SOJAS 2015 – 2018: A Résumé of Four Seasons of Archaeological Survey South of Jiroft

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Abstract: The SOJAS (South-of-Jiroft Archaeological Survey) Project aims to find the relations between the Jiroft Region and the shores of the Persian Gulf by investigating settlements, routes and natural resources in the plains and valleys located south of Jiroft, within the limits of the province of Kerman. Altogether, 209 archaeological sites have been discovered during the seasons of 2015–2018. These are located in several survey zones, among which the plains of Boluk and Faryab are the most prominent. Furthermore, the Varamin strip of the Middle Halil Rud Valley and the Lower Halil Rud Valley proved to be important settlement zones. Large-scale occupation in the region occurred in the Early and Middle Chalcolithic periods, with a first marked increasing in the Late Chalcolithic. During the Early Bronze Age, dense settlement patterns developed in almost all parts of the region. Several sites seem to be related to the procurement and exchange of chlorite artefacts. Of special importance is a probable settlement of miners in the Bagh-e Borj Mountains; an area where natural chlorite outcrops are most abundant. The end of the Early Bronze Age is characterized by a collapse of the settlement systems. Only very few sites existed during the 2nd millennium and the first half of the 1st millennium BCE. A full-scale re-occupation of the entire region occurred during the Achaemenid period. This trend continued into the Arsacid period, when the number of sites was doubled compared to the previous period. This period yielded the largest number of sites in the region. A dense occupation continued during the Sasanian and the Early Islamic to Seljuk periods. After the Seljuk period, a second settlement collapse took place, which left the region with only sparse occupation until modern times, when cities and villages in the region expanded as a consequence of agricultural intensification.

Keywords: Settlement systems; Natural resources, Chlorite, Diorite; Jiroft Culture

چکیده: پروژهٔ بررسی باستان‌شناختی جنوب جیرفت بر آن است که با بررسی محوطه‌های باستانی، راه‌ها، و منابع طبیعی در دشت‌ها و دره‌های جنوب جیرفت در استان کرمان به اطلاعات بیشتری دربارهٔ منطقهٔ جیرفت و کرانه‌های خلیج‌فارس دست یابد. طی فصول ۲۰۱۵ تا ۲۰۱۸ م. درمجموع ۲۰۹ محوطهٔ باستانی شناسایی شد. این محوطه‌ها در چند منطقه بررسی قرار دارند که دشت‌های بلوک و فاریاب مهم‌ترین آن‌ها هستند. علاوه‌بر این، نوار ورامین در قسمت میانی و سفلای دره هلیل رود از نواحی مهم تمرکز محوطه‌ها هستند. طی دوره‌های مس‌وسنگ قدیم و میانه است که مردم زیادی در منطقه سکنی گزیده‌اند که در دورهٔ مس‌وسنگ جدید افزایش چشمگیری میابد. طی عصر مفرغ قدیم تقریباً در تمام منطقه الگوی استقراری فشرده‌ای شکل گرفت. به نظر می‌رسد چند محوطهٔ باستانی به استحصال و تبادل اشیایی از سنگ صابون مربوط بودند. موردی مهم در این زمینه استقرارگاهی احتمالی متعلق به معدنکاوان در کوهستان باغ بوری است که برونزدهای سنگ صابون به‌وفور یافت می‌شوند. پایان عصر مفرغ شاهد فروپاشی الگوی استقراری بود. طی هزارهٔ دوم و نیمهٔ نخست هزارهٔ اول پ.م. تعداد انگشت‌شماری محوطهٔ باستانی باقی‌مانده بود. طی دورهٔ هخامنشی کل منطقه دوباره مسکون شد. این وضعیت تا دورهٔ اشکانی ادامه یافت، به‌طوری که محوطه‌ها نسبت به دورهٔ قبل دو برابر شد. این دوره شاهد بیشترین تعداد محوطه‌ها در منطقه بود. تراکم استقراری تا دورهٔ ساسانی و صدر اسلام تا دورهٔ سلجوقی ادامه یافت. پس‌از دورهٔ سلجوقی الگوی استقراری دوباره فروپاشید و باعث شد جمعیت محدود و پراکنده‌ای در منطقه ساکن بماند. این وضعیت تا عصر حاضر ادامه یافت و با تشدید کشاورزی در منطقه بود که روستاها و شهرها در منطقه رشد کردند.

کلیدواژگان: الگوی استقراری، منابع طبیعی، کلوریت، دیوریت، فرهنگ جیرفت

The University of Tübingen and the Iranian Centre for Archaeological Research (ICAR) jointly carry out the archaeological research project "South-of-Jiroft Archaeological Survey" (SOJAS), directed by P. Pfälzner (Tübingen) and N. A. Soleimani (ICHHTO Kerman). M. Karami from Tübingen University acts as field director while N. Nezafati (Olum va Tahghighat University of Teheran) cooperates with the project as geologist and studies mineral deposits in the

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region, particularly with regard to petrography. A further component, introduced in 2018, is an ethnographical study in the same region, jointly supervised by ICAR and the anthropologist S. Klocke-Daffa from Tübingen University.

Aims of the project

The main aim of this project is to gain a better understanding of the connections of the Jiroft Region in South-East Iran and the Persian Gulf Area. The Persian Gulf Area was always a major traffic line between Iran, Mesopotamia and several other regions as far as India, throughout many prehistorical and historical periods. During the Early Bronze Age, the Persian Gulf was the major passage for the exchange of goods between Mesopotamia in the west and the regions of Magan and Meluḫḫa in the east (Lamberg-Karlovsky, 1972; Heimpel, 1987a; 1987b; Potts, 1982; 2009; 2017; Glassner, 1996; Aruz – Wallenfels, 2003; Possehl, 2012; Pittman, 2013). In the Achaemenid, Sasanian and Islamic periods, its significance for international traffic and exchange between East and West, including South-East Iran, was equally high (Reade, 1996; Whitehouse, 1996; Daryaee, 2003; 2009; Hauser, 2012; 2013). Our project seeks to study how and through which routes the wide basin of the Halil Rud, and, in particular, the region of Jiroft, was integrated into this interregional exchange system during the different periods. Settlements, natural deposits of mineral resources and landscape over time are the most important factors in answering this question. As an example, for the Early Bronze Age, precious stones – such as chlorite in the form of stone vessels and possibly diorite and gabbro for the fabrication of large statuary – are a clear indication of the exchange networks between South-eastern Iran and Mesopotamia. How and along which routes were these objects traded? At this point, also the modern period comes into consideration for a comparative analysis. This understanding initiated an ethnographical study of exchange networks and relations in the wider Jiroft Region.

In order to answer these questions in different periods, the SOJAS archaeological project takes three sorts of evidence into particular consideration: a) The major natural passages between the Jiroft Basin and the shores of the Persian Gulf in Hormozgan are studied to judge whether they plausibly could have functioned as traffic lines between the mentioned regions; b) The settlement patterns along these corridors are investigated diachronically to understand social dynamics arising in these areas as a consequence, or alternatively as a precondition, of exchange networks; c) The natural mineral deposits of chlorite, diorite/gabbro and calcite surrounding the Jiroft Basin are documented and sampled in order to gain insight into their distribution, potential exploitation and possible integration into exchange networks in antiquity.

The survey zones

Three seasons of survey (2015, 2016 and 2018) and one study season (2017) have been carried out by the SOJAS Project, so far. The survey activities were, up to now, focused on several inter-connected regions south of Jiroft (Fig. 1):

- A small strip of the Middle Halil Rud Valley, immediately south of Jiroft and west of the Halil Rud River, called the Varamin strip (survey zone G), was systematically investigated in our survey; as this area is assumed to have been an access zone to the corridors mentioned below.
- The plain of Boluk (survey zone A), which is irrigated by the Boluk River and forms a narrow but elongated basin opening to its eastern side onto the Middle Halil Rud Valley, was intensively surveyed. It constitutes the first part of a corridor leading towards the Persian Gulf, the so-called 'Boluk-Faryab-Corridor'. This corridor passes the plains of Boluk and Faryab and leads into the wide basin of Ziyaret Ali, from where the route continues down into the Rudan and Minab regions; the latter is a gateway to the Persian Gulf Shore.
- The plain of Faryab (survey zone B) was as intensively surveyed as the aforementioned plain. It forms the second part of the 'Boluk-Faryab-Corridor' connecting the Jiroft Plain to the Persian Gulf. The plain is a wide, but

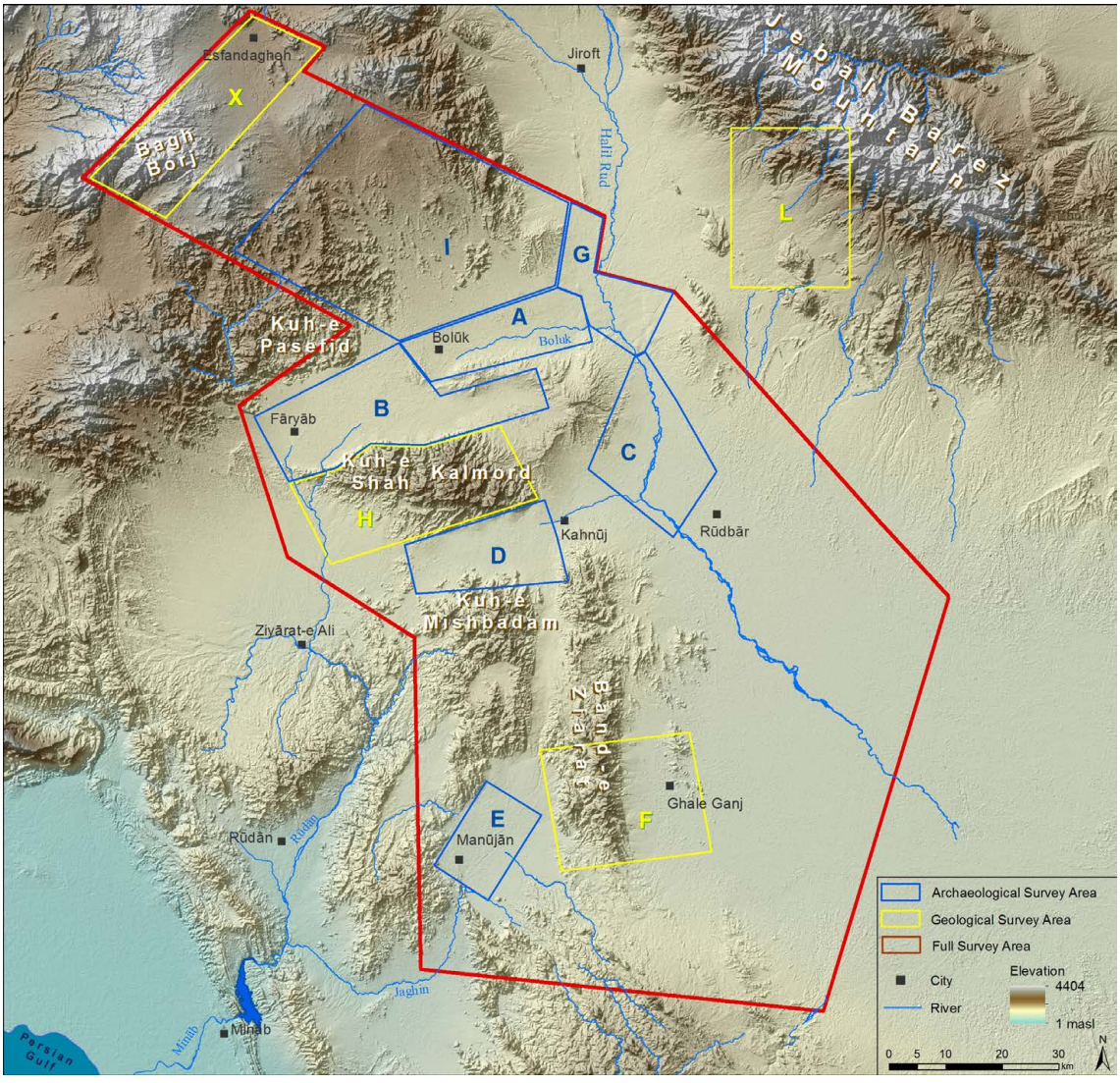


Fig. 1. Map of the SOJAS project with zones of intensive survey 2015–2018.

only in parts, fertile plain surrounded by high mountains on almost all sides. It is directly connected to the Boluk Plain by a flat passage at its eastern end.

- The region of Gulashgerd (survey zone H) forms a third part of the 'Boluk-Faryab-Corridor' and connects the plain of Faryab to the Ziyaret Ali Basin, the latter located mainly in Hormozgan province. Gulashgerd itself is a gorge starting at the southwestern end of the Faryab Plain and opening onto the Ziyaret Ali Plain. The Gulashgerd or Dahaneh Shirin River passes through this gorge, which offers a comfortable passage towards the south. Our intensive survey covered the valleys of Gulashgerd or Dahaneh Shirin River and its tributary, the Dahaneh Shur, as well as that of the Darreh Rud which represents the confluent of the two aforementioned rivers. Here, the survey area extends up to the provincial border between Kerman and Hormozgan.

  In addition to the mentioned valleys, the archaeological survey in zone H was extended into the Kalmord Mountains, located east of the Dahaneh Shur and Dahaneh Shirin river system. This mountainous area was searched for natural chlorite deposits.

- The Lower Halil Rud Valley, or western Rudbar Plain (survey zone C), is located east of the Kalmord Mountains and forms the

westernmost part of the Jazmuryan Basin. It is separated from the Middle Halil Rud Valley, or Jiroft Plain, by the narrow gorge of Bahadorabad, where the Halil Rud River passes through hilly areas to both sides of the river. So far, only the western part of zone C, located on the right side of the river, below the Bahadorabad narrows, has been covered by our survey activities. The Lower Halil Rud Valley forms the first part of the 'Kahnuj-Manujan-Corridor', which is the second important passage connecting the Jiroft Region to the Persian Gulf. This passage further-on passes through the plains of Kahnuj and Manujan, from where it reaches the Minab Area close to the shores of the Persian Gulf. However, our survey activities, until to the 2018 season, have not yet reached the Kahnuj and Manujan plains; they are envisaged for future campaigns of the project.

In addition, the routes defined by the 'Boluk-Faryab-Corridor' and the 'Kahnuj-Manujan-Corridor' can also be combined by an east-west connection through the plain of Kahnuj. This cross-cutting directly connects the Kahnuj Plain to the Ziyaret Ali Plain. Thus, a third alternative corridor can be proposed, namely the 'Kahnuj-Ziyaret Ali-Corridor'. Its role could be evaluated by a survey on the western part of the elongated Kahnuj Plain, which remains to be done in future seasons of the project.

- The Bagh-e Borj Mountainous Region (survey zone X) is situated on the west of the Jiroft Plain and northwest of the Boluk Plain. Due to the steep mountains along the western side of the Jiroft Plain, zone X can best be reached from the Boluk Plain. This area is investigated in our project because of its natural deposits of chlorite. Furthermore, ancient settlement activities are studied in this zone in order to identify those periods in which human occupation was present close to the natural stone resources. Thus, we can trace the phases of potential human access to these resources, seen as a pre-condition for its exploitation.
- The Band-e Ziyaret Mountains together with the plain of Qaleh Ganj, located at the eastern foots of the mountains, were selected for a geological survey of diorite and gabbro deposits (survey zone F). In addition, the investigation of the presence of settlements around these deposits aims to trace the potential human access to the stone resources of this area during different periods.
- The Jebal Barez Mountains (survey zone L) were investigated to spot natural deposits of calcite, a material highly appreciated for fabricating stone vessels during the Early Bronze Age. The Jebal Barez is located to the east of the Middle Halil Rud Valley, or the Jiroft Plain. Direct access to these mountains is granted from the eastern periphery of the Jiroft Plain.
- A final zone of investigation is located immediately to the west of the Middle Halil Rud Valley, at the foothills of the mountains, west of the Jiroft and north of the Boluk Plains (survey zone I). This area was hitherto only shortly investigated. Its value lies in its potential for yielding evidence of connections between the Bagh-e Borj mountainous region and the plains of Jiroft and Boluk.

In the following chapters, the primary results of the 2015 to 2018 seasons of survey in the mentioned zones are presented. We will first consider the development of settlement patterns from the Neolithic to the Islamic periods. Thereafter, the localization and the relation of the investigated stone resources to the settlements will be examined. Finally, the importance of the different corridors connecting the Halil Rud Basin to the Persian Gulf will be preliminarily discussed. This will lead to some first general conclusions of the project.

In total, 209 sites have been registered during the three survey campaigns, 184 of which have been documented and sampled systematically and intensively. Most of the sites, 75 in number, were located in zone B, the Faryab Plain. This is followed by zone A, the Boluk Plain, where 36 sites were documented. Zone G, the Varamin Strip of the Jiroft Plain, yielded 29 sites. Up to

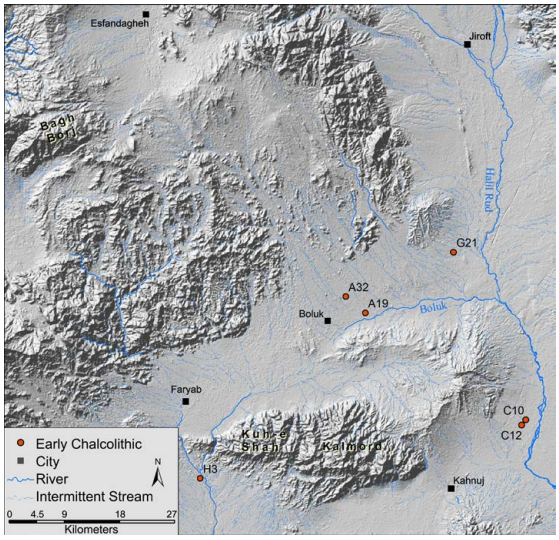


Fig. 2. Left: Settlements of the Early Chalcolithic period in the SOJAS region (survey of 2015–2018).

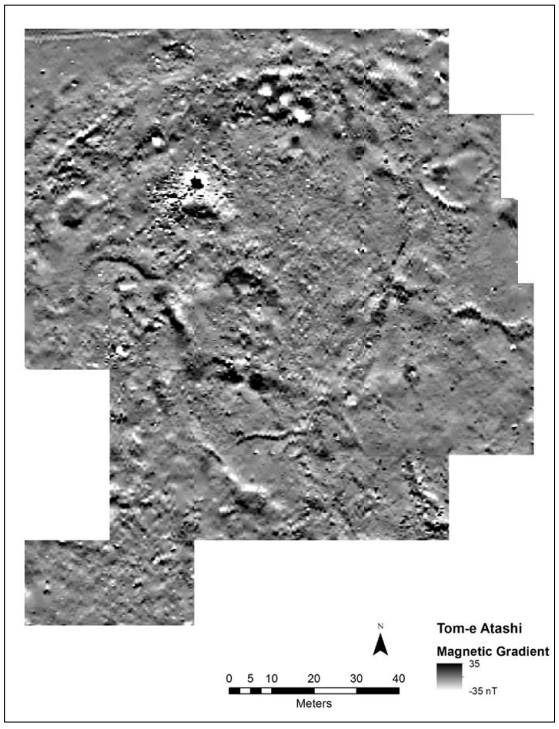


Fig. 3. Right: Geomagnetic prospections at the Early Chalcolithic site of Tom-e Atashi (site A19).

now, 23 sites were found and sampled in zone C, the Lower Halil Rud Valley, where survey activities only started in 2018 and need to be continued. Zone X, the Bagh-e Borj mountainous area, yielded, surprisingly, the high number of 19 sites. In zone F, the Band-e Ziyaret Mountains and the plain of Qaleh Ganj, 12 sites were recorded, but not all of them were fully documented yet. Zone H, the Valley of Gulashgerd and the adjacent Kalmord Mountains, yielded 7 sites, while zone I, located immediately to the west of the Jiroft Plain, revealed 8 sites.

The development of settlement patterns

From the Epipalaeolithic to the Middle Chalcolithic period

The earliest occupation, retrieved so far in the region to the south of Jiroft, is dated to the Epipalaeolithic period. It is only one site (B75), located in the southern part of the Faryab Plain (zone B), close to the banks of the Chil-e Shur River. A large number of stone artefacts were discovered, reminiscing of the Zarzian Culture of the Western Zagros (personal communication with J. Thomalsky). Due to its position on the flat plain, the place can be considered an open air site of hunter and gatherer groups.

No occupation of the Neolithic period is recorded in the survey zones, so far. Pottery types similar to the ceramics from the Neolithic site of Gav Koshi on the Esfandagheh Plain, excavated by one of the authors (N.A.S.) recently (Soleimani, 2016a; 2016b), were not yet recovered in our survey.

As attested by surface finds, occupation in the regions south of Jiroft started in the Transitional and Early Chalcolithic periods (5200–4500 BCE),[1] with seven sites attested for the two successive phases (Fig. 2). These earliest periods are characterized by pottery specimens of the Chaff-tempered Coarse Ware, also known as Lalehzar Ware (Beale, 1986: 39–47; Chase et al. 1967: 149–152, figs. 1–3, pl. 3, Tabs. I-III), and Yahya VC and VB types, particularly the Yahya Black-on-buff Ware (Beale, 1986: 55–67, fig. 4.20). Three sites (A9, A19, A32) of this date were found in the Boluk Plain (zone A), of which Tom-e Atashi (site A19) is the most interesting. Geomagnetic prospections carried out at this site, yielded a circular enclosure of a village with no signs of solid architecture inside (Fig. 3). This suggests the existence of organic, ephemeral buildings. Further Early Chalcolithic settlements were discovered in the Gulashgerd/ Darreh Rud Valley (zone H), in the Varamin Strip of the Jiroft Plain (zone G) and on the Lower Halil Rud (zone C).

The Middle Chalcolithic period (4500–4000

1. For the absolute dating of the SOJAS periods, see: Pfälzner – Soleimani 2017, 117-121, fig. 13.

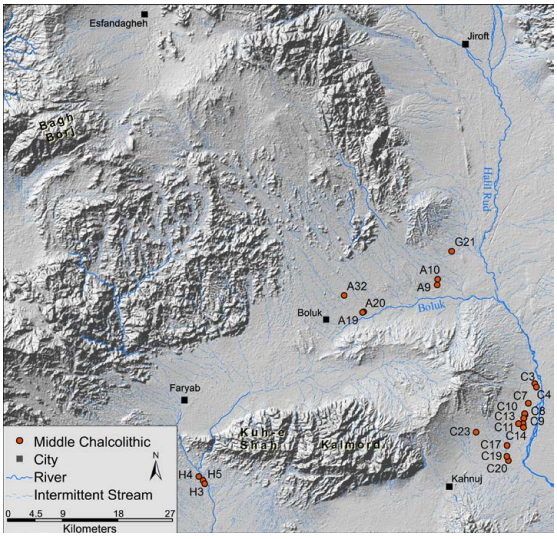


Fig. 4. Left: Settlements of the Middle Chalcolithic period in the SOJAS region (survey of 2015–2018).

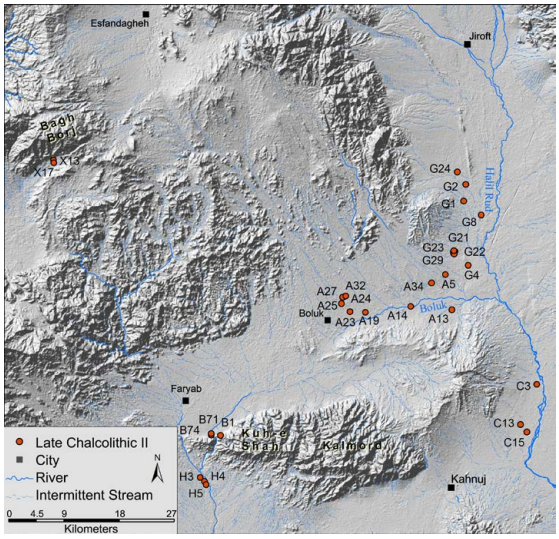


Fig. 5. Right: Settlements of the Late Chalcolithic II period in the SOJAS region (survey of 2015–2018).

BCE) witnessed a remarkable incline in the number of settlements for the first time. Altogether, 20 sites were recorded for this period (Fig. 4). They are characterized by the occurrence of Black-on-red Ware of the Yahya VA type (Beale, 1986: 67-80). Interestingly, most of these sites (12 in number) are located along the western bank of the Lower Halil Rud, in zone C. They are all small and situated close to each other, in a line from north to south. Next in density is zone A, the Boluk Plain, which yielded four Middle Chalcolithic sites. Only one site of this period (site G21) was located in the Varamin Strip of the Jiroft Plain (zone G). Interestingly again, there was a cluster of three Middle Chalcolithic sites at Bagh-e Kahur in the valley of the Gulashgerd/Darreh Rud River in zone H (sites H3, H4, H5). No occupation of this period was recorded in the Faryab Plain. As a preliminary conclusion, it can be argued that the lower course of the Halil Rud played an important role in the development of the Middle Chalcolithic Culture south of Jiroft.

The Late Chalcolithic period

The Late Chalcolithic I period (4000–3700 BCE), which is characterized by Mahtoutabad pottery types (Vidale and Desset, 2013: 241–246, fig. 13.08/13.15; Pfälzner and Soleimani 2017: 119), is sparsely represented in the survey region south of Jiroft. It is hitherto only attested at three sites, two of which (G1 and G8) are located in the Varamin Strip of the Jiroft Plain. Thus, Mahtoutabad pottery seems to be a phenomenon which is strongly concentrated on the Jiroft Plain[2].

A sharp increase in settlement takes place during the Late Chalcolithic II period (3700–3400 BCE), which has also been labelled the 'Aliabad Phase' due to the occurrence of the typical painted and unpainted Aliabad potteries (Chase et al. 1967: 182–188, pls. 8, 10, figs. 21–28; Soleimani et al. 2016). Altogether, 30 sites of this period were documented (Fig. 5). At the same time, a regional shift of settlement occurred: the major occupation is now concentrated on the Boluk and the Jiroft plains. Ten sites were recorded on the Boluk Plain (zone A) and nine sites on the Varamin Strip of the Jiroft Plain (zone G). Along the Lower Halil Rud (zone C), where the majority of the Middle Chalcolithic sites had been recorded, only three Aliabad sites could be detected. Of particular importance is, again, the Gulashgerd Region (zone H), where three Aliabad sites are located (H3, H4, H5) (Fig. 6). These are the same places as those of the Middle Chalcolithic period demonstrating the continued significance of this region. Contrary to the situation in the Early and Middle Chalcolithic periods, settlements are now also attested in the Faryab Plain (zone B), where three Aliabad sites were documented. Finally, a new region comes into view: the Bagh-e Borj mountainous area (zone X), where two neighbouring Aliabad sites were discovered. In conclusion, when taking the

2. At Mahtoutabad, an own phase, Phase I, has been attributed to this phenomenon (Vidale and Desset, 2013).

Fig. 6. The site of Bagh-e Kahur (site H3) in the Valley of Gulashgerd/ Darreh Rud, settled from the Early Chalcolithic period onwards though many later periods.

intensive occupation of the plains of Jiroft and Boluk during this phase into consideration, the Late Chalcolithic period II can be considered a formative phase of the urban culture of the Early Bronze Age in the Jiroft Region.

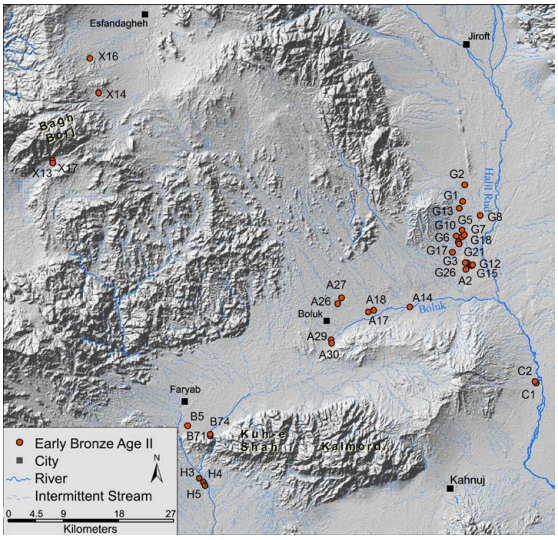
The Late Chalcolithic III (3400–3200 BCE), which can be equated with the "Late Uruk Horizon" (or Mahtoutabad III phase) is weakly attested in our region. Only four sites can be attributed to this period so far, two of which are located in the Bagh-e Borj Mountains (zone X), while one site was recorded in the Varamin Strip in the Jiroft Plain (zone G) and one in the Gulashgerd Region (zone H). In view of the scarcity of "Late Uruk" occupation in the region – which is so impressively attested at Mahtoutabad, Phase III (Desset et al. 2013) – a gap of occupation in large parts of the region could theoretically be postulated. However, this might be an oversimplified assumption. Contrary to it, an alternative hypothesis is proposed here: at many sites, especially those not influenced by the "Late Uruk-aspect" of the cultural development in the Jiroft Region, the occupation might have developed directly and uninterruptedly from the Aliabad phase into the Early Bronze Age, "bypassing" the Late Uruk segments of the society.

The Early Bronze Age

The Early Bronze Age I, or Proto-Elamite period (3200–2900 BCE) is also weakly attested in the region. Only two sites, one in the Boluk Plain (zone A) and one in the Gulashgerd Area (zone H), display the characteristic pottery specimens of this period as attested at Tepe Yahya Phase IVC2 (Potts, 2001: 1–54, 195–198; Mutin, 2013: 51–53; Petrie, 2013: 147–151). One possible reason for this scarcity, among others, might be the fact that only a very limited number of diagnostic types exist at Tepe Yahya for phase IVC2, making it difficult to clearly assign pottery to this period.[3]

The Early Bronze Age II (2900–2500 BCE) witnessed the emergence of urban culture in the Jiroft Plain, as is most impressively attested at Konar Sandal South (Madjidzadeh and Pittman, 2008: 75–88, Tab. 2). This phenomenon is referred to as the "Jiroft Culture", with its Phase A attributed to the first half of the 3rd millennium BCE. A substantial increase of sites is attested for this period. A total number of 35 sites of this date have been recorded, so far, in all survey zones (Fig. 7). The highest concentration occurs in zone G, the Varamin Strip of the Jiroft Plain. Here, 15 sites are located close to each other. Among them is the largest urban agglomeration of the Early Bronze Age within our survey areas: the site of Hajjiabad-Varamin (site G1) (Pfälzner and Soleimani, 2017: 122, 129, figs. 24-27). A second cluster of sites can be found in the Boluk Plain, where eight sites have been recorded. In contrast, the adjacent plain of Faryab, to the west, housed only very few Early Bronze Age sites. Only three sites yielded pottery of this period. Interestingly,

3. Based on the assumption that Tepe Yahya Phase IVC1 needs to be dated later, separated from Phase IVC2 by a hiatus (compare the opinion of the present authors on the Yahya chronology as presented in Pfälzner and Soleimani, 2017: 120, fn. 109).



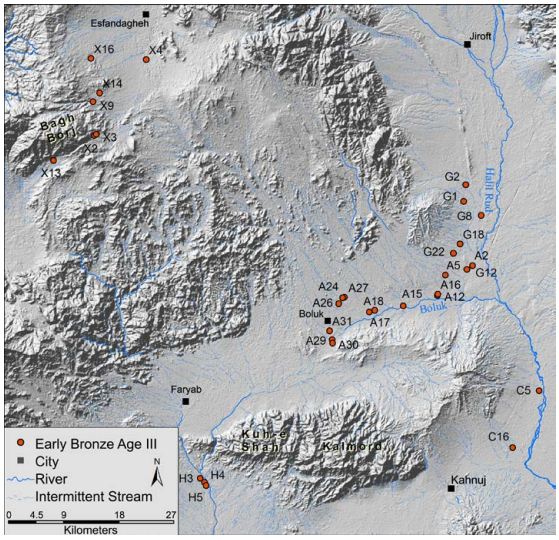


Fig. 7. Left: Settlements of the Early Bronze Age II in the SOJAS region (survey of 2015–2018).

Fig. 8. Right: Settlements of the Early Bronze Age III in the SOJAS region (survey of 2015–2018).

they exclusively centre on the southernmost margin of the plain, where there are the entrances into the valleys of the Dahaneh Shirin and the Dahaneh Shur rivers leading through the mountains towards the south. Thus, these sites could be seen in connection with routes leading towards the south, into Ziyaret Ali Plain, as part of the 'Boluk-Faryab-Corridor'. This is supported by the presence of three sites in the Gulashgerd/Darreh Rud Valley of zone H, at exactly the place where the two aforementioned valleys enter the Ziyaret Ali Plain. These sites (H3, H4, H5) demonstrate a continuity of occupation from the Late Chalcolithic onwards (see above), which shows their importance as permanent stations along the 'Boluk-Faryab-Corridor'. Another region of interest for the Early Bronze Age II is the Bagh-e Borj Mountain area (zone X), where four sites of the first half of the 3rd millennium BCE were identified. In contrast, the Lower Halil Rud region (zone C) was only scarcely populated during the Early Bronze Age; only two sites of this period have been recorded on the right bank of the river.

The Early Bronze Age III (2500–2000 BCE), which is characterized by the occurrence of lavishly decorated chlorite vessels (Madjidzadeh, 2003), is labelled Phase B of the urban "Jiroft Culture". The settlement patterns are marked by a strong degree of continuity from the first half of the 3rd millennium BCE. The total number of sites is 31 and, thus, equals the settlement density of the Early Bronze Age II (Fig. 8). However, the highest concentration of settlement can now be observed at the Boluk Plain (zone A). Here, 13 Early Bronze Age III sites can be found. The neighbouring zone G, the Varamin Strip of the Jiroft Plain, yielded only six sites of this period. Thus, a settlement shift from zone G towards zone A seems to have taken place during the second half of the 3rd millennium BCE. Another region showing an increase in occupation during the Early Bronze III period is the Bagh-e Borj Mountain area, or zone X. Here, seven sites were recorded. One of them (site X3) is located very close to the natural chlorite deposits. On the contrary, the Lower Halil Rud Region remains only scarcely populated during this period, while the Faryab Plain is even devoid of any Early Bronze Age III settlement remains. Interestingly, the Gulashgerd/Darreh Rud Region (zone H) is still characterized by the continued presence of the three aforementioned sites, namely H3, H4 and H5, during the second half of the 3rd millennium BCE.

From the Middle Bronze Age to the Iron Age

A sharp decline in settlement activities in the region south of Jiroft took place in the Middle Bronze Age. Occupational remains as indicated by surface pottery were retrieved at only three sites, two of them in zone A and one in zone G. For the Late Bronze Age, no occupation was detected at all. During the Iron Age, a weakly attested reoccupation seems to have taken place.

Fig. 10. The Achaemenid cairn cemetery of Gurestan-e Pashmuki (site B46) in the Plain of Faryab, at the foot of the Kalmord Mountains (right).

Pottery of a possible Iron Age I or II date was only found at five sites. Generally, the long time span from the Middle Bronze Age to the Iron Age (ca. 2000–550 BCE) seems to have been characterized by a disruption of settlement continuity and, to a large extent, by an abandonment of the region.

The Achaemenid period

The Achaemenid period (550–300 BCE) witnessed a revival of settlement activities in the region (Fig. 9). Both the Varamin Strip of the Jiroft Plain and the Boluk Plain were settled again, with three sites in zone G and four sites in zone A. An astonishing development characterizes the Faryab Plain (zone B). Here, a large number of sites could be discovered; 13 in total, many of them being cairn cemeteries along the foot of the Kalmord Mountains (Fig. 10). Thus, for the first time in history, the Faryab Plain became intensively settled. Probably, this was due to the development of Qanat irrigation systems. On the contrary, there is no occupational evidence of this period yet in the Lower Halil Rud Region, or zone C. An isolated Achaemenid settlement was discovered in the Bagh-e Borj Mountains (zone X).

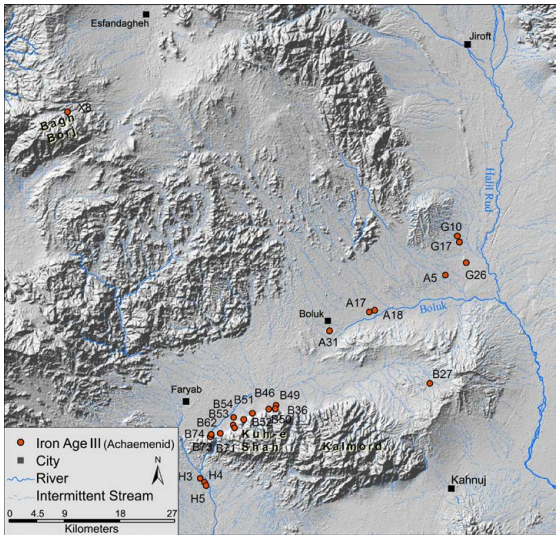


Fig. 9. Settlements of the Achaemenid period in the SOJAS region (survey of 2015–2018).

The Arsacid period

The Arsacid or Parthian period (300 BCE–250 CE) saw a continuation of the settlement patterns of the previous period.[4] However, the density of settlement increased considerably. Altogether, 53 sites of the Arsacid period were recorded so far (Fig. 11). Thus, the number of sites was more than doubled in comparison to

4. The sites and recorded potteries attributed to the Arsacid period potentially include also some of the early Sasanian period, as the ceramics of the transitional phase between the two periods are very difficult to differentiate chronologically (Pfälzner and Soleimani, 2017: 121, fig. 12).

Fig. 12. The Arsacid site of Tom-e Moradabad (A28) in the Boluk Plain (drone photography by Amir Ahmadpour)

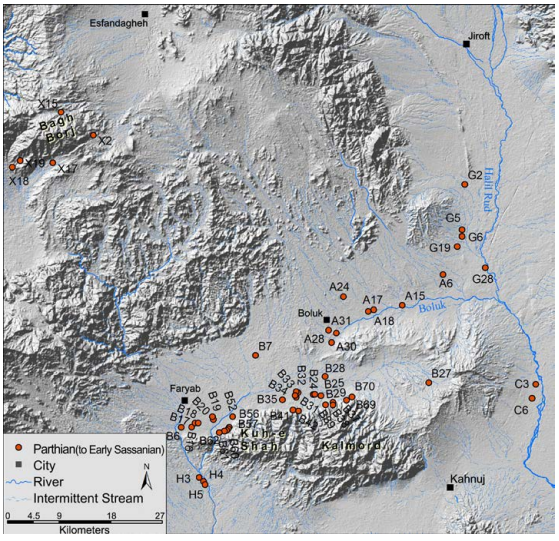


Fig. 11. Settlements of the Arsacid (Parthian) period in the SOJAS region (survey of 2015–2018).

the previous Achaemenid period. This makes the Arsacid period the most abundantly attested phase in the survey region. Most of sites of this period, 30 in number, are again located in zone B, the Faryab Plain. Among them are numerous cairn cemeteries along the foot of the Kalmord Mountains, as in the previous period. But also the Boluk Plain (zone A), where eight sites were recorded, was densely occupied. The same is true for the Varamin Strip of the Jiroft Plain (zone G), where five sites were documented. Additionally, Parthian sites were found on the Lower Halil Rud River (zone C), in the Bagh-e Borj Mountains (zone X) and in the Gulashgerd Region (zone H). With regard to the latter area, it is interesting to note that the very ancient Chalcolithic and Early Bronze Age sites of H3, H4 and H5 on the Gulashgerd/Darreh Rud River were settled once more during this period.

Of particular interest is the site of Tom-e Moradabad (site A28), located at the western end of the Boluk Plain (Fig. 12). Here, a Parthian castle of rectangular shape could be retrieved with the help of a geomagnetic prospection (Fig. 13). More sites of this kind seem to be present, as for example in the Faryab Plain. This hints at the existence of a hierarchical, fortified, possibly state-controlled settlement pattern in the regions south of Jiroft during the Arsacid period.

The Sasanian period

The Sasanian period (250–640 CE)[5] shows a shift in the settlement patterns (Fig. 14). The Faryab Plain is considerably less occupied, a

5. The Sasanian period (Period 16 of the SOJAS chronology) possibly includes some very early Islamic sites and potteries, as the transitional phase between the two periods is hard to define (Pfälzner and Soleimani, 2017: 121, fig. 12).

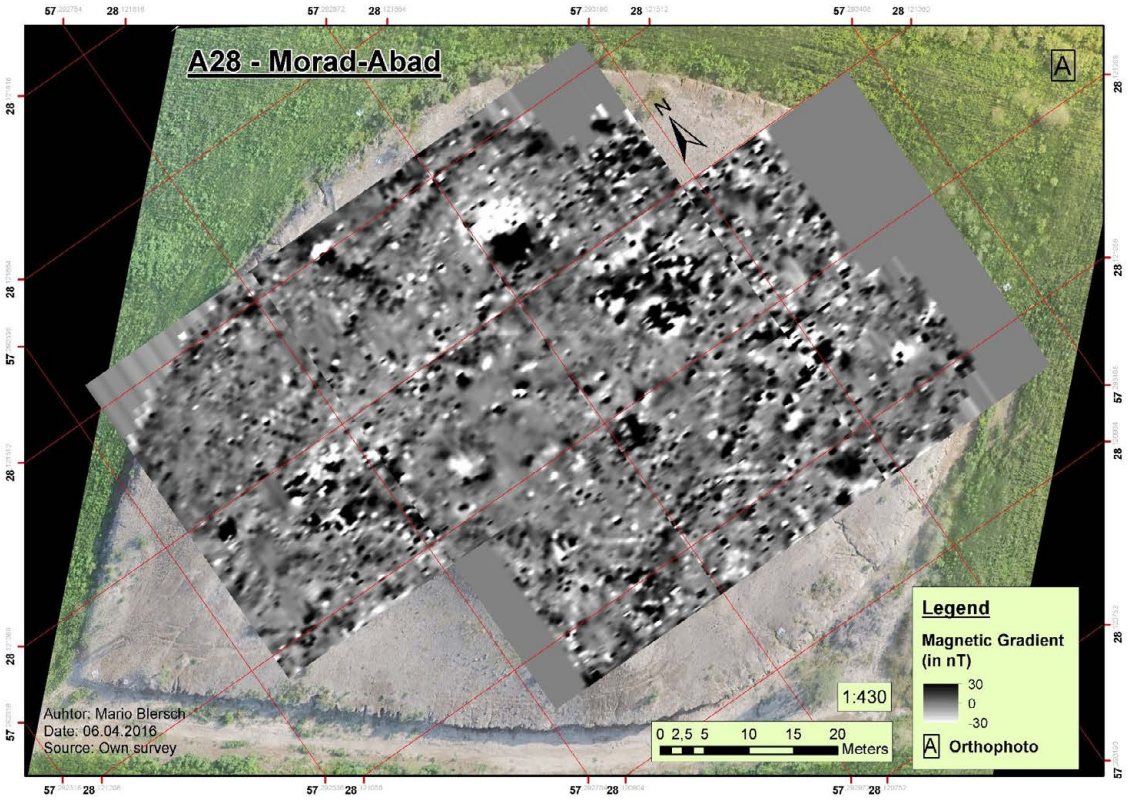


Fig. 13. Result of the geomagnetic prospections at the Arsacid site of Tom-e Moradabad (A28).

picture influenced by the decreasing number of cairn cemeteries. Still, 14 sites exist on the Faryab Plain (zone B), among them the large site of Tom-e Hesar (site B4), where a Sasanian castle of rectangular shape war recorded through a geomagnetic prospection (Figs. 15 and 16). Smaller satellite sites were spread around this mounded site. Glass production can be identified on some of them. Thus, Tom-e Hesar was probably the central place of the fertile plain during this period, controlling agricultural activities as well as handicraft production.

The Boluk Plain (zone A) housed the same number of sites, 14 in total, as the neighbouring plain of Faryab during the Sasanian period. This dense pattern of sites extends uninterruptedly into the Varamin Strip of the Jiroft Plain (zone G), where eight sites could be identified, among them the large urban site of Dor Khatun (site G7). Substantial architecture was recorded at this place through geomagnetic prospections. In contrast, the right bank of the Lower Halil Rud (zone C) as well as the Bagh-e Borj Mountains (zone X) were only sparsely populated during this

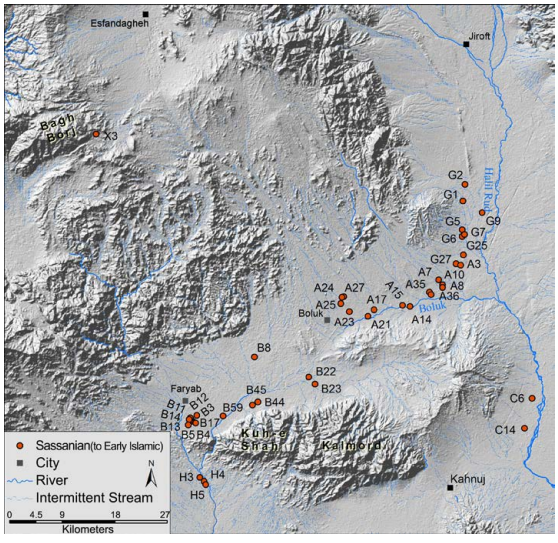


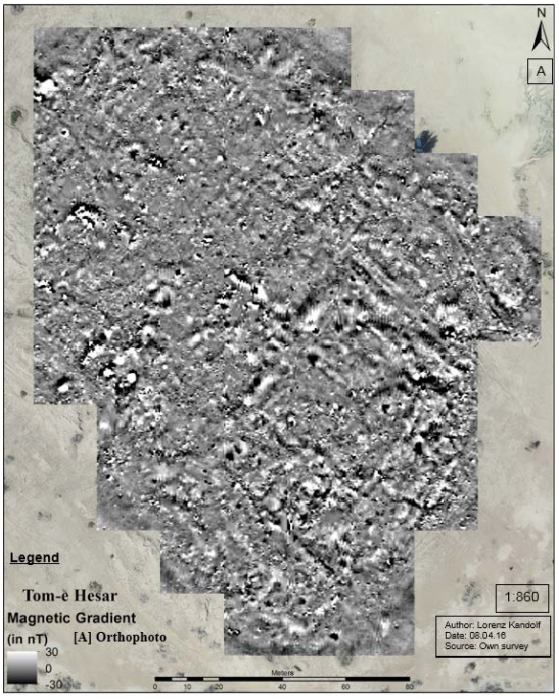
Fig. 14. Settlements of the Sasanian period in the SOJAS region (survey of 2015–2018).

period. Furthermore, it is interesting to note that the sites H3, H4 and H5 in the Gulashgerd Area (zone H), settled in many previous periods (see above), were still active during Sasanian times.

The Islamic period

The Early Islamic and Seljuk periods (640–1200 CE)[6] witnessed the last phase of intensive occupation of the region south of Jiroft before

6. Both combined into one period for the documentation of surface potteries and sites, i.e. SOJAS period 19 (Pfälzner and Soleimani, 2017: 121, fig. 12).



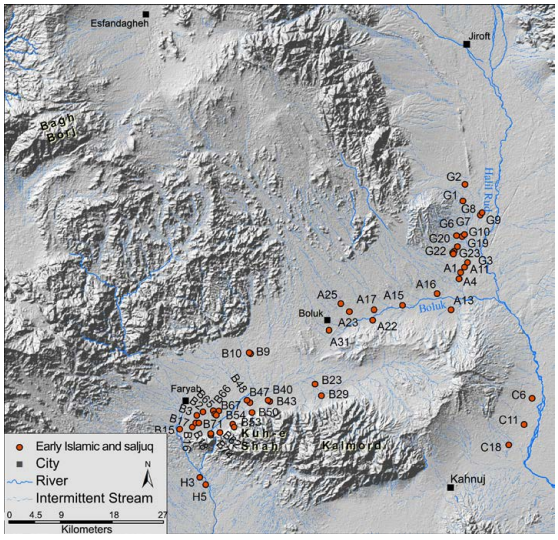


Fig. 15. Top: The Sasanian site of Tom-e Hesar (B04) in the Faryab Plain (drone photography by Amir Ahmadpour).

Fig. 16. Down left: Result of the geomagnetic prospections at the Sasanian site of Tom-e Hesar (B04).

Fig. 17. Down right: Settlements of the Early Islamic and Seljuk periods in the SOJAS region (survey of 2015–2018).

modern times. 51 sites could be attributed to this period (Fig. 17). Most of them, 23 in number, are located in the plain of Faryab (zone B), making this plain the most densely occupied area within our survey region during the mentioned time. The large urban settlement of Sharb-e Ma' (site B15) is the most prominent site on the Faryab Plain (Fig. 18). It is located close to the entrance of the Gulashgerd gorge, thus controlling this important point along the 'Boluk-Faryab-Corridor' and, therefore, the route towards the Persian Gulf. Site B15 can be seen in connection to two other sites of the same period further south, in zone H, along the Gulashgerd/Darreh Rud River (sites H3 and H5).

Second in number of settlements of the Early Islamic and Seljuk periods is the Varamin Strip of the Jiroft Plain (zone G), where 12 sites were recorded. Surely, these sites need to be seen in dependence of the huge Early Islamic to Seljuk urban centre of Old-Jiroft, located close to the

Fig. 18. The Early Islamic and Seljuk site of Sharb-e Ma' 1 (B15) at the southern end of the Faryab Plain.

modern city of Jiroft, outside of our survey area (Chubak, 2004). The Boluk Plain (zone A) was also densely populated during this time, with 11 sites. Less settlements were recorded, so far, on the right bank of the Lower Halil Rud (zone C), and not a single one in the Bagh-e Borj Area (zone X).

Settlement decreases considerably during the Middle and Late Islamic periods, which seems to have been an effect of the devastations of the Mongolian incursions. Only in modern times, these regions, especially the plains of Jiroft, Boluk, Faryab and Rudbar, were intensively settled again, in combination with intensified, highly productive irrigation agriculture.

The exploitation of stone resources

The Bagh-e Borj Mountains (zone X) are identified as the main source of chlorite in South-Eastern Iran. The natural deposits of chlorite were intensively documented in collaboration with the geologist N. Nezafati (Fig. 19). Four major outcrops of chlorite were identified, two on the eastern slope of the mountains (sites X1 and X7), and two on the southern flank (sites X11 and X19). Samples of these deposits were taken and are being chemically analysed at Tehran. Traces of quarrying and working could be identified at several points on these sites.

Of special importance is the settlement site of Tom-e Ali Hosseini (site X3), which is located high up in the mountains, at an altitude of 2300 m above sea level (asl.) and at a distance of only 2.8 km from the largest chlorite deposit (site X1). The function of this settlement needs to be seen in connection with the nearby chlorite source; probably it was the place where miners lived, at least temporarily. The site exclusively yields pottery of the Early Bronze Age III. Thus, it can be interpreted as a chlorite miners' settlement of the second half of the 3rd millennium BCE. Another similar settlement, albeit dated to the first half of the 3rd millennium BCE, called Do Kanderi 3 (site X14), was located several kilometres to the north, on the way leading up to another chlorite deposit (site X7). Interestingly, there were also two Aliabad-period settlements close-by, called Do Kanderi 1 and 2 (sites X9 and X10), dating to the Late Chalcolithic II and III periods. This demonstrates that the chlorite deposits of the Bagh-e Borj Mountains were already accessed and possibly exploited during the Late Chalcolithic period. Alternatively, they could be understood in connection with copper deposits, which also exist in this area.

A second deposit of chlorite was discovered in the Kalmord Mountains (zone H), south of the plains of Boluk and Faryab. These sources, however, are much more restricted in size than those of the Bagh-e Borj Mountains and no Bronze Age settlements were found nearby. Thus,

Fig. 19. The chlorite outcrop of site X1 in the Bagh-e Borj Mountains.

they do not seem to have played a role as resource supply during the Bronze Age.

Diorite and gabbro are very hard stones of a dark-grey to black colour. They were very popular for the fabrication of large statuary, mainly of royal persons, in Mesopotamia during the 3rd millennium BCE, in particular during the Akkade, the Lagash II (Gudea) and the Ur III periods. They have been mainly searched for in Oman so far (Heimpel, 1982; 1987a and 1987b; Yule and Guba, 2001). Our discovery of abundant natural diorite and gabbro deposits in the Band-e Ziyaret Mountains (zone F) during the geological survey leads to the conclusion, that also South-East Iranian deposits need to be considered as raw material sources for the Mesopotamian objects. The question of transport from the inland sources in the Band-e Ziyaret Mountains to the coast for shipment needs to be carefully investigated. While the stone material from the eastern slope of the mountain, where it is abundant around Qaleh Ganj, is difficult to transport towards the Persian Gulf, it is much easier to exploit deposits on the western slope of the mountains. The large gabbro deposit at Kahnak 1 (site F9) lies at the western foot of the mountains, on a dry river bed that crosses the Manujan Plain (Fig. 20) (Pfälzner and Soleimani, 2017: 134-135, fig. 36). Thus, gabbro from there could have been transported, even in large blocks, over flat terrain along the 'Kahnuj-Manujan-Corridor' down to Minab, and from there it could have been shipped across the Persian Gulf. Our planned survey in the Manujan Plain will hopefully give answers to this important question of whether Early Bronze Age settlements existed nearby and along this route.

The third stone material investigated in our survey is calcite. Stone vessels were carved from this light, whitish to yellowish and often banded material in the Early Bronze Age, and even as early as the Late Chalcolithic period. Probably these stone vessels were also exported to Mesopotamia or other regions in the 3rd millennium BCE, because similar objects were found, for example, in the Royal Cemetery of Ur (Woolley, 1934). An abundant deposit of travertine, a variety of calcite,

Fig. 20. The gabbro outcrop of site F9 at Kahnak 1 in the Band-e Ziyaret Mountains, with Prof. Nima Nezafati.

located in the Jebal Barez Mountains (zone L), to the north-east of the Jiroft Plain, was documented and sampled. It is the site of Qaleh Samuran (site L1), an Early to Middle Islamic hilltop fortress high up in the mountains, which was constructed on top of massive layers of travertine. Due to the abundance of travertine at this place and the proximity of the Jiroft Plain, this natural deposit could theoretically have been exploited since the Early Bronze Age, or even earlier.

The importance of the routes between the Halil Rud and the Persian Gulf

As a result of our survey findings, the assumed corridors connecting the Jiroft Plain with the shores of the Persian Gulf proved to be areas which were intensively settled during prehistoric and historic times. The existence of regularly spaced settlements is seen as a precondition for the establishment of stable and secure routes. These settlements could additionally function as stations for supply and accommodation along the routes. The importance of the 'Boluk-Faryab-Corridor' could be most clearly demonstrated, so far. It might have been used as a traffic way since the Late Chalcolithic II period, when settlements spread from the Jiroft Plain through the Boluk Plain and the southern fringe of the Faryab Plain up to the region of Gulashgerd. At the latter place, on the Gulashgerd/Darreh Rud River, a cluster of sites was present as early as the Chalcolithic period; these three sites continuously functioned as stations on the route towards the Ziyaret Ali Plain and further south during successive periods.

The 'Boluk-Faryab-Corridor' seems to have been particularly important during the Early Bronze Age II and III, throughout most part of the 3rd millennium BCE. A constant line of settlements emerged along this route, only interrupted in the northern and middle part of the Faryab Plain, as this area was very salty and unsuitable for permanent settlement. The above-mentioned, large sites on the Gulashgerd River (zone H) could have served as important stopovers on this route. We assume that this route was the major way for transporting chlorite

vessels and other goods from the realm of the Jiroft Culture to the Persian Gulf, for further shipment to Mesopotamia and other regions.

The site of Golnabad (site A24), on the northern fringe of the Boluk Plain, could have been of special importance on this route. It is a particularly large site dated to the second half of the 3rd millennium BCE or Early Bronze Age III, where many fragments of chlorite vessels were found on the surface. Thus, the site might have functioned as a distribution centre, and probably also production centre of chlorite vessels. From here, the chlorite deposits in the Bagh-e Borj Mountains could be easily reached, more directly than from the Jiroft Plain. This brings the site into a central position for the exchange of chlorite: raw material or semi-fabricated chlorite products from the Bagh-e Borj Mountains could have been brought to the site, from where they could be further transported – probably after final fabrication – to the urban centres of the Jiroft Plain and along the 'Boluk-Faryab-Corridor' towards the Persian Gulf. Thus, Golnabad could have been a knot in the exchange network of chlorite during the second half of the 3rd millennium BCE. Sites of the first half of the 3rd millennium BCE, or Early Bronze Age II, existed nearby (sites A26 and A27); they were possibly functioning in a similar way during this time.

The route along the 'Boluk-Faryab-Corridor' became obsolete during the collapse of the settlement systems at the end of the Early Bronze Age. It was inactive from the Middle Bronze Age to the Iron Age II. However, it was revived during the Achaemenid period, when both the Boluk and Faryab Plains were intensively settled, and also the sites in the Gulashgerd area (zone H) were re-occupied. The route seems to have been continuously in use during the following times, through the Arsacid and Sasanian up to the Early Islamic and Seljuk periods. After the Mongolian incursions, it seems to have been inactive again. Even nowadays, there is no important road along this line, which would make the Homozgan province accessible from the north.

The second corridor, the 'Kahnuj-Manujan-Corridor', has been less systematically explored by our project so far. What can be said on the basis of the hitherto available data is that the lower course of the Halil Rud seems to have been an important settlement area and traffic line from the Early and Middle Chalcolithic times onwards. This is, probably to a lesser extent, also true for the Early Bronze Age, the Arsacid and the Sasanian periods. As our view has so far remained limited to the right bank of the river – the opposite bank was not yet surveyed – no final conclusions on this matter can be made. The same is also true for the southern continuation of this corridor, especially the Kahnuj Plain, to where the survey has not yet extended. What is important for our understanding of the 'Kahnuj-Manujan-Corridor' is the fact that it is only through this corridor that the above-mentioned diorite and gabbro sources of the Band-e Ziyaret Mountains are accessible from the Persian Gulf. Thus, in the case that these deposits were exploited in the Early Bronze Age and material brought from there to Mesopotamia, this must have happened along the southern part of the 'Kahnuj-Manujan-Corridor'.

Preliminary conclusions

To sum up, our project has shown that the areas to the south of Jiroft – subdivided into several large plains, of which the Boluk, Faryab and Rudbar Plains range among the most extended – were intensively settled from the Chalcolithic to the Islamic periods. One Epipalaeolithic site, so far, hints at the earliest human occupation of the region. Starting with the Early and Middle Chalcolithic periods, most zones of this vast region were initially settled, with the Lower Halil Rud being the clear focus of this early occupation. The Late Chalcolithic period marks a strong increase in settlement numbers throughout all zones. At this time, dense settlement patterns emerged in the core zones. This phase can be considered the formative phase of the later urban developments of the Early Bronze Age.

The Early Bronze Age II and III are characterized by the presence of dense settlement patterns in the Jiroft and Boluk Plains. These seem to have been connected to the regions where abundant natural deposits of stone existed. Chlorite was brought

into the plains from the Bagh-e Borj Mountains, where Early Bronze Age settlements existed as well. The sites of Tom-e Ali Hosseini (X3) and Golnabad (A24) seem to have played important roles in the procurement, production and distribution of chlorite objects during the second half of the 3rd millennium BCE. The 'Boluk-Faryab-Corridor' was an important passage for the exchange of chlorite objects, which could be transported from here down to the shores of the Persian Gulf. Sites along the Gulashgerd/ Darreh Rud River (zone H) held important positions as stations along this route. Probably also calcite, quarried in the Jebal Barez Mountains, travelled along these routes and could have been exported on this way to the Persian Gulf and beyond. For diorite and gabbro, which occurs in the Band-e Ziyaret Mountains, the eastern route along the 'Kahnuj-Manujan-Corridor' was, at least theoretically, the better option for transport. Of course, it can be assumed that other objects, of which no physical remains are to be found, were equally exchanged along these corridors, necessarily in both directions.

After a pause of large-scale occupation from the Middle Bronze Age to the Iron Age II, similar settlement patterns evolved in the mentioned zones during the Achaemenid period. Connected to this, the interregional routes through these zones seem to have been revived. From now on, the Faryab Plain came more strongly into the focus of human activities. The cairn cemeteries along the foot of the Kalmord Mountains, dating to the Achaemenid and the Arsacid periods, are an impressive indication of human presence in the Faryab Plain. The highest concentration of occupation in the regions to the south of Jiroft was reached in the Arsacid period. Fortresses exercised control over the densely populated plains, and probably also over the interregional roads. A similar system of fortresses existed during the Sasanian period, with only a slightly smaller number of settlements throughout the region. In this time, large urban centres became increasingly visible. The settlement patterns in the Early Islamic and Seljuk periods can be seen as a continuation of the settlement trends of the previous periods. The 'Boluk-Faryab-Corridor' still seems to have played a major role for international transportation at this time, particularly for connecting the important city of Old-Jiroft and the port of Hormoz on the Persian Gulf (Stein, 1937: 180–185). Thereafter, following the Mongolian invasion, a second collapse of local settlement patterns – similar to that at the end of the Early Bronze Age – is attested.

Future prospects

The research project presented above is in a preliminary state, as it is still ongoing. Especially the potteries found in the survey are still in the process of detailed studies. In the future, our conclusions might change with regard to the dating of some of the sites, connected to inevitable corrections of the settlement patterns. Thus, the picture presented above still remains subjected to possible modifications.

Furthermore, the survey will be continued in future seasons. This might lead to the discovery of more sites within some of the mentioned survey zones – a fact that might also result in some changes of our present picture. Most importantly, however, the regions not yet touched by our survey, especially the eastern part of the Lower Halil Rud, the Kahnuj Plain, the Manujan Plain and large parts of the Qaleh Ganj Plain, need to be included to gain a complete picture of the regions south of Jiroft and to finally understand the social dynamics related to the utilization of routes and corridors between the Jiroft Plain and the shores of the Persian Gulf.

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