Surfaces and streets: phytoliths, micromorphology and changing use of space at Neolithic Çatalhöyük (Turkey)

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The site of Çatalhöyük occupies a key position within the development of larger settlements in south-west Asia, but the apparent absence of outdoor activity areas has challenged conceptions of social interaction within the site. Where did the inhabitants of this substantial settlement meet together if there were no public spaces? The identification of outdoor activity areas is difficult in such a densely patterned settlement, but micromorphology and phytolith analysis, when used together, can provide secure interpretations. The present study applies these methods to a stratigraphic sequence of deposits in Level South, where a succession of open areas was located adjacent to a series of buildings. The analysis reveals that these open areas were gradually transformed from a place for the dumping or accumulation of midden material in the early phases, to an informal and then a formally laid surface in the later stages. This suggests that although streets or courtyards may have been rare or absent in the early centuries at Çatalhöyük, they were present in the later phases of the occupation.

Keywords: Turkey, Çatalhöyük, Neolithic, micromorphology, phytoliths, social interaction

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Table S1. Micromorphology samples, in order from earliest to latest deposits, and summary of macroscopic and microscopic observations and interpretations. Field descriptions from http://www.catalhoyuk.com/database.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
1	(17339)/ (17036)	17339 S3	75	333	South P	V	Fill of large pit, backfilled with midden-like material. Lowest part of the section under 17036/ 17037. Complex fine layers of ash, organics, coprolites	13	Multiple layers of articulated siliceous phytoliths and grass-derived microcharcoal with a parallel orientation, and mixed calcitic ashes, overlain by 'packing' of calcareous clay with vughs and plant voids	Sparse (<5%) sub-rounded burnt aggregates, grey laminated plaster fragments (5%), sparse (<5%) degraded burnt bone, shell (<5%), omnivore coprolites with bone inclusions (10%), wood charcoal (10%), calcareous spherulites and dung ash (<5%)		Multiple dumping episodes of partially charred animal dung and grass-derived plant remains, wood ash, truncated and overlain by packing, rapidly buried

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Table S1. Continued.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
2	(16549)/ (17335)	16549 S3	75	333	South P	V	Course bedding, dump levelling deposit, upper extent utilised as a surface. Uppermost layers of space 333 below Building 65	9	Massive structure of mixed calcareous clay with vughs and plant voids and three laminations of grass-derived phytoliths and microcharcoal. One band of quartz/mineral grains	Coprolites, degraded bone fragments, lithic chips. Bands of pale calcareous aggregates (20%), rounded orange clay aggregates (20%)	Secondary gypsum crystallisation, water laid crust of fine sediment, silty-clay coatings in bone voids	Packing with mixed midden and calcareous clay/mudbrick type material. Exposure
3	(16246)/ (16247)	16247 S8	65	299, 333	South Q	IV	Dumped layer, thin orange lenses	7	Largely massive structure of mixed calcareous clay with vughs and plant voids, some packing voids, one lamination of grass-derived phytoliths and microcharcoal	Clustered coprolites (10%), sparse degraded bone (<5%), large fragments of cracked wood charcoal (5%), sub-rounded brown calcareous clay aggregates (<5%)	Faunal bioturbation, secondary gypsum crystallisation. Water laid crust and silty-clay coatings in bone voids	Reworked/ trampled midden material and calcareous clay/mudbrick type material. Exposure

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Table S1. Continued.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
4	(15717)/ (15743)	15717 S6	65	299, 305	South Q	IV	Truncated by Mellaart. Butts up to walls 2505, 2506. Lower midden deposit does not appear to butt. Charred/ phytolith layers, continue sequence below 17039, above 16247	6	Largely massive structure of mixed calcareous clay with vughs and plant voids, and channel voids/cracks. One band of grass-derived phytoliths and microcharcoal with some wood charcoal	Ootic limestone pebble (<5%), pale yellow calcareous aggregates (10%) and sub-rounded orange aggregates (<5%). Sparse quartz and mineral grains (<5%), animal dung fragments, coprolites with digested bone (10%), and degraded bone fragments (<5%)	Secondary gypsum crystallisation, silty-clay coatings in bone voids	Reworked/ trampled midden material and calcareous clay/mudbrick type material. Cyclical 'fire-spot' use. Exposure
5	(17039)/ (17057)/ (17071)	17039 S3	56	339	South R	III	Midden with trodden upper surface. Lowest layers relating to	10	Largely massive structure of mixed calcareous clay with vughs and plant	Pottery and lithic fragment (<5%) with burnt marl (5–10%), wood charcoal (20%)	Secondary gypsum crystallisation	Reworked/ trampled midden material and calcareous

Table S1. Continued.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
							Building 56		voids, and channel voids/cracks. One 'fire-spot' laminated deposit	with some grass derived microcharcoal. Sparse burnt degraded bone (<5%)		clay/mudbrick type material. Cyclical 'fire-spot' use
6	(16590)/ (17017)	16590 S31	56	339	South R	III	Respects south face of south wall of B.56 (F2069). Underlies 16568, uppermost part of underlying sequence related to Building 56	3	Largely massive structure of mixed calcareous clay with vughs and plant	Large igneous rock fragment, sub-angular to sub-rounded mineral grains (20%), sub-rounded burnt brown aggregates (<5%), large (*c*. 3cm) orange aggregated with internal water-laid banding (40%), large degraded bone	Secondary gypsum crystallisation, silty-clay coatings in bone voids	Reworked/ trampled midden material and calcareous clay/mudbrick type material. Cyclical 'fire-spot' use. Exposure

Table S1. Continued.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
										fragments (5–10%) and animal dung (5–10%)		
7	(16534)/ (16568)	16568 S22	44	319	South S	II	Midden deposit sealing buttress material (16559), banked up to support southern wall of B 44. Some bricky material within 16568, which may suggest that it was part of the levelling episode directly after the B44 construction. Earliest part of	5	Massive structure of mixed calcareous clay with vughs and plant voids, and channel voids/cracks, some packing voids. One lens of calcareous marl with organic laminations, one band of grass-derived phytoliths and microcharcoal/ animal dung	Mineral grains (10%), rounded brown aggregates (5%), omnivore coprolites (10–20%), highly degraded bone (5%)	Secondary gypsum crystallisation, silty-clay coatings in bone voids	Reworked/ trampled midden material and calcareous clay/mudbrick type material. Cyclical 'fire-spot' use. Exposure

Table S1. Continued.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
							Building 44 sequence. Below unit 16534					
8	(16277)/ (16507)	16277 S3	44	130	South S	II	Level deposit with suspected trodden surface in external space between B.44 and wall F.2645. Uppermost area of Building 44	5	Massive structure of mixed calcareous clay with vughs and plant voids, and channel voids/cracks	Wheat husk phytoliths (<5%), wood charcoal (5–10%), rock fragments (5%) and pale calcareous aggregates (5%), brown aggregates (5%), burnt bone (5%)	Secondary gypsum crystallisation, silty-clay coatings in bone voids	Reworked/ trampled midden material and calcareous clay/mudbrick type material. Cyclical 'fire-spot' use. Exposure
9	(16260)/ (16262)	16262 S26	44	129	South S	II	Layer of silty ash with frequent charcoal, capped with a compact, thick yellowish-brown layer	5	Massive structure of mixed calcareous clay with vughs and plant voids, and channel voids/cracks, one band of grass	Degraded bone (5%), mineral grains (5%), brown aggregates (<5%)		Reworked/ trampled midden with surface constructed from plant-tempered calcareous clay

Table S1. Continued.

Slide	Field unit(s)	Sample	Building	Space	Hodder level	Mellaart level	Field description	Sub units in thin section	Microscopic observations	Inclusions	Post-dep. alterations	Interpretation
							suggested as being a trodden surface. Large fragments of animal bone. Below 16259		derived phytoliths and microcharcoal			aggregate
10	(16259)/ (16260)	16259 S4	44	129	South S	II	Suspected trodden surface, extremely compact & relatively level at the southern end of deposit	3	Massive structure of mixed calcareous clay with vughs and plant voids, and channel voids/cracks	Omnivore coprolites with bone inclusions (5–10%), bone fragments (<5%), wood charcoal (5%), microcharcoal (5%), pale brown aggregates (<5%)		

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Table S2. Phytolith samples.

Field unit	Sample	Space	Hodder level	Mellaart level	Type
17058	3	339	South R	III	Bulk/midden
17046	3	339	South R	III	Fire-spot
17044	3	339	South R	III	Fire-spot
17017	3	339	South R	III	Bulk/midden
17010	3	339	South R	III	Fire-spot
16520	3	319	South S	II	Fire-spot
16590	3	130	South S	II	Bulk/midden
15728	5	129	South S	II	Spot/midden
16260	3	129	South S	II	Bulk/midden
16259	3	129	South S	II	Bulk/trodden
16253	3	129	South S	II	Bulk/midden
15702	4	129	South S	II	Bulk/midden
15702	3	129	South S	II	Spot/midden