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THE ROLE
OF CULTURE
IN EARLY
EXPANSIONS
OF HUMANS

SENCKENBERG
world of biodiversity

Coastal adaptations on the Western Cape

Nicholas Conard

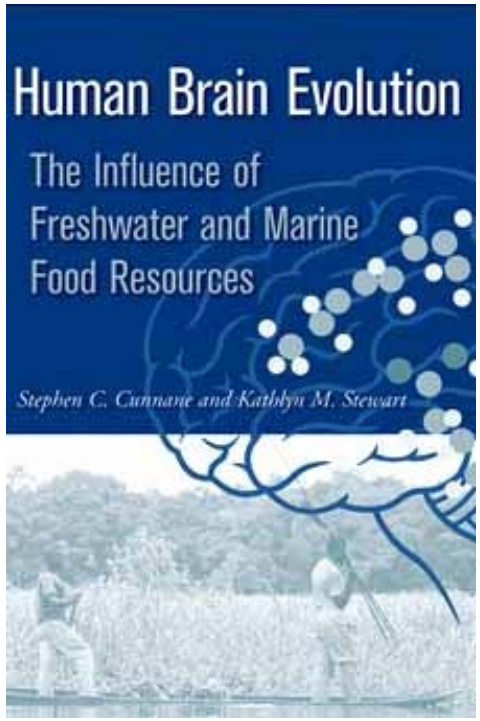
Tübingen

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

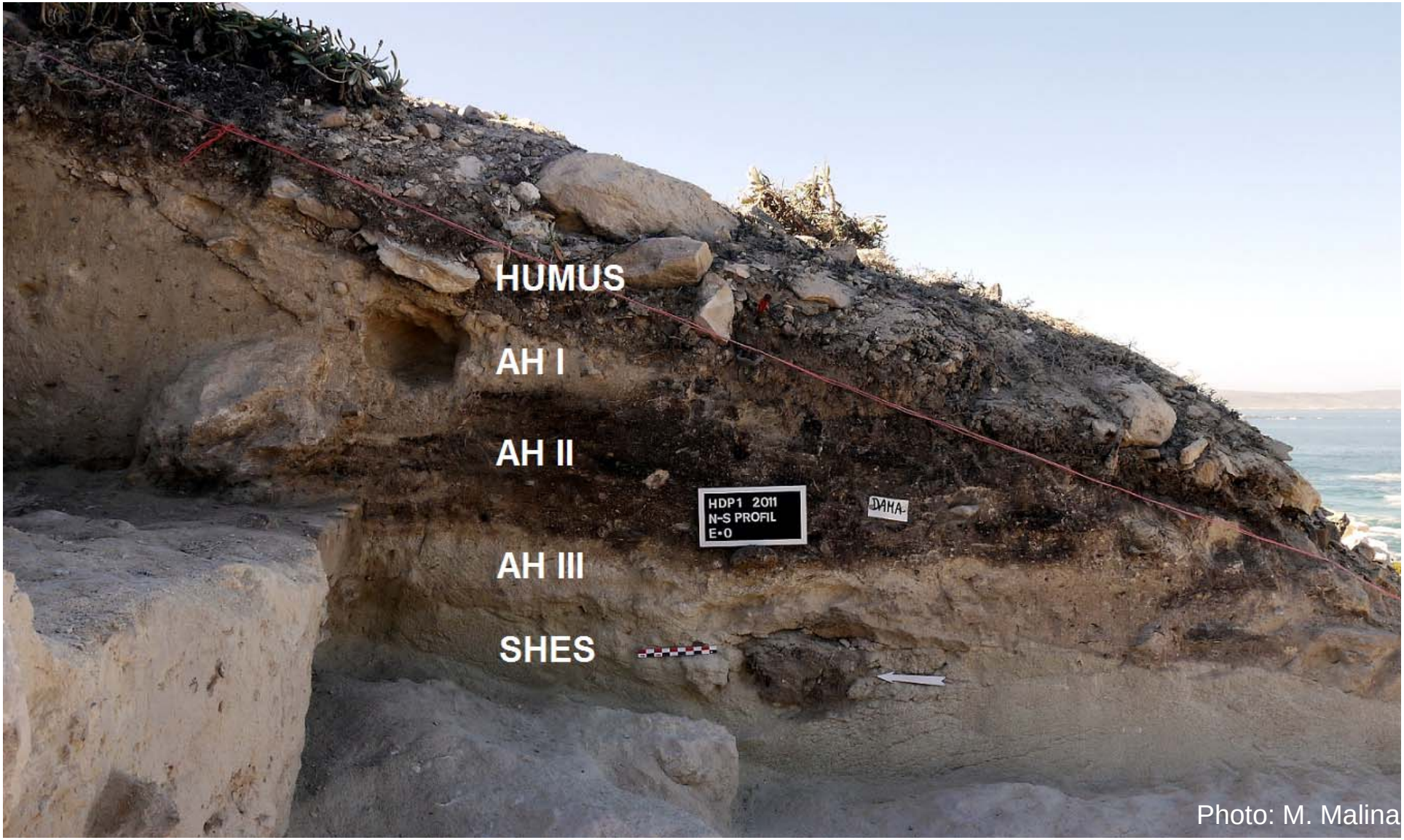


Cunnane & Stewart (Eds.) 2010

Coastal Adaptations

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

How do we define shell middens?



Stratigraphy 2011

“Shell midden“ or
a picnic on the beach

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

Cymbula granatina

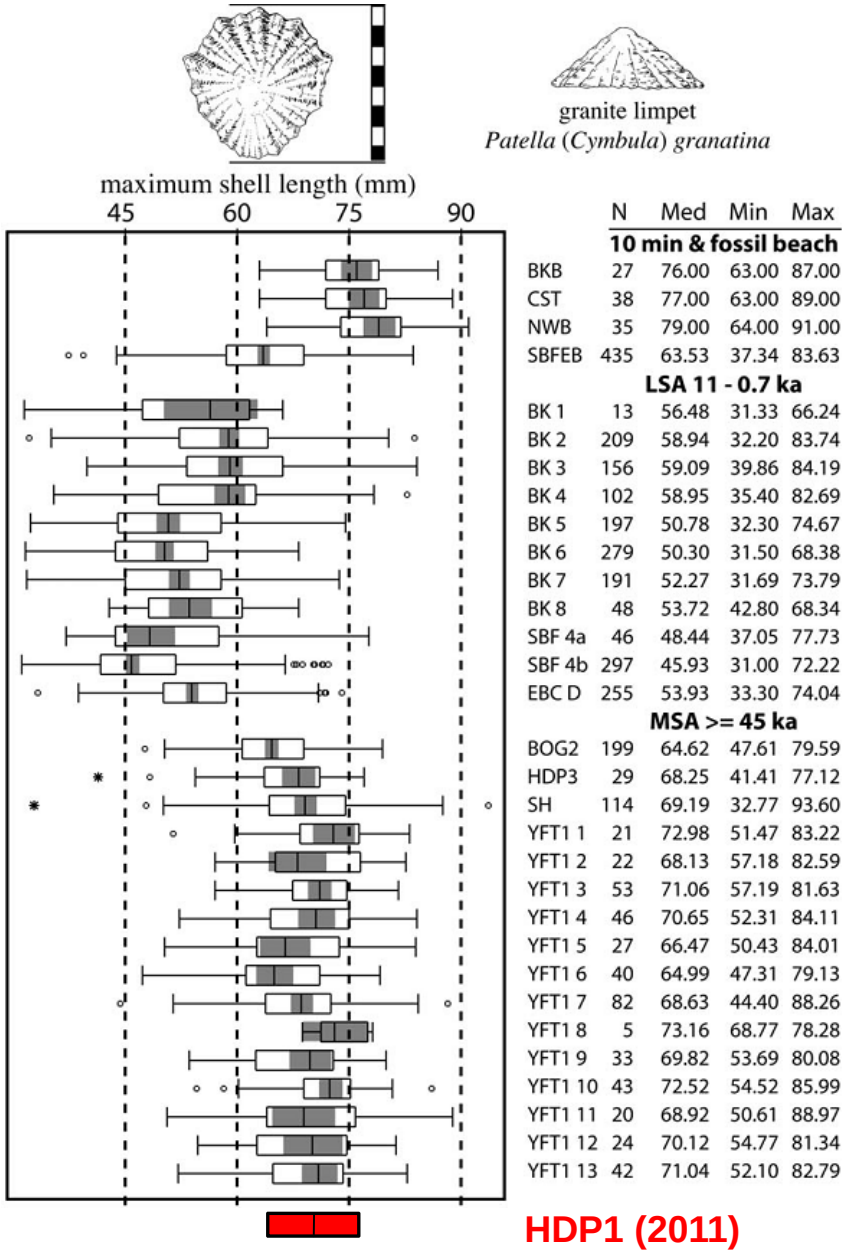
Choromytilus meridionalis

Shellfish calories and densities

HDP1 Limpet sizes	
Valid *n*	60
Mean	69.8 mm
Median	71.2 mm
Maximum	84.6 mm
minimum	43.6 mm
Standard deviation	8.0 mm

Data by K. Kyriacou

Conform to the typical MSA pattern

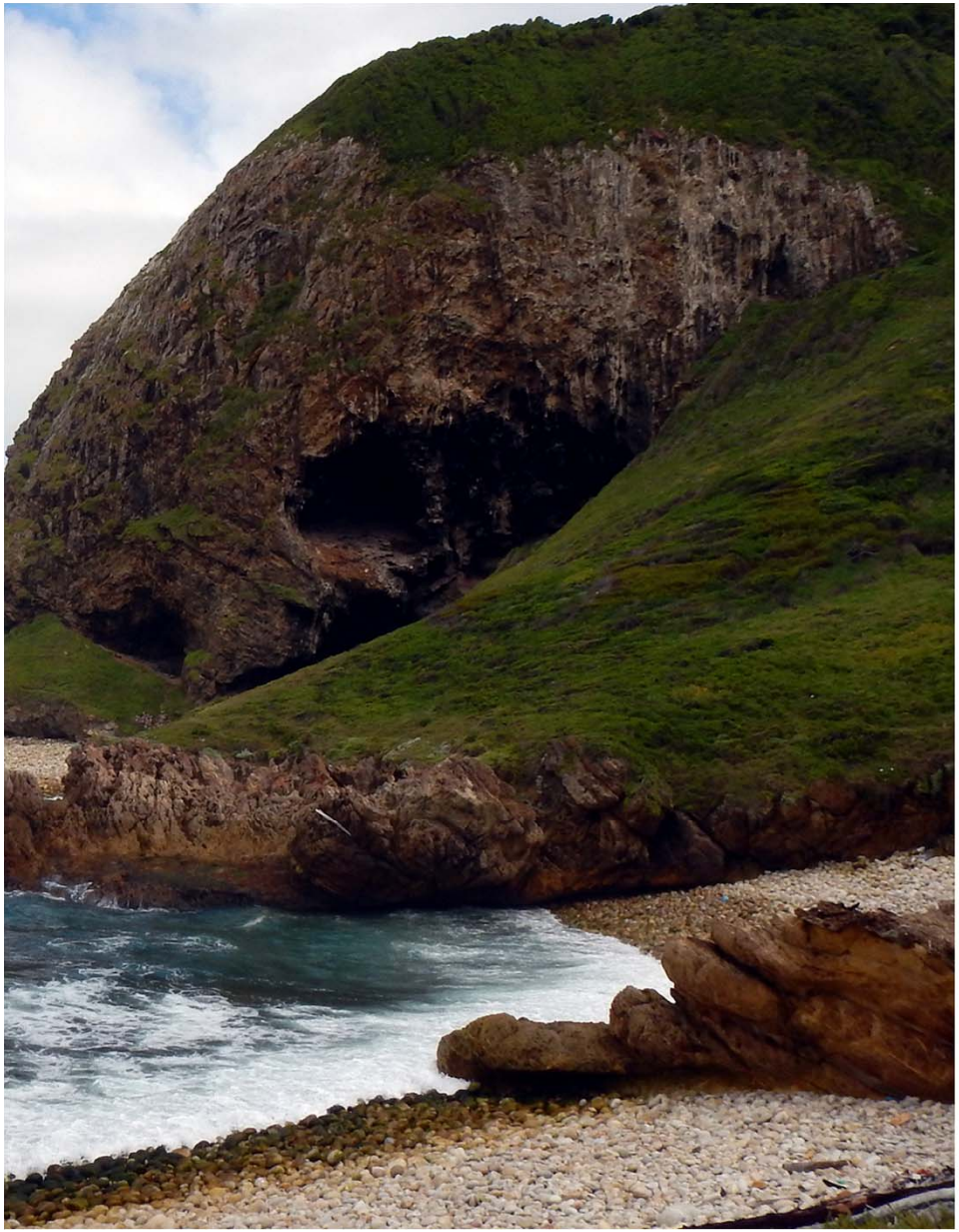


	N	Med	Min	Max
10 min & fossil beach				
BKB	27	76.00	63.00	87.00
CST	38	77.00	63.00	89.00
NWB	35	79.00	64.00	91.00
SBFEB	435	63.53	37.34	83.63
LSA 11 - 0.7 ka				
BK 1	13	56.48	31.33	66.24
BK 2	209	58.94	32.20	83.74
BK 3	156	59.09	39.86	84.19
BK 4	102	58.95	35.40	82.69
BK 5	197	50.78	32.30	74.67
BK 6	279	50.30	31.50	68.38
BK 7	191	52.27	31.69	73.79
BK 8	48	53.72	42.80	68.34
SBF 4a	46	48.44	37.05	77.73
SBF 4b	297	45.93	31.00	72.22
EBC D	255	53.93	33.30	74.04
MSA >= 45 ka				
BOG2	199	64.62	47.61	79.59
HDP3	29	68.25	41.41	77.12
SH	114	69.19	32.77	93.60
YFT1 1	21	72.98	51.47	83.22
YFT1 2	22	68.13	57.18	82.59
YFT1 3	53	71.06	57.19	81.63
YFT1 4	46	70.65	52.31	84.11
YFT1 5	27	66.47	50.43	84.01
YFT1 6	40	64.99	47.31	79.13
YFT1 7	82	68.63	44.40	88.26
YFT1 8	5	73.16	68.77	78.28
YFT1 9	33	69.82	53.69	80.08
YFT1 10	43	72.52	54.52	85.99
YFT1 11	20	68.92	50.61	88.97
YFT1 12	24	70.12	54.77	81.34
YFT1 13	42	71.04	52.10	82.79

HDP1 (2011)

Avery et al. 2008

Shellfish dimensions



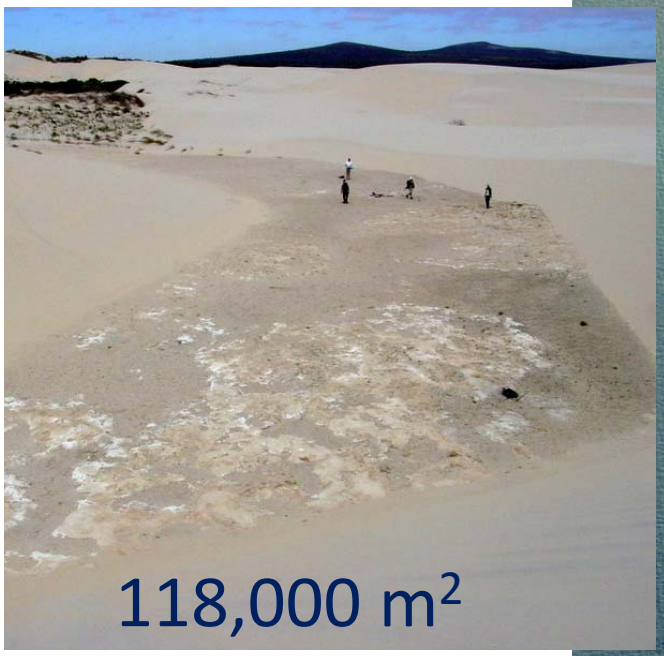
Photos S. Mentzer & C. Miller

Klasies River Mouth / variable at time high densities

Site	**Density (kg/m³)**	Chronology
Pinnacle Point 13B	0.01 - 9	MIS 6 – 5c
Hoedjiespunt 1	11 - 13	MIS 5e
Klasies River	0.3 – 163	MIS 5d - 3
Blombos Cave	<10 – 164	MIS 5e – 5a
Elands Bay	289 – 302	LSA

Shell Middens ?

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

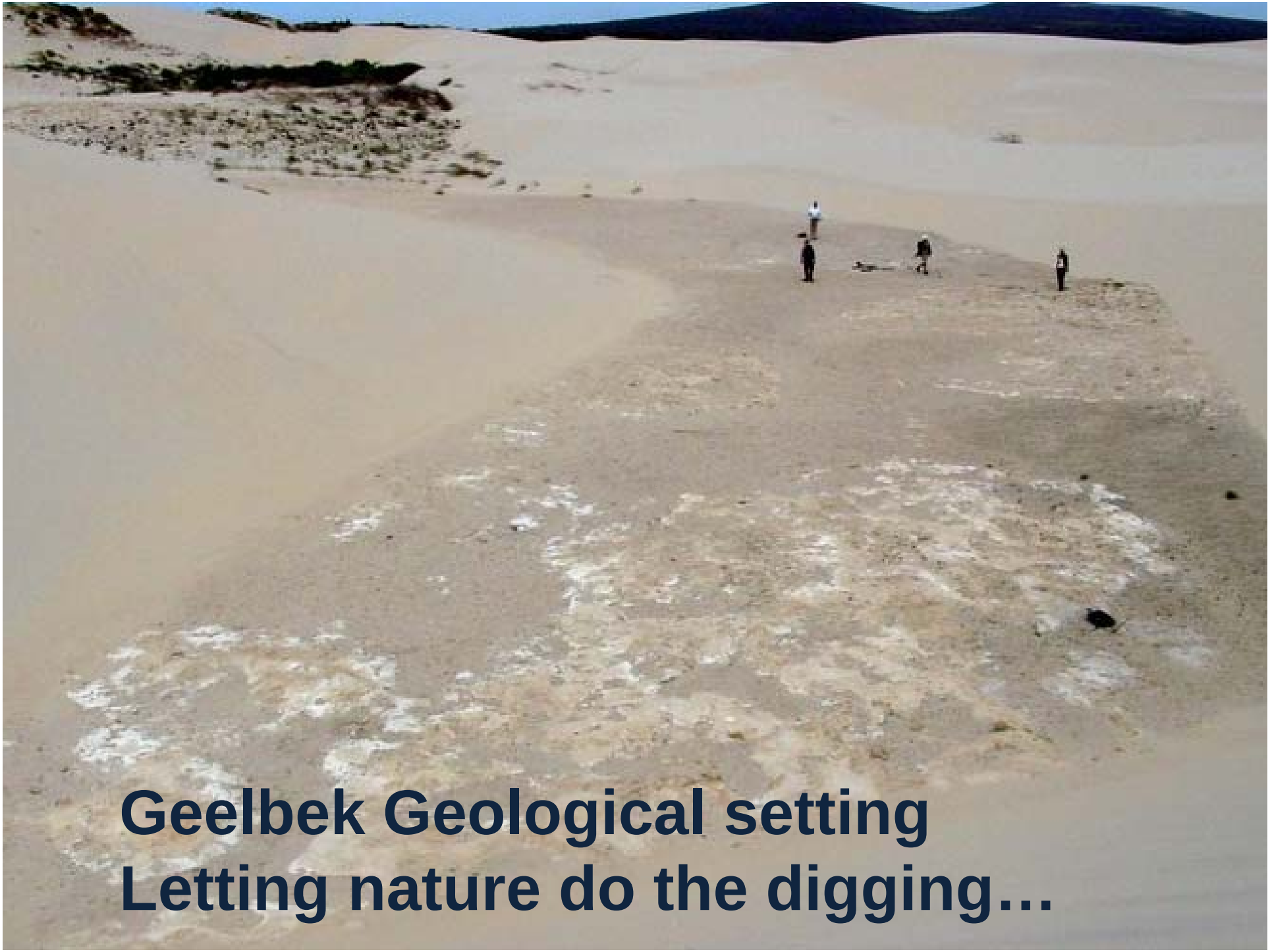


Geelbek Dunes

Anyskop Blowout

1998 – 2002 (2007)

GEELBEK DUNES & DUNE MIGRATION



Geelbek Geological setting
Letting nature do the digging…

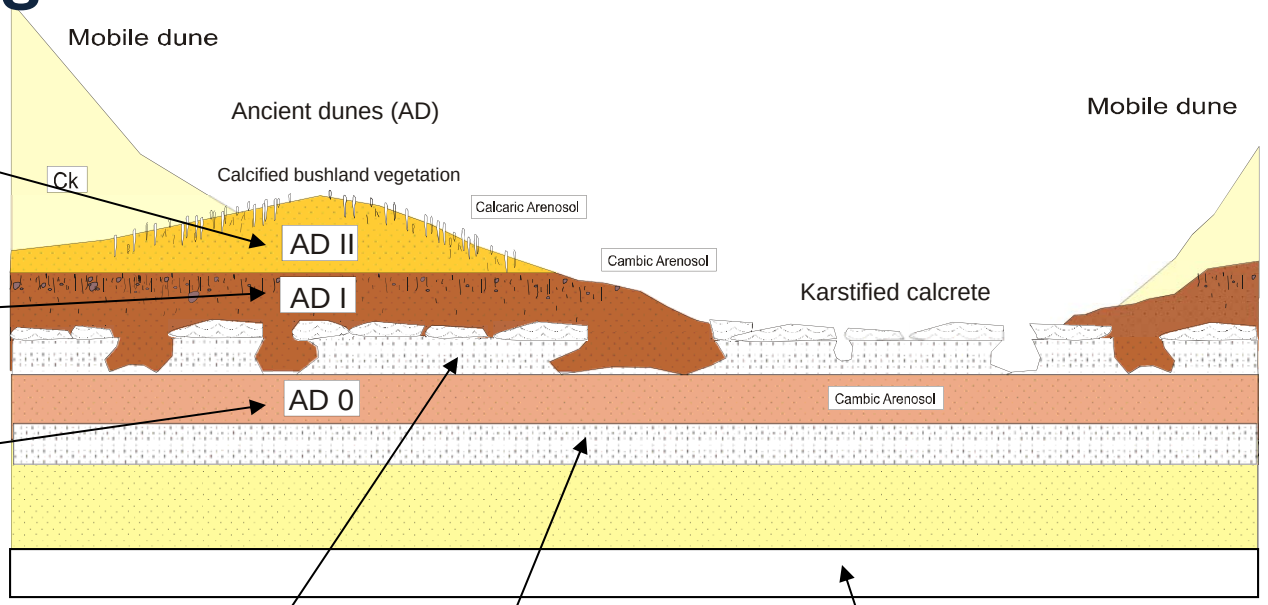
Geelbek Chronostratigraphy

3 sand units

5 - 6 ka BP

10 - 11 ka BP

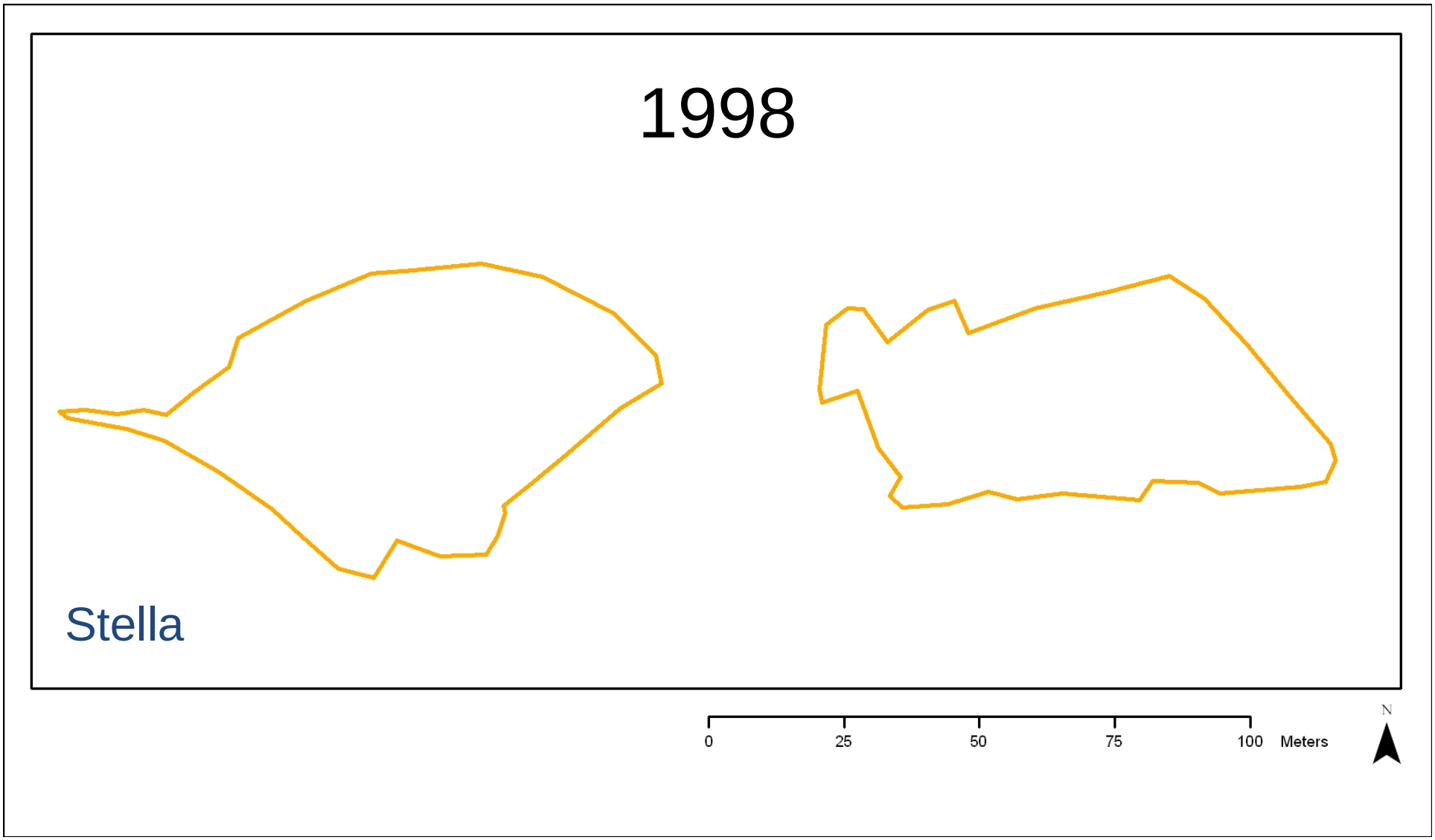
Undated

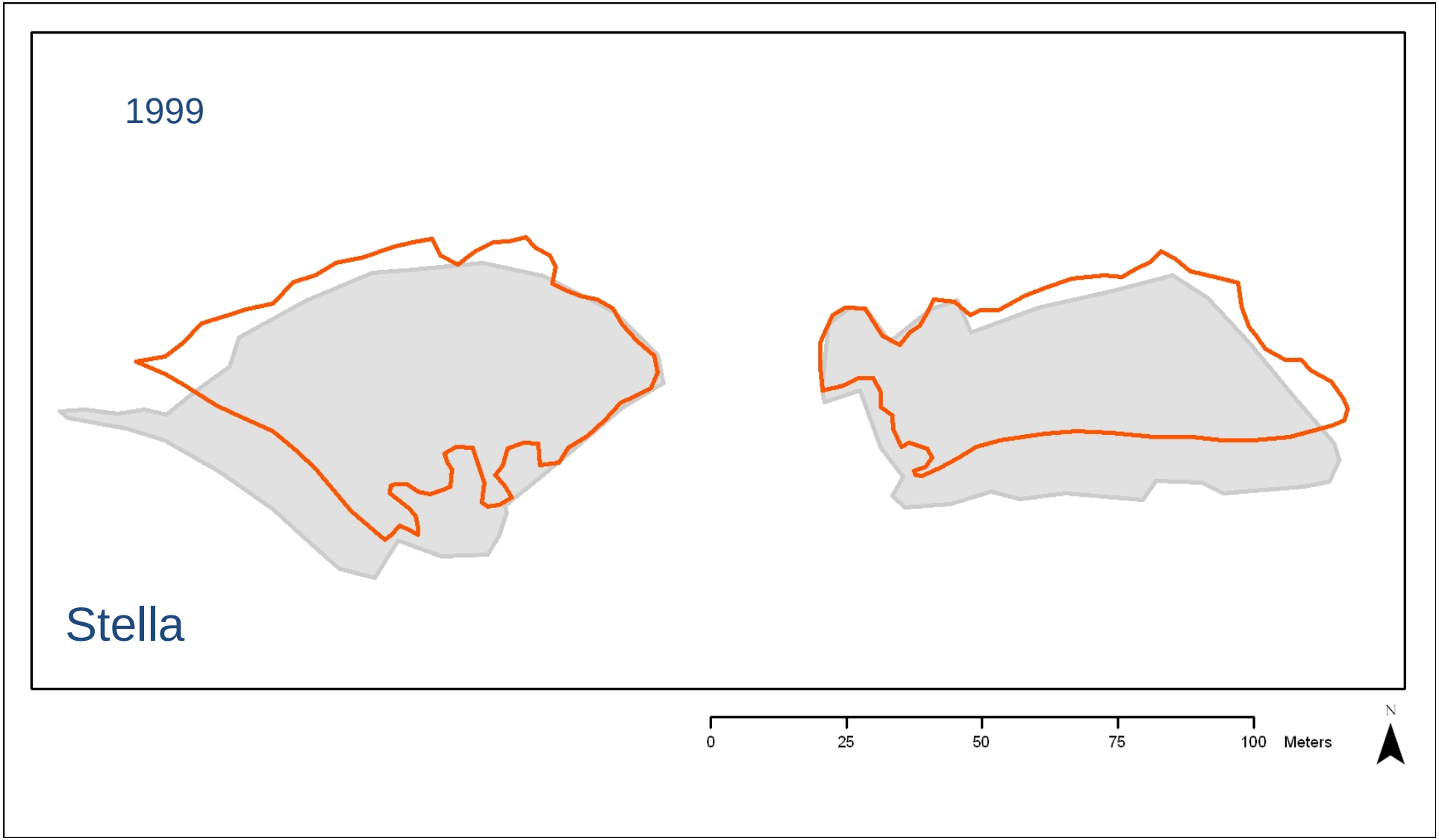


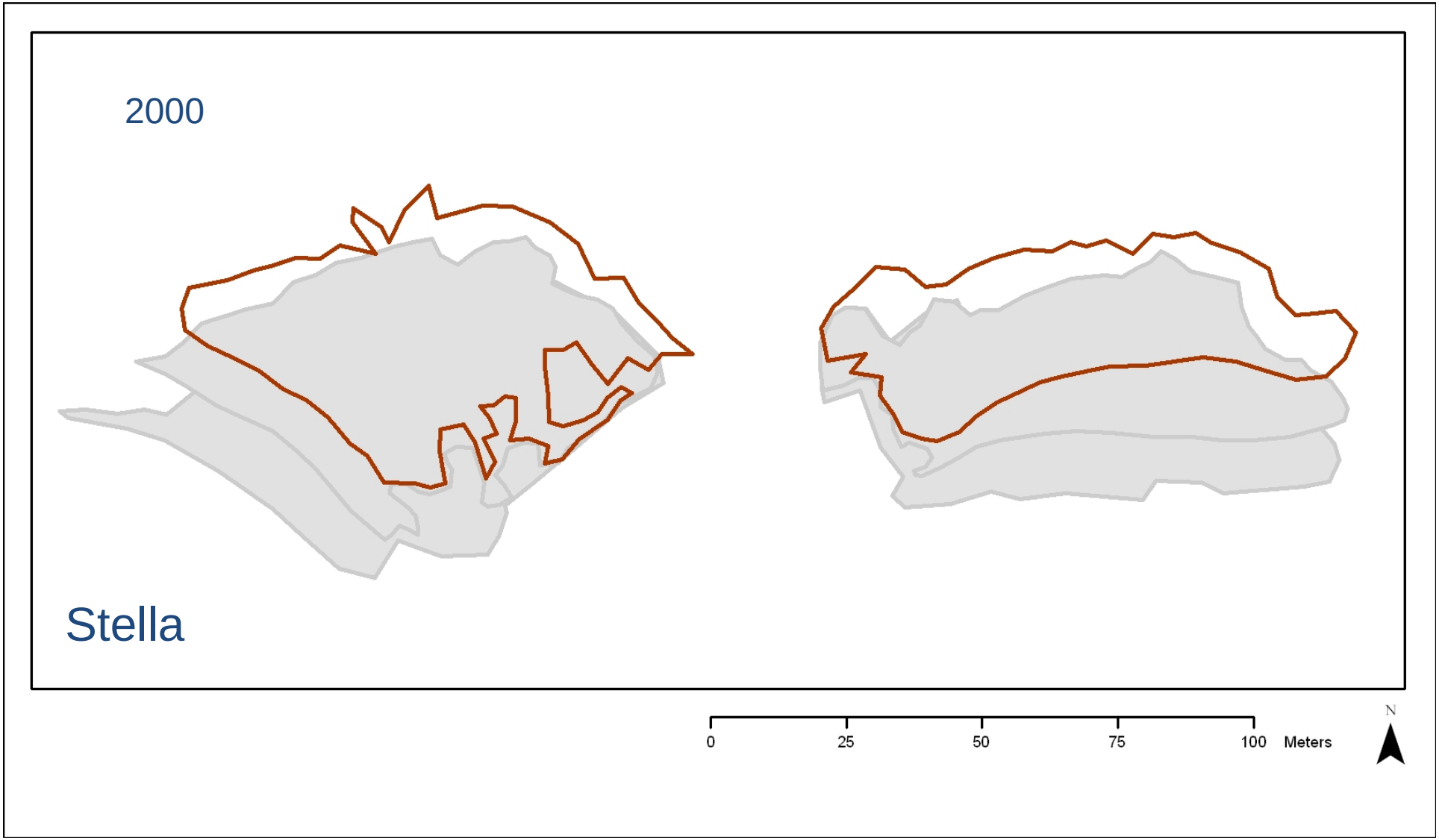
3 calcrete units

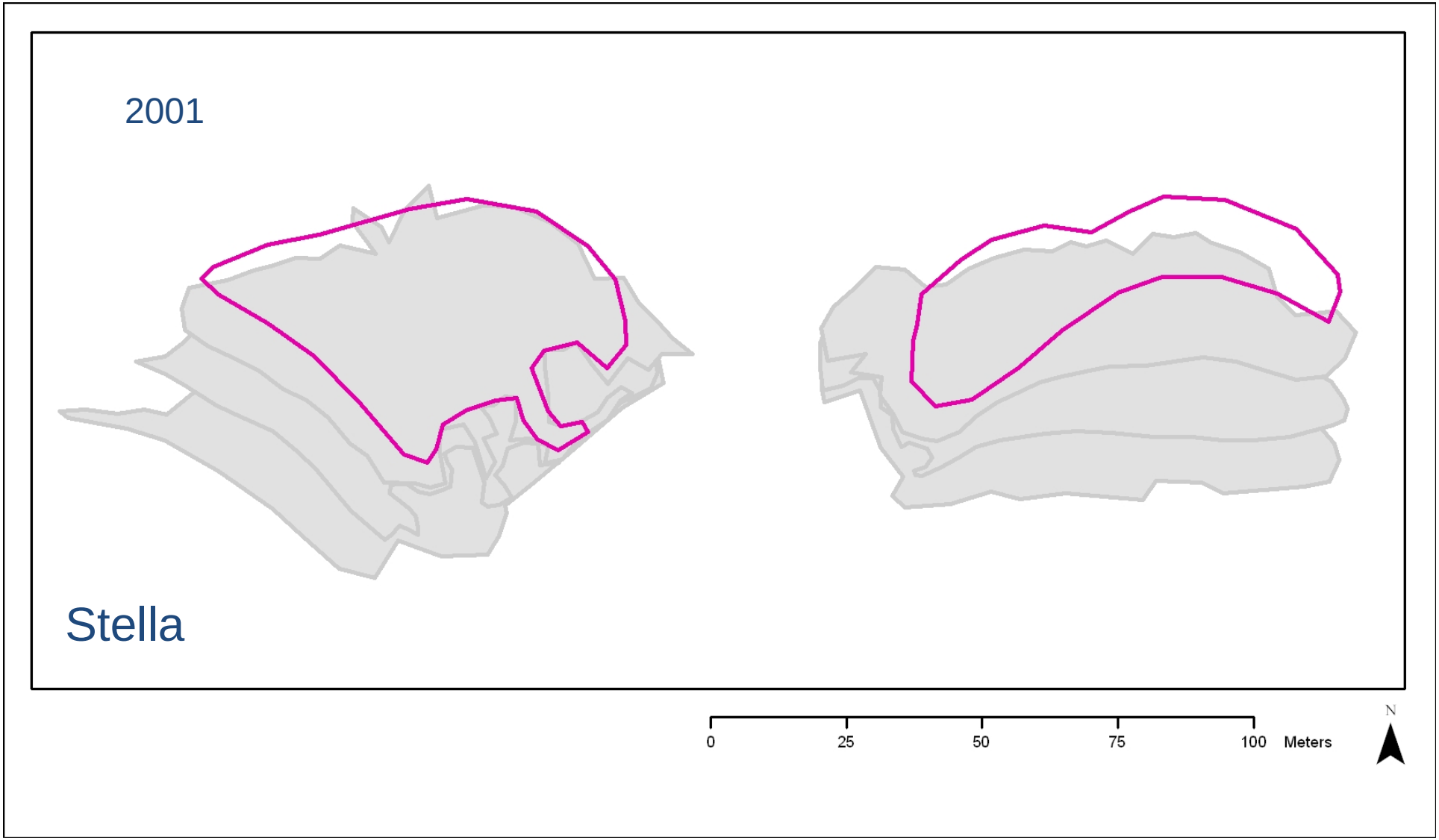
65 ka BP / 125 – 150 ka BP / 225 – 250 ka BP

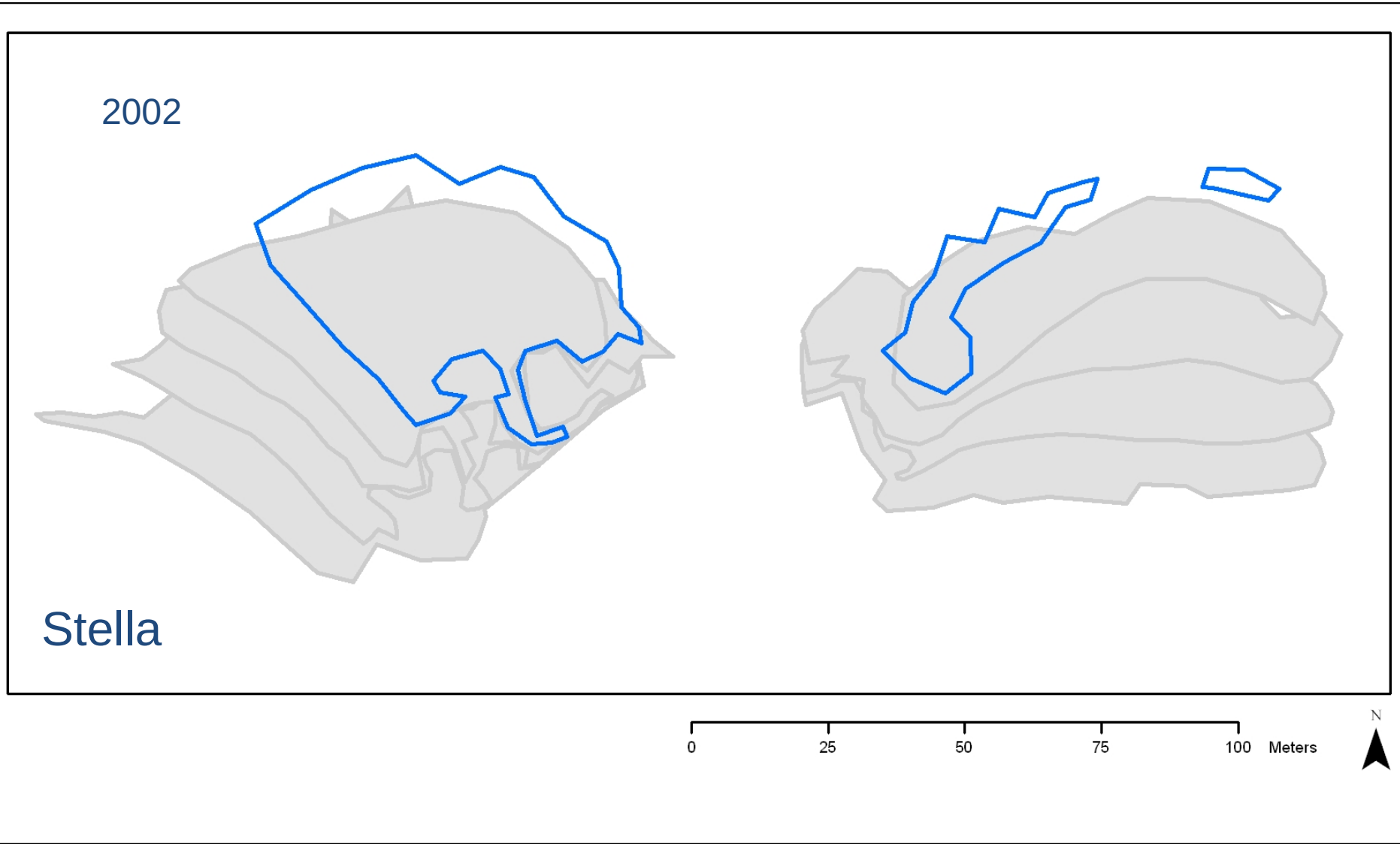
Dune migration



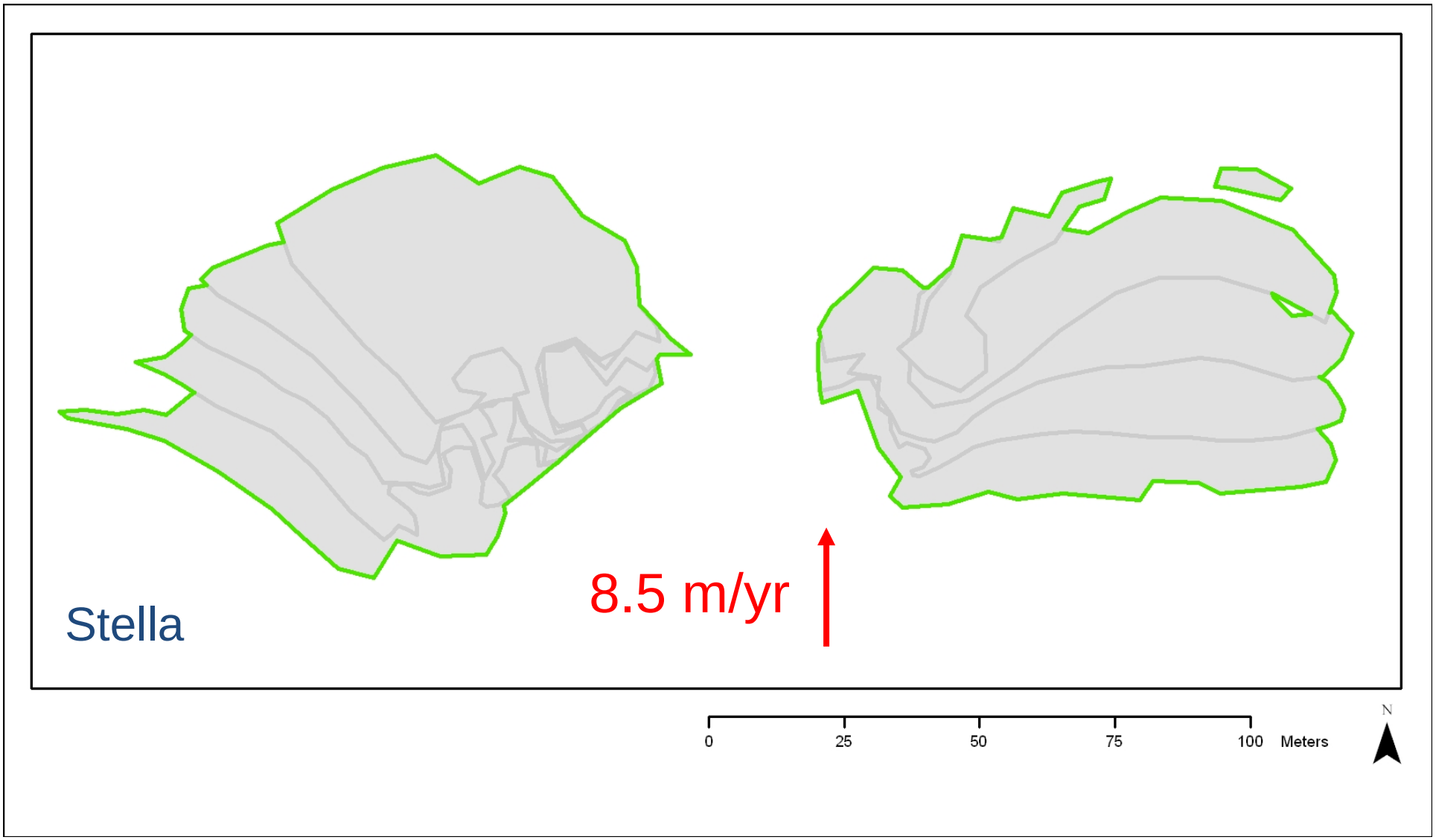

1999
Stella
0
25
50
75
100
Meters
N


2000
Stella
0
25
50
75
100
Meters
N


2001
Stella
0
25
50
75
100
Meters
N

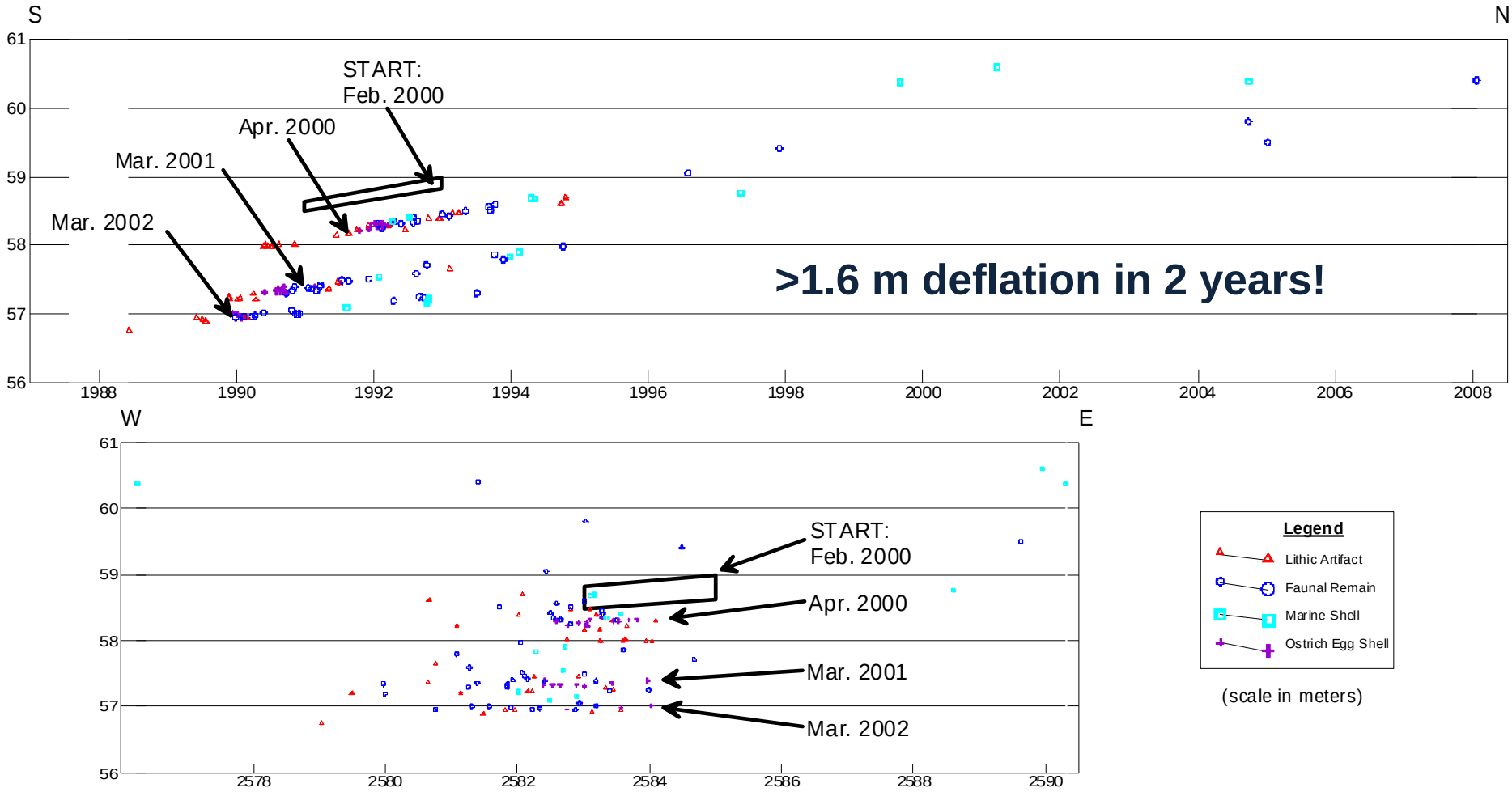

2002
Stella
0
25
50
75
100
Meters
N

Dune movement samples complete landscape



Total surface area sampled at Geelbek > 118,000 m²

GOME B: Feb. 2000, compact brown sand



GOME A: loose dune sand

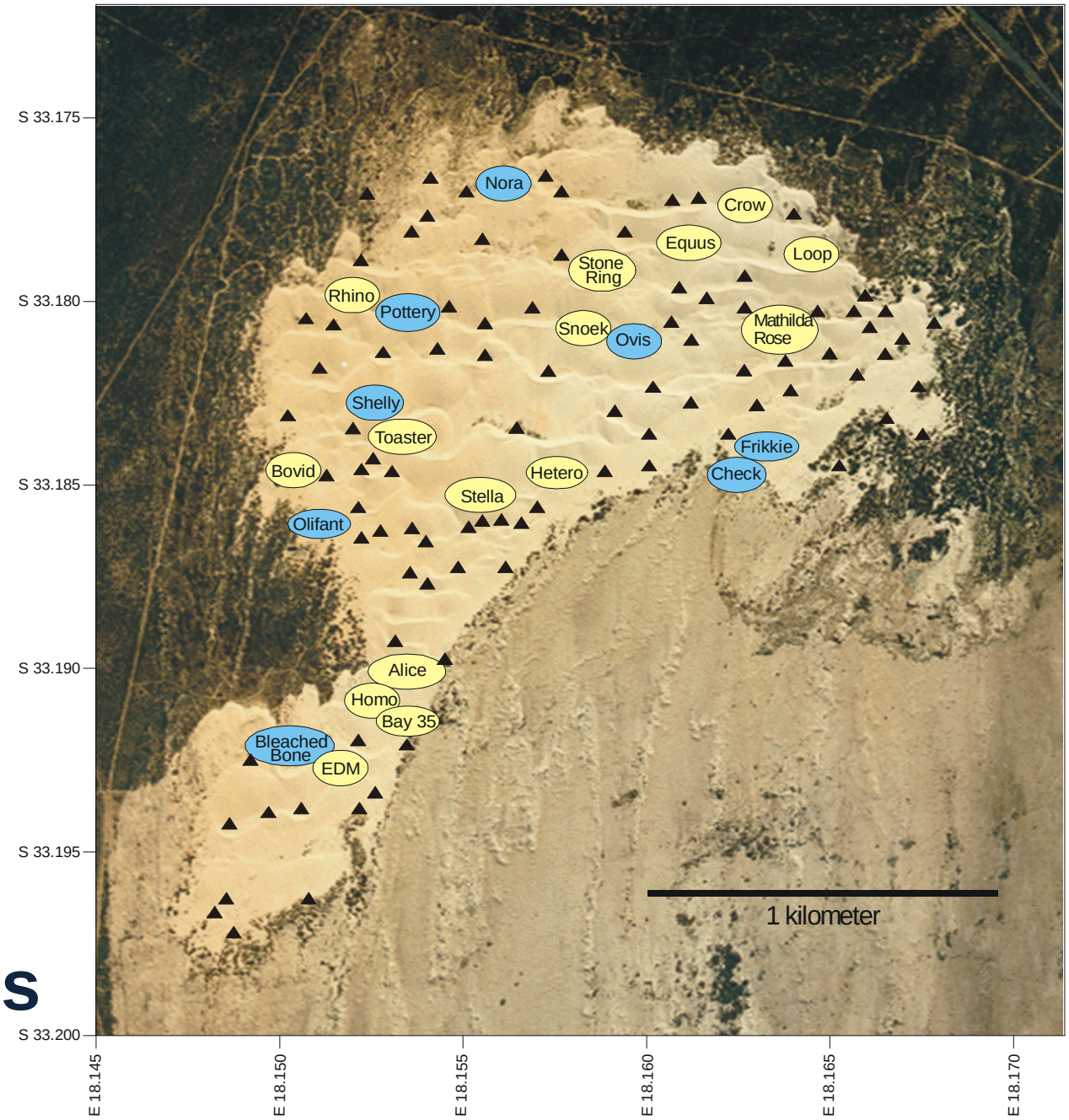
23 localities

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

ESA (n=0)

118,000 m²

Geelbek Dunes



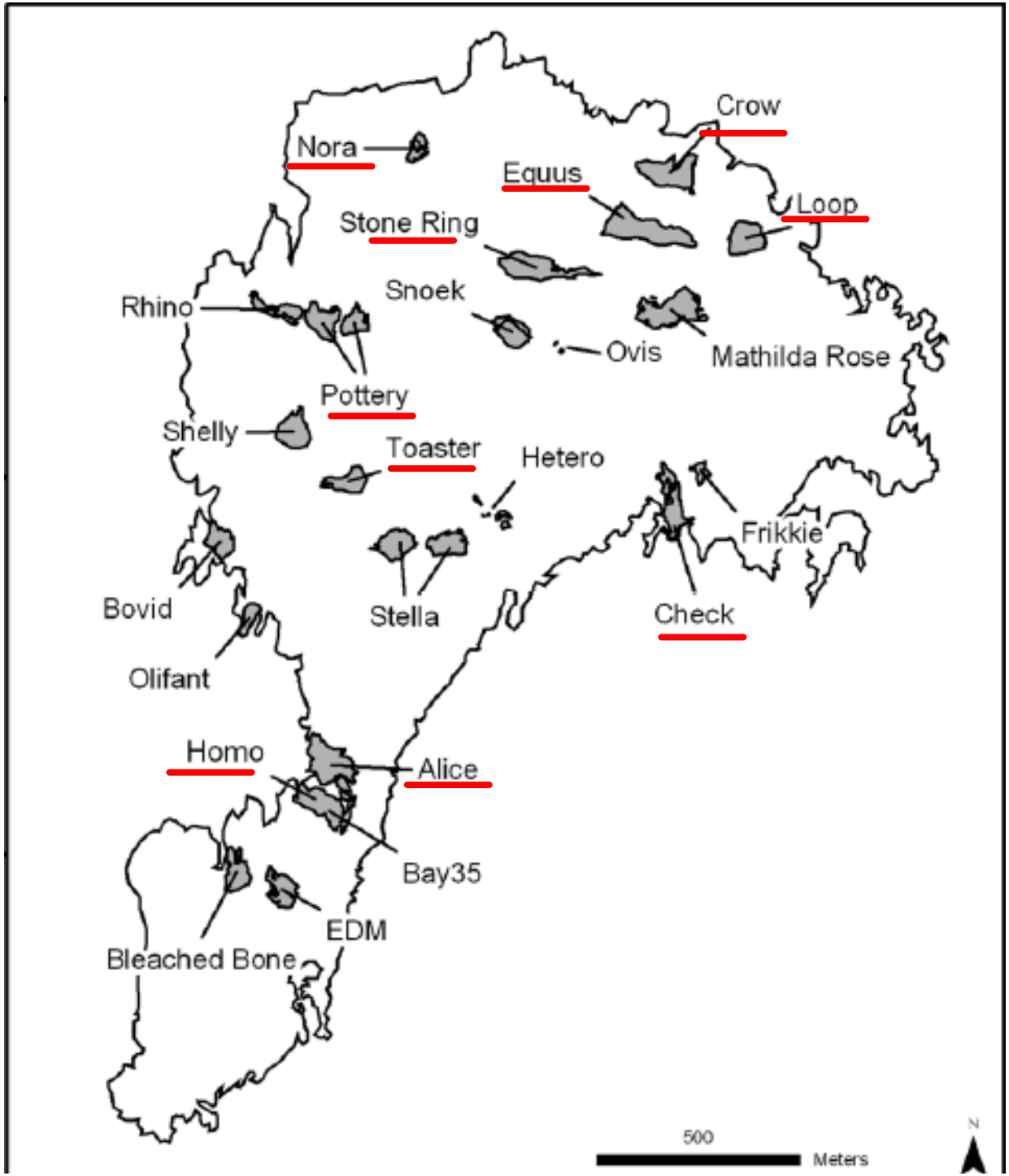
23 localities

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

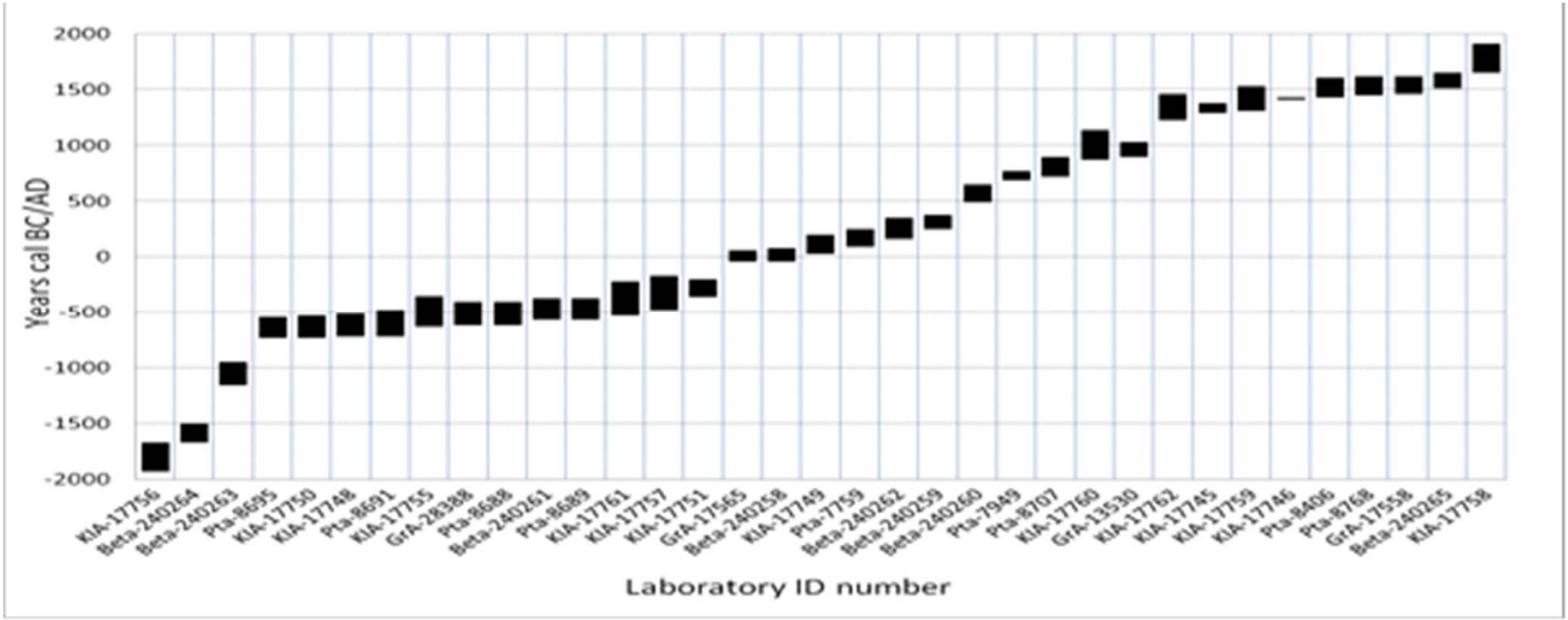
ESA (n=0)

118,000 m²

Geelbek Dunes



Geelbek



Human bones:

Hetero 1450 – 1620 AD low marine component to diet
Homo 900 – 1030 AD moderate marine compenent 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

Geelbek, calibrated radiocarbon dates, the last 4000 years

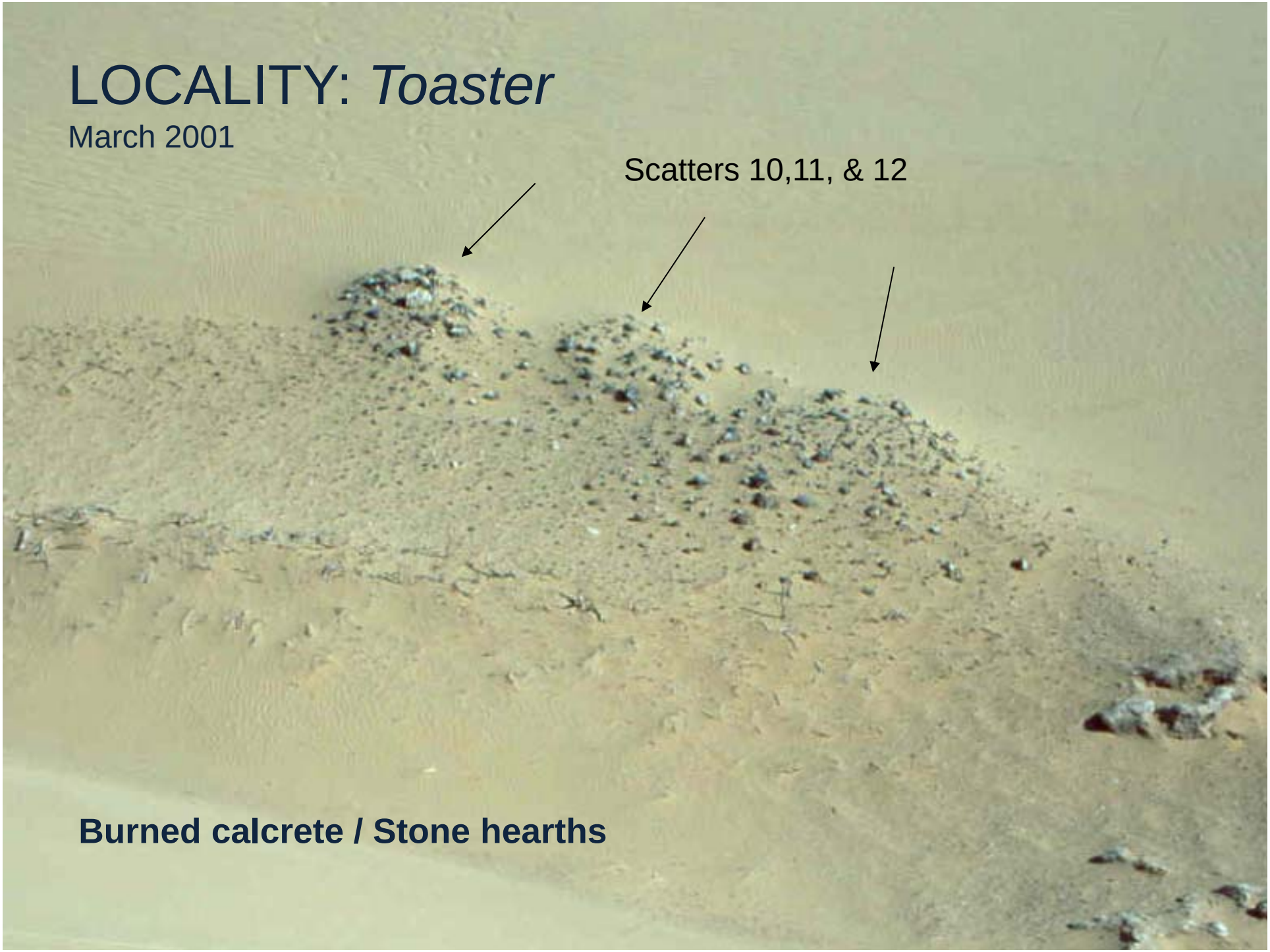
Stone features

49 stone features

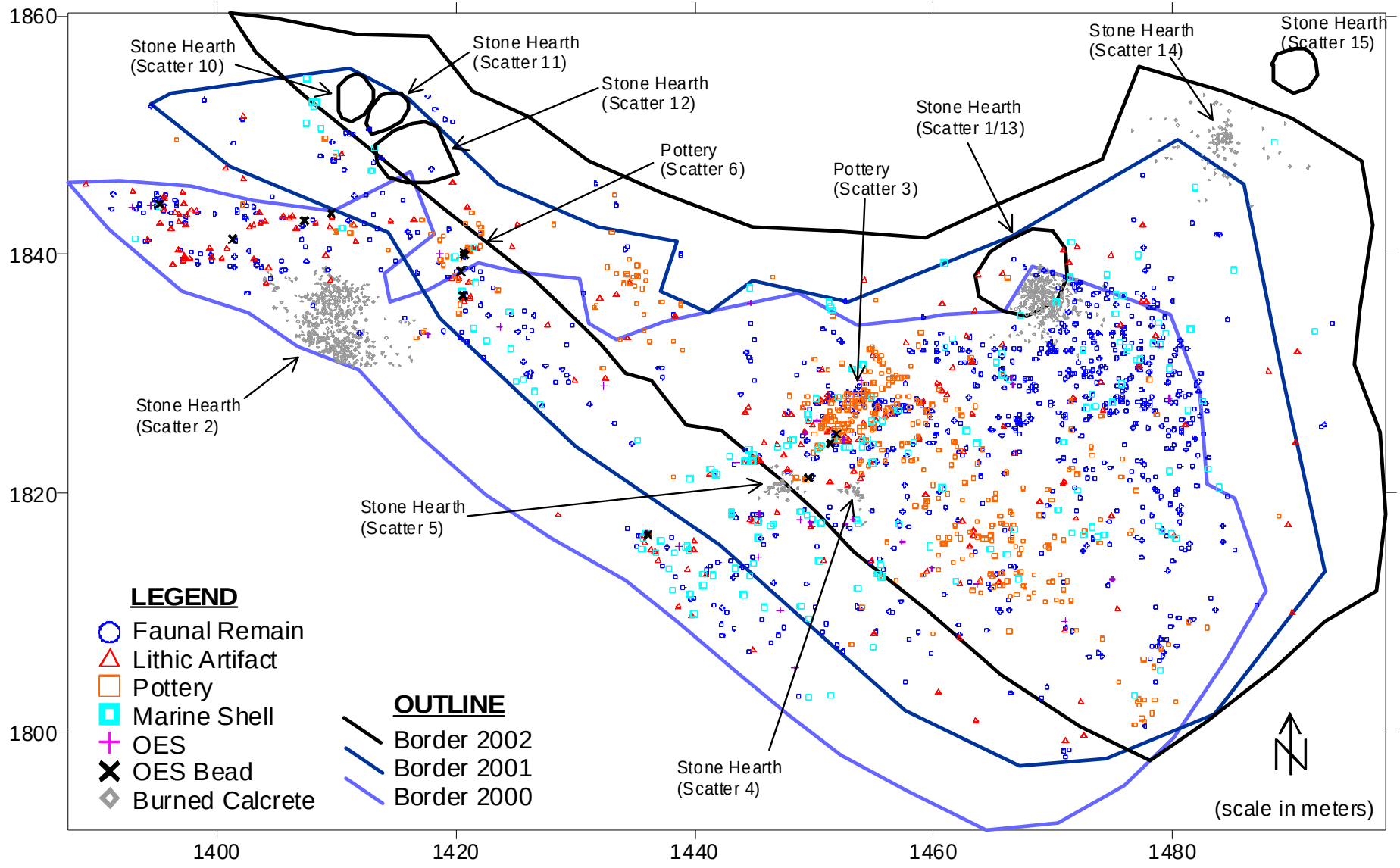
- **hearths for cooking**
- **whale blubber rendering**
- **work spaces**
- **living areas**

LOCALITY: *Toaster*

March 2001



Burned calcrete / Stone hearths



Toaster 2000 -2003

Coastal resources

Whale scavenging (~2500 BP)

Whale barnacles

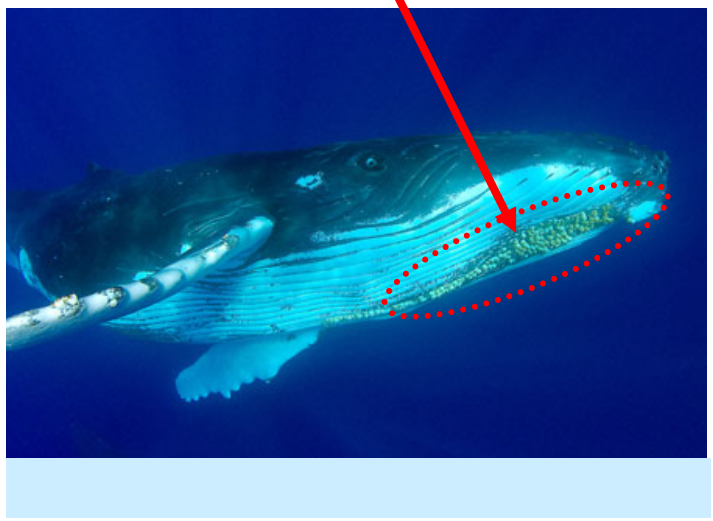
Shells

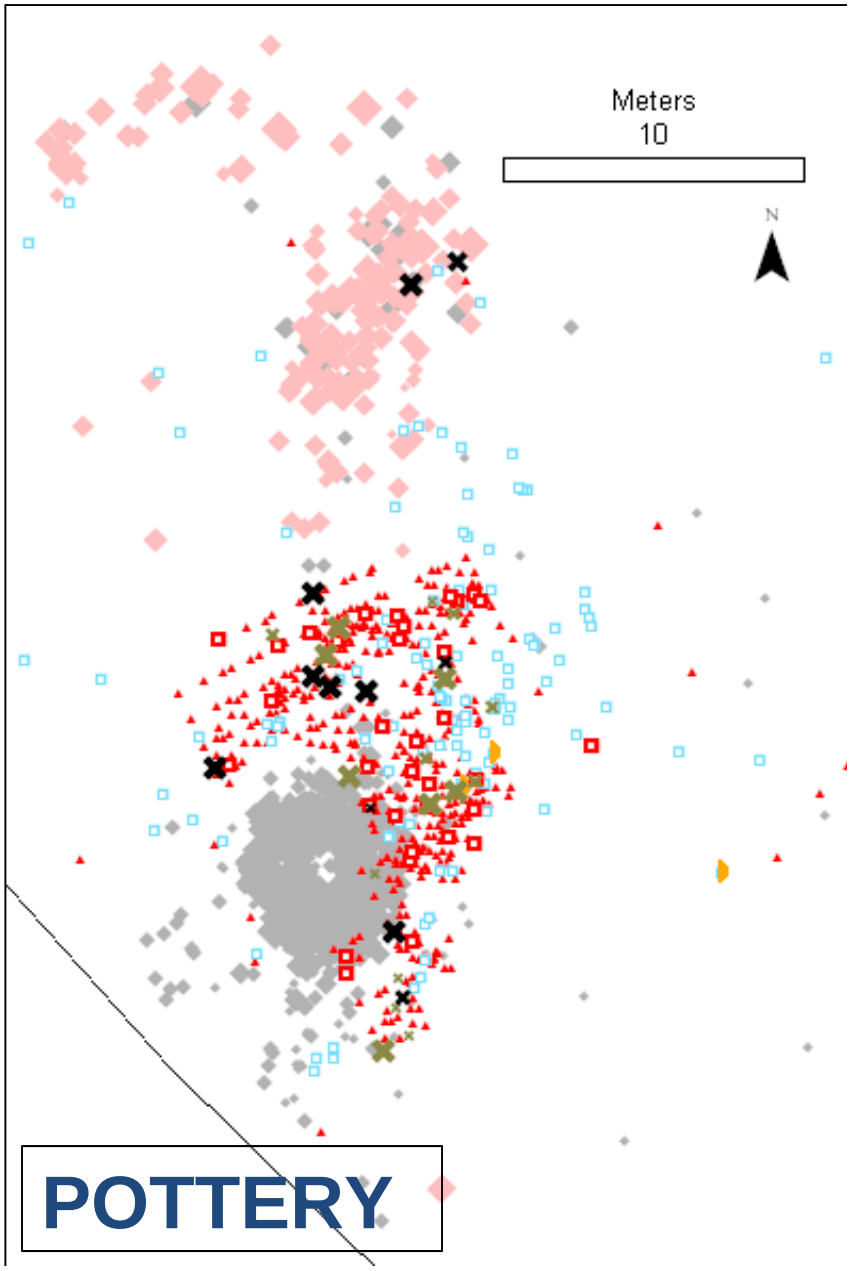
Ret. shells

Lithics

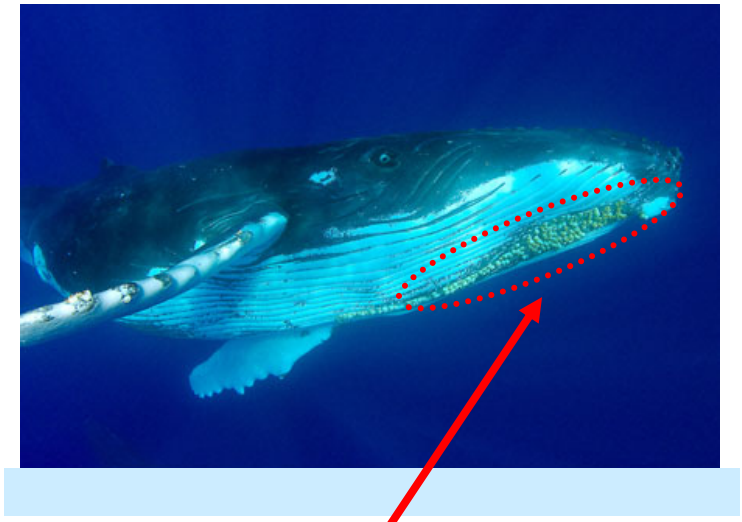
Beads

Calcrete





Marine resources



2nd case in locality Nora (~2600 BP)

Buchanan (1988)

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

LSA spatial organization (~2500 BP)

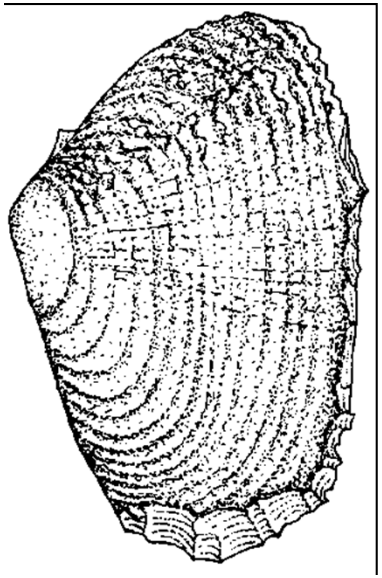
Shells

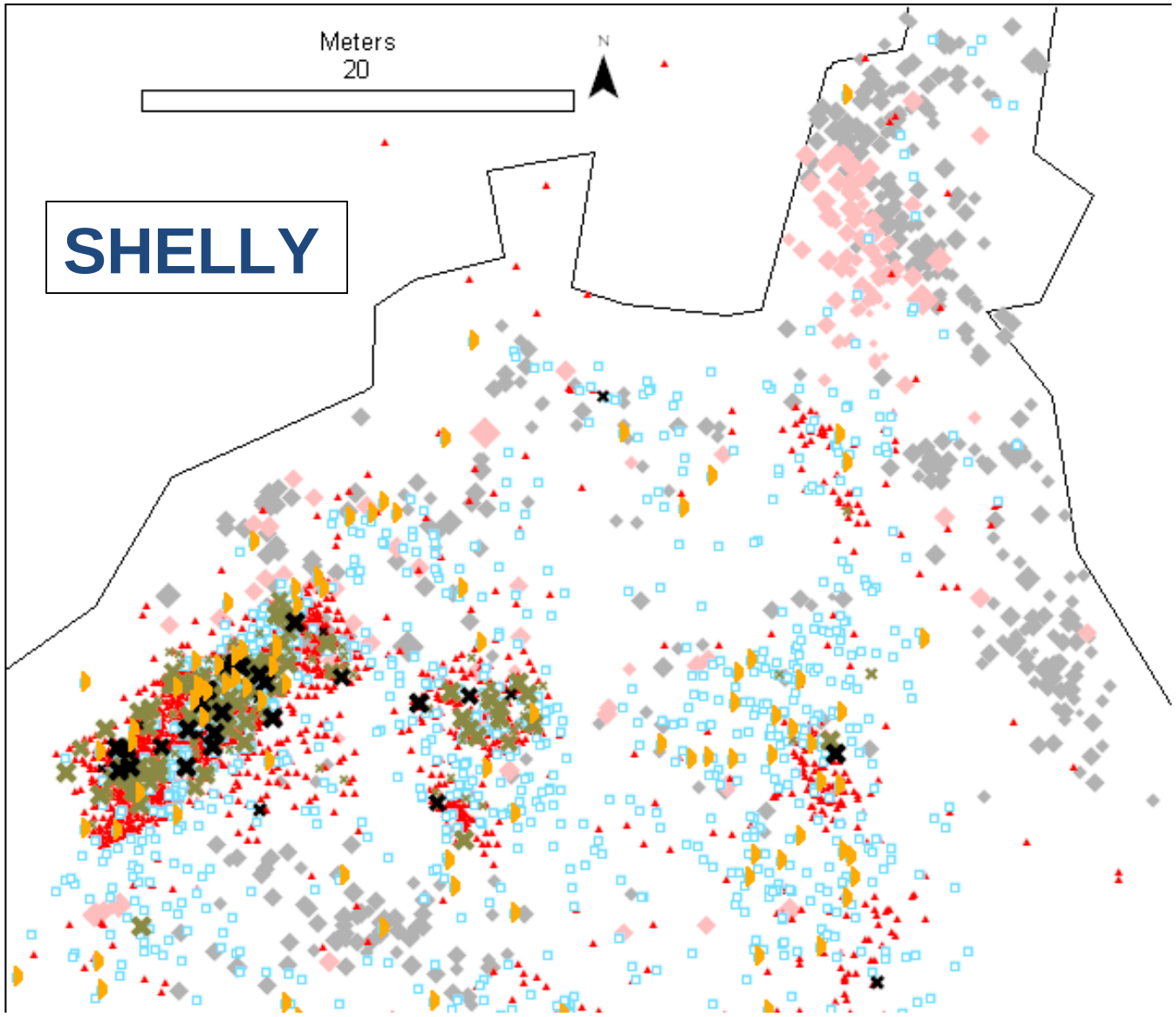
Retouched shells

Lithics

Beads

Calcrete

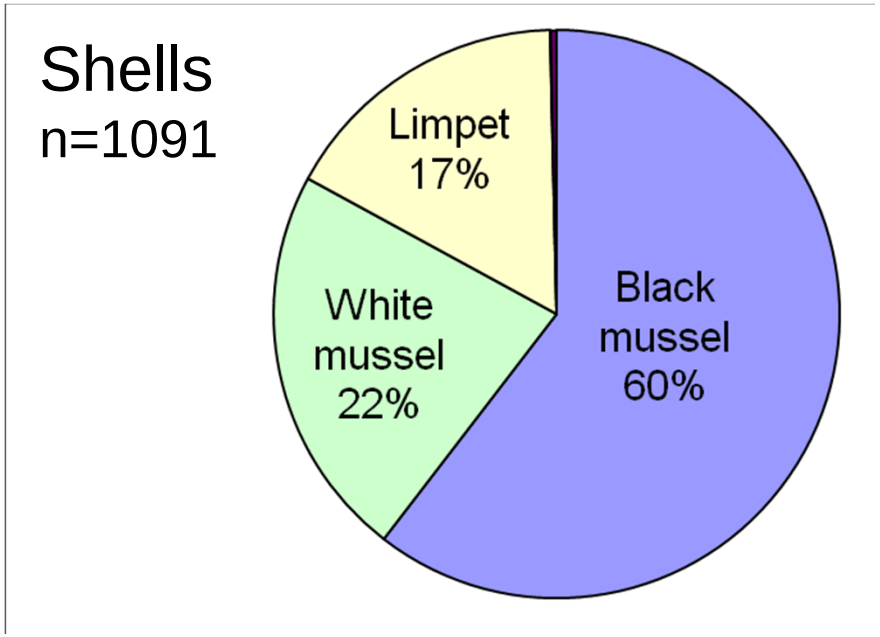




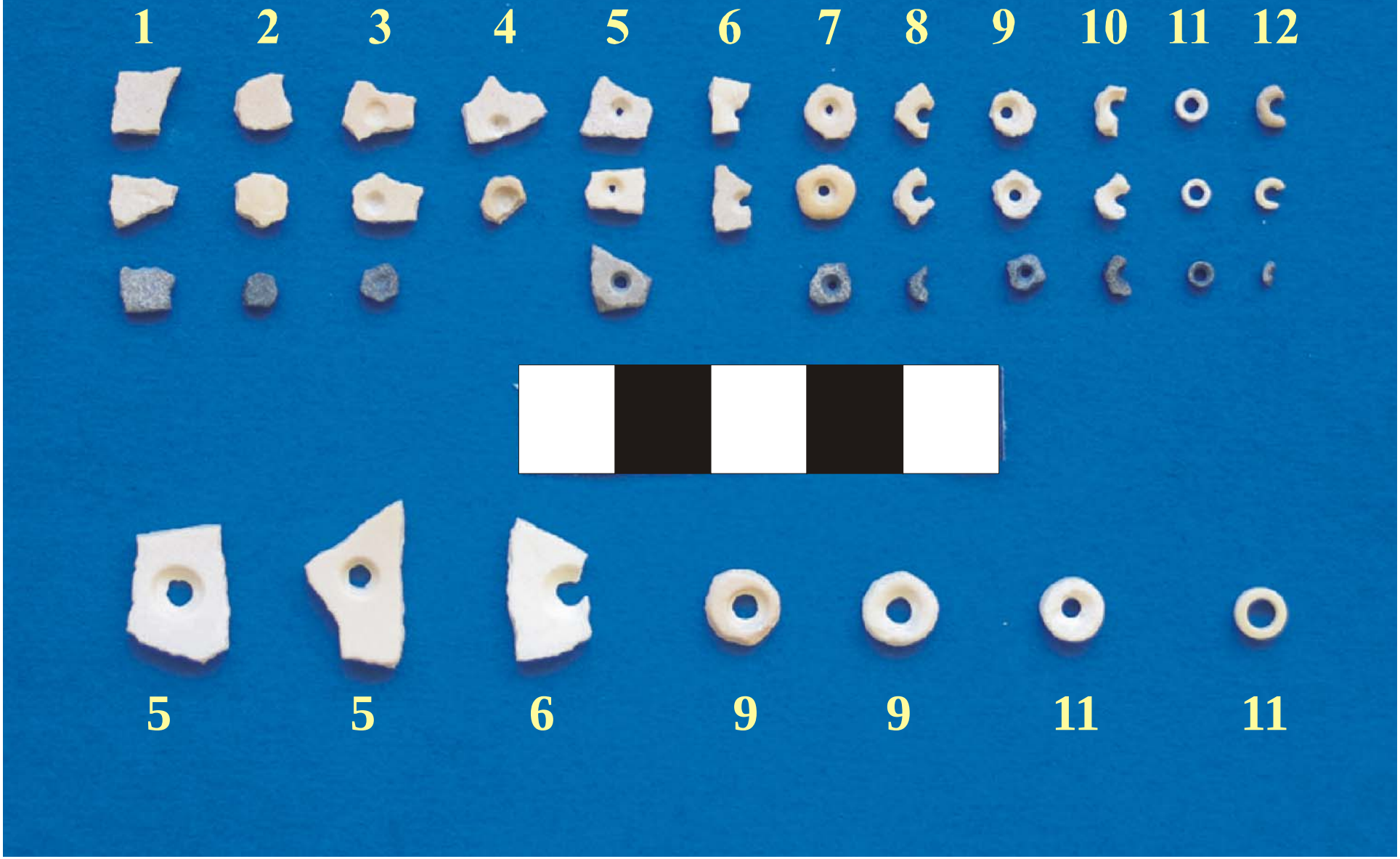
Locality SHELLY - caloric budget

Buchanan (1988)

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



Stages of bead production (1-12)



OES bead manufacture

LOCALITY	
• *Nora*	2,580 BP
• *Pottery*	2,500 BP
• *Shelly*	2,465 BP
• *Toaster*	1,260 BP

Shelly

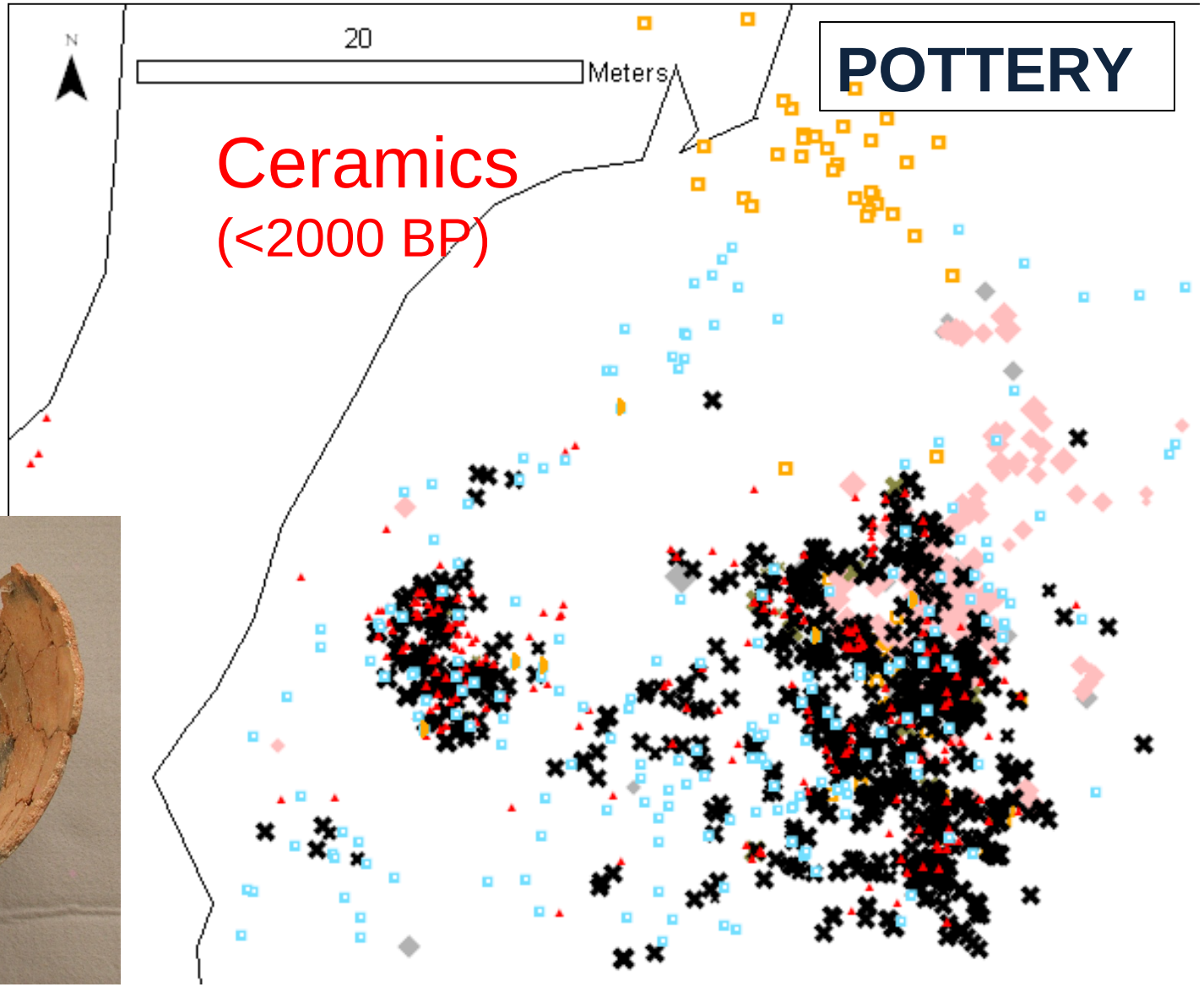
Pottery

Nora

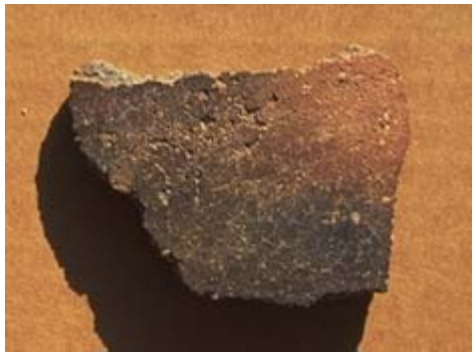
Toaster

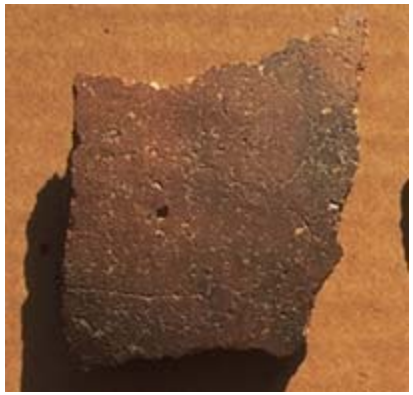
Bead making
(~2500 BP)

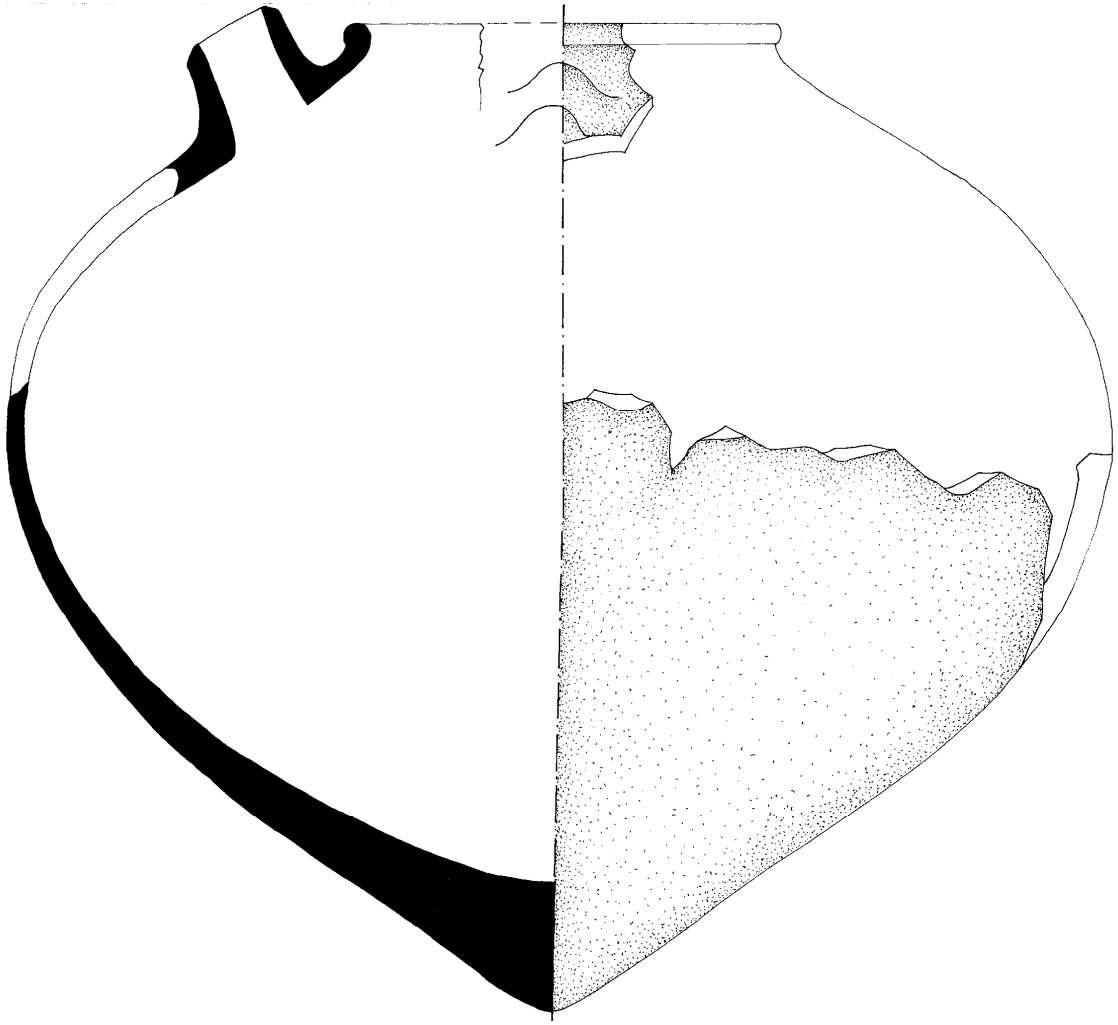
- Ceramic
- Shells
- Ret. shells
- Lithics
- Beads
- Calcrete

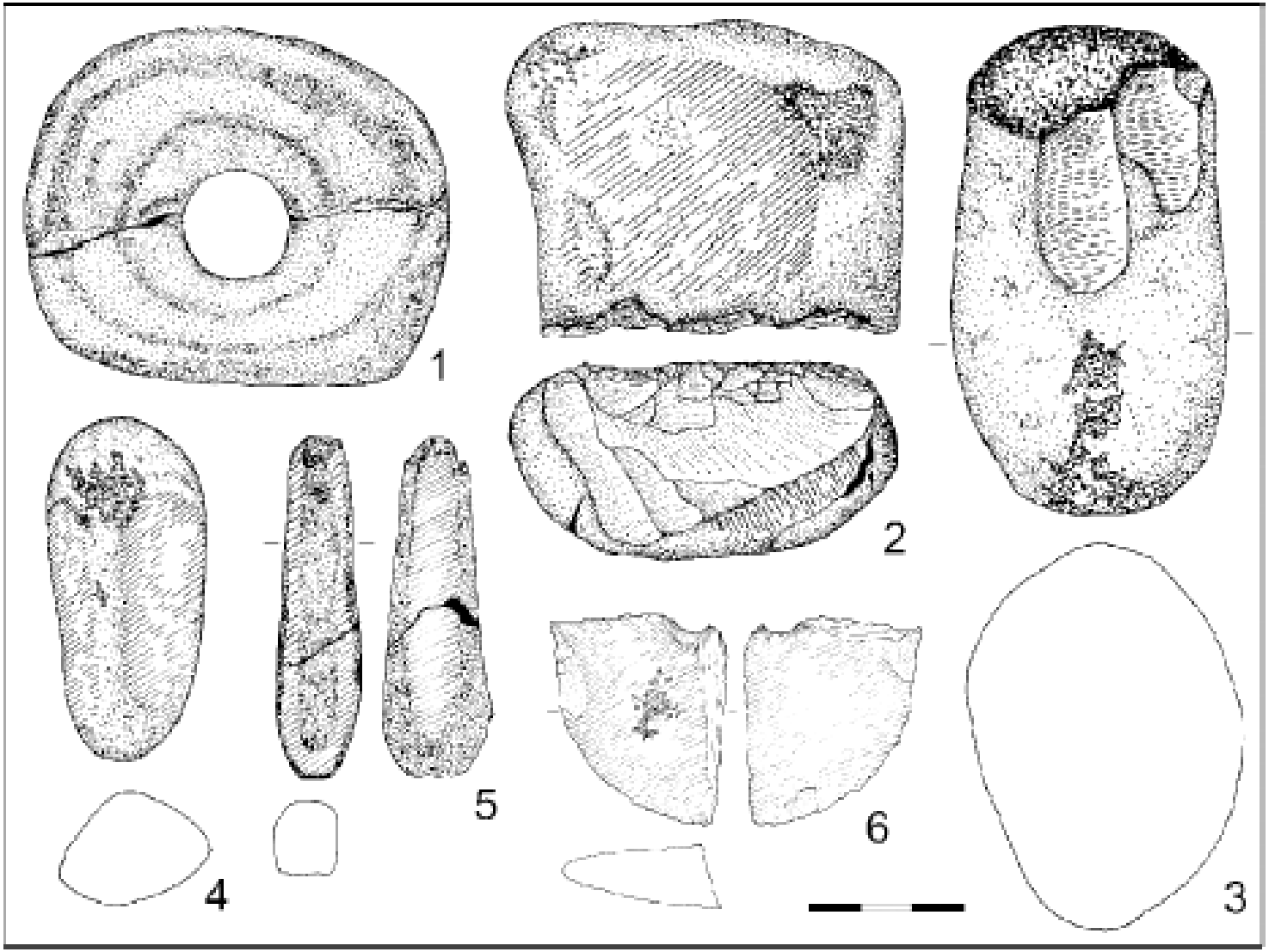


Stone Ring



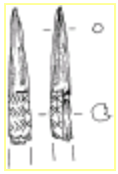






Many ground stone tools
Localities: *Equus*, *Homo*, Pottery and Shelly

Bone tools



HO 136

CR 917

CR 942

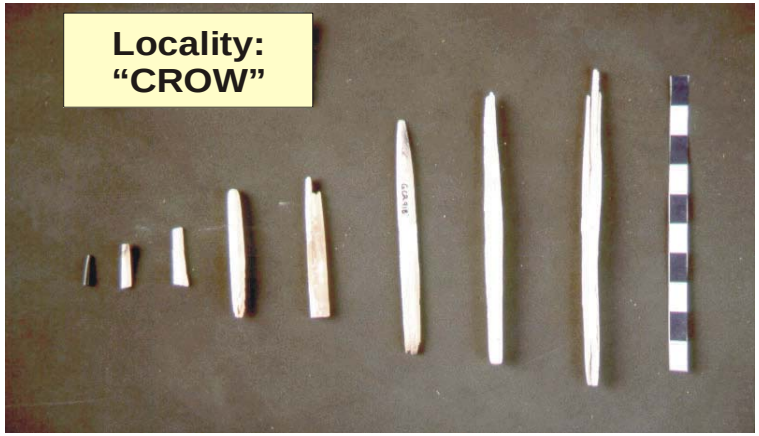
CR 943

SH 858.15

CR 914

CR 915

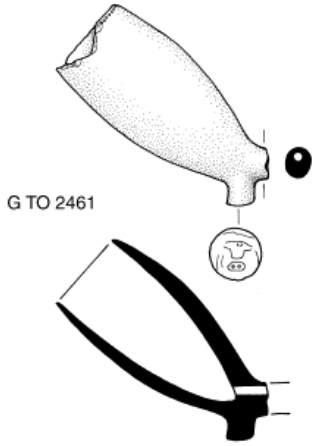
CR 916



LOCALITY
- *Crow* 1420 AD

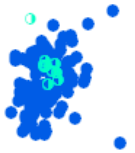
Settlement Patterns in the Holocene LSA

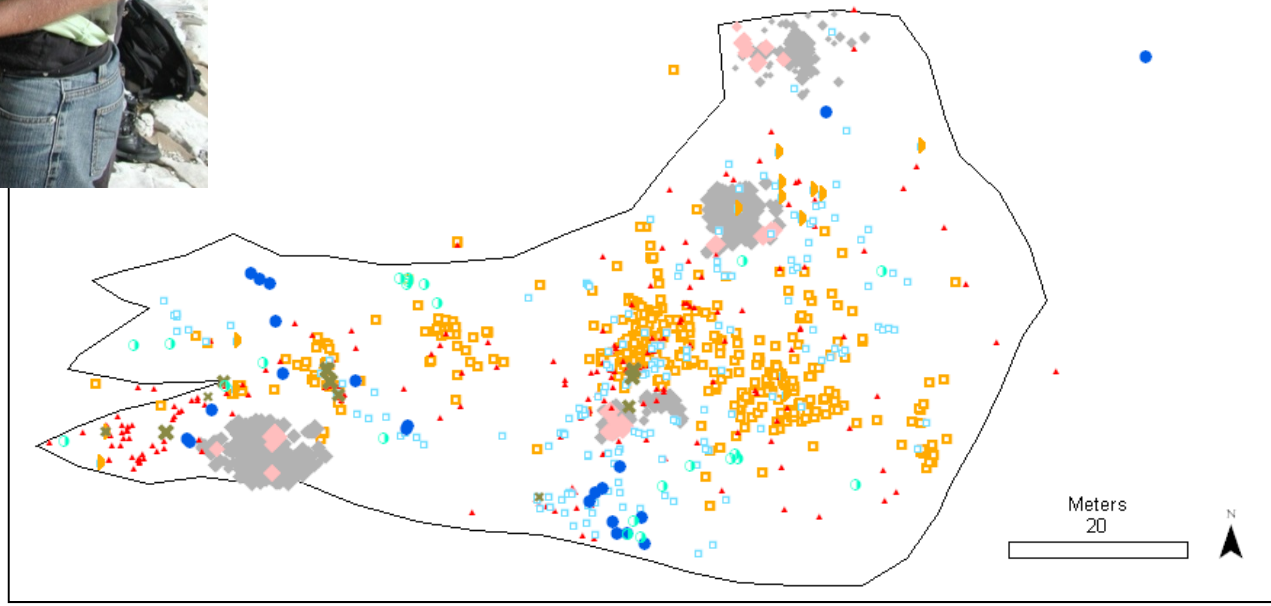
- Higher find densities than during the MSA reflect longer occupations and higher population densities
- Adaptable and varied subsistence strategies with marine and terrestrial resources
- Diverse material culture
- Symbolic artifacts common
- Human burials



Elephant
Historic
Ceramic
Shells
Lithics
Beads
Calcrete

TOASTER





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**

The Archaeology of the West Coast of South Africa

Edited by

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Antonia Malan
David Braun

Chapter 2 2013

Stone Age economics and land use in the Geelbek Dunes

Andrew W. Kandel & Nicholas J. Conard