Coastal adaptations on the Western Cape

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Research Questions

• How did modern humans evolve?
• What role did coastal adaptations play?
• What do we know about MSA & LSA coastal adaptations?

Hypotheses

• Parkington‘s seafood model
• Marean‘s Pinnacle Point refugium model
Coastal Adaptations

Earliest evidence: „shell middens“ MSA South Africa (beginning ~164 ka?)

How do we define shell middens?

© ROCEEH-Database
Stratigraphy 2011

Photo: M. Malina
“Shell midden” or a picnic on the beach
### Shellfish calories and densities

<table>
<thead>
<tr>
<th>Layer</th>
<th>PAT (kg)</th>
<th>PAT* (kcal)</th>
<th>CM (kg)</th>
<th>CM* (kcal)</th>
<th>Total (kg)</th>
<th>Total* (kcal)</th>
<th>% PAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH I</td>
<td>5.6</td>
<td>4760</td>
<td>2.5</td>
<td>900</td>
<td>8.1</td>
<td>5660</td>
<td>69%</td>
</tr>
<tr>
<td>AH II</td>
<td>2.2</td>
<td>1870</td>
<td>0.7</td>
<td>252</td>
<td>2.9</td>
<td>2122</td>
<td>76%</td>
</tr>
<tr>
<td>AH III</td>
<td>5.5</td>
<td>4675</td>
<td>0.8</td>
<td>288</td>
<td>6.3</td>
<td>4963</td>
<td>87%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13.3</td>
<td>11,305</td>
<td>4</td>
<td>1440</td>
<td>17.3</td>
<td>12,745</td>
<td>77%</td>
</tr>
</tbody>
</table>

**Cymbula granatina**

**Choromytilus meridionalis**
### HDP1 Limpet sizes

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid n</td>
<td>60</td>
</tr>
<tr>
<td>Mean</td>
<td>69.8 mm</td>
</tr>
<tr>
<td>Median</td>
<td>71.2 mm</td>
</tr>
<tr>
<td>Maximum</td>
<td>84.6 mm</td>
</tr>
<tr>
<td>minimum</td>
<td>43.6 mm</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>8.0 mm</td>
</tr>
</tbody>
</table>

Data by K. Kyriacou

Conform to the typical MSA pattern

Shellfish dimensions

Avery et al. 2008

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**LSA 11 - 0.7 ka**

<table>
<thead>
<tr>
<th>Site</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>BKB</td>
<td>27</td>
<td>76.00</td>
<td>87.00</td>
</tr>
<tr>
<td>CST</td>
<td>38</td>
<td>77.00</td>
<td>89.00</td>
</tr>
<tr>
<td>NWB</td>
<td>35</td>
<td>70.00</td>
<td>91.00</td>
</tr>
<tr>
<td>SBFEB</td>
<td>435</td>
<td>63.53</td>
<td>83.63</td>
</tr>
</tbody>
</table>

**MSA >= 45 ka**

<table>
<thead>
<tr>
<th>Site</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>BKG</td>
<td>199</td>
<td>47.62</td>
<td>79.59</td>
</tr>
<tr>
<td>HDP3</td>
<td>29</td>
<td>41.41</td>
<td>77.12</td>
</tr>
<tr>
<td>SH</td>
<td>114</td>
<td>32.77</td>
<td>93.60</td>
</tr>
<tr>
<td>YFT1</td>
<td>21</td>
<td>51.47</td>
<td>83.22</td>
</tr>
<tr>
<td>YFT1</td>
<td>22</td>
<td>57.18</td>
<td>82.59</td>
</tr>
<tr>
<td>YFT1</td>
<td>53</td>
<td>57.19</td>
<td>81.63</td>
</tr>
<tr>
<td>YFT1</td>
<td>46</td>
<td>52.31</td>
<td>81.11</td>
</tr>
<tr>
<td>YFT1</td>
<td>27</td>
<td>50.43</td>
<td>84.01</td>
</tr>
<tr>
<td>YFT1</td>
<td>40</td>
<td>47.31</td>
<td>79.13</td>
</tr>
<tr>
<td>YFT1</td>
<td>82</td>
<td>44.40</td>
<td>86.26</td>
</tr>
<tr>
<td>YFT1</td>
<td>5</td>
<td>68.77</td>
<td>78.28</td>
</tr>
<tr>
<td>YFT1</td>
<td>33</td>
<td>53.69</td>
<td>80.08</td>
</tr>
<tr>
<td>YFT1</td>
<td>43</td>
<td>54.52</td>
<td>85.99</td>
</tr>
<tr>
<td>YFT1</td>
<td>20</td>
<td>50.61</td>
<td>88.97</td>
</tr>
<tr>
<td>YFT1</td>
<td>24</td>
<td>54.77</td>
<td>81.34</td>
</tr>
<tr>
<td>YFT1</td>
<td>42</td>
<td>52.10</td>
<td>82.79</td>
</tr>
</tbody>
</table>

HDP1 (2011)
Klasies River Mouth / variable at time high densities

Photos S. Mentzer & C. Miller
Shell Middens?

Clast supported shell middens are rare in the MSA and much more common in the LSA.

<table>
<thead>
<tr>
<th>Site</th>
<th>Density (kg/m³)</th>
<th>Chronology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinnacle Point 13B</td>
<td>0.01 - 9</td>
<td>MIS 6 – 5c</td>
</tr>
<tr>
<td>Hoedjiespunt 1</td>
<td>11 - 13</td>
<td>MIS 5e</td>
</tr>
<tr>
<td>Klasies River</td>
<td>0.3 – 163</td>
<td>MIS 5d - 3</td>
</tr>
<tr>
<td>Blombos Cave</td>
<td>&lt;10 – 164</td>
<td>MIS 5e – 5a</td>
</tr>
<tr>
<td>Elands Bay</td>
<td>289 – 302</td>
<td>LSA</td>
</tr>
</tbody>
</table>
Anyskop Blowout
Langebaanweg
Geelbek Dunes
West Coast National Park
5 km
Hoedjiespunt
Elandsfontein
Ysterfontein
Geelbek Dunes
Anyskop Blowout
118,000 m²

Geelbek Dunes
Anyskop Blowout
GEELBEK DUNES & DUNE MIGRATION
Geelbek Geological setting
Letting nature do the digging...
Geelbek Chronostratigraphy

3 sand units
5 - 6 ka BP
10 - 11 ka BP
Undated

3 calcrete units
65 ka BP / 125 – 150 ka BP / 225 – 250 ka BP
Dune migration

1998

Stella
2001

Stella
Dune movement samples complete landscape

Total surface area sampled at Geelbek > 118,000 m²

Stella 8.5 m/yr
GOME B: Feb. 2000, compact brown sand
GOME A: loose dune sand

>1.6 m deflation in 2 years!
23 localities

- LSA (n=8)
- LSA and MSA (n=15)
- ESA (n=0)

118,000 m²

Geelbek Dunes
23 localities

- LSA (n=8)
- LSA and MSA (n=15)
- ESA (n=0)

118,000 m²

Geelbek Dunes
Geelbek
Geelbek, calibrated radiocarbon dates, the last 4000 years

**Human bones:**
- Hetero 1450 – 1620 AD  low marine component to diet
- Homo  900 – 1030 AD   moderate marine component to diet
- Loop  40 BC -60 AD    extremely high marine component to diet

**Cattle**
- Alice  1700 – 1930 AD
- Check  250 – 380 AD

**Sheep/Goat**
- Ovis  modern
49 stone features

• hearths for cooking
• whale blubber rendering
• work spaces
• living areas
LOCALITY: *Toaster*

March 2001

Scatters 10, 11, & 12

Burned calcrete / Stone hearths
Coastal resources
Whale scavenging (~2500 BP)

- Whale barnacles
- Shells
- Ret. shells
- Lithics
- Beads
- Calcrete

Map showing the locations of various artifacts related to whale scavenging.
Marine resources

Buchanan (1988)

- Humpback whale: 650kJ / 100 g
- Average mass = 30,000 kg
- 40% usable nutritionally
- 78 M kJ ~ 19 M cal

> 34,000 Big Macs

2nd case in locality Nora (~2600 BP)
LSA spatial organization (~2500 BP)

- Shells
- Retouched shells
- Lithics
- Beads
- Calcrete
Locality SHELLY - caloric budget

Buchanan (1988)

- Black mussels: 150kJ / 100 g shell
- Limpets: 350kJ / 100 g shell
- Total shell weight = 4.6 kg ~ 8360 kJ ~ 2000 cal

= 4 Big Macs
Stages of bead production (1-12)
OES bead manufacture

**Shelly**

**Pottery**

**Nora**

**Toaster**

<table>
<thead>
<tr>
<th>LOCALITY</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nora</td>
<td>2,580 BP</td>
</tr>
<tr>
<td>Pottery</td>
<td>2,500 BP</td>
</tr>
<tr>
<td>Shelly</td>
<td>2,465 BP</td>
</tr>
<tr>
<td>Toaster</td>
<td>1,260 BP</td>
</tr>
</tbody>
</table>
Bead making
(~2500 BP)

- Ceramic
- Shells
- Ret. shells
- Lithics
- Beads
- Calcrete

Ceramics
(<2000 BP)
Stone Ring
Many ground stone tools
Localities: *Equus, Homo, Pottery and Shelly*
Bone tools

Localities:
- HO 136
- CR 917, CR 942, CR 943
- SH 858.15
- CR 914, CR 915, CR 916

Locality: “CROW”

Locality:
- Crow 1420 AD
Settlement Patterns in the Holocene LSA

- Higher find densities than during the MSA reflect longer occupations and higher population densities.
- Adaptable and varied subsistence strategies with marine and terrestrial resources.
- Diverse material culture.
- Symbolic artifacts common.
- Human burials.
Elephant Hunting
Late 18th C
8 bullets, 2 clay pipes, 1 gunflint, 1 iron hook
Conclusion Geelbek & Anyskop

- Entire landscape provides important archaeological data

- Greatest strength: large surfaces expose new kinds of sites

- Greatest weakness: difficulty in establishing chronological control