MILJÖARKEOLOGISKA LABORATORIET

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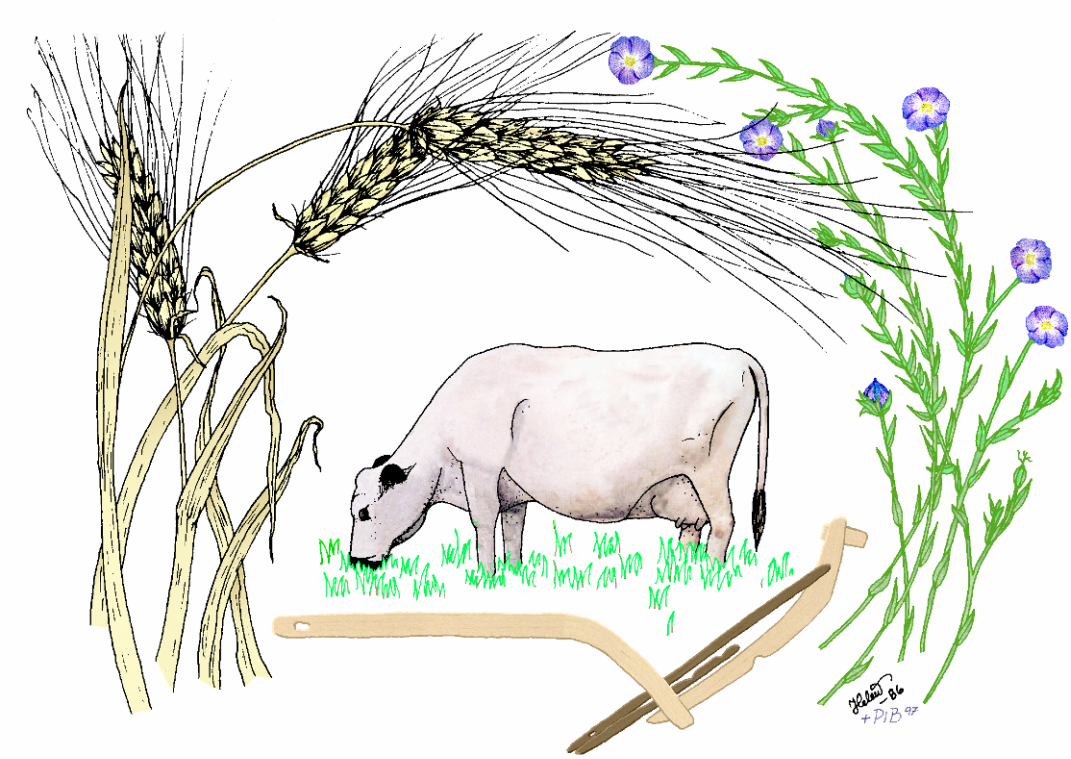

Supplementary soil analyses to the micromorphology samples from Gjellestad forprosjekt, 28/1, Halden kommune, KulturminneID 180775, Viken county, Norway.

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Information

The samples derive from a site with a ship burial. The ship is assumed to be of approximately the same date as the Oseberg and Gokstad ships on the basis of size, ca 800-900 AD, though differing construction details suggest that it may be slightly older. Samples were collected from profiles through the ship and from the mound.

All samples and site information has been provided by Christian Løchsen Rødsrud and Camilla Cecilie Wenn, Kulturhistorisk museum, Universitetet i Oslo.

This is a supplementary analysis to the micromorphology conducted by Dr Richard I Macphail at University College London.

Sample treatment

Geochemistry

Prior to all analyses all samples were dried at 30°C. Samples were then passed through a 1.25 mm sieve and any presence of material of cultural significance noted (such as bone, charred material, ceramics etc.). The chemical methods employed here are the same as those used in Swedish soil chemical studies following the methodological approach of Engelmark and Linderholm (1996 and 2008). The parameters analysed and abbreviations used are explained in table 1.

Table 1. Geoarchaeological methods and abbreviations as used in this report.

Abbreviation	Method	Description
MS_{lf}	Magnetic Susceptibility	Magnetic susceptibility measured on 10g of soil, with a Bartington MS3 system with an MS2B probe (Dearing 1994). Data are reported as SI-units per ten grams of soil, (corresponding to X_{lf}, 10^{-8} m^3 kg^{-1}) (Thompson & Oldfield 1986).
MS550	Magnetic Susceptibility after burning at 550ºC	Magnetic susceptibility after 550° C ignition (units as above)
LOI (%)	Loss On Ignition	Soil organic matter, determined by loss on ignition at 550° C, in percent (Carter, 1993).
Cit-POI	Total phosphate (mg P/kg dry matter, ppm) (inorganic & organic)	Extraction with 2% citric acid (Arrhenius 1934) on ignited soil (Engelmark & Linderholm 2008)
P quota	**Cit-POI /Cit-P**	Ratio of inorganic & organic to inorganic phosphate

These methods have been developed and adapted for soil prospection and the bulk analysis of occupation soils and features. Analysed parameters comprise organic matter (loss on ignition [LOI, and pH], Carter 1993), two fractions of phosphate (inorganic [Cit-P], and sum of organic and inorganic [Cit-POI]) (Engelmark & Linderholm 2008, Linderholm 2007) and magnetic susceptibility (MS-χ_{lf} MS-χ_{hf}) and MS550-χ_{lf} (Crowther 1993, Linderholm 2007, Engelmark & Linderholm 2008). These analyses provide information on various aspects concerning phosphate, iron, red-ox potential and other magnetic components and total organic matter in soils and sediments, and their relationship to phosphate.

Results

Results from the various analyses are presented in table 1. Elements are presented in ppm except where otherwise noted.

Table 1 analytical results

MALNo	FieldNo	FeatureNo	MS	MS550	CitPOI (ppm)	LOI	MSQ	Fe%	Ca%	K	Mn	S	Ti	Cr	Sr	Rb	Zr	Pb	Zn	Sc	Th	U	V
20_0029_1	pj7034	PX6413	5	16	228,5	2,6	3,5	1,4	1,4	16366	289	566	2729	33	200	73	403	11	20	58	4	5	44
20_0029_2	pj7035	PX6413	4	24	280,3	6,6	6,4	1,1	1,2	14274	238	717	2588	23	202	69	435	15	10	48	5	4	32
20_0029_3	pj7036	PX6413	3	6	271,6	7,9	2,0	1,0	1,2	17340	189	1492	3190	41	207	68	455	15	10	41	6	7	44
20_0029_4	pj7037	PX6413	5	4	227,2	2,3	0,9	1,5	1,5	18295	252	746	3001	44	222	77	443	12	21	66	5	6	43
20_0029_5	pj7038	PX6413	5	5	238,1	1,4	0,9	1,5	1,6	18998	267	344	3081	66	218	77	466	14	22	42	5	7	44
20_0029_6	pj7139	PX7138	3	3	162,2	2,3	0,9	1,2	1,5	15906	276	638	3005	46	213	76	400	12	10	39	4	5	38
20_0029_7	pj7140	PX7138	4	7	263,3	3,2	2,0	1,0	1,3	16274	221	554	2354	36	192	64	423	11	8	42	3	5	32
20_0029_8	pj7141	PX7138	4	3	163,1	2,3	0,9	1,0	1,3	18529	233	515	2694	26	223	76	433	13	10	40	5	7	27
20_0029_9	pj7142	PX7138	4	4	246,3	1	0,9	2,2	2,7	22034	535	452	4548	34	287	90	524	18	23	72	7	6	52
20_0029_10	pj7143	PX7138	4	4	201,9	2,3	0,9	2,3	1,6	17478	321	865	3104	41	221	75	469	12	15	43	6	5	53

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Figures

Figure 1. Site location northeast of Singlefjorden, Norway (Kulturminnesøk).

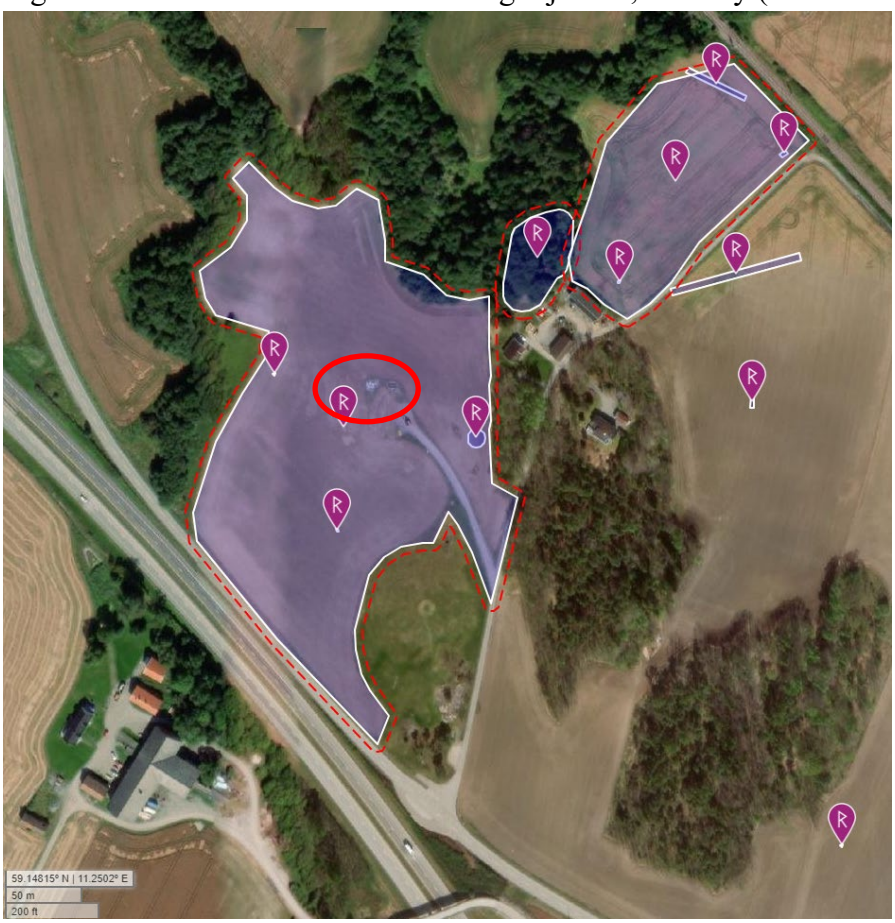

Figure 2. Site location, north of E6 and area where trenches were placed (Kulturminnesøk).

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