Neanderthal-Modern Human Interactions in the Southern Caucasus

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Major Research Questions

What was the palaeoenvironmental & temporal context of the Middle–Upper Palaeolithic transition?

Were Neanderthals & Modern Humans sympatric or allopatric?

If sympatric, what niches & resources were exploited & what kinds of interactions occurred?

If allopatric, what were the main differences in niche & resource exploitation?

What rifts or continuities in material culture & behavior can be identified between the LMP & EUP? What is the relevance?
Specific Hypotheses

HUNTING ABILITIES DISTINGUISH MODERN HUMANS FROM NEANDERTHALS

TESTS: species representation, mortality, sex ratios, life history characteristics

ARTIFACT DIVERSITY & “SOPHISTICATION” DISTINGUISH MODERN HUMANS FROM NEANDERTHALS

TESTS: core reduction, blank production, tool manufacture, use, recycling, & discard

SOCIAL RELATIONSHIPS & INTERACTIONS DISTINGUISH MODERN HUMANS FROM NEANDERTHALS

TESTS: mobility, land-use, & raw material exploitation
Sources of Data

Archaeological Excavation

Palaeoenvironmental Reconstruction: D. Lordkipanidze (palynology), S. Weiner (mineralogy), C. Mallol & P. Goldberg (micromorphology), E. Allue (palaeobotany), & J. Agusti (microfauna)

Chronometric Dating: T. Jull & E. Boaretto (AMS), J. Rink (ESR), & N. Mercier & H. Valladas (TL)

Zooarchaeology & Taphonomy: G. Bar-Oz

Lithic Analysis

Mobility & Land-use Studies

Human Behavioral Ecology

Djurchula Cave
Geography of the Late Mousterian
After Bar-Yosef and Pilbeam 2000

Levalloiso-Mousterian

Lower Nile Valley Complex

Eastern Micoquian

Northern Levantine Micoquian

Eastern Micoquian/para-Micoquian

Taurus-Zagros

Late Levantine Mousterian

Levalloiso-Mousterian

40

Chatelperronian

Szeletian

38/33

Uluzzian

30

40/36

29

30

34-

30

30

50/45?

48/47

40

Taurus-Zagros

2000

40

30

30

30/28?

Late Aterian

30/28?

36

40

36.5

30

38/33

Charentian

40

30

Levalloiso-Mousterian

Eastern Micoquian
The image contains a map of the Caspian region with major cities and geographical features labeled. Key locations include:

- **Black Sea**
- **Caspian Sea**
- **Elbrus** (5642m)
- **Kazbegi** (5033m)
- **Aragac** (4090m)
- **Ararat** (5165m)
- **Tbilisi**
- **Yerevan**
- **Sevan**
- **Van**
- **Urmia**

Additional details include:
- **Elbrus** and **Kazbegi** are mountains.
- **Aragac** and **Ararat** are also notable peaks.
- **Tbilisi** and **Yerevan** are major cities.

The image also includes elevation ranges such as:
- <100m
- 3000m
- 3600m

The map uses a satellite image from 2001 by **TERRA Satellite**.
• Diversity in elevation & numerous river valleys draining Caucasus form a patchwork of rich & diverse ecological niches

• Environments: open broad-leaved & coniferous woodlands interspersed with grasslands

• Little evidence for dramatic environmental shifts during climatic oscillations of OIS 3
Chronology & Stratigraphy

AMS=37; TL=21; ESR=5; Total=63

BP Weighted Mean

<table>
<thead>
<tr>
<th>Method</th>
<th>Value</th>
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<tbody>
<tr>
<td>2 AMS</td>
<td>19325 ± 89</td>
</tr>
<tr>
<td>2 AMS</td>
<td>21664 ± 159</td>
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<tr>
<td>2 AMS</td>
<td>27000 ± 260</td>
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<tr>
<td>8 AMS</td>
<td>30600 ± 160</td>
</tr>
<tr>
<td>6 AMS</td>
<td>33433 ± 249</td>
</tr>
<tr>
<td>3 AMS</td>
<td>34314 ± 447</td>
</tr>
<tr>
<td>3 AMS</td>
<td>36482 ± 517</td>
</tr>
<tr>
<td>4 TL</td>
<td>44111 ± 2137</td>
</tr>
<tr>
<td>7 AMS</td>
<td>42763 ± 806</td>
</tr>
<tr>
<td>3 TL</td>
<td>46050 ± 2215</td>
</tr>
<tr>
<td>4 AMS</td>
<td>41992 ± 846</td>
</tr>
<tr>
<td>8 TL</td>
<td>42490 ± 1479</td>
</tr>
<tr>
<td>ESR (EU)</td>
<td>42468 ± 2532</td>
</tr>
<tr>
<td>ESR (LU)</td>
<td>45802 ± 2757</td>
</tr>
</tbody>
</table>

Layer 9: 48862 ± 3814  2 TL
Layer 10: 49910 ± 2587  4 TL

North
<table>
<thead>
<tr>
<th></th>
<th>Layers 2–4</th>
<th>Layer 5</th>
<th>Layer 6</th>
<th>Layer 7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capra caucasica</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NISP</td>
<td>376</td>
<td>191</td>
<td>1408</td>
<td>1098</td>
<td>3073</td>
</tr>
<tr>
<td>MNI</td>
<td>5</td>
<td>4</td>
<td>14</td>
<td>12</td>
<td>35</td>
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<tr>
<td>MNE</td>
<td>162</td>
<td>70</td>
<td>458</td>
<td>384</td>
<td>1074</td>
</tr>
<tr>
<td>NISP:MNE</td>
<td>2.00</td>
<td>2.73</td>
<td>3.07</td>
<td>2.86</td>
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<tr>
<td>%Total NISP</td>
<td>89.74</td>
<td>92.7</td>
<td>95.65</td>
<td>96.57</td>
<td>95.02</td>
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<tr>
<td><strong>Bison priscus</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>NISP</td>
<td>26</td>
<td>15</td>
<td>57</td>
<td>30</td>
<td>128</td>
</tr>
<tr>
<td>MNI</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>MNE</td>
<td>17</td>
<td>10</td>
<td>23</td>
<td>18</td>
<td>68</td>
</tr>
<tr>
<td>NISP:MNE</td>
<td>1.53</td>
<td>1.50</td>
<td>2.48</td>
<td>1.67</td>
<td>1.88</td>
</tr>
<tr>
<td>%Total NISP</td>
<td>6.21</td>
<td>7.28</td>
<td>3.87</td>
<td>2.64</td>
<td>3.96</td>
</tr>
</tbody>
</table>

(Total: NISP = 3234, MNI = 53)
Mortality vs. Lifespan for LMP Caucasian Tur

Layers 6–7 (N=57)

**Young:** 31.6% total sample

**Prime Age:** 66.7% total sample

**Old:** 1.7% total sample

Based on wear of lower deciduous 4th premolar & lower 3rd molar (Stiner 1994)
Survivorship and Mortality
Modified triangular plot (after Steele & Weaver 2002)

1: LMP Ortvale Klde
2: MP Italy
3: UP Italy
4: MP Kebara gazelle
5: MP Kebara fallow deer
6: MP Kebara red deer
7: MP Gabasa 1

Old 100%

Prime-age Adults
“ambush” hunting

Juvenile 100%
Prime 100%

\[ y = -0.0004x + 0.5159 \]
\[ R^2 = 0.0012, P=0.66 \]
\[ y = -0.0011x + 0.5233 \]
\[ R^2 = 0.0114, P=0.37 \]

Layer 6 % Survivorship
Layer 7 % Survivorship

FUI

% MNI

Layer 6 (NISP=1408, MNE=458)
Layer 7 (NISP=1098, MNE=384)

NO Correlation
Full Representation
NO selective transport by hominins
Mean size of LMP sample > modern sample

Two adult size groups = sexual dimorphism

DFA suggests ratio: ~66% females
<table>
<thead>
<tr>
<th>Environment</th>
<th>% Male</th>
<th>% Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer Alpine Meadow</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Winter Forest</td>
<td>28</td>
<td>72</td>
</tr>
<tr>
<td>Ortvale Klde</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>LMP</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>EUP</td>
<td>33</td>
<td>67</td>
</tr>
</tbody>
</table>
Caucasian Tur Migration

**CURRENT MIGRATORY RANGE**

**WINTER**
- 800m
- Estrus/breeding late Nov–early Jan

**SUMMER**
- 4200m
- Maternal groups of 12
- Solitary males

**AGGREGATION**

**DISPERGAL**

**WINTER** (Oct–May)

**SUMMER** (May–Oct)

Births in May–June
Caucasian Tur Migration

OIS 3 MIGRATORY RANGE

WINTER (Oct–May)

Births in May–June

Summit

Summer (May–Oct)

Maternal groups of 12 Solitary males

Estrus/breeding late Nov–early Jan

4500
4000
3500
3000
2500
2000
1500
1000
500
0 masl

Ortvale Klde

CAUCASUS MOUNTAINS

3200m

3000m

sub-alpine zone

0
1000
2000
3000
4000
4500

masl

WINTER

800m
Cenomanian-Turonian Flint
Kazkhi Region, Imeretia

Local: \( \leq 25 \) km

\[ N = 22,051 \]

LMP: Full Reduction
99.6% total (<5000/m\(^3\))

Chikiani Obsidian, Lake Paravani,
Djavakheti Region

Non-local: \( \geq 100 \) km

LMP: Curated Tools
0.4% total (<15/m\(^3\))

Local/m\(^3\):Non-local/m\(^3\) = 236:1
**Flake n=1597  DORSAL SCAR PATTERNS  Core n=234**

\[ \chi^2 = 366.97, \text{ df} = 4, \ p \leq 0.001 \]

**Core Reduction**

*Récurent* unidirectional
Levallois

\[ \chi^2 = 357.26, \text{ df} = 13, \ p \leq 0.001 \]

**LENGTH INTERVALS (mm)**

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>Flake n=237</th>
<th>MLS n=237</th>
<th>Core n=254</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>6-10</td>
<td>15</td>
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</tr>
<tr>
<td>11-15</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>16-20</td>
<td>25</td>
<td>25</td>
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</tr>
<tr>
<td>21-25</td>
<td>30</td>
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<td>26-30</td>
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<td>31-35</td>
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<tr>
<td>36-40</td>
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<td>41-45</td>
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<tr>
<td>46-50</td>
<td>55</td>
<td>55</td>
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<tr>
<td>51-55</td>
<td>60</td>
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</tr>
<tr>
<td>56-60</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>&gt;65</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>

Mean: 18.8  | 40.9
Core Management Techniques

Débordants

Outrepassé

Flakes
Blank Production:

\[ X^2 = 36.55, \text{ df}=6, \ p \leq 0.001 \]

- **Faceted** \( n = 416 \)
- **Plain** \( n = 769 \)

Unidirectional elongated blanks
Statistical analyses indicate that typological forms are due to resharpening and recycling rather than intentional production.
RADIATING MOBILITY

WINTER (Oct–May) lower elevations

1. Neanderthal aggregation
2. Meat & fat procurement
3. Diet Breadth: Resource availability not specialization
4. Coordinated group hunts
5. Intimate knowledge of landscape & animal behavior
6. Provisioning of places & individuals
7. Full reduction sequences & intensive, repeated occupations

CAUCASUS MOUNTAINS

Ortvale Klde

BBC

raw material acquisition

ambush & butchery stations

floral resources?

OK
1. Neanderthal dispersal
2. Refocus foraging on plant resources?
3. >Diet Breadth: >resource availability
4. Lower prey encounter rates at lower elevations
5. High-quality lithic raw material at lower elevations only
6. Provisioning of mobile individuals & small groups
7. Abbreviated reduction sequences & ephemeral sites
The Late Mousterian of the Caucasus

Largely identical subsistence patterns (Capra & Bison) but regionally distinct lithic traditions

MEZMAISKAYA CAVE
LMP ~36 ka, EUP ~32 Ka
based on 3 AMS dates

ORTVALE KLDE
LMP 36.5 ka, EUP 34.5 Ka
based on 63 AMS, TL, & ESR dates

Non-Levallois
Eastern European Micoquian

Capra caucasica

Bison priscus

Levallois Scraper Industry
Regional Neanderthal Traditions

- Western Crimea
- Kabazi I & V
- Starosele
- Northern Caucasus
- Southern Caucasus
- Black Sea
- Mediterranean Sea
- Taurus-Zagros
- Euphrates
- Tigris
- Late Levantine Mousterian
- Mezmaiskaya
- Matuzka
- Barakaevskaya
- Il’skaya I & II
- Monasheskaya
- Ortvale Klde
- Djuchula Cave
- Bronze Cave
- Sakazhia Cave
- Karaïn
- Kunji
- Warwasi
- Shanidar
- Bisitun
- Amud
- Kebara
- Dederiyeh?
- Quneitra?
- Monasheskaya
- Mezmaiskaya
- Barakaevskaya
- Il’skaya I & II
- Monasheskaya
- Ortvale Klde
- Djuchula Cave
- Bronze Cave
- Sakazhia Cave
- Karaïn
- Kunji
- Warwasi
- Shanidar
- Bisitun
- Amud
- Kebara
- Dederiyeh?
- Quneitra?
The Middle–Upper Palaeolithic Boundary

- 27000 ± 260 AMS
- 30600 ± 160 AMS
- 33433 ± 249 AMS
- 34314 ± 447 AMS

- 36482 ± 517 AMS
Cenomanian-Turonian Flint
Kazkhi Region, Imeretia
Local: ≤ 25 km

N = 11,905

EUP: Full Reduction
93.3% total (<5200/m$^3$)

Chikiani Obsidian, Lake Paravani,
Djavakheti Region
Non-local: ≥ 100 km

EUP: Full Reduction
6.7% total (<370/m$^3$)

Local/m$^3$: Non-local/m$^3$ = 14:1
Ortvale Klde
Bone Tools
Layer 4

non-Aurignacian bone
and backed blade &
bladelet industries
Symbolic/Notational Behavior?
HUNTING ABILITIES DISTINGUISH MODERN HUMANS FROM NEANDERTHALS

TESTS:
species representation, mortality, sex ratios, life history characteristics

RESULTS:
1. Hunting abilities IDENTICAL
2. Change in hunting ≠ MP–UP transition
3. Hunting prowess ≠ proxy “modernity”
4. Hunting behavior = resource availability & landscape knowledge
ARTIFACT DIVERSITY & “SOPHISTICATION” DISTINGUISH MODERN HUMANS FROM NEANDERTHALS

TESTS:
core reduction, blank & tool production, use, recycling, & discard behaviors

RESULTS:
1. LMP–EUP techno-typological traditions DISTINCT
2. Sophisticated Technology ≠ Sophisticated Adaptation
3. Technological Sophistication ≠ proxy “modernity”
4. Techno-typological traditions = cultural preference
SOCIAL RELATIONSHIPS & INTERACTIONS DISTINGUISH MODERN HUMANS FROM NEANDERTHALS

TESTS:
raw material exploitation, mobility, land use

RESULTS:
1. LMP: <0.5% non-local raw materials (small, exhausted)
   - Small, local territories = less extensive mobility
   - Smaller social networks (100s km²)
2. EUP: >6% non-local raw materials (full reduction, >utility)
   - Large, regional territories = more extensive mobility
   - Larger social networks (1000s km²)
The Transition in the Caucasus

Late Neanderthal Refugia

MEZMAISKAYA CAVE
LMP ~36 ka; EUP ~32 ka

ORTVALE KLDE
LMP 36.5 ka; EUP 34.5 ka

BREACH OF TRADITIONAL BIOGEOGRAPHIC BARRIER
Geography of the Late Middle Palaeolithic

30/38

Lower Nile Valley Complex

30/28

Levalloiso-Mousterian

30/36

Chatelperronian

30

Levalloiso-Mousterian

34/30

Eastern Micoquian

29

Szeletian

30

Eastern Micoquian/para-Micoquian

30/36

Charentian

30

36

36.5

Taurus-Zagros

40

48/47

Late Levantine Mousterian

50/45

40

Tauride-Aurignacian

30

40

40

Levalloiso-Mousterian

40

40

40

Eastern Micoquian

44

44
MP–UP transition occurred 36.5–34.5 ka, during a period of global climatic decline not well expressed in the region.

NO temporal evidence for sympatry. Interactions occurred to the south or too brief to be detected.

Continuity in hunting practices & the acquisition & exploitation of biogeographic information.

Real but insignificant rifts in lithic technology due to cultural preference not adaptive function.

Dramatic rifts in land use & mobility, and group & social network size. EUP penetration of Caucasus Mountains and cultural continuity in north & south.
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