Systematical radiocarbon dating of Late Neolithic human remains

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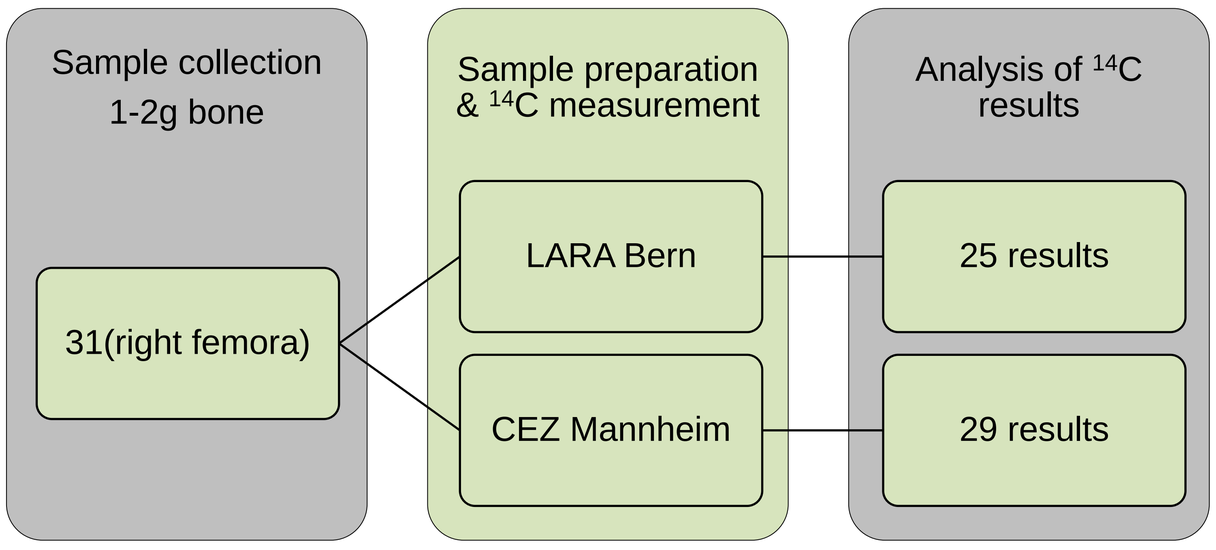
Introduction

Collective burials of the Late Neolithic are found all over Europe; however, undisturbed inhumations are rare. Therefore, the dolmen of Oberbipp (fig. 1) in Switzerland, with approximately 40 individuals, provides a great opportunity to study the burial in its entirety.

Radiocarbon dating is used commonly in archaeology. Nevertheless, often only few samples are analyzed due to funding reasons.

The aim of this project was twofold: a) to evaluate the burial sequence; b) to sample the most frequently occurring bone for dating at least at two laboratories.

Materials & Methods



- 29 measurements were considered for interpretation
- ➢ Inter-lab variation of the results was calculated
- ^{14}C results were checked against stratigraphy of *femora*

Fig.: 1: One layer of the entombed individuals at Oberbipp.

Results

- The average age offset between LARA & CEZ is 58yr (n=25), LARA slightly older than CEZ
- The standard deviation of the average for LARA is ±164yr (n=25) and ±79yr (n=25) for CEZ
- 20 cases: LARA & CEZ date the *femora* between ~3300-3000 BCE (green)
- 2 cases: LARA & 3 cases: CEZ date the *femora* between ~2900-2700 BCE (yellow)
- 3 cases: LARA date the *femora* ~3800-3600 BCE and CEZ ~3300-3000 BCE (red, fig. 2)
- 3 cases: discrepancies of R_data between LARA & CEZ but similar date cal. (2σ) (125 054, 126 195, 127 080, fig. 2)
- 11 *femora* sampled again and sent to RAU Oxford for cross-check (grey)

Table 1: Summary of results from LARA and CEZ, samples grouped by stratigraphy.

	LARA Bern		CEZ Mannheim		
Femur	**R_Date**	**Date cal. (2σ)**	**R_Date**	**Date cal. (2σ)**	
125 121	4464±35	3340-3021 BC	4467±22	3334-3027 BC	Group 1
125 121-1	4226±37	2910-2679 BC	4242±24	2909-2761 BC	
125 122	4197±37	2896-2666 BC	4169±23	2880-2668 BC	
125 123	4705±43	3633-3371 BC	4364±19	3024-2912 BC	
125 124	4422±48	3327-2920 BC	4440±24	3329-2942 BC	
125 128	4928±20	3763-3652 BC	4470±21	3334-3029 BC	
125 001	4511±44	3362-3036 BC	4467±23	3335-3027 BC	Group 2
125 054	4386±19	3087-2920 BC	4496±22	3341-3097 BC	
125 074	4464±20	3331-3027 BC	4461±23	3332-3026 BC	
125 239	4486±34	3346-3032 BC	4481±23	3339-3039 BC	
126 144	4467±37	3341-3022 BC	4459±27	3335-3022 BC	
125 434	No Result		4214±23	2897-2701 BC	
125 439	No Result		4463±23	3333-3036 BC	
126 158	4516±19	3351-3104 BC	4453±22	3330-3022 BC	Group 3
126 195	4532±41	3366-3097 BC	4436±23	3326-2935 BC	
126 416	4450±20	3328-3022 BC	4504±22	3345-3100 BC	
126 425	4456±37	3341-2944 BC	4454±22	3330-3022 BC	Group 4
126 567	4445±20	3327-3019 BC	4506±22	3346-3101 BC	
125 974	4478±34	3341-3029 BC	4486±22	3339-3093 BC	
125 955	No Result		4385±24	3090-2917 BC	
126 581	No Result		4559±23	3371-3117 BC	
126 668	4498±42	3355-3031 BC	4454±22	3330-3022 BC	
127 054	4954±20	3782-3662 BC	4454±23	3331-3022 BC	Group 5
127 080	4492±67	3366-2936 BC	4488±23	3339-3094 BC	
127 153	4429±40	3331-2921 BC	4403±23	3092-2927 BC	
127 156	4441±37	3334-2928 BC	4445±22	3329-3016 BC	
127 152	4471±47	3354-2945 BC	4441±22	3329-2971 BC	
127 095	4490±20	3339-3096 BC	4472±22	3335-3029 BC	
127 194	4450±20	3328-3022 BC	4526±22	3358-3104 BC	

Discussion & Conclusions

- No burial sequences can be distinguished yet
- High accordance between laboratories

Deviation between LARA & CEZ might be due to:

- ➢ plateau of calibration curve
- ➢ differences of collagen extraction

To keep the interpretation error as small as possible:

- ➢ collaboration between laboratories should regularly be considered
- ➢ the sample size should be as large as possible
- ➢ R_data of laboratories should be evaluated
- ➢ collagen quality criteria should always be kept in mind

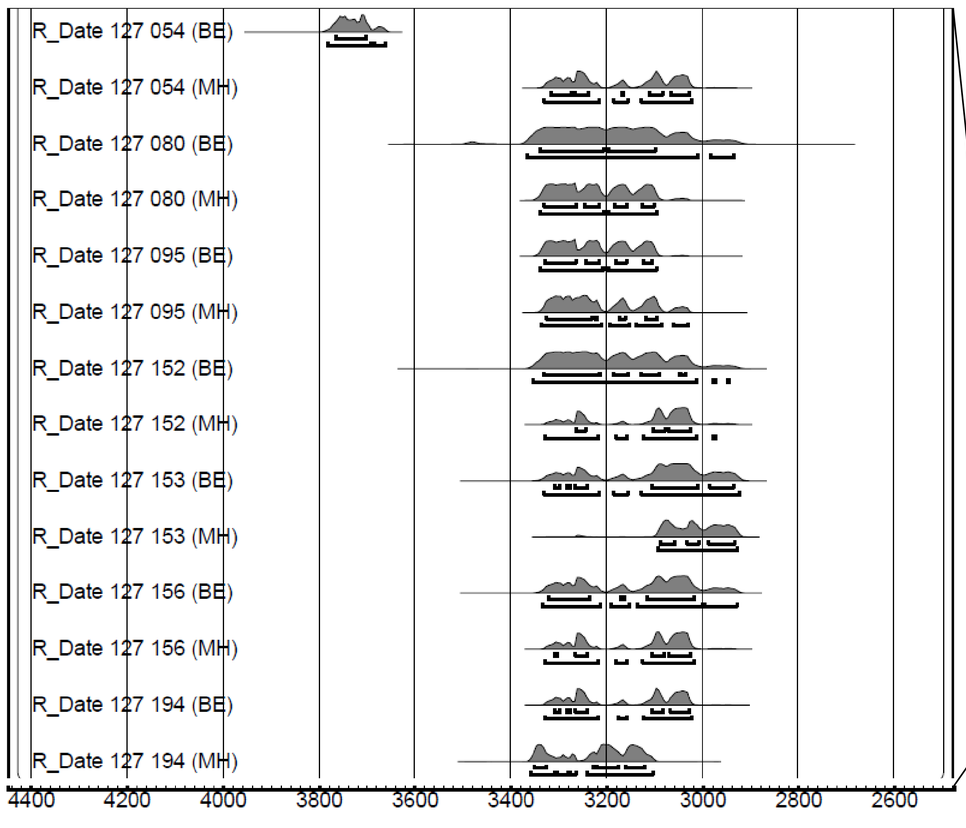


Fig. 2: Calibration curves for group 5, showing a high concordance between LARA and CEZ results except for sample 127 054; OxCal v4.3.2 Bronk Ramsex (2017); r:5 IntCal13 atmospheric curve by Reimer et al. (2013).

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