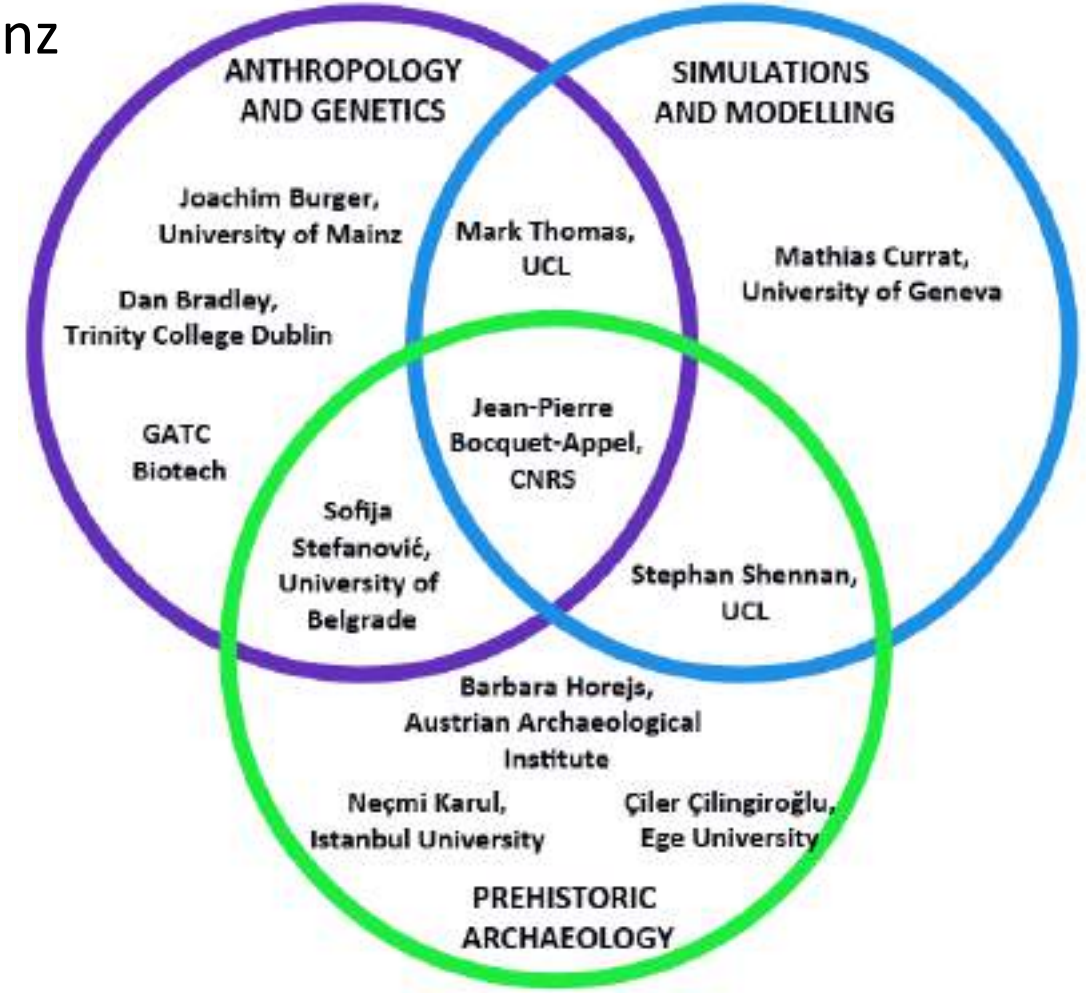


Fig. 1. mtDNA types from prehistoric samples of hunter-gatherers and farmers. The green shading represents the first farming areas [dark green: early LBK, 5650 to 5400 calibrated years B.C.E. (calBC); light green: LBK, 5400 to 4900 calBC] in central Europe, based on archaeological finds, whereas squares represent successfully analyzed Late Palaeolithic, Mesolithic, and Ceramist hunter-gatherers dating from 13,400 to 2300 B.C.E. The term "Neolithic" is sometimes applied to the Eastern European Ceramist culture because of their use of pottery, but this does not imply a farming economy (*21*). Previously analyzed (*11*, *12*) LBK farming sites are marked with circles for comparison. The area of each square or circle is proportional to the number of individuals successfully investigated. In red are labeled archaeological sites with one or more U4/U5 individuals; in yellow, sites with other mtDNA types, highlighting the specificity of U types in the prehistoric hunter-gatherers. The sites are as follows: 1, Ostorf; 2, Bad Dürrenberg; 3, Falkensteiner Höhle; 4, Hohler Fels; 5, Hohlenstein-Stadel; 6, Donkalnis; 7, Spiginas; 8, Dudka; 9, Kretuonas; 10, Drestwo; 11, Chekalino; 12, Lebyazhinka; 13, Unseburg; 14, Unterwiederstedt; 15, Derenburg/Meerenstieg; 16, Eilsleben; 17, Halberstadt; 18, Seehausen; 19, Flomborn; 20, Vaihingen an der Enz; 21, Schwetzingen; 22, Asparn/Schletz; 23, Ecsegfalva.

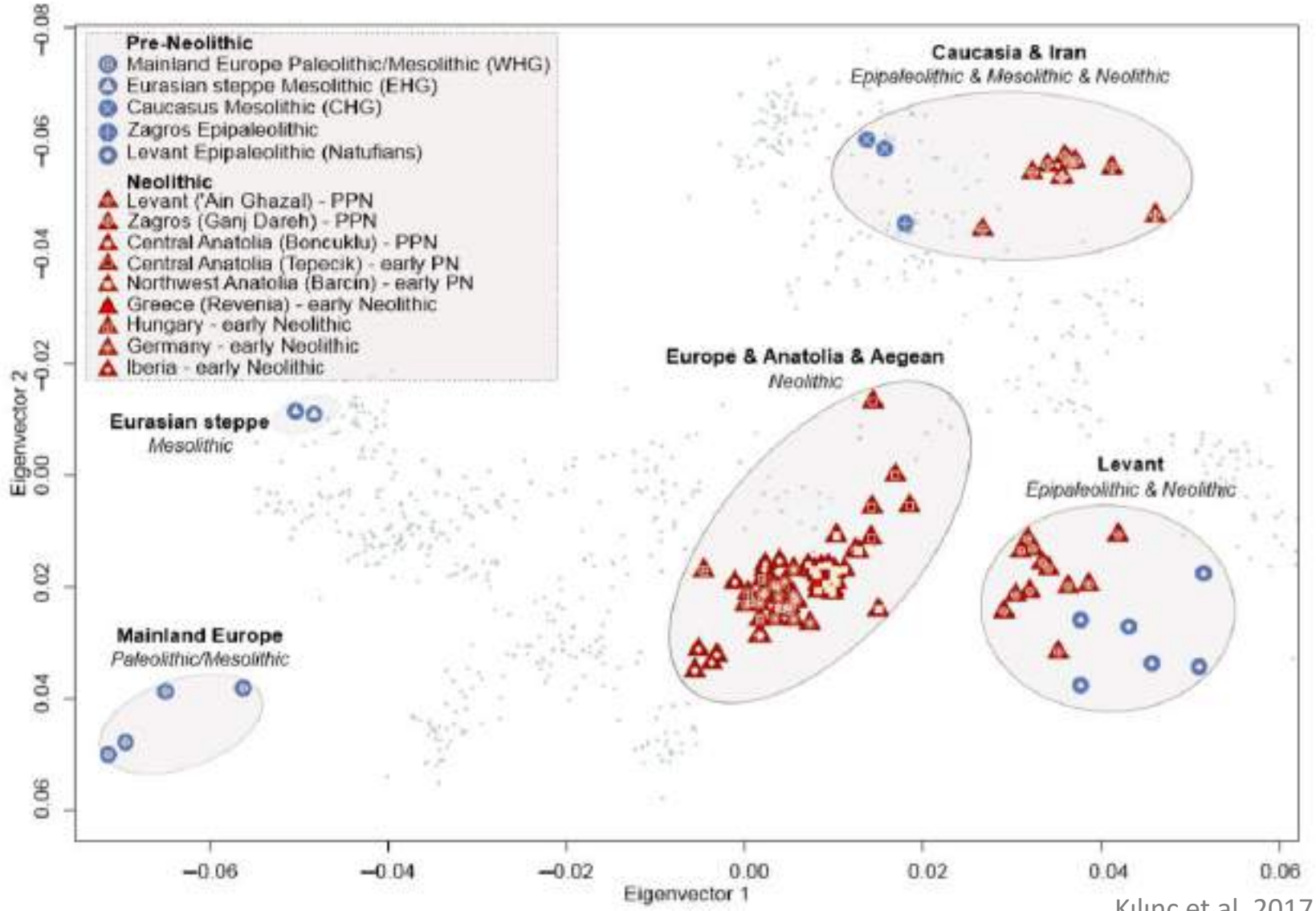
BEAN – BRIDGING THE EUROPEAN AND ANATOLIAN NEOLITHIC (2012-2016), ITN NETWORK

Demography, migration, and lifestyle at the advent of civilisation

PI Prof. Joachim Burger, JGU Mainz

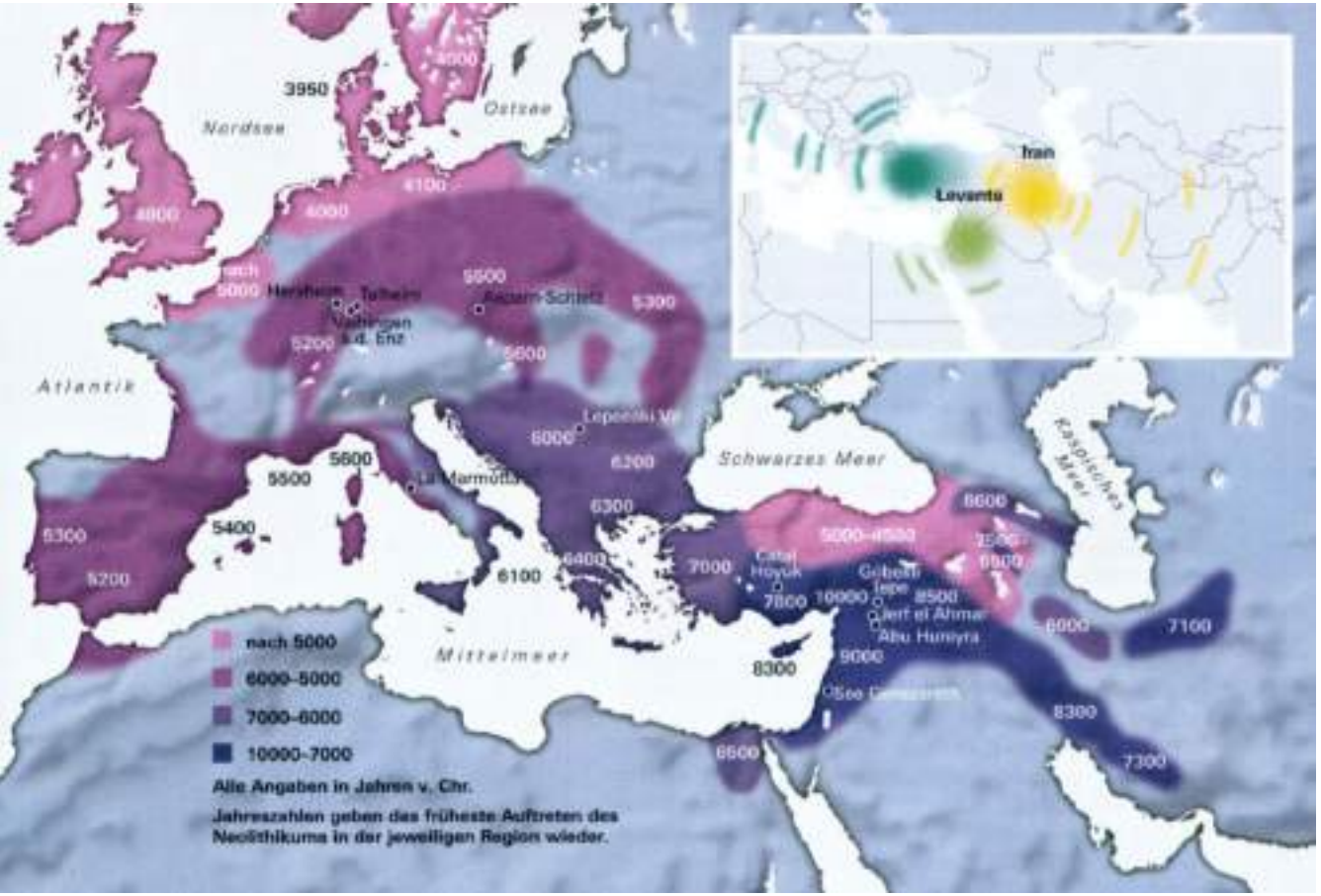


Southwest Asia as a heterogeneous core? Three populations expanding into three different directions?



Kılınç et al. 2017

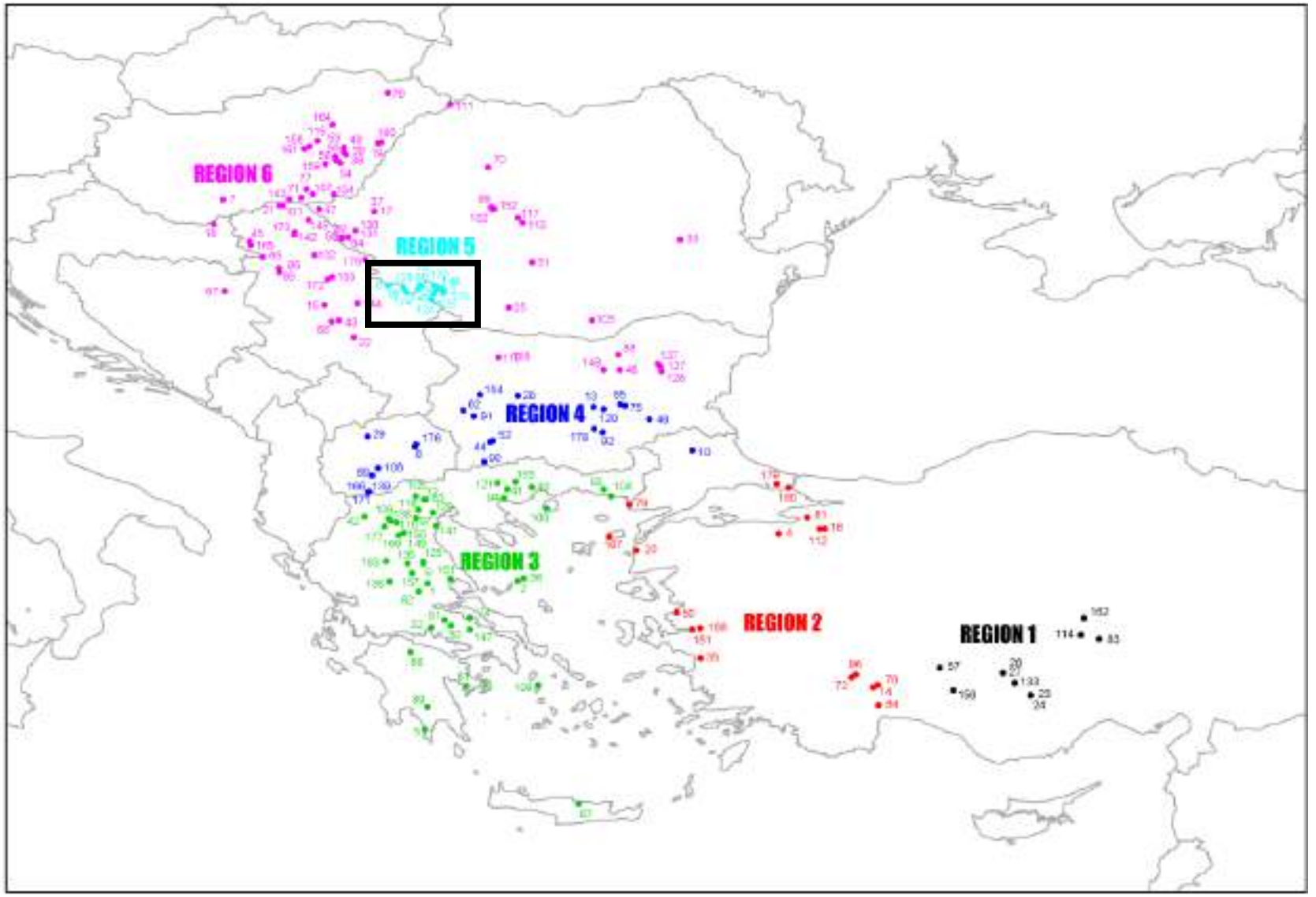
From continental-scale ancestry patterns…



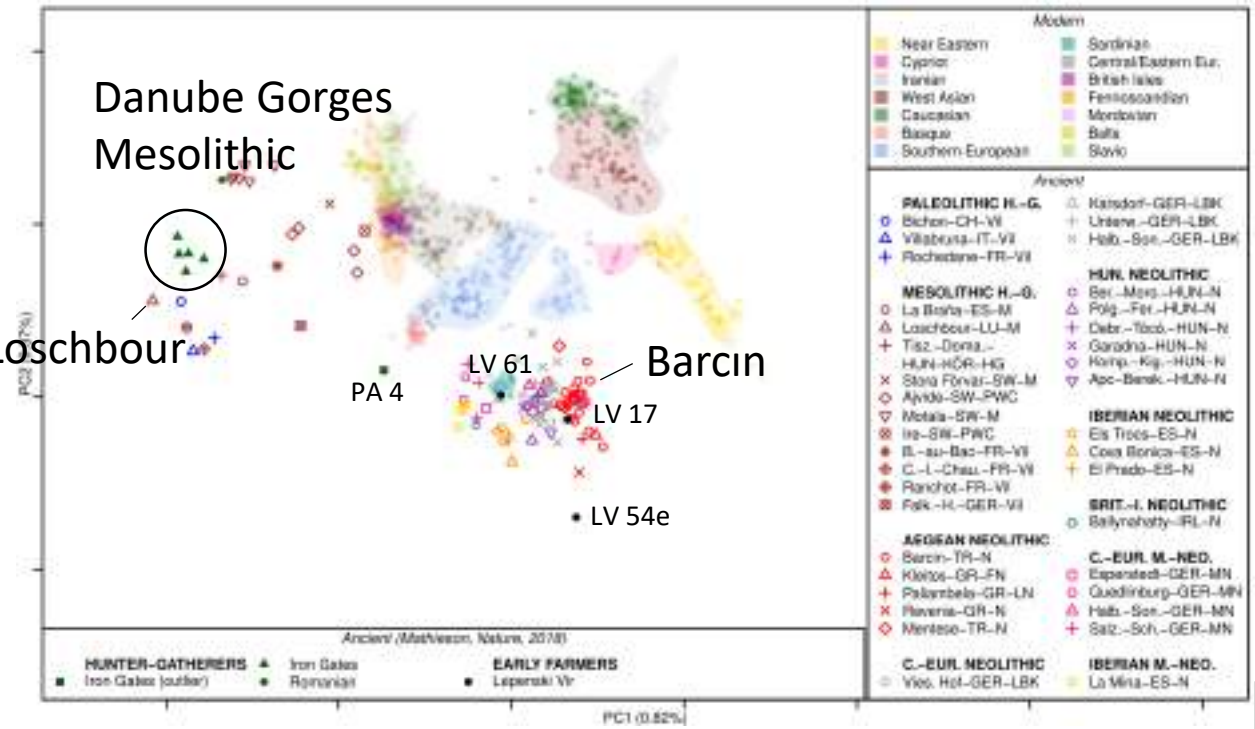
Burger and Shennan 2018

… to individual biographies

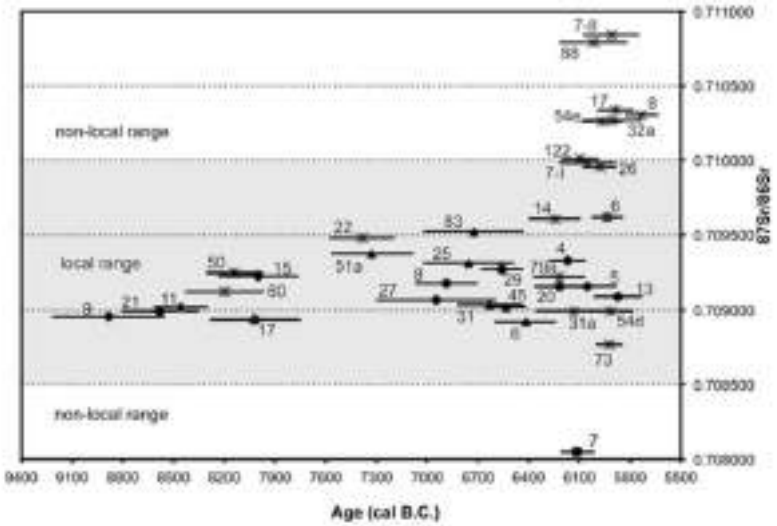
© Prince Parise, Discover 2018



R script: Yoan Diekmann/Leonardo Vallini, geographic coordinates from literature

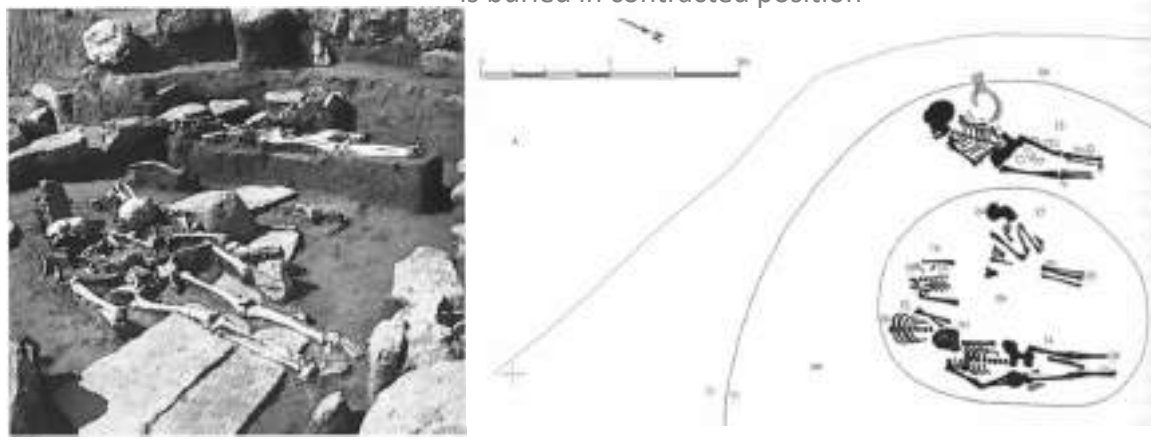


PCA: Yoan Diekmann, adapted from Brace et al. 2019

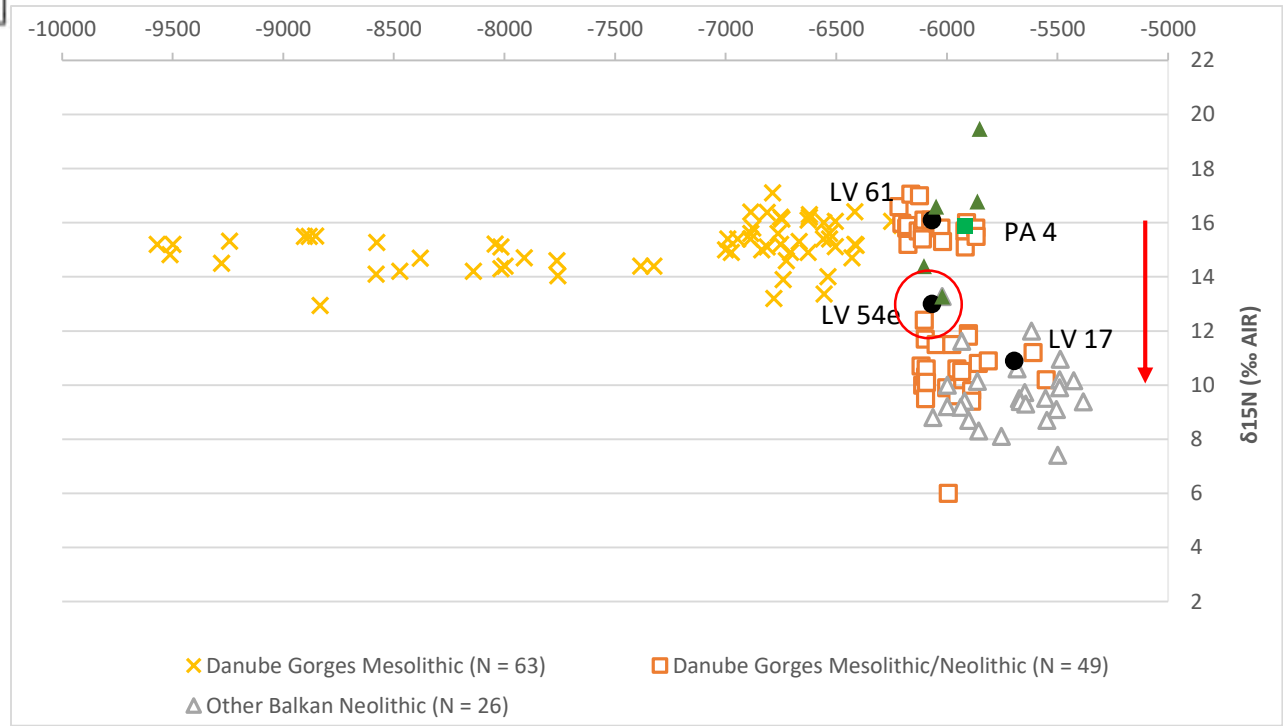


credits: Borić and Price 2013, fig.3, scatterplot between 87Sr/86Sr and radiometric dates for directly AMS-dated individuals (n = 37) with obtained strontium values.

credits: Borić 2016, fig.4.39B, Lepenski Vir: skeletal remains of individuals 13-17, spit 9 and 48; individual 17 is buried in contracted position



credits: Borić 2016, fig.4.19A, Lepenski Vir: close-up of burials 54d-e and 54c in the foreground, looking south; 54e is buried in extended supine position parallel to the Danube with the head facing downstream



Loschbour, Luxembourg, ca. 6,200-6,000 cal. BC

Barcın Höyük, Northwest Anatolia; adult skeleton in extreme 'hocker' position in an inter-dwelling space, Trench M13. Ca. 6200-6000 cal. BC

When was farming adopted?

~8,300 cal. BC farming adopted on the Central Anatolian Plateau

[but only as low-level food-production initially]

~6,700/6,600 cal. BC in Western Anatolia and the Aegean Basin

~6,100 cal. BC in the Balkan Corridor

How was farming adopted?

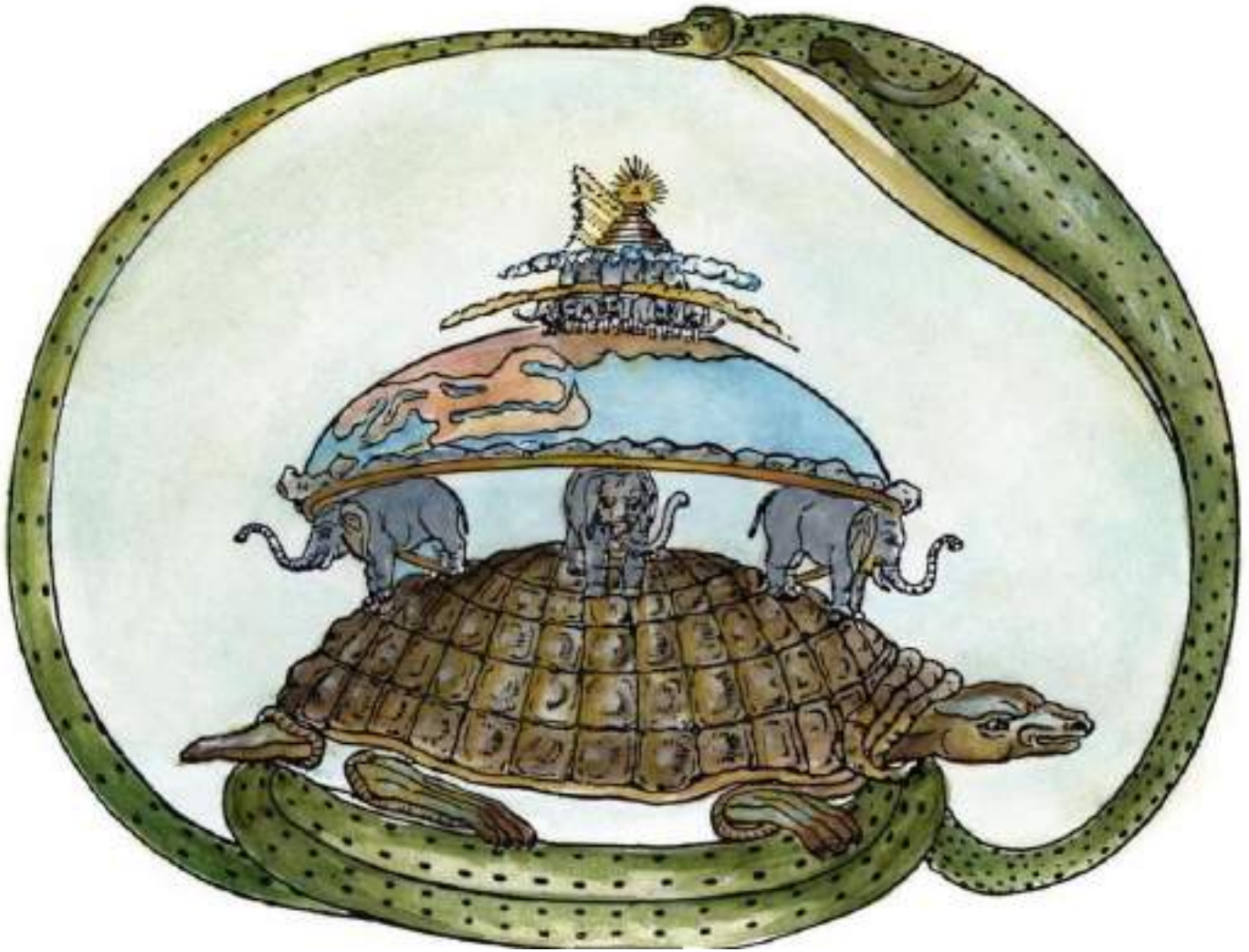
Different regional trajectories: incipient neolithic in Central Anatolia, fully-fledged (i.e. ‘packaged‘) in the Aegean Basin, disruptive in the Danube Gorges

Who spread farming?

Migrating farmers from Anatolia/the Aegean Basin

Chain of migration from Central Europe not reaching all the way back to the Near East?

Central/Western Anatolian farming frontier as a porous boundary: biological interactions between mesolithic Aegeans and neolithic Anatolians before the arrival of agriculture?



Hindu concept of the Universe: the universe is encircled by a serpent, the symbol of eternity. Mount Meru represents paradise, the earth below it is supported by six elephants, and below this is the infernal region carried by a tortoise

Acknowledgements

Marie Skłodowska-Curie Actions (2018-2020)

ITN Training Network BEAN 2012-2016 – PI Joachim Burger

Yoan Diekmann, Jens Blöcher, Laura Winkelbach, Leonardo Vallini, Bogdana Milić, Bernhard Weninger

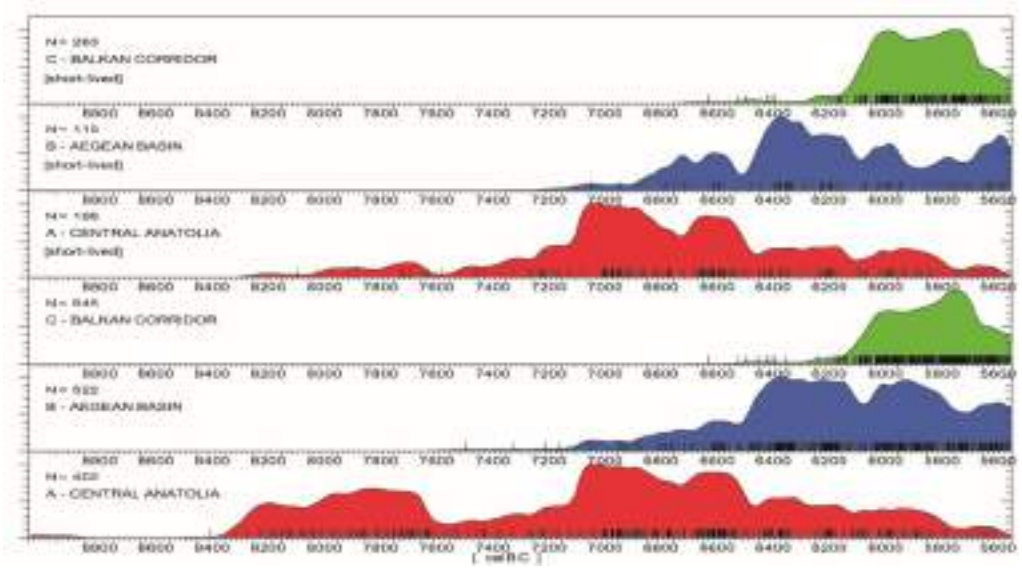
Limited evidence for dietary shift in the Aegean Basin due to lack of stable isotope values for Mesolithic Aegeans

Outlook: demographics of early farming expansion beyond the Near East:

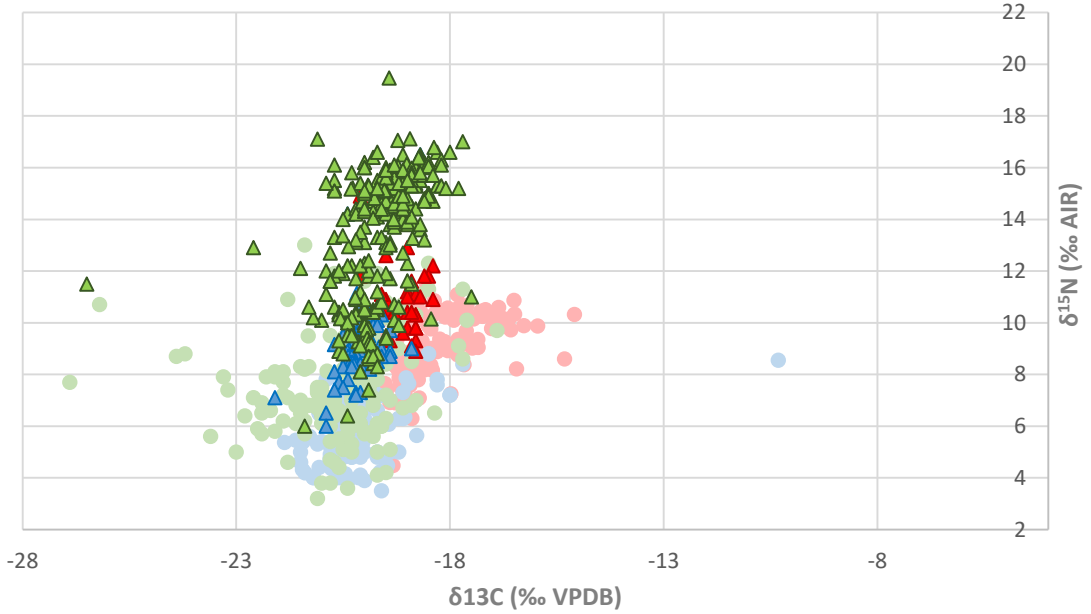
- Single wave or multiple waves?
- Origins of Europe's first farmers?
- Size of populations at the wave front?
- Interaction with local foragers?
- Any sex-bias admixture event?
- Demographic structure of early neolithic societies?

Credit: Karul, site of Aktopraklık, Atlasdergisi.com

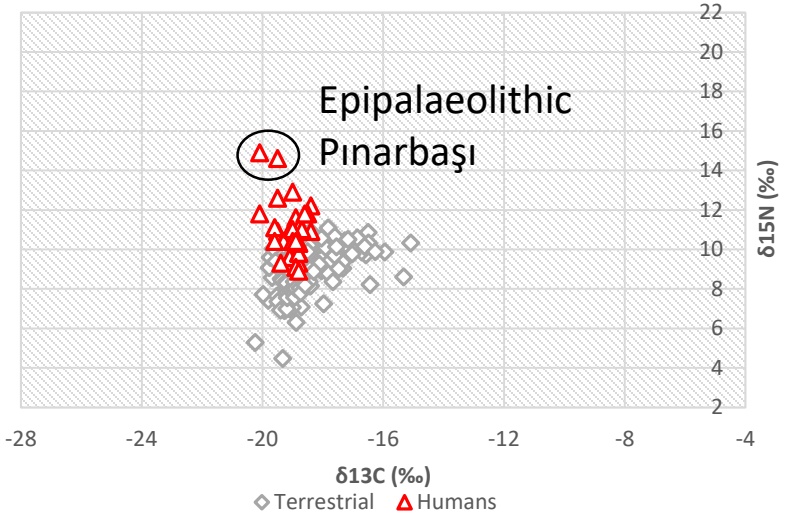
Dietary shifts?



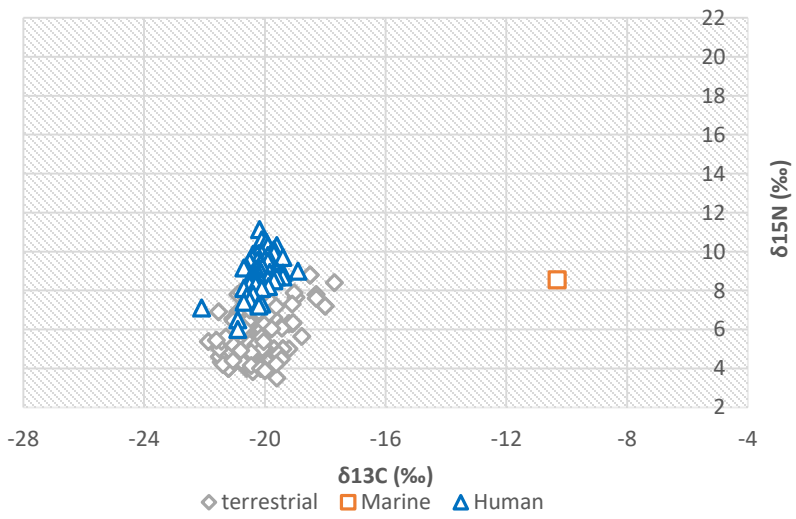
Published paired $\delta^{13}C/\delta^{15}N$ values Southeast Europe (9,500-5,500 cal. BC)



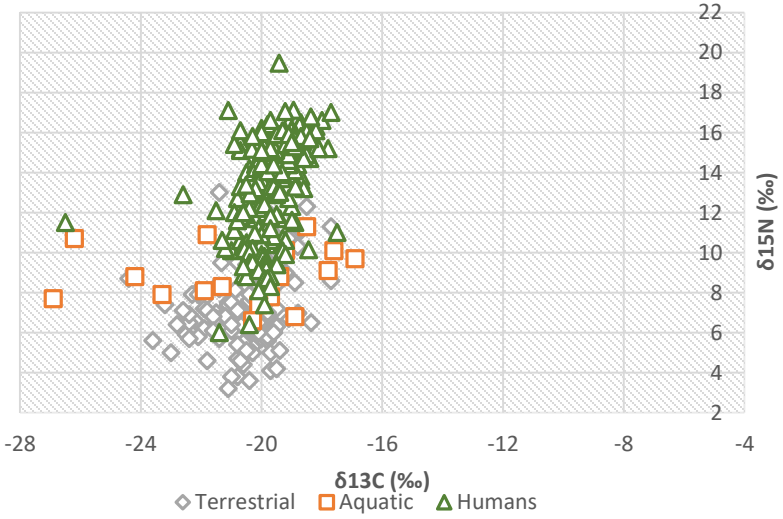
Central Anatolia



Western Anatolia & Aegean Basin



Balkan Corridor



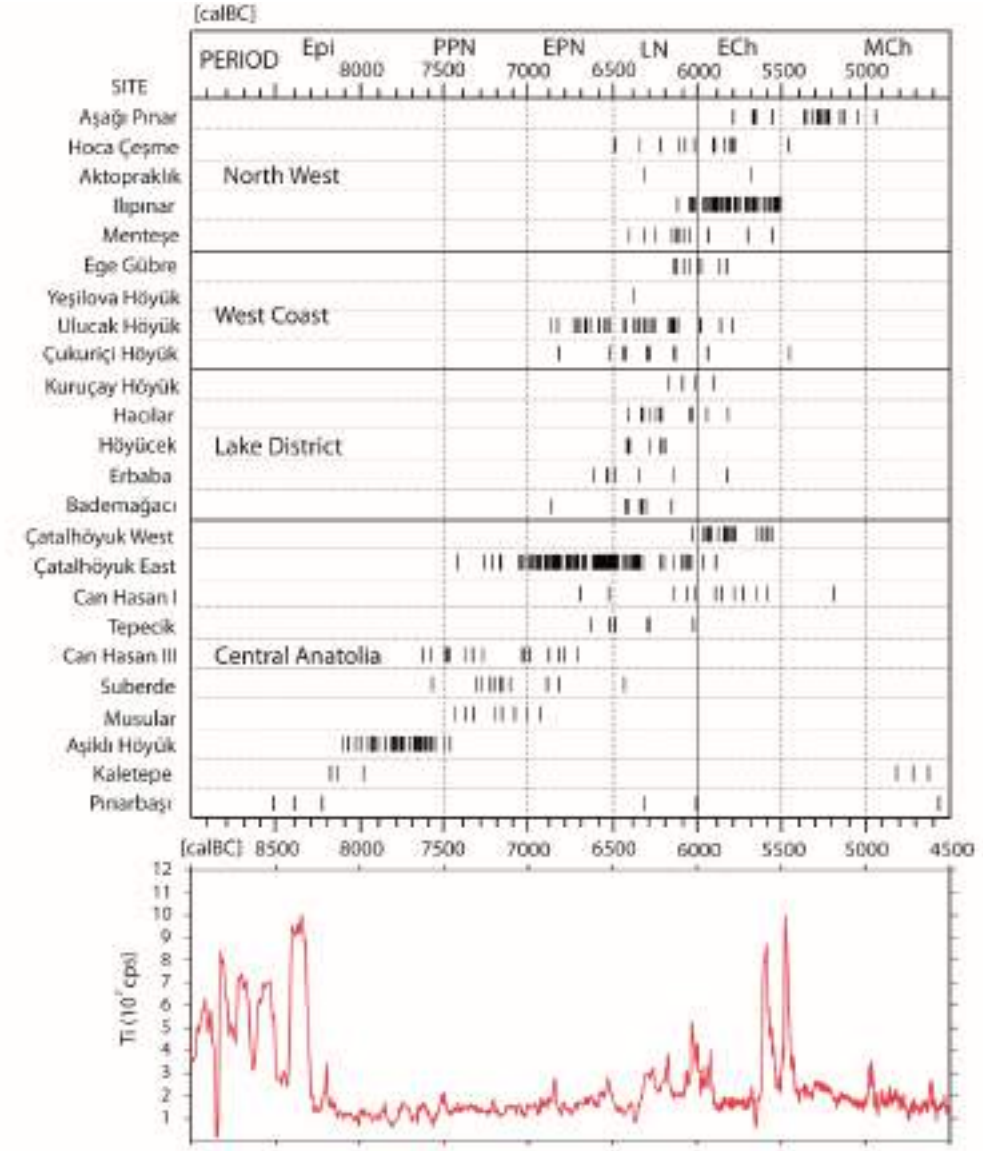
Weninger, work in progress

TOP

Overview of total 14C-ages (N = 466) arranged according to sites (vertical) and periods (horizontal) with calibrated ages plotted by the Barcode Method (Clare and Weninger 2014).

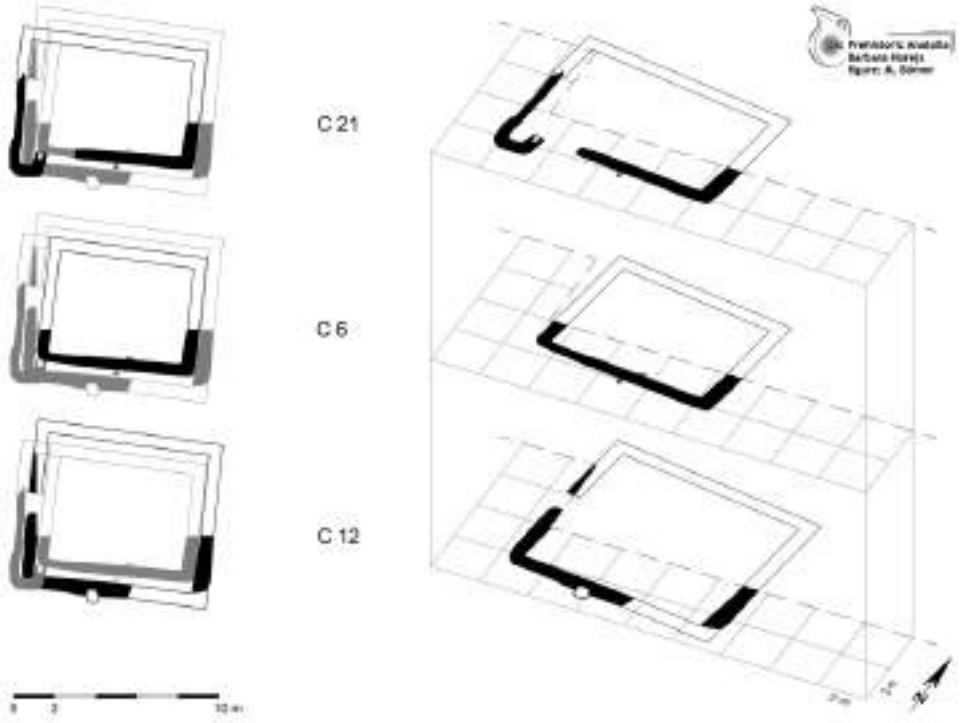
BOTTOM

Pattern of dust deposition across the Iranian Plateau (Sharifi et al. 2015).

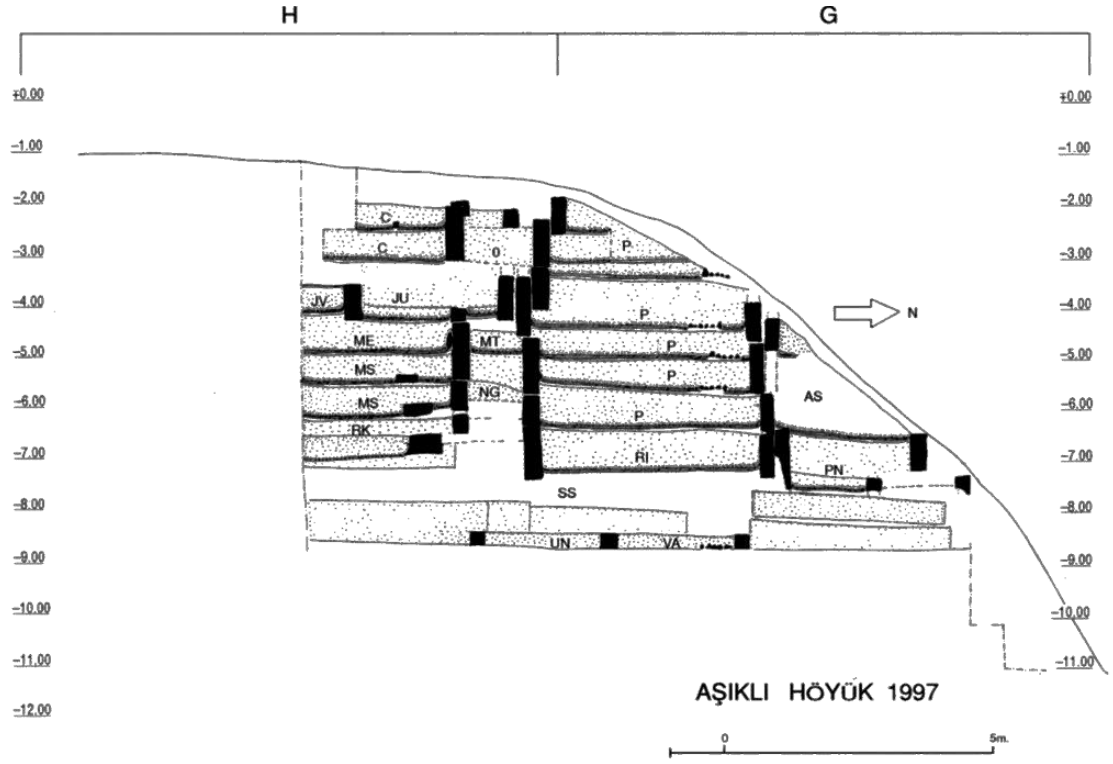


Building continuity

Sequence of building replacement at Çukuriçi Höyük near Ephesus, SW Turkey (left), and deep sounding at Aşıklı Höyük, Cappadocia, Central Turkey (right)



Credits: Brami et al. 2016



Credits: Esin and Harmankaya 1999

Mesolithic/Neolithic transition in the Danube Gorges: Contribution of stable isotopes

Credits: Borić 2011, fig.1

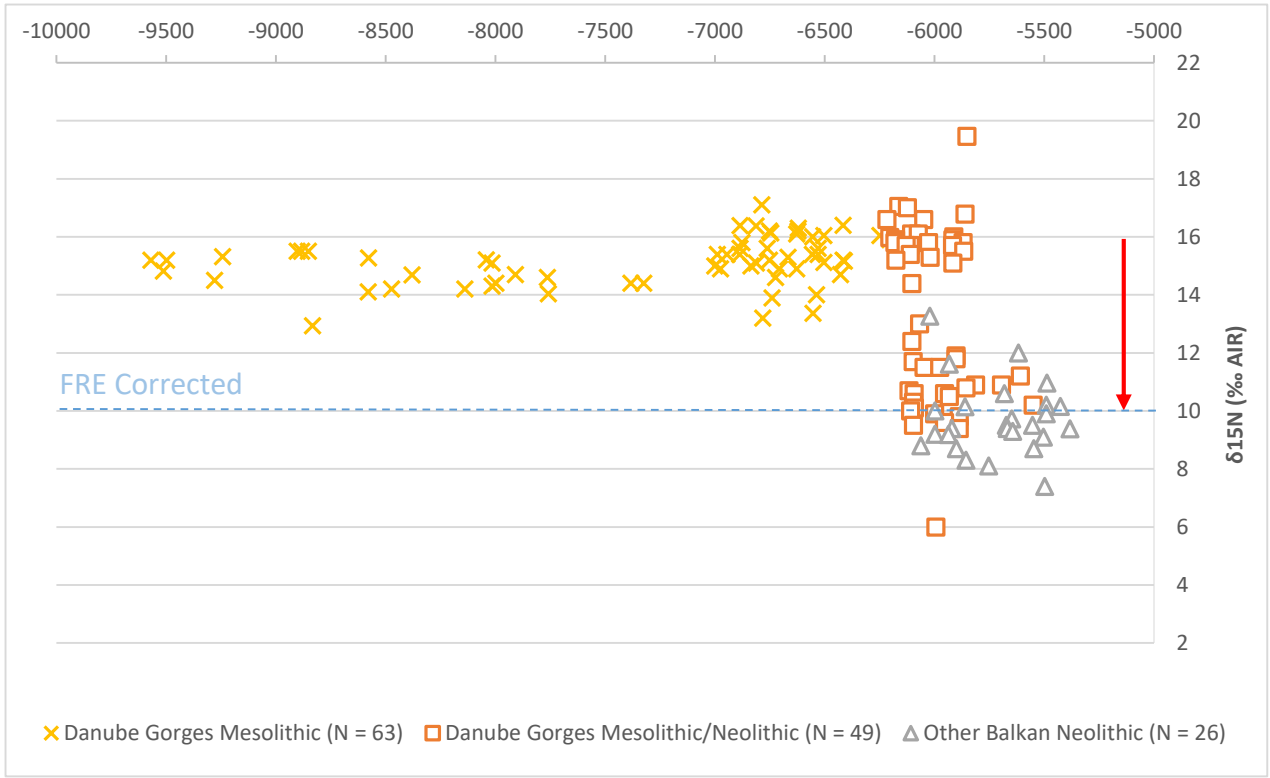
Mesolithic: Danube Gorges sites (Cuina Turcului, Hajdučka Vodenica, Lepenski Vir, Ostrovul Corbului, Padina, Schela Clavodei, Vlasac)

Meso/Neo Transition: Danube Gorges sites (Ajmana, Hajdučka Vodenica, Icoana, Lepenski Vir, Padina, Velesnica, Vlasac)

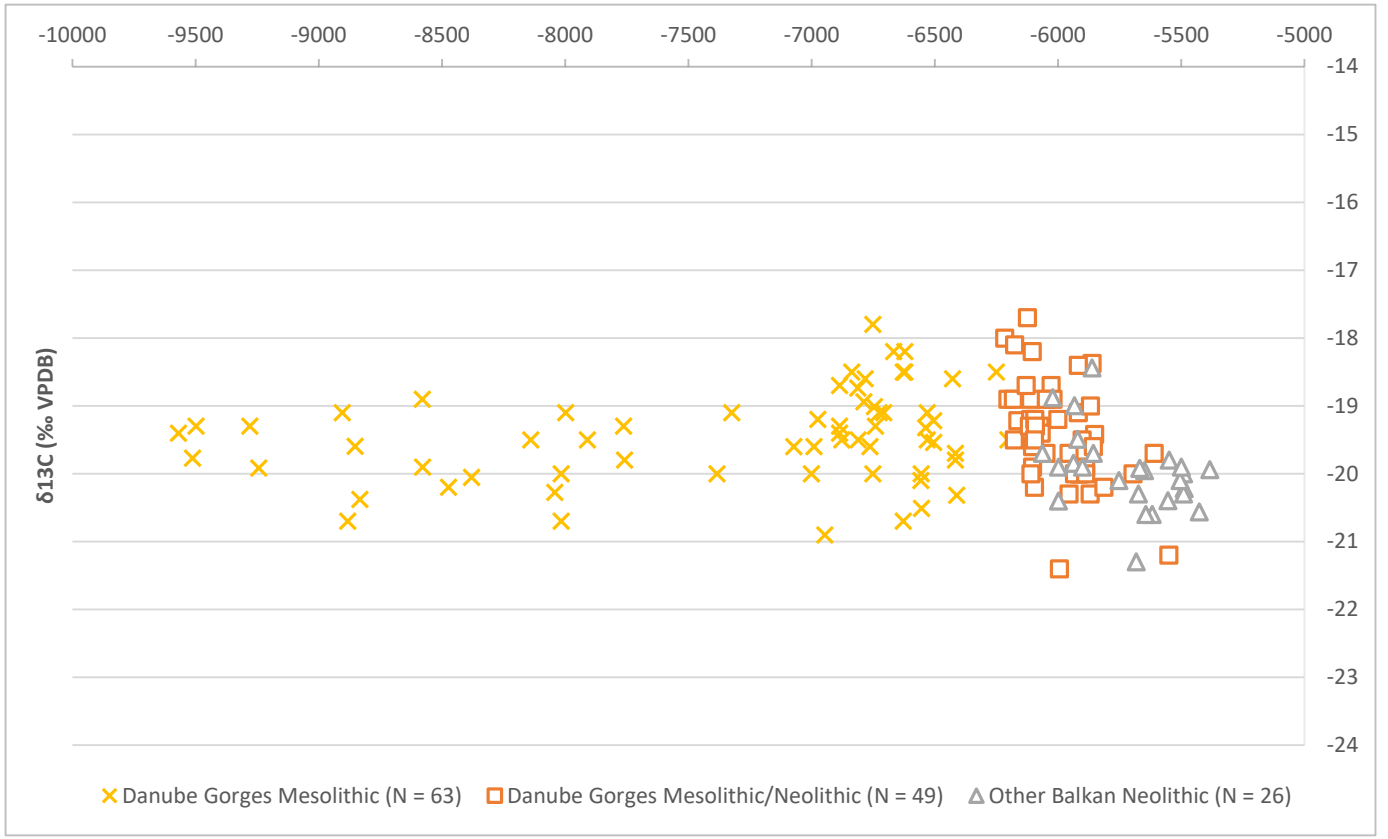
Neolithic: Other Balkan sites (Cârcea-Viaduct, Coțatcu, Deszk, Džuljunica-Smărdeš, Endrőd Varnyai-tanya, Golokut Vizić, Gomolava, Măgura Buduiasca, Maroslele-Pana, Ohoden, Perlez Batka C, Samovodone, Szarvas, Starčevo Grad, Topole Bač, Vinča, Yabalkovo)

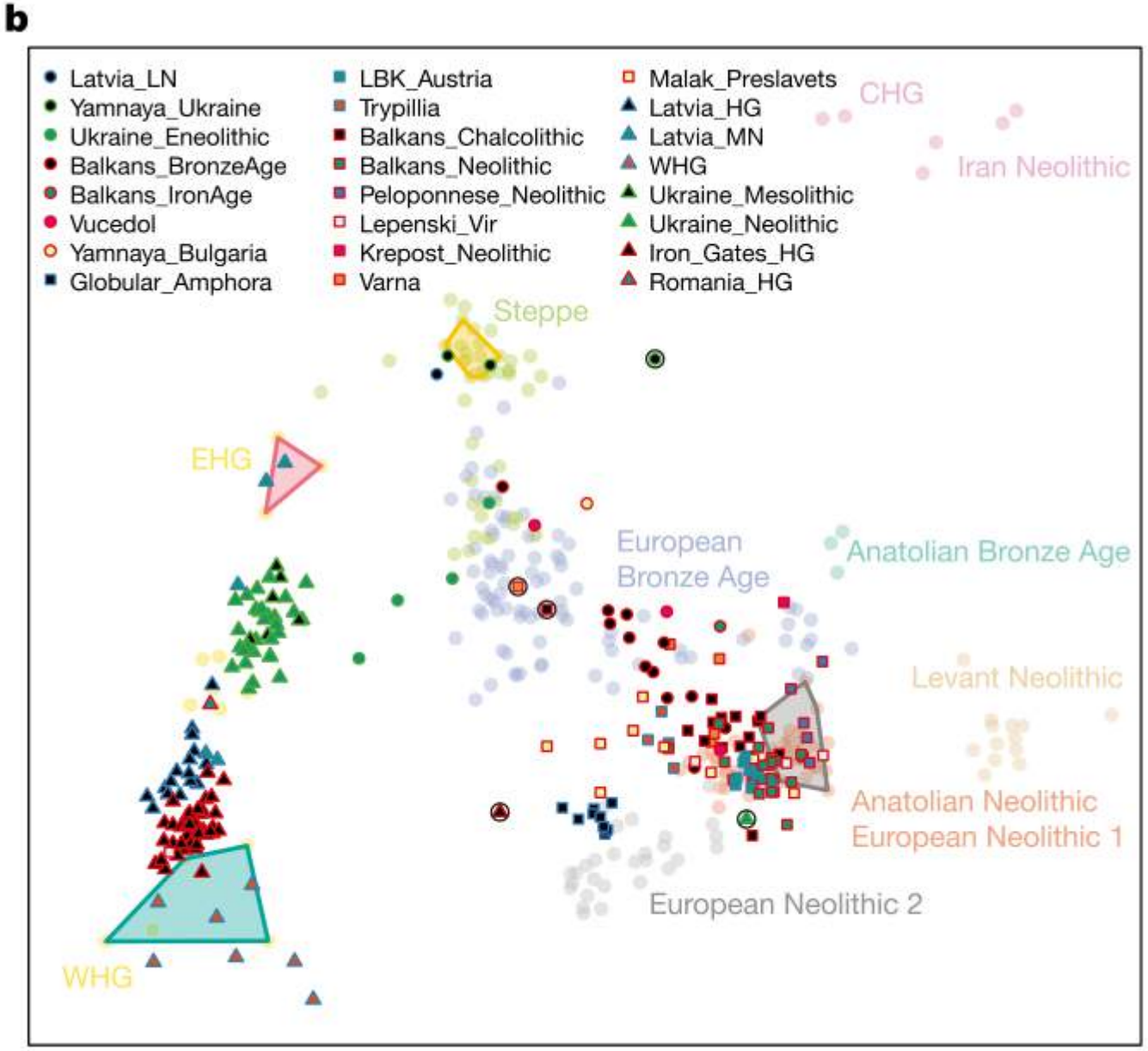
Isotopic values after Bonsall et al. 1997; Whittle et al. 2002; Gruppe et al. 2003; Borić et al. 2004; Bonsall et al. 2008; Nehlich et al. 2010; Borić 2011; Borić and Price 2013; Budd and Lillie 2014; Bonsall et al. 2015; Matthieson et al. 2018; Jovanović et al. 2019

Drop in $\delta^{15}N$ values observed in directly-dated humans from the Mesolithic-Neolithic transition in the Danube Gorges – presumably concomitant with the introduction of agriculture & a more restricted terrestrial C_3 plant food diet. Any $\delta^{15}N$ value above 10‰ is likely to indicate intake of aquatic food



The median value of the corresponding calibrated ^{14}C-age was used. Dates uniformly re-calibrated in OxCal v4.3.2 (Bronk Ramsey 2017) using the IntCal13 atmospheric curve (Reimer et al. 2013). All ^{14}C dates on human bones. Correction for freshwater reservoir effect follows Borić 2011; Bonsall et al. 2015 (any date with $\delta^{15}N \geq 10‰$). Excludes ^{14}C duplicates and individuals identified in the literature as neonates and children < 5 years to avoid high $\delta^{15}N$ values before weaning. All stable isotope measurements on human bone collagen.


-10000
-9500
-9000
-8500
-8000
-7500
-7000
-6500
-6000
-5500
-5000
-14
-15
-16
-17
-18
-19
-20
-21
-22
-23
-24
δ13C (‰ VPDB)
Danube Gorges Mesolithic (N = 63)
Danube Gorges Mesolithic/Neolithic (N = 49)
Other Balkan Neolithic (N = 26)



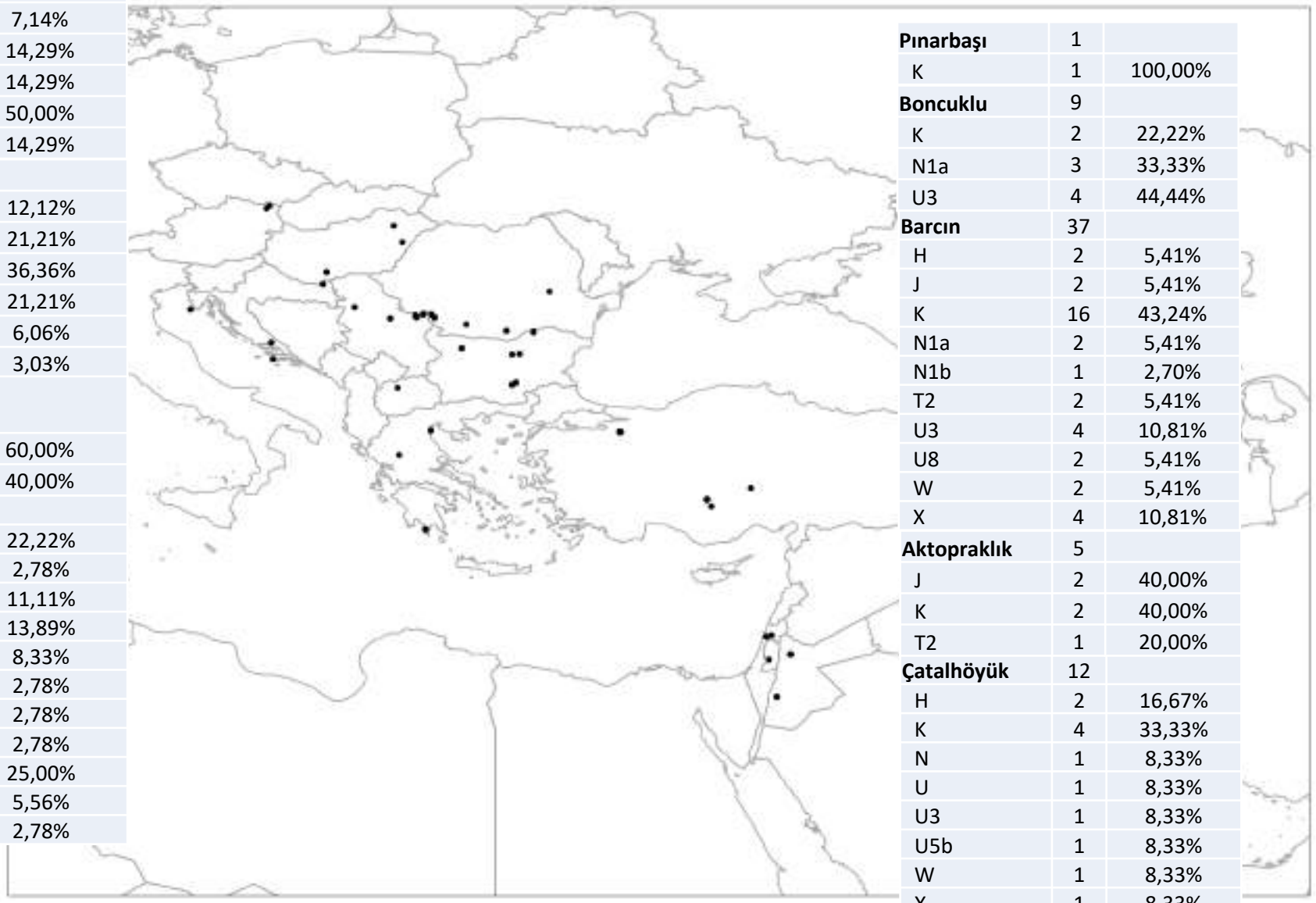
Mathieson et al. 2018
Shows Mesolithic cline between WHG & EHG
The Iron Gates Mesolithic clusters with WHG group (except 1 from Padina, ca. 6050-5850 cal. BC, projected as 50% WHG, 50% EF)

Four individuals from Lepenski Vir, dated ca. 6200-5600 cal. BC cluster with Anatolian EF!!

No isotopic data for marked individuals

Distribution of 47 sites with published palaeogenomes (mtDNA and nuclear capture) dating to 9,500-5,500 cal. BC in the Near East and Southeast Europe

Padina	14	
I	1	7,14%
K	2	14,29%
U4	2	14,29%
U5a	7	50,00%
U5b	2	14,29%
Vlasac	33	
K	4	12,12%
U4	7	21,21%
U5a	12	36,36%
U5b	7	21,21%
U8	2	6,06%
X	1	3,03%
Hajdučka Vodenica	5	
U5a	3	60,00%
U5b	2	40,00%
Lepenski Vir	36	
H	8	22,22%
HV	1	2,78%
J	4	11,11%
K	5	13,89%
N1a	3	8,33%
T1	1	2,78%
T2	1	2,78%
U4	1	2,78%
U5a	9	25,00%
U5b	2	5,56%
X	1	2,78%

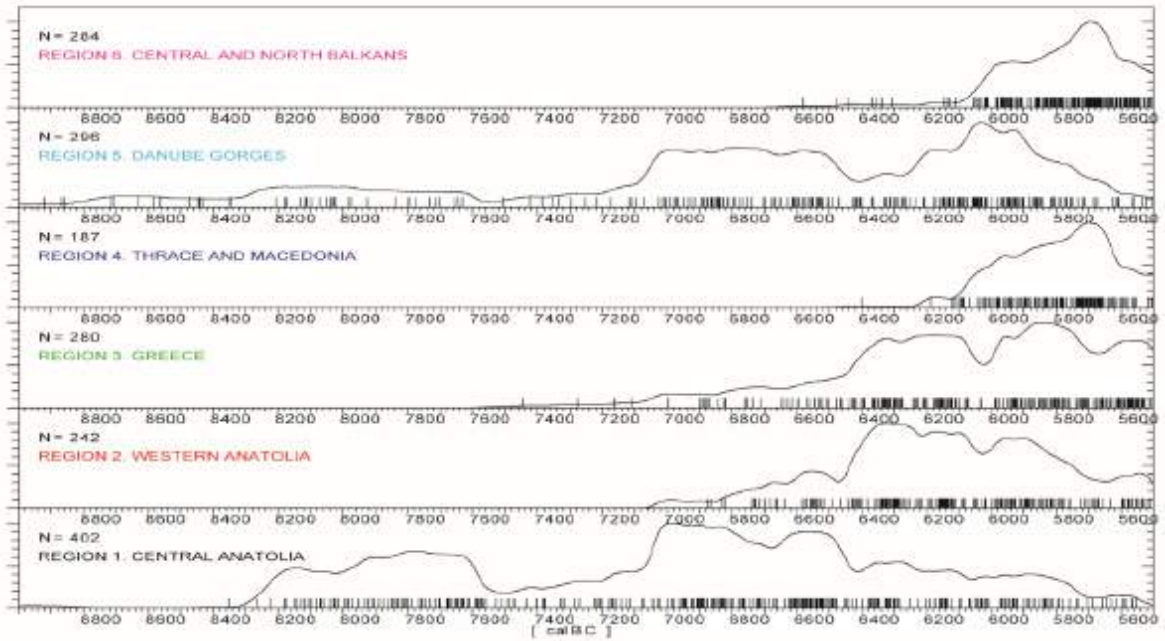


Pınarbaşı	1	
K	1	100,00%
Boncuklu	9	
K	2	22,22%
N1a	3	33,33%
U3	4	44,44%
Barcın	37	
H	2	5,41%
J	2	5,41%
K	16	43,24%
N1a	2	5,41%
N1b	1	2,70%
T2	2	5,41%
U3	4	10,81%
U8	2	5,41%
W	2	5,41%
X	4	10,81%
Aktopraklık	5	
J	2	40,00%
K	2	40,00%
T2	1	20,00%
Çatalhöyük	12	
H	2	16,67%
K	4	33,33%
N	1	8,33%
U	1	8,33%
U3	1	8,33%
U5b	1	8,33%
W	1	8,33%
X	1	8,33%

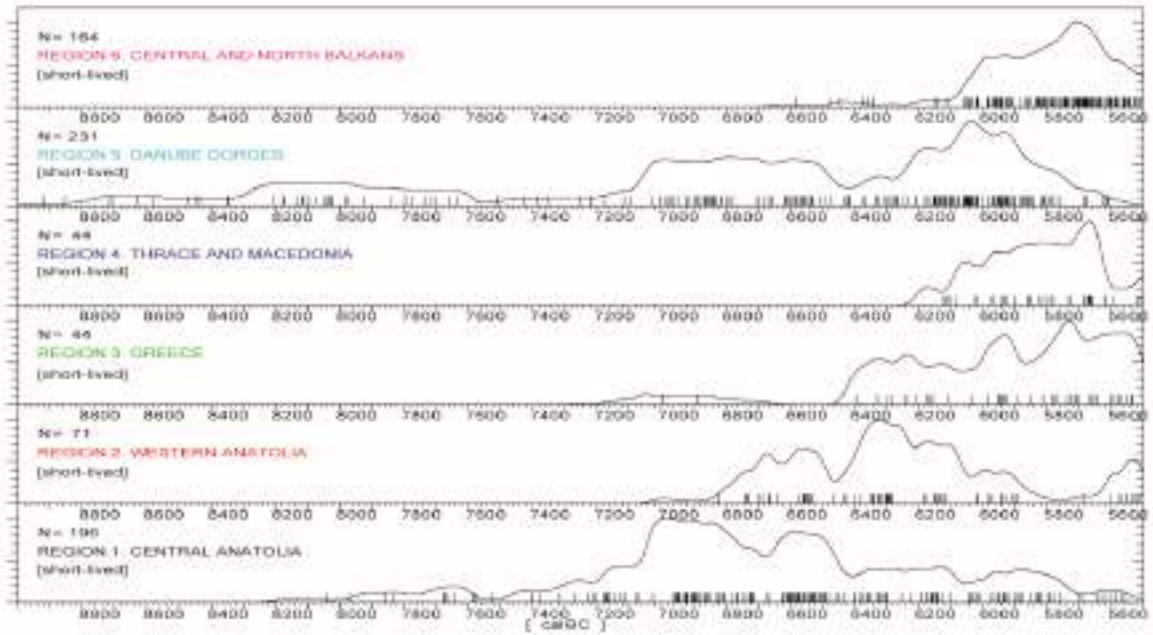
R script: Yoan Diekmann/Leonardo Vallini, geographic coordinates from literature

Summed probability distributions of *n* = 1,691 calibrated radiocarbon dates during the interval 9,500-5,500 cal. BC. Created in CalPal v.2019.3 (Weninger et al. 2019a) using the CalPal-Hulu-2018 Hulu curve (Weninger and Jöris 2008; Weninger et al. 2019b)

All Dates



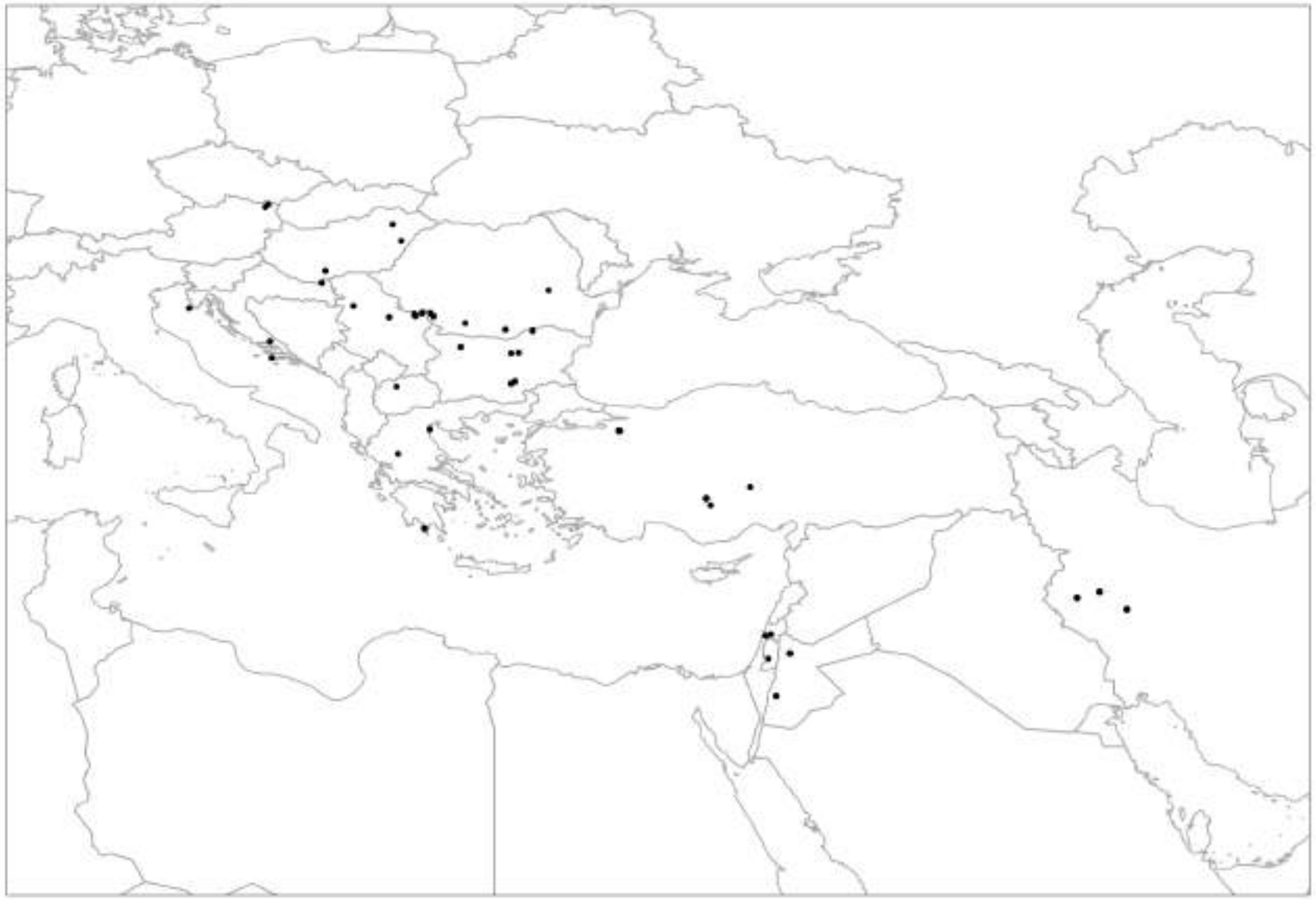
Dates on Short-lived samples



For Region 1, 2, 3, 4 and 6, only ^{14}C dates associated with ‘neolithic’ layers (where food-production is evident or implied) are plotted.

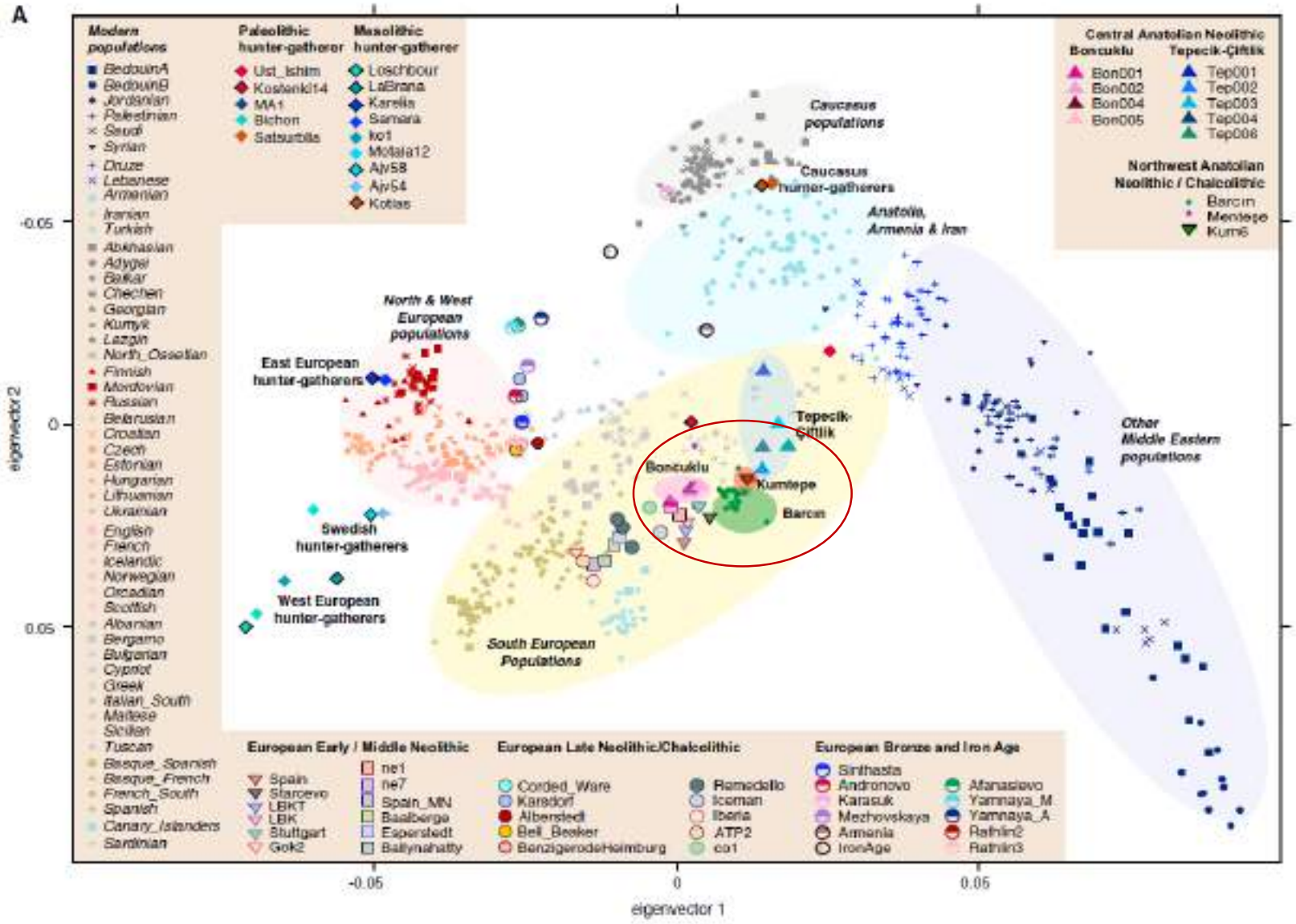
For Region 5, ^{14}C dates associated with both ‘mesolithic’ and ‘neolithic’ occupations are plotted.

Distribution of 47 sites with published palaeogenomes (mtDNA and nuclear capture) dating to 8,500-5,500 cal. BC in the Near East and Southeast Europe



R script: Yoan Diekmann/Leonardo Vallini, geographic coordinates from literature

Central and Western Anatolian farmers cluster tightly on the PCA of genetic diversity



Kılınç et al. 2016