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A Brief Report on New Radiocarbon Dates from Tappeh Sofalin, Pishva, Iran

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(47-57)

Abstract

In the summer of 2017, renewed fieldwork was undertaken at Tappeh Sofalin in the Varamin Plain. A total of 20 samples for absolute dating were collected during this season, several of which have been analyzed. We present this new evidence for the dating of the site and compare it briefly with published dates and analyses from other sites. Finally, we discuss implications for the chronology of the Proto-Elamite spread to the Central Plateau and other areas of Iran.

Keywords: Absolute dating, Tappeh Sofalin, Proto-Elamite horizon.

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1. Radiocarbon Sampling during the 2017 Season

In the summer of 2017, fieldwork was continued at Tappeh Sofalin, in a project directed by Morteza Hessari, Reinhard Bernbeck, and Susan Pollock as a collaboration between the Iranian Center for Archaeological Research and the Freie Universität Berlin. Sofalin is located at the eastern edge of the Varamin Plain just northeast of the modern town of Pishva, on a slope of the Pishva fault that overlooks the easternmost arm of the Jajrud, a river that has created a massive gravel fan (Fig1).

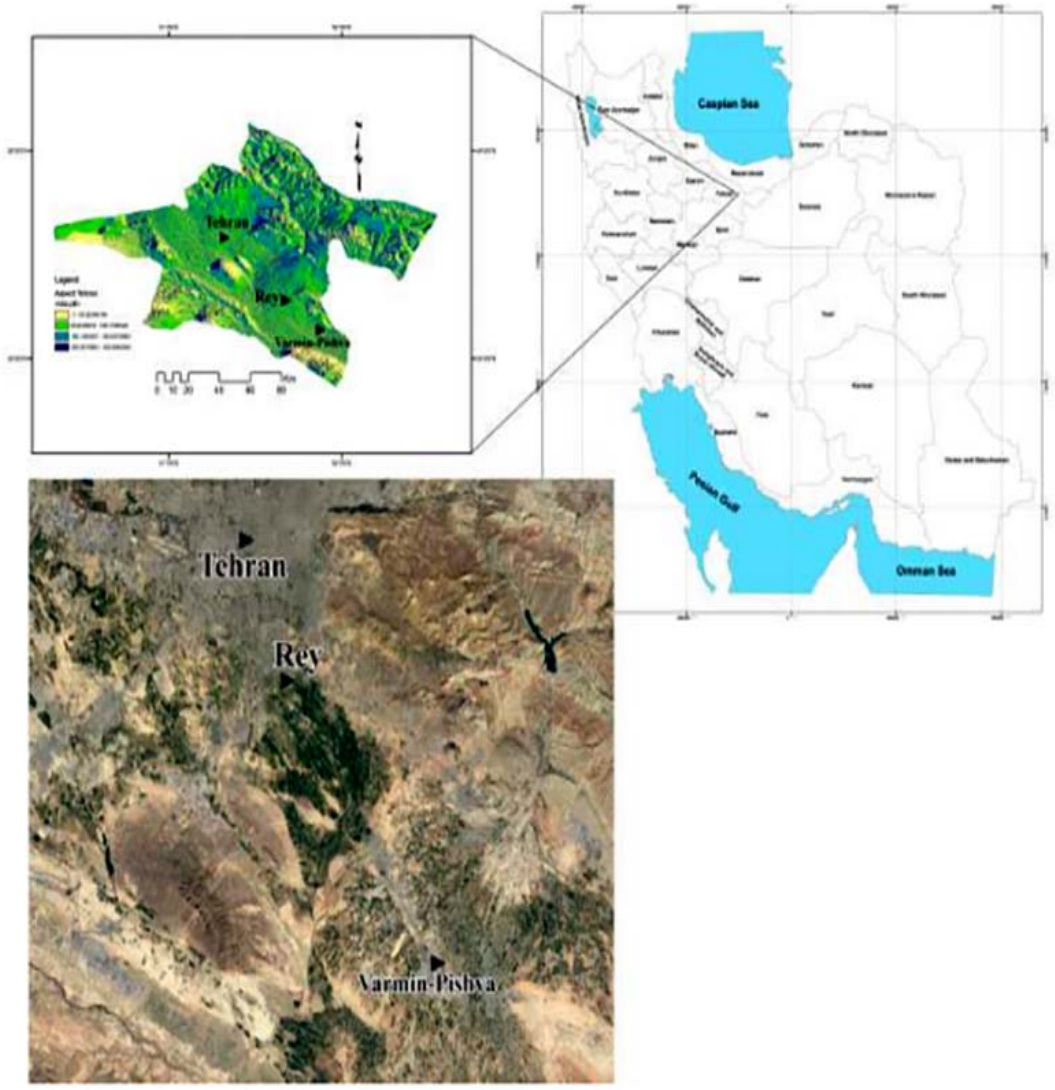

Figure 1: Location of the Varamin Plain and Tappeh Sofalin

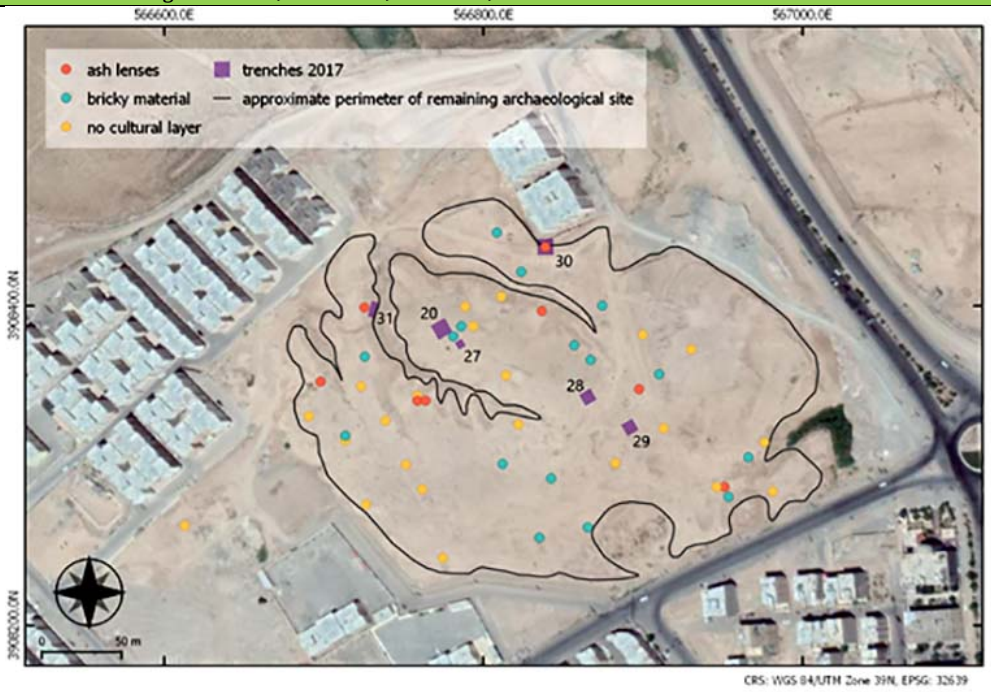

Figure 2: Location of trenches and augering from the 2017 season at Tappeh Sofalin

Five trenches were opened during this season, and a sixth continued from an earlier season (Fig 2). Trench 20 had already been excavated in 2011 and is of particular interest because of the architecture it contains (Fig 3; see Hessari 2011). It was situated in the lower reaches of the sloping plateau on which the site is located and had an irregular outline due to our intent to trace the walls and installations connected with them. A small stratigraphic trench 27 was placed just to the south of it in 2017. This trench revealed a sequence of no more than 0.50-0.75 m depth of cultural deposits before reaching sterile soil. Of these shallow archaeological layers, 0.20-0.35 m consisted of mixed surface materials, leaving in this part of the site an approximate depth of 0.30-0.40 m of well-stratified archaeological layers.

Figure 3: Architecture in Trench 20, Tappeh Sofalin, 2011.

Trench 28 with a total size of 5 x 5 m was opened in a spot where a deep, recent looting hole had exposed ashy layers. Based on previous experience at the site, the combination of ashy deposits and looting led us to assume the likelihood of encountering contexts with artifacts of an administrative nature such as sealings and/or tablets. Careful cleaning of the 0.85 m deep plundering hole revealed that the looters had hit on an ancient depression with almost vertical sides and had continued to dig below its lowest level. The depression itself may have originally been a natural cavity lined with gypseous matter or could even have been a fire installation, as it was filled with dense ash layers. The looters had left intact approximately one third of its original stratigraphic layers in the eastern part of the pit. The excavation and screening of all of the matrix from these layers led to the discovery of a number of Proto-Elamite cretulae, both sealed and unsealed, as well as tokens, figurines and a few copper objects (Figures 4 and 5).

Figure 4: Sealing, depicting an ibex with the head turned backwards, from Trench 28, Locus 2809, Tappeh Sofalin.

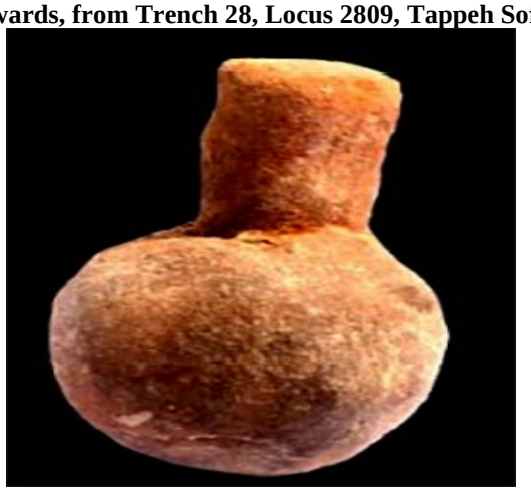

Figure 5: Token in the shape of a vessel or pomegranate from Trench 28, Locus 2806. Tappeh Sofalin.

Trench 29, with a size of 5 x 5 m, was placed southeast of Trench 28, but it turned out

to contain no archaeological remains whatsoever. This negative result is of significance, as it indicates either that the ancient site has undergone severe destruction through erosional processes or that it consisted of a number of distinct locations that remained disconnected from each other. Trench 30 was situated in the northeastern confines of the site. The goal of excavating it was to expose a pit visible in a high profile that had been cut during construction of the housing that destroyed much of the northernmost part of the site. The pit could not be excavated in its entirety due to the dangerous working conditions; instead, only its southern profile was cut back and sampled. Finally, an augering survey of the site identified a number of places with ashy layers (Figure 2). We excavated one of them since it was very close to the surface and unlikely to survive even one more year. In this Trench 31 two adjacent fire installations were discovered that were already in such a bad state of preservation that their original shape could no longer be determined.

A total of 20 samples with charred plant remains were taken from these trenches for absolute dating purposes, eight from Trench 20, five each from Trenches 30 and 31, and two from Trench 28. Many of these samples were too small even for AMS dating. After determining the weight of the samples, we made a selection of six of them to be dated by the Poznan radiocarbon lab in Poland (Table 1). Of the samples submitted, one is from a general building context in Trench 20. The sample from the former looting hole in Trench 28 derives from Locus 2809, one of the major extant loci with administrative objects. This locus contained a total of 13 fragments of sealings, four of them with seal impressions. This is also the locus from which the sealing in Figure 4 comes. While not well preserved, this sealing shows the image of an ibex or goat with the head turned towards the back, cut carefully in a “classic style” (see Pittman 1994: 61-64).

Two radiocarbon samples come from the pit in Trench 30 from the northeastern edge of the site. One is from Locus 3002, in the upper part of this pit, the other from one of its lowest loci, Locus 3008. Finally, two samples derive from the two neighboring fire installations in Trench 31. Locus 3115 is an ashy layer with a dense deposit of small sherds in it. Locus 3117 is similar in character, except that it also contained burnt stones and one large bone. Pottery from Trench 31 is remarkable for the elevated proportion of “Banesh trays” in the assemblage.

	Lab No	Age 14C	Trench	Locus	Context	Find No	cal. date (2 sigma)
late	Poz-103892	4310 ± 80 BP	30	3002	upper level of a pit close to northern edge of the site	30003	3328 - 2672 BCE
middle	Poz-103644	4465 ± 30 BP	28	2809	ashy layer from pit, partly destroyed by a looting hole	28106	3337 - 3024 BCE
	Poz-103645	4480 ± 35 BP	31	3117	inside a fire installation	31072	3342 - 3029 BCE
	Poz-103643	4510 ± 35 BP	20	2050	general architectural context	20004	3354 - 3097 BCE
early	Poz-103891	4640 ± 35 BP	31	3115	inside a fire installation	31068	3518 - 3357 BCE
	Poz-103889	4440 ± 400 BP	30	3008	lower level of a pit close to northern edge of the site	30017	(4054 -2035 BCE)

Table 1: Radiocarbon dates from Tappeh Sofalin; calibrations using OxCal 4.3, IntCal 13 curve

Of the six samples, the one from the lowermost levels of the pit in Trench 30 was too small to provide useful results (Poz-103889; see Table 1). The others fall into three distinct time brackets.

The date from Locus 3115 in Trench 31, the base level of one of the largely eroded fire installations, is clearly earlier than all others and would seem to date to the initial occupation of the site. Three determinations from Trenches 20, 28 and 31 yield more or less identical date ranges that span almost 300 years each. This relatively wide bracket is due to a plateau at that particular point in the calibration curve (as noted by numerous scholars, including Dahl et al. 2013; Petrie 2014). The last date, Poz-103892, from one of the uppermost loci of the pit in Trench 30 indicates a later occupation phase at the site; its range is larger than that of the four other dates.

These dates reconfirm an impression already arrived at through an analysis of the tablets from Tappeh Sofalin, namely that the site has a relatively long occupation span (Dahl, Hessari, and Yousefi Zoshk 2012:70–71; Dahl, Petrie, and Potts 2013: Fig. 18.17), potentially reaching from the Late Uruk (Susa Acr. I: 17) through the late Proto-Elamite period. In addition, the spatial distribution of the samples could suggest that archaeological remains at Tappeh Sofalin consist of short sequences that display the character of a shifting settlement. This does not preclude the existence of superimposed strata elsewhere in the settlement that might have been substantially eroded away, a possibility that is in need of further research.

2.Discussion

Renewed interest in the Late Chalcolithic to Early Bronze periods of the Iranian plateau has brought with it a wave of new excavations and absolute dates. A major obstacle for all attempts at absolute dating of the late fourth millennium BCE is a plateau in the calibration curve at ca. 3350-3100 BCE that leads to wide ranges for calibrated data at 95% levels (see Petrie 2014: 149-150, fig. 9.3 and 9.6). A substantial set of data that are relevant for the Iranian Plateau, including the Proto-Elamite period, has recently been analyzed using Bayesian modeling by Pollard et al. (2013). They conclude that the transition from Late Chalcolithic to the Early Bronze Age occurs somewhere in the middle of the fourth millennium BCE. The Proto-Elamite period itself is dated by them to ca. 3100 - 2900 BCE. Following a suggestion first made by Robert H. Dyson (1987) and later elaborated by Barbara Helwing (2006: 35–37, Table 1), Pollard et al. propose that there is a transitional period between the end of Sialk III/Late Chalcolithic (Sialk sub-level III,7) and the Early Bronze Proto-Elamite horizon as it is known from Sialk IV,2 and perhaps including Level IV,1 (see Amiet 1985). This “Transitional Proto-Elamite” or “pre-Proto-Elamite” period is supposed to occupy the remaining time between ca. 3500/3400 BCE and 3100 BCE (Pollard et al. 2013: 47).

The question thereby raised is, what corresponds to a “transitional Proto-Elamite” phase in the development of Proto-Elamite administrative technologies? The reconstruction of writing developments proposed by Jacob Dahl, Cameron Petrie and Daniel Potts (2013) does not fit the model advanced by Pollard et al., who suggest a short period of only 200 years for the Proto-Elamite phenomenon. Based on the evidence of the development of writing in Susa, Dahl et al. compare format, internal structure and paleographic elements of tablets from multiple sites in order to suggest an early spread of these administrative technologies to northern highland Iran (Tappeh Sialk, Tappeh Sofalin, Tappeh Ozbaki) and only later towards the southeast (Tall-e Malyan and Tappeh Yahya).

The new radiocarbon dates from Tappeh Sofalin seem to support the model advanced by Dahl et al. Three of the Sofalin dates (Poz-103644, Poz-103645, and Poz-103643) show an extensive overlap (Table 1, Figure 6). In the terminology of Helwing and

Pollard et al., this date range would fall almost entirely into the "Transitional Proto-Elamite" horizon.

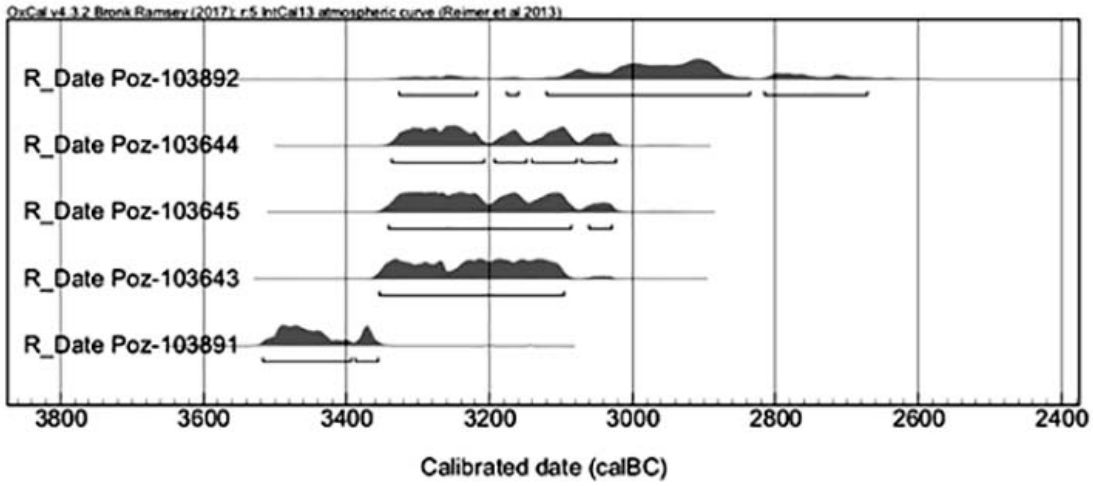

Figure 6: Graphical representation of calibrated radiocarbon dates from Tappeh Sofalin (Poz-103889 is excluded as unreliable)

In order to render our dates comparable to those analyzed by Pollard et al., a Bayesian model based on five dates (Poz-103889 was excluded as unreliable) was devised in OxCal, with boundary ranges calculated on the assumption that these five dates all belong to one phase (Fig 7). This is justified as we have, unfortunately, no indications for any stratigraphic sequence for any of these dates. They suggest a span from approximately 3500 to 2900/2800 BCE for the Sofalin Proto-Elamite occupation.

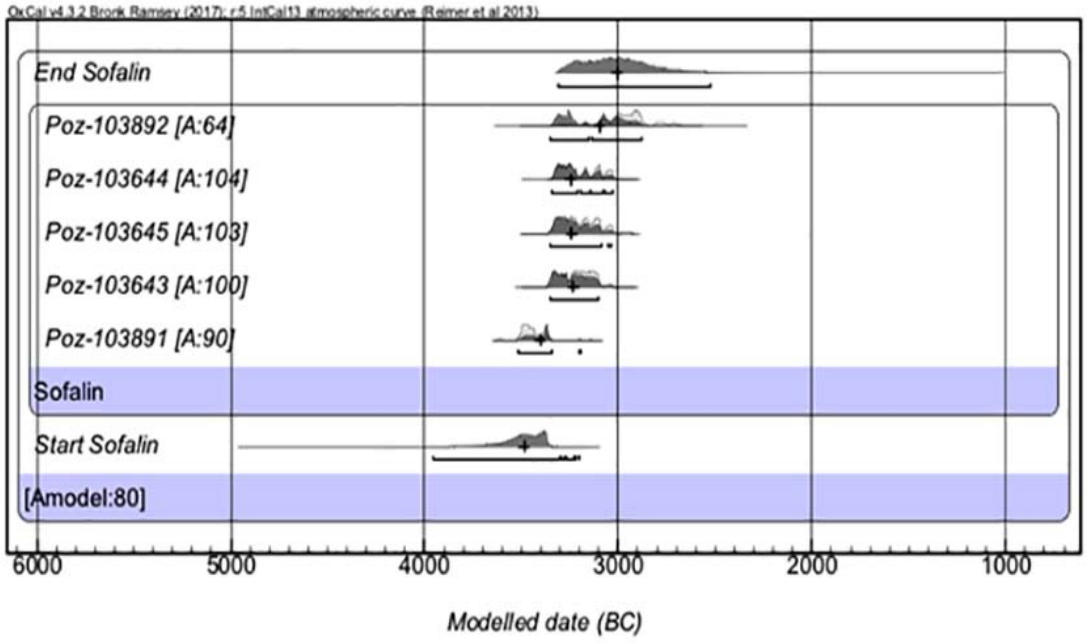

Figure 7: Modeled dates from Tappeh Sofalin (modeling using OxCal 4.3)

		unmodeled				modeled				
Site	Sample	from	to	%	median	from	to	%	median	A
Tappeh Sofalin T.30	Poz-103892	3328	2672	95.3	2954	3347	2877	95.4	3100	63.3
Tappeh Sofalin T.28	Poz-103644	3337	3029	95.3	3217	3341	3027	95.4	3246	103.4
Tappeh Sofalin T.31	Poz-103645	3342	3024	95.4	3217	3349	3036	95.4	3242	103.5
Tappeh Sofalin T.20	Poz-103643	3354	3097	95.4	3213	3355	3102	95.4	3234	99.6
Tappeh Sofalin T.31	Poz-103891	3518	3357	95.4	3457	3517	3197	95.4	3401	89.6
Qoli Darvish II.2	OxA-18095	3339	3017	95.4	3180	3109	3025	95.4	3068	100.1
Qoli Darvish II.2	OxA-18094	3322	2919	95.4	3047	3095	3022	95.4	3054	120.3
Qoli Darvish II.2	OxA-18040	3263	2911	95.4	3002	3093	3012	95.4	3047	92.1
Qoli Darvish II.2	OxA-17944	3340	3028	95.4	3220	3122	3025	95.4	3086	76.5

Table 2: Comparison of unmodeled and modeled radiocarbon dates from Tappeh Sofalin and Qoli Darvish; Qoli Darvish data based on information from Pollard et al. 2013: Table 7; Tappeh Sofalin data modelled using OxCal 4.3

Still, these dates provide some further hints for the development of a more robust chronology of the Proto-Elamite period. Qoli Darvish is of particular interest here, as it is located not far from Tappeh Sofalin and has typical Proto-Elamite finds in level II.2, including administrative items such as sealings and a few tablet fragments. There are four radiocarbon determinations from Qoli Darvish II.2 (Alizadeh, Aghili, and Sarlak 2013: 162). While there is substantial overlap of these dates with those from Tappeh Sofalin, the former seem to fall somewhat later (Table 2). Our comparison is based on the modeled data provided by Pollard et al. (2013, Tab. 7) and those from Tappeh

Sofalin reported here. On a more general level, these dates can be set in relation to those dates from Eanna Level IV and the White Temple in Uruk. The Uruk determinations are attributable to the Late Uruk period, and new laboratory studies have yielded determinations that date these levels to the 36th to mid-33rd centuries BCE (Van Ess 2013; Van Ess and Heußner 2015). Contrary to Desset's (2016) more recent assertion, the absolute dating of Late Uruk levels in southern Mesopotamia is thereby earlier than the Proto-Elamite radiocarbon samples from Tall-e Malyan, but also than ours reported here for Tappeh Sofalin or those from Arisman (Görsdorf 2011; Helwing 2011).

In conclusion, the new absolute dating evidence from Tappeh Sofalin indicates a relatively long span of settlement for the Proto-Elamite occupation at the site. It also tentatively supports the conclusions reached by Dahl et al. (2013) on the complex chronological patterns of the adoption of writing across the Iranian plateau. According to these authors, writing spread from Susa towards the northern plateau in a first phase. Archaeological evidence seems to confirm that this horizon on the Iranian plateau appears somewhat earlier than so far assumed. Any closer correlation of archaeological finds with Dahl et al.'s division into an "early", "middle" and "late" Proto-Elamite will need further investigation of the associated ceramic and sealing assemblages and especially a large number of absolute dates from well-stratified contexts. Most likely, the inclusion of the southeastern Iranian sites into the realm of Proto-Elamite writing followed only later. It is obvious that more evidence from Tappeh Sofalin itself, but also from related sites is needed for a critical evaluation of the results presented here.

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گذری بر نتایج جدید نمونه‌های کربن ۱۴ به منظور تاریخ‌گذاری مطلق تپهٔ سفالین پیشوا، ایران

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چکیده

در تابستان ۱۳۹۶، درچارچوب برنامه میدانی باستان شناسی طرح مشترک، کاوش مرحله جدید در تپه سفالین، واقع در دشت ورامین آغاز گردید. در این فصل تعداد ۲۰ نمونه کربن ۱۴ برای تاریخ گذاری مطلق جمع آوری گردید، که تعدادی از آنها مورد آزمایش قرار گرفت. در این مقاله نتایج بدست آمده از آزمایشگاه ارائه خواهد گشت و در یک مطالعه تطبیقی با سایر محوطه های هم افق خود در محدوده پژوهش قرار خواهد گرفت. در نهایت این پژوهش، درباره گاه نگاری و گسترش آغازایلامی در مرکز فلات ایران و سایر مراکز هم افق در ایران، مورد کنکاش قرار و بحث قرار می‌گردد. در تابستان ۱۳۹۶، درچارچوب برنامه میدانی باستان شناسی طرح مشترک، کاوش مرحله جدید در تپه سفالین، واقع در دشت ورامین آغاز گردید. در این فصل تعداد ۲۰ نمونه کربن ۱۴ برای تاریخ گذاری مطلق جمع آوری گردید، که تعدادی از آنها مورد آزمایش قرار گرفت. در این مقاله نتایج بدست آمده از آزمایشگاه ارائه خواهد گشت و در یک مطالعه تطبیقی با سایر محوطه های هم افق خود در محدوده پژوهش قرار خواهد گرفت. در نهایت این پژوهش، درباره گاه نگاری و گسترش آغازایلامی در مرکز فلات ایران و سایر مراکز هم افق در ایران، مورد کنکاش قرار و بحث قرار می گردد.

واژه‌های کلیدی: گاه نگاری مطلق، تپه سفالین، دشت ورامین، افق آغاز ایلامی، ایران.

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