The Research of the *Consiglio Nazionale delle Ricerche* (National Research Council) in Eastern Iran: Shahr-i Sokhta and Sistan in late 3rd – early 2nd Millennia and the Diffusion of the Greater Khorasan Civilization (Bactria-Margiana Archaeological Complex)

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To the memory of Sandro Salvatori,
Researcher, Colleague, Friend

The archaeological research of *Consiglio Nazionale delle Ricerche*, CNR (National Research Council) in Iran began in 1976 with a survey in the Urmia plain aimed at the study of the Urartian expansion into Iran, carried out by of the *Istituto di Studi Egeo-Anatolici*. The survey came to an end with the Islamic Revolution of 1979. The institute, that after 2000 changed its name into *Istituto di Studi sulle Civiltà dell'Egeo e del Vicino Oriente*, ICEVO (Institute of Studies on the Civilizations of Aegean and Near East), continued its studies and connections with Iranian scholars, and after 1998 it was possible to resume fieldwork in north-western Iran. After 2006 a series of bureaucratic reasons made it impossible to

continue activities in that part of the country, so the research shifted to Eastern Iran, which was also an old interest of the institute. Specifically, CNR was interested in two problems: the crisis of urbanization and the abandonment of the settlements in Eastern Iran of late 3rd-early 2nd millennia BC and the possibly contemporary expansion in Eastern Iran and in the neighbouring areas of the Bactria-Margiana Archaeological Complex (BMAC), which the authors prefer to call Greater Khorasan Civilization (GKC) for the reasons explained below.

These interests materialized with an excavation at Shahr-i Sokhta in years 2007 and 2014 described below; with the excavation since 2011 at Tepe Chalow (county of Jajarm, Northern Khorasan, Figs. 1-2) of a GKC necropolis (Sołtysiak *et al*. 2016; Vahdati *et al*. 2019; Vahdati *et al.* 1399; Vahdati - Biscione in press; Vahdati *et al.* in print) and with inspections to published and unpublished sites of Eastern Iran reportedly with GKC pottery (Biscione - Vahdati 2012; Biscione - Vahdati 2021; in press). In the meantime ICEVO and other institutes in 2013 merged into the new *Istituto di Studi sul Mediterraneo Antico*, ISMA (Institute of Studies on Ancient Mediterranean) and in 2016 the archaeological fieldwork in Eastern Iran passed to the *Istituto per le Tecnologie Applicate ai Beni Culturali*, ITABC (Institute for the Technologies Applied to the Cultural Heritage), that added to the research mentioned above two laser-scanner and photogrammetric surveys, in Fars at Firuzabad (Fig. 2) and in Sistan at Kuh-e Khwajeh (Fig. 13). Since 2017 ISMA continued its archaeological research in Iran with an excavation at the site of Qaleh Naneh, in Kurdistan, near the border with Iraq. Finally in 2019 ISMA, ITABC and other institutes merged into a new one, the *Istituto di Scienze per il Patrimonio Culturale*, ISPC (Institute of Sciences for the Cultural Heritage) and now all the archaeological activities of CNR in Iran, are carried out in the same institute.

The well-known crisis of urbanization of Eastern Iran began in late 3rd - early 2nd millennia, in different moments in different areas, and after 1800-1700 BC extended almost all over the region, as shown, for instance, by the abandonment of Tepe Hissar and Shahdad, by the end of the Indus civilization and by the crisis of GKC. The case of Shahr-i Sokhta will be discussed below. After 1800-1700 a

Fig. 1: Eastern Iran and neighbouring areas, with the main geographical features mentioned in this article.

dark period extend over much of Eastern Iran, where in most areas settlements are unknown until late 2nd - early 1st millennium.

It must be remarked that the flourishing period of GKC and its great expansion into Eastern Iran (Biscione - Vahdati 2021: 543) happened in 24th-19th centuries BC i.e. at the same time of the crisis of Tepe Hissar and possibly of the crisis and of the end of the Hirmand Civilization (see below). After 1800/1700 anyhow the crisis hit also GKC (Luneau 2021), although it marked more a change than a collapse.[1] After 1500/1400 BC in the whole 'Core Area' of GKC (i.e. the regions

1. It should be remarked that the GKC pottery found in Eastern Iran belongs only to the flourishing period of this civilization, and apparently no pottery of the later period was found..

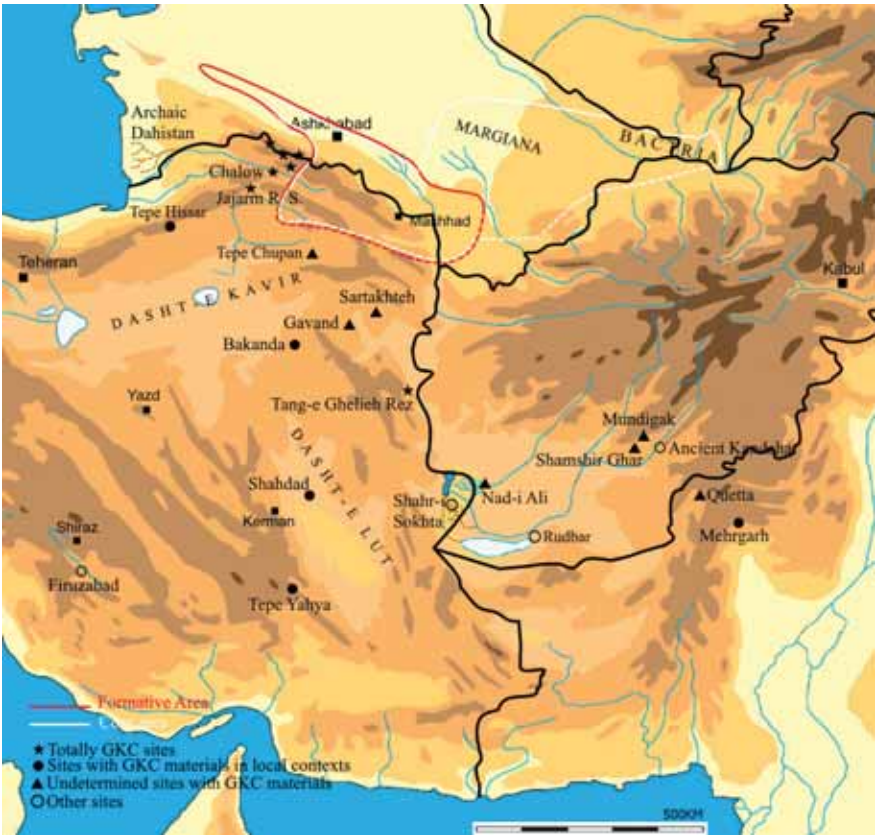

Fig. 2: archaeological sites and areas of Eastern Iran and neighbouring regions mentioned in this article.

where it was preceded by Namazga Culture or not previously settled, see below) it was replaced by the Yaz I culture (e.g. Lhuillier 2013; Vahdati 2018), that continued with periods II and III into the Achaemenid period. This anyhow did not happen in the so-called 'Expansion Area' of GKC (the regions where GKC expanded into areas formerly occupied by other cultures/civilisations, see below), where after 1800/1700 BC no settlement is known.

The other exceptions to this generalized abandonment are the Gorgan plain and the ancient delta of the Atrek River (Figs. 1-2). In this last area the presence of the Archaic Dahistan Culture of the Iron Age, 13th- 6th/5th centuries BC, is well-known (e.g. Lecomte 2006: 461-462; 2009: 69-72), and so are its connection

with the Grey Ware Culture, suggesting an unbroken cultural continuity. The evidence suggests that the Archaic Dahistan culture occupied the whole of the area of distribution of the earlier Grey Ware culture, including the Kal-e Shur basin where Grey Ware was replaced by GKC and eventually by Yaz I culture (Biscione - Vahdati 2012: 358, 359 fig. 5), the Gorgan plain and the oasis of Tepe Hissar, as witnessed by the excavations of 1995 by E. Yaghmai (Roustaei 2010: 615-617).

The reasons of the crisis are still unknown and many hypotheses have been put forward, e.g. the over-exploitation of the environments due to overpopulation, the shifting of trade routes, an ecological crisis, a drought period (e.g. Biscione 1977: 115; Dales 1977a; Dixit *et al.* 2014; Fouache *et al.* 2015: 27; Luneau 2016: 171-172, 173-175; 2019)[2] but we are far from a consensus.

Let us examine what happened at Shahr-i Sokhta. There, according to the traditional views, after the great expansion of phases 5-4 (late Period II - early III) with a surface of about 100 ha, we witness a shrinking of the inhabited part of the settlement, that in period IV (phases 1-0) seems to have covered a surface of 5-10 ha, both at the *Burnt Building* (560 sq. m) and on other parts of the site (Tosi 1976: 141, pl. I; 148, fig. 4; 152, fig. 8; Salvatori - Tosi 2005: 289 fig. 12). In this volume anyhow H. Moradi evidences the presence of Period IV in the central and in the northern parts of the city, thus with a surface larger than previously assumed. It is necessary now to measure the surface of the new found parts of the city settled in Period IV and to determine whether the pottery assemblage of the new-found areas is exactly like the one of the *Burnt Building*[3] or somehow different, implying a slightly different date or a different function.

Whatever the surface of Period IV, there are evidences of a significant change in the final part of Period III, i.e Phase 2, that from many points of view marks a passage from the full Period III, Phases 4-3 (Salvatori - Vidale 1997: 63-67, figs.

2. For a general presentation of the Holocene climatical variations in Central Asia see Fouache *et al*. 2021.
3. The pottery of Period IV was never properly published, the only extensive publication being Biscione 1979, which was not aimed at a comprehensive and total typology. Anyhow the pottery of Period IV was very standardized and shows a very limited range of variations, therefore the typology presented in the article can be considered fully reliable. This was also confirmed by an unpublished dissertation (Giacummo 1987).

192-208; Salvatori - Tosi 2005: 287-289, fig. 12) to the Period IV of the *Burnt Building*. Phase 2 was originally identified at Shahr-i Sokhta in the necropolis, squares BQ and BV of the topographical grid of the Italian excavation, with two thin and poorly preserved mud brick platforms that were washed away by a sudden rain (Biscione *et al*. 1974: 29; Biscione 1990: 391, 408 fig. 18). The data have never been fully published. Then Phase 2 was also discovered at the sites of Tepe Rud-i Biyaban 2 and 3 (Biscione 1990: 394; Salvatori - Tosi 2005: 288) The presence of Phase 2 was always empirically determined according to the presence of pottery that did not find comparisons in other phases of the Shahr-i Sokhta sequence. Recently Phase 2 was discovered also at Tepe Graziani (Kavosh *et al.* 2019: 129, 135).

The CNR excavations of 2007 were aimed at Period IV (on the surface of the chosen area was found a good amount of pottery typical of this period) but instead they revealed a good sequence of phase 2, useful to study the process that led to Period IV.

The excavation was a northwards extension of Trench 5, dug in 2002 by Dr. Zurab Makharadze (not published), so it was considered part of the same trench. It was located on a small hill at the NW corner of Shahr-i Sokhta (Fig. 3) at the junction of the 50 × 50 m squares G'FL, G'FM and G'FR determined in 2005 by the Iranian Archaeological Mission. Locating on the Google Earth satellite imagery the co-ordinates of the NE corner of the new excavation (30°36'08.75"N 61°19'29.5"E) it was possible to ascertain that the place lies in square G'CO of the Italian Archaeological Mission.

The excavation began on 26th November 2007, opening a testing pit determined by the lie of the ground, oriented east-west and measuring 5.5 × 8.0 m. On the highest point of the excavation was visible a fragment of a much eroded wall (Wall 1, Figs. 4, 8) preserved to a height of just a few centimetres, oriented east-west. It was associated with the remains of a heavily eroded clay floor which survived only in the immediate vicinity of the wall (Fig. 4), with abundant evidence and remains of straw, seeds and other paleobotanical remains. Wall and floor were defined Layer 0.

Under the floor was found a dark, loose soil, rich in ashes, with abundant traces of organic matters, evidence that the area was used as a garbage dump. The remains of the Layer 0 floor sealed the upper part of the deposit that, as shown by the uniform strata of ashes and other matters (Fig. 5), accumulated in a very regular way. The garbage dump, that covered a significant part of the testing pit, had a precise stratigraphic and chronological meaning and was called Layer 1. Immediately west of Wall 1 and under it the garbage dump was just a few centimetres thick, while east of it, beyond an earlier wall (Wall 2, Fig. 5) it was more than a metre deep. It filled an empty space without any structure and rested on a soil formed by decayed mud-bricks, that was reached in the last days of excavation. It was an open space that southwards continued into a similar open area excavated in 2002.

In the north-western part of the testing pit the soil was instead hard and whitish: it was formed by mud-brick fragments and decayed mud-bricks.

Wall 2 (Fig. 5), which was a few centimetres under the floor of layer 0 and was covered by the loose soil of the garbage dump, was part of Layer 2, that was identified by a series of structures and spaces: Room 1, Space 2 and Space 3. The walls of Room 1, that in part were earlier and re-utilized, were covered by black plaster; a door, later filled in, connected Room 1 and Space 3. The soil of Room 1 and Space 2, as already said, was compact, whitish and formed by decayed mudbricks. In Space 3, instead, there was one of the typical Shahr-i Sokhta fillings (Fig. 6), rich in pottery and in any kind of finds. Most of the walls of Space 3 were earlier and re-utilized.

Layer 2 was abandoned before the garbage dump, and not for a very short period, as shown by the filling of decayed bricks. Before the area was used as a garbage dump the tops of the walls were cut.

Under the foundations of the walls of Layer 2 the soil changed and became one of the typical Shahr-i Sokhta fillings, rich in any kind of materials. This change evidenced Layer 3, formed by walls under Room 1 and Spaces 2-3. These walls apparently formed two poorly identifiable spaces, which because of this were not numbered and defined. Some of the walls of Layer 3, as already said,

Fig. 3: Shahr-i Sokhta 2007. Trench 5, the excavation area before the activities seen from south-west. In the lower left corner can be seen part of the excavation by Dr. Makharadze carried out in 2002.

Fig. 4: Shahr-i Sokhta 2007, Trench 5. A fragment of the burnt floor and Wall 1, both layer 0 of the 2007 excavation, level 2 of the sequence of Trench 5, seen from north. The floor had a great amount of straw and seeds and was taken away for paleobotanical studies.

Fig. 5: Shahr-i Sokhta 2007, Trench 5, Space 1. The regular strata of the accumulation of the garbage dump (layer 1 of the 2007 excavation, level 3 of the sequence of Trench 5) as seen on the southern section of Space 1. On the right can be seen the eastern (outer) face of Wall 2, the eastern wall of Room 1.

Fig. 6: Shahr-i Sokhta 2007, Trench 5. The filling of Space 3. Mudbrick fragments, potsherds and stone objects can be seen.

were re-utilized for room 1, Layer 2. Under Space 2, Layer 3 was identified a floor on which rested a square fireplace (Fig. 7).

The lowest layer, Layer 4, is identified by one wall on the southern edge of the excavation, which was re-used also in the upper layers 3 and 2, and by a floor in space 2, that covered a buried jar whose mouth emerged from the floor (Fig. 7). It was not possible to go deeper because of lack of time.

Thanks to the garbage dump of Layer 1 it was possible to connect the 2007 sequence to the one of the excavation of 2002, which reached exactly this layer. Above it two structural phases were found, identified by brick platforms, so it was possible to reconstruct the sequence of the north-eastern corner of Shahr-i Sokhta. It is formed by the following levels:

Level 1. Upper brick platform of the Iranian excavation of year 2002.

Fig. 7: Shahr-i Sokhta 2007, Trench 5, Space 3. The square fireplace of layer 3 (level 5 of the sequence of Trench 5), that rested on a floor taken away during the excavation, and the earlier floor of layer 4, with the mouth of a buried jar.

Level 2. Lower brick platform of the Iranian excavation – layer 0 of 2007 excavation.
Level 3. Garbage dump (lowest point reached by the Iranian excavation – Layer 1 of the 2007 excavation).
Level 4. Layer 2 of the 2007 excavation.
Level 5. Layer 3 of the 2007 excavation
Level 6. Layer 4 of the 2007 excavation.

Soil samples were systematically gathered to study microfauna and botanical remains. The good preservation of the remains allows a sound study of the environment of Shahr-i Sokhta in late Period III that will shed light on the theory of the dry period beginning in mid-3rd millennium, proposed as one of the causes of the urbanization crisis (Gupta *et al*. 2006: 1086-1087; Dixit *et al.* 2014; Fouache *et al.* 2015: 27). These samples are being studied, like the others of those years of excavation, by Dr. L. Costantini and his team.

A preliminary examination of the pottery of the garbage dump revealed a remarkable amount of ceramics later than Phase 3 and earlier than Period IV, thus identifying at last Phase 2. In order to gather a larger sample of this pottery it was decided to continue in the following season the excavation of the garbage dump, but for a series of bureaucratic reasons this was possible only in 2014. The aims of the 2014 season, which began on 9th December, included also reaching the natural soil in the westernmost – and deepest – part of the excavation of 2007.

There was opened a small testing pit, 2 × 1 m, presuming that the natural soil was close and because earlier walls did not leave much space. The pit went down to a depth of 1,80 m in archaeological levels of Period III, until on 14th December it was decided to end the work because of lack of time, of cramped working space that did not allow to identify structures and because of the fear that nearby walls could collapse into the pit. Therefore the natural soil was not reached.

The exploration of the garbage dump was continued opening a 4 × 4 m square immediately south of the area excavated in 2007 (Fig. 8).

The soil of the new square was dark, loose and rich in ashes, with abundant traces of organic matters, just like the one of the 2007 excavation. The only

exception was the north-western corner, very close to Wall 1 of the 2007 excavation, where the loose soil was covered by a layer of hard clay, probably originating from the decay of the wall.

Under the garbage dump was found a small structure of Level 4, formed by a wall oriented east-west and then north-south, making a right angle, and by another wall oriented north-south, leaning on it and continuing southwards (Fig. 8). The garbage dump rested on a compact clayey soil, which was not excavated because, as already said, the aim was gathering more evidence of Phase 2. In the north-eastern corner of the excavation there was a pit also filled by the garbage dump (Fig. 8), that there reached its deepest point.

A first examination of the pottery found in the garbage dump gave results that allow also to establish a chronology of the sequence. Here a preliminary presentation will be made. The first evident thing is the fact that pear-shaped beakers are practically absent and bowls are the dominant shape. Two groups of pottery have been identified. One of them shows good connections with the buff ware of Phase 3: it is characterized by small undecorated bowls, with fine paste

Fig. 8: Shahr-i Sokhta 2014, Trench 5. The area excavated in 2014 at the end of the season. Wall 1 (level 2) of the 2007 excavation can be seen at the highest point of the baulk, the level 4 structure is located south of it and to the east is visible the pit filled by the garbage dump (level 3). Some of the level 4 structures excavated in 2007 can be seen beyond the baulk.

of a light buff colour, shading off to whitish or greenish, and engobe of the same colour, with rounded lower part of the body and slightly extroverted rim (Fig. 10: a-d) similar to the ones of Phase 3, types B 10-13 (Salvatori - Vidale 1997: 65-66). They seem to be the prelude to the small bowls of period IV (Biscione 1979: fig. 10; 1990: 392, 396 fig. 3, particularly I-L). These small bowls are very common, so much that they can be considered typical also of Phase 2. Buff bowls with a S-shaped profile (Fig. 9: e), typical of Phase 3 (Salvatori - Vidale 1997: 65, 153; figs. 206-207), were also found, but they are not as common as the small bowls.

Other elements typical of Phase 3, as known at Shahr-i Sokhta, Tepe Rud-i Biyaban 2 and 3 and at Tepe Graziani (Mariani 1993-94; Salvatori - Vidale 1997: 65-66; Kavosh *et al*. 2019: 106-135) are rare (Fig. 9: a-c) or absent. A few intrusive sherds from deeper layers were also found (e.g. Fig. 9: d, f).

The other group is formed by shapes already attributed to Phase 2, and now identified more precisely. For instance the buff cylindrical-conical bowls (Fig. 10: e) are similar to the ones from Tepe Rud-i Biyaban 3 (Fig. 10: l) attributed to phase 2 (Biscione 1990: 392, 395; fig. 2C; 403; figs. 9-10), and the buff, undecorated ledged-rim jars[4] (Fig. 10: i, j; k from Tepe Rud-i Biyaban 2), already evidenced as typical of Phase 2 (Biscione 1990: 392, 393 fig. 1 A-B, 395; fig. 2 A, 405; fig. 13). Also typical is a buff conical-rounded bowl with horizontal rim (Fig. 10: f), similar but not identical to the ones of period IV (Biscione 1979: pl. XI fig. 9; Giacummo 1987: fragment 20172). Other typical shapes are light buff basins with almost horizontal rim (Fig. 10: g-i), with painted decoration or undecorated, with a diameter ranging from 18 to 31 cm. A similar but not identical shape was previously already identified at Shahr-i Sokhta and Mundigak III (Casal 1961 II: fig. 94, n. 429; Biscione 1990: 391-392, 399, 400; fig. 6, 401; fig. 7-8). Identical shapes were instead found in the excavation carried out by the Zabol University at Tepe Graziani, Building cycle 3,1 (Kavosh *et al*. 2019: 128 fig. 118 nos.3-4). Other pottery shapes connecting Tepe Graziani with Phase 2 can be seen again in

4. One similar fragment was found in Period IV (Giacummo 1987: fragment 22385). Most probably it is not a shape typical of Period IV but an intrusive fragment that rose from deeper layers.

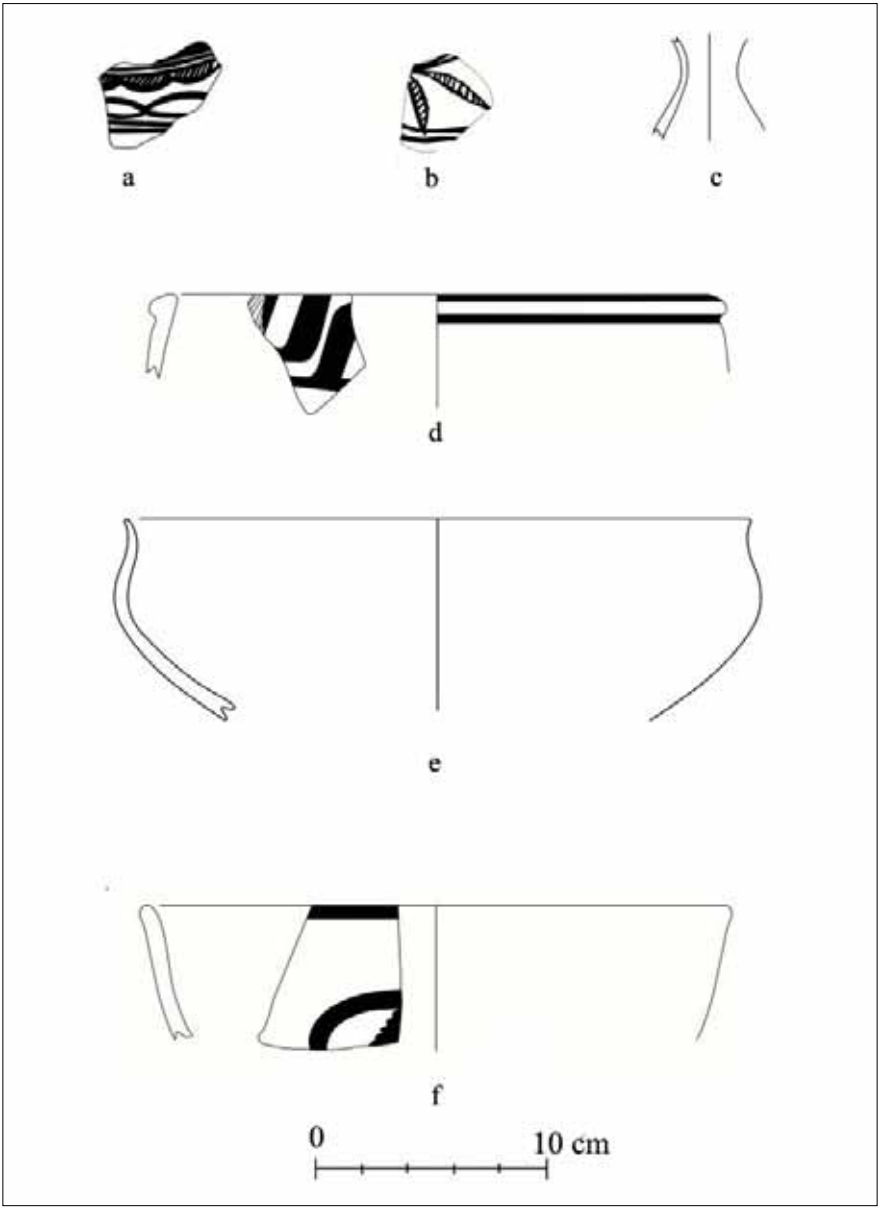

Fig. 9: Shahr-i Sokhta. Buff pottery from level 3 of trench 5, continuing the tradition of phase 3 (a, b, e) and intrusive fragments from deeper strata (c, d, f).

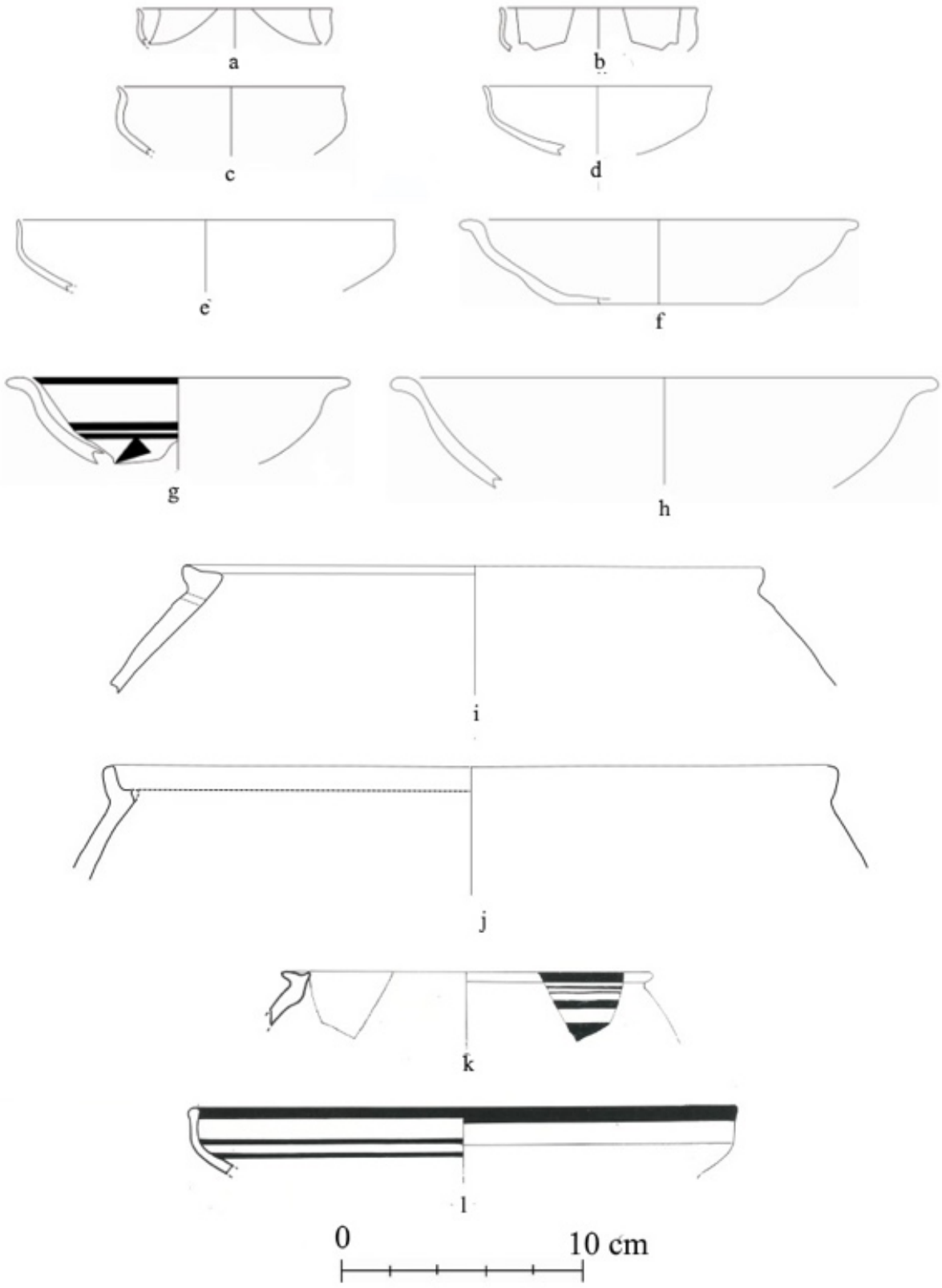

Fig. 10: Sistan. Buff pottery of Phase 2, typical shapes. Vases a-j from Shahr-i Sokhta, Trench 5, level 3; vases k-l respectively from Tepe Rud-i Biyaban 2 and 3 (k-l from Biscione 1990: 393 fig. 1, 395 fig. 2).

Building cycle 3, 1 (Kavosh *et al*. 2019: 128 fig. 118, nos. 10-11) and in Trench III (Kavosh *et al*. 2019:134; fig. 122, no. 20). The similarities with phase 2 were already evidenced by the authors (Kavosh *et al*. 2019: 129, 135).

It must be remarked that in the layers of Phase 2 only buff ware was found. There was no trace of Grey or Red Ware. Painted decoration is very rare.

Other finds from Trench 5 include well-known clay human and animal figurines, beads, lithic industry and a wooden stick die (Fig. 11). On three faces numbers are indicated respectively by one, two and three circles with a dot in the middle, and on the fourth face there are couples of vertically opposite triangles. The motifs are filled with an encrustation of a very light brown, almost whitish colour. Those dies are well-known at Shahr-i Sokhta (Cortesi *et al.* 2008: 24-27).

South of the square excavated in 2014, on the surface, in an area with abundant fragments of the small bowls described above, was found a square lapis lazuli stamp seal with an incised composition of straight lines forming square angles, without lug or suspension holes (Fig. 12).

As already said at Shahr-i Sokhta Phase 2 was almost absent, but now it is known in the Trench 5, here presented, and in other parts of the city (Moradi this volume; Sajjadi this volume). The sequence is not particularly short, as shown by the two platforms of the 2002 excavation and by the garbage dump presented above. One of the main tasks facing us are checking the connections between the sequence of Trench 5, the other areas found at Shahr-i Sokhta and the evidence gathered at Tepe Graziani and at Tepe Rud-i Biyaban 2 and 3. It should be remarked, for instance, that while at these last two sites the cylindro-conical bowls and ledged-rim jars (Fig. 10: k-l) have almost always a painted decoration (Biscione 1990: 392, 395 fig. 2C; 403, figs 9-10; 404, figs. 11-12), the ones found at Shahr-i Sokhta are undecorated and larger. This could be a random variation due to the small number of finds or it could suggest that the two sequences do not fully overlap.

Another task facing us in the next future is the determination of the settled area of Shahr-i Sokhta in Phase 2. A cursory check of the surface of the north-western part of the city revealed indeed a significant presence of this kind of pottery, and also the other evidences found in the recent excavations should be taken into account. This and the new data on the presence of Period IV (Moradi this volume) urge us to check and verify our ideas about the sudden collapse of the settled area of Shahr-i Sokhta at the end of Period III (e.g. Tosi 1976: 138; Biscione 1990: 402; Salvatori - Tosi 2005: 289, fig. 12). It is indeed likely that the surface of the city shrank, but how much and when is still to be determined. The reduction of surface of the city could be mirrored by a smaller number of settlements of Period IV in the ancient Rud-i Biyaban delta.[5]

5. Professors S. R. Musavi Haji and R. Mehrafārin, directors of the systematic archaeological survey of Iranian Sistan carried out in 2007-2008 by the University of Zahedan, kindly gave us a copy of the unpublished survey reports. To them go our warmest thanks. A cursory examination of the reports revealed 54 sites that can be surely dated to Period IV, a number much smaller than the one of Periods II and III. Anyhow we should take into account the fact that whatever the date of Shahr-i Sokhta sequence (see the following paragraph) the time-span covered by Period IV was shorter than the one of Periods II-III.

Fig. 11: Shahr-i Sokhta 2007. The wooden stick die from Trench 5, space 1, cut 18 (level 3), Shahr-i Sokhta. On this face the number is indicated by two incised circles with a dot in the middle, filled with an encrustation of a very light brown, almost whitish colour.

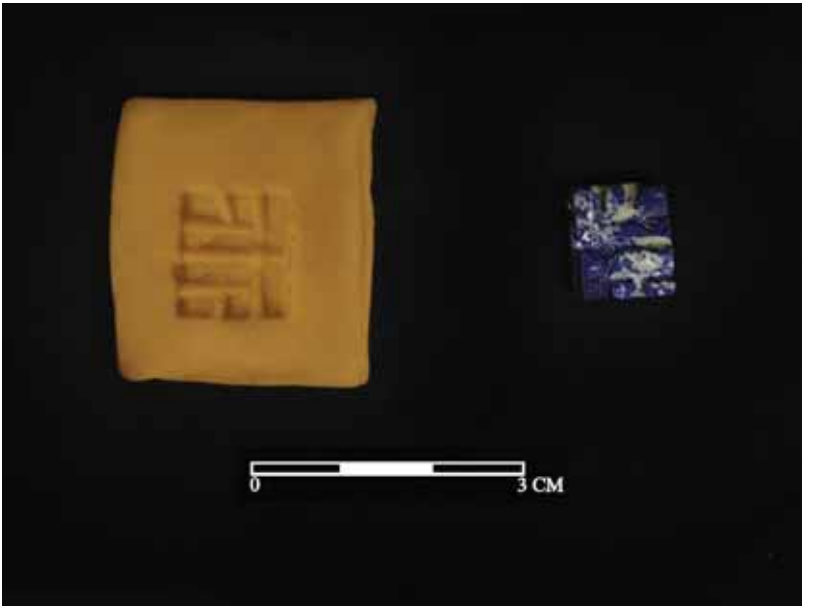

Fig. 12: Shahr-i Sokhta 2014. Square stamp seal with incised composition of straight lines forming square angles, without lug or suspension holes. Surface, immediately east of Trench 5.

Phase 2 is traditionally dated 2300-2200 BC (Biscione 1990: 399; Salvatori - Tosi 2005: 288, 289 fig. 12; 290 fig. 13; Cortesi *et al.* 2008: 9, 28-30), based on a consistent series of C14 determinations and comparisons with other areas, although a date earlier than the Indus civilization was proposed for the whole Shahr-i Sokhta sequence, therefore including the later part of Period III (Jarrige *et al*. 2011). A new set of C14 dates from Tepe Graziani indicate approximately 2850-2620 for Period II, 2600-2470 for Period III, Phases 4-3 and 2450-2350 for Period IV (Helwing *et al*. 2019: 153-155). At the moment, waiting for new C14 determination from the recent excavations at Shahr-i Sokhta, the authors prefer conservatively to follow the traditional dating, with the variation for the end of period IV exposed below.

The other focus of interest of CNR is the presence of BMAC/GKC in Eastern Iran, that is implemented with excavations at Tepe Chalow and inspections to published and unpublished sites in Eastern Iran where GKC materials were reported. This study includes Sistan too. The work is carried out by A.A. Vahdati, the co-director of the excavation at Chalow and of the operations for the research of GKC sites, and by R. Biscione.[6] The research is going on year by year, following the constant flow of new information. The last inspection was carried out in March 2019 and the results are already interesting (Biscione - Vahdati 2021; in press).

Based on the previously published works and on the new data gathered on the field it was possible to ascertain that the Namazga I-IV culture was present in a large region of Eastern Iran, inside a line running from Darreh Gaz to Shirvan, and to Torbat-e Jam, including the upper Atrek Valley and the areas of Mashhad, Nishapur and Sabzevar and possibly the regions of Neqab and Davarzan (Fig. 1).

6. The authors of the research thank all the colleagues who kindly gave information and showed them sites and materials, many of them unpublished, all over Khorasan. In particular we wish to thank Mr. M. Abdullahzadeh, director of the branch of Davarzan of the Khorasan Razavi Cultural Heritage Office (CHO); Mr. Maymari, of the Neqab branch; Mr. Rajabi, of the Bardaskan branch of the Khorasan Razavi; Mr. M. Farjami,and Mr. S. Yusefi, archaeologists of the Southern Khorasan Province. The authors of the research are particularly grateful to professors O. Gārāzhian and H. Bāsafā from Nishapur University for their kindness and their explanations, and to professors S. R. Musavi Haji and R. Mehrafārin of the Zahedan University, who kindly gave a copy of the unpublished reports of their survey in Sistan, as explained in footnote 4. Above all the authors of the present article are very grateful to Dr. A.A. Vahdati, without whom this part of the research could not have been possible.

In this large zone, which covers a surface greater than the area of Namazga culture I-IV in Turkmenia,[7] no other cultures are known. It was defined 'Formative Area' (Biscione - Vahdati 2021: 527-28) because GKC has definitely its roots in the Namazga culture (Fig. 2).

GKC, as it is well known, occupied also the Murghab delta, ancient Margiana, and the Middle Oxus valley, ancient Bactria, where no previous cultures or civilizations are known. The Formative Area, Margiana and Bactria, i.e. the regions where GKC was preceded only by Namazga culture and the previously unsettled regions where it expanded (Fig. 2), are defined 'Core Area' (Biscione - Vahdati 2021: 528). It covers the majority of Greater Khorasan of Sasanid and Early Islamic period (Rante 2015: 9-17), a region with a strong individuality that continued in Iron Age with the presence of Yaz Culture, in Achaemenid period (Cattenat - Gardin 1977: 230-235, figs. 2-4) and in some way was still present in the Early Islamic period (Rante 2015: 21-22). For this reason the authors prefer to use the name 'Greater Khorasan Civilization', GKC, instead of Bactria-Margiana Archaeological Complex or Oxus Civilization, two formulas that impose strong geographical limits to a larger phenomenon.

GKC expanded further in areas originally settled by other cultures/civilizations (Fig. 2), namely in Northern Khorasan in the middle Atrek valley in the area of Bojnord, in the Kal-e Shur valley (in the regions of present-day Jajarm and Esfarayen), in Khorasan Razavi, in Southern Khorasan, in Sistan (for Sistan see also fig. 14), in the Quetta and Mehrgarh areas in Pakistan (Santoni 1984; 1988; Jarrige 1988; 1989; Jarrige - Hassan 1989) and at Mundigak (Balali 2010). In Khorasan, south of the formative area, five sites with GKC pottery have been found (Biscione - Vahdati 2021: 531-36), namely Tepe Chupan, Sartakhteh, Gavand, Bakanda, Tang-e Ghelieh Rez. Later on GKC pottery (and possibly also NMZ IV) was found at sites near Neqab and Davarzan, in Northern Khorasan (Figs. 1-2).

7. The presence of Period Namazga IV in the ancient Murghab delta is poorly documented, and the question is still under discussion, therefore it was preferred not to include this region in the diffusion area of Namazga I-IV.

Tepe Chupan, not excavated, is a site with a still not well-defined Chalcolithic local culture and clusters of GKC pottery that possibly result from the erosion of graves. It is not possible to ascertain whether GKC and local pottery coexisted or the GKC arrival was later than the settlement. The same applies to Sartakhteh.

At the site of Gavand a GKC grave was illegally excavated. Scientific excavations by the Southern Khorasan Cultural Heritage Office (Farjami 2015; 2016: 474-475, 478 fig. 4) revealed that the site was destroyed by agricultural activities, and in the mixed layers has been found pottery going back to GKC, historical and Islamic period. Possibly the GKC pottery indicates the presence of a necropolis. At Bakanda an unpublished necropolis was excavated, whose graves showed an association of local and GKC pottery. At Tang-e Ghelieh Rez a GKC necropolis was excavated and preliminarily published (Sorush - Yusefi 2014).

Further presences of GKC prestige objects and pottery in local context are well-known in Eastern Iran, suffice it to mention among the other sites Tepe Hissar (e.g. hoards 1 and 2, Schmidt 1937: 171-174 figs. 96-98, 175 fig. 99), Shahdad (Lamberg-Karlovsky - Hiebert 1992; Salvatori - Tosi 1997: 128-131; Mutin - Lamberg-Karlovsky 2019: 554-558) and Tepe Yahya (Lamberg-Karlovsky - Hiebert 1992: 6, pl 2 a-b; Lamberg-Karlovsky - Potts 2001: 63 fig. 2.5, 146 fig. 5.3, 201-203, 205-206; Mutin - Lamberg-Karlovsky 2019: 558-550).

It is now possible to divide the wide region into which GKC expanded outside the core area into two different zones (Biscione - Vahdati 2021: 529-530): the expansion area, where GKC replaced the local cultures/civilizations and is represented by settlements and graveyards without any local element, and the influence area, where GKC pottery is associated to local one, like for instance at Tepe Yahya, or GKC prestige objects are found in local contexts, e.g. at Hissar or at Shahdad (Fig. 2). Unfortunately, it is not always possible to be sure if some of the unexcavated sites should be placed in the expansion or in the influence areas.

The different distribution of GKC luxury objects and pottery also evidences different types of connections with the core area of the GKC (Biscione - Vahdati 2021: 542). In the expansion area the total presence of GKC and the lack of any other cultural tradition indicate the presence of a large number of people coming

from the core area. In the influence area isolated burials with GKC pottery show the presence of individuals coming from the core or expansion areas who moved for various reasons (trade, specialized knowledge and abilities needed abroad etc.), as already suggested by other authors (e.g. Lamberg-Karlovsky - Hiebert 1992: 3, 6; Salvatori 1995: 50; Thornton 2013: 195; Salvatori 2016: 454; Mutin - Lamberg-Karlovsky 2021: 574, 578-79); groups of GKC luxury objects and GKC pottery highlight strong connections with the core area and finally the presence of isolated GKC luxury objects indicates most probably commercial ties with the core area[8].

The expansion seems to have happened in regions that at the moment were unpopulated, as shown by the lack of earlier settlements in the Jajarm Railway Station area (Fig. 2) near the Kal-e Shur river, by the gaps in the sequences of Chalow (Vahdati *et al*. 2019: 182-184) and by the end of the Hirmand civilization in Sistan (see below).

Southern Sistan, both Iranian and Afghan, constitutes one of the most significant territories with important GKC presence. The surveys carried out in Afghan Sistan in 1969-1971 by Prof. G. Dales, then of the University of Pennsylvania Museum of Archaeology and Anthropology, revealed a set of GKC luxury objects (Dales 1972: 31-35, figs 16-19; Dales 1977b), defined in the publication 'Hissar IIIC' because at the time there were no other possible comparisons. Only later the full meaning of these finds and their implications would have been clear to archaeologists. The objects, most probably coming from graves, were brought as offerings to the burial of a local holy man in the shrine of Godar-i Shah, located on the course of the Shela Rud, which is the natural spillway of the Hamun Lake into the Gowd-e Zirreh (Figs. 13-14).

The results of the survey were published only in a preliminary way (Flam 1969; Dales 1972; 1977b; 1993). Prof. Dales was preparing the final publication of the report and in 1984 or 1985 showed us in Rome slides of the finds of his survey,

8. The area of Mehrgarh, here registered as belonging to the influence area, is peculiar because GKC pottery coexists with the local one, but its presence is so strong to suggest the contemporary presence of local and GKC traditions, equally significant, that co-existed peacefully.

among which we could identify fragments of pottery then called 'Namazga VI' and now better defined GKC.

Prof. Dales never published the report also because of his untimely demise, but in 2008 R. Biscione could study the documents kept in the archives of the Pennsylvania Museum of Archaeology and Anthropology.[9] Many of the surface potsherds gathered in the Gardan Reg and Shela Rud area (Fig. 13) are typical of the Hirmand Civilization, periods Shahr-i Sokhta II-III-IV, but a number of them are clearly GKC (Fig. 15). These sherds were found in at least six sites out of at least nine,[10] and in three of them they were associated with pottery of periods Shahr-i Sokhta II-IV, while the other three gave only GKC pottery.

The report of the survey in Afghan Sistan carried out in 1949-1951 by prof. W.A. Fairservis (Fairservis 1961) was checked, but it was not possible to determine with certainty the presence of GKC materials. The datable elements of the protohistoric sites found by Fairservis (who actually defined them 'prehistoric') have very good parallels with Periods II and mainly III of Shahr-i Sokhta. Some finds anyhow might suggest connections with GKC, like the two pottery trumpet-shaped hollow feet from site 110 (Fairservis 1961: 75 fig. 36 p-q) and the two fragments of copper-bronze round mirrors with triangular-section rim from site 109 (Fairservis 1961: 72 fig. 36 b-c), not known at Shahr-i Sokhta and ubiquitous in GKC (e.g. Kaniuth 2006: 65-73; Vahdati *et al*. 1399: 56 fig. 8 n. 6; Vahdati *et al*. in press). The potsherds kept in the storerooms of the Peabody Museum of Archaeology and Ethnology at Harvard University were checked by Raffaele Biscione in 2008,[11] and no evidence of GKC ceramics was found.

9. The pottery gathered during the survey was brought to the Kabul Archaeological Museum, and the graphic and photographic documentation of the survey is kept in the archives of the University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia. The study was possible thanks to the kindness of Dr. Richard Hodges, then Director of the Museum, and to the invaluable help of Prof. Holly Pittman, to whom go our warmest thanks. The results of the study will be soon published.

10. Unfortunately in the archives no map was found with the localization of the sites, and their description is not always clear about their number. For instance the definition 'kiln sites' found in the archives does not specify how many they were and the same happens for 'Shela Rud terraces'.

11. This was possible thanks to the kindness of Professor C.C. Lamberg-Karlovsky and of Dr. Richard Meadow, to whom go our warmest thanks.

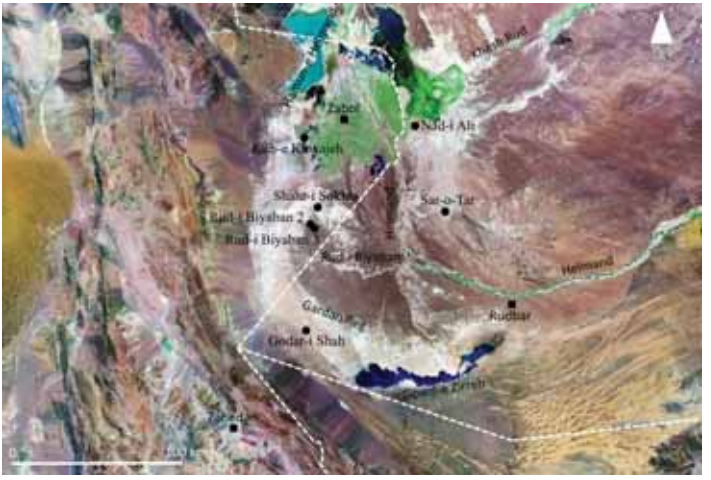

Fig. 13: Sistan. The main geographical features and the archaeological sites mentioned in this article (Elaboration from false colour satellite imagery).

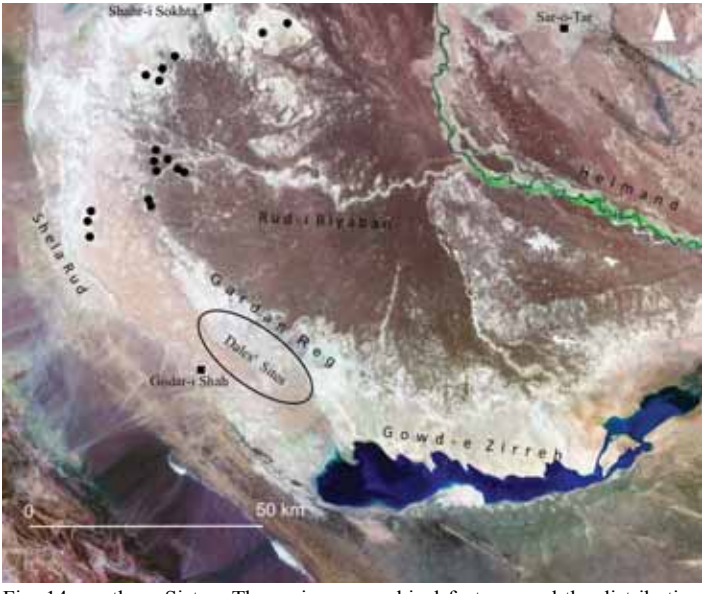

Fig. 14: southern Sistan. The main geographical features and the distribution of the GKC sites. Dots indicate the GKC sites and squares mark sites of other periods. It is not possible to determine exact position and number of the sites found by the Dales' survey, so their approximate position is indicated by the black ellipse (Elaboration from false colour satellite imagery).

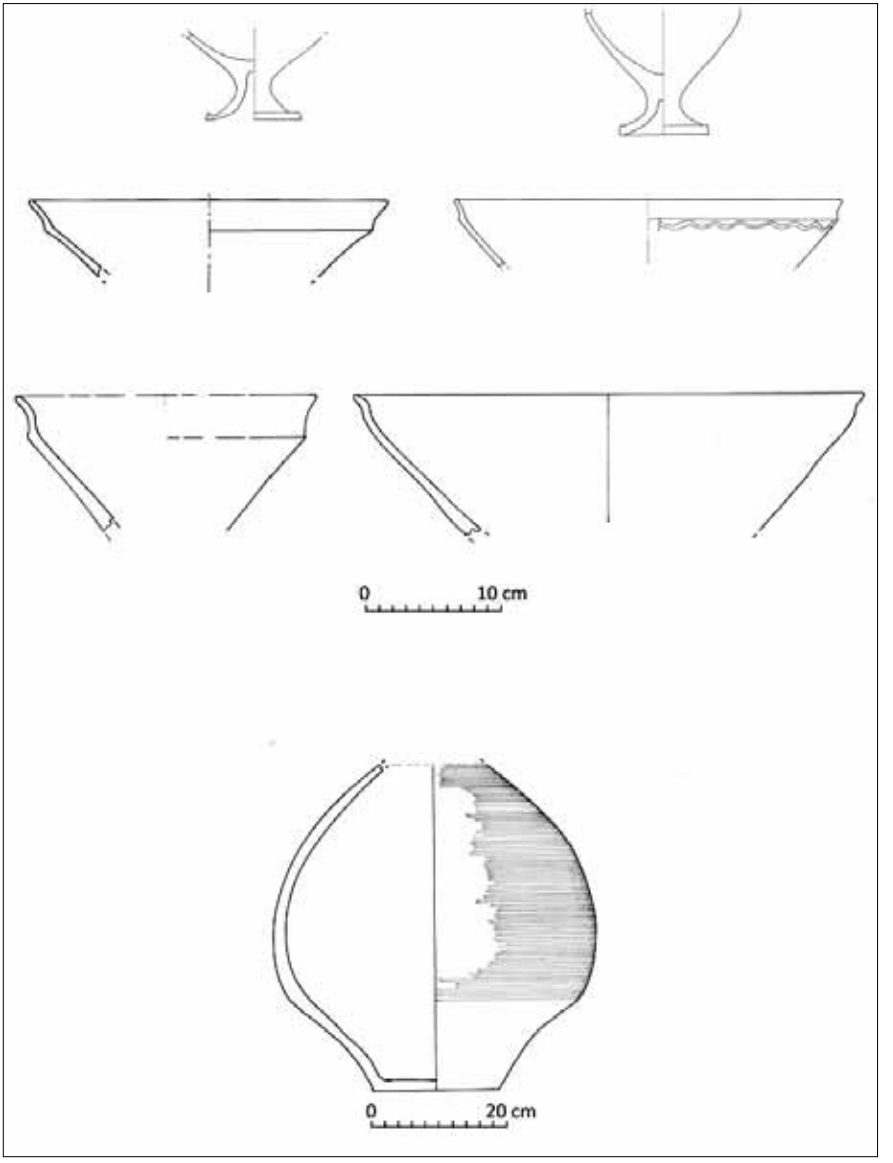

Fig. 15: samples of GKC pottery from various sites of the Dales' survey in the Gardan Reg area.

It must be remarked that the protohistoric sites of the Fairservis survey are located in the Gardan Reg area, i.e in the same region studied by Dales. Unfortunately the incompleteness of the cartography and of the records does not allow us to understand if the territories surveyed by Fairservis and by Dales overlap or not and, if not, how far are the two areas.

In 20th century not one GKC fragment was ever found in Iranian Sistan, neither in the excavations, nor on the surface of the excavated sites including Shahr-i Sokhta, nor in surveys, but in the recent years things changed. A cursory check of the reports of the Sistan survey of 2007 – 2008 directed by professors S. R. Musavi Haji and R. Mehrafārin (see footnotes 4 and 5) revealed sure presence of GKC pottery in 17 sites, 11 of them in the south-western part of the ancient delta of the Rud-i Biyaban and the others in the northern part (Fig. 14). Possible GKC pottery was found on 29 more sites.

Among the 17 sites with sure GKC pottery 11 were settled also in period Shahr-i Sokhta III, on 2 were found period IV and GKC potsherds, one had pottery of periods III, IV and GKC and 3 were new foundations. It is clear that GKC pottery was scarcely associated with the one of period Shahr-i Sokhta IV.

It should be remarked that in the Spring of 2021 professor R. Shirazi of the Zahedan University carried on a survey aimed at identifying on the field sites with GKC pottery, preliminary to the excavation of one of these sites. The aim of the research, that doubtless will give rich results, is exactly the study of the GKC presence in Iranian Sistan.

The data from Sistan corroborate the evidence of a BMAC/GKC presence (Fig. 2) at Nad-i Ali (Besenval - Francfort 1994: 5) Shamshir Ghar (Francfort - Tremblay 2010: 107-108) and Mundigak (Balali 2010). They also shed a new light on the significant GKC presence in the Quetta and Mehrgarh areas, which were not isolated outposts in far-away areas. The important influx in Sistan is not surprising if we think that at Shahr-i Sokhta Period I and at Mundigak Period III was found Namazga III pottery, dated end of 4th millennium – beginning of the 3rd (e.g. Biscione 1973) and the Quetta valley too was reached by the same Namazga III pottery (Fairservis 1956: figs. 414-415). Mergarh, Nowsharo and Sibri are not

far from the Quetta valley, on a natural highway connecting it, and ultimately Afghanistan, with the Indus Valley. Clearly the expansion of GKC followed at least some of the routes already used one thousand years before by the Namazga III expansion out of the formative area.

It is to be remarked that all the GKC potsherds found in Sistan, just like the ones found in other parts of Iran and in the Mehrgarh area, are associated with the flourishing period of the GKC, dated 24th - 19th centuries BC (Lyonnet - Dubova 2021: 32) and not with the later, final period dated 1800/1700 – 1500/1400 BC (Luneau 2021: 497).

These facts suggest that in Sistan, unlike the Mehrgarh area where GKC and local pottery were found together in the excavations (Santoni 1988: 138; Jarrige 1996: 871), the two cultural traditions were not contemporary. Indeed if GKC and Hirmand Civilization co-existed and some of the small sites hosted both cultural traditions most probably some GKC sherds would have been found also in the excavations, and as already said this never happened.[12] We must therefore accept that in Sistan GKC and Hirmand Civilization were not contemporary and that GKC pottery arrived *after* the abandonment of Shahr-i Sokhta and of the other sites in the Rud-i Biyaban, i.e. after the end of the Hirmand Civilization.

This is a further evidence that forces us to re-consider the date of the latest part of the sequence of Shahr-i Sokhta, namely the end of Period III (Phase 2, dated 2300-2200, see above) and to the whole of Period IV, Phases 1-0. Phase 1, that constitutes the most important part of Period IV with the occupation of the whole *Burnt Building*, shows strong connections with Bampur V-VI, generally dated 2200-2000 BC, and the C14 determinations (Salvatori - Tosi 2005: 288, 290)

12. In the oasis of Nishapur there is clear evidence that, at least in the Chalcolithic period, Namazga culture and a local culture not yet well-identified coexisted. The eastern part of the oasis was territory of the local culture (Garajian 2012: 59-62), the western one of the Namazga Culture (Hiebert - Dyson 2002; Bāsafā - Rezāi 2016) and apparently the cultural border was very strong and impassable, as no potsherds of one cultural tradition was found in the sites of the other. This peculiar fact could be connected with the presence, immediately west of the Nishapur oasis, of an easy road leading to the upper Atrek valley, that as already said was territory of the Namazga culture. In Sistan there is no clear border between the Hirmand Civilization and GKC, so the model of the Nishapur oasis cannot be applied.

"…point to a maximum probability range between 2200 and 2000 BC, well in accordance with a palaeo-magnetic determination from the same archaeological context (2050-1950 BC)". Then after the fire the *Burnt Building* was abandoned and followed a gap dated 2000-1850 BC; finally in Phase 0 one of the rooms of the *Burnt Building* was re-settled and this occupation, based on one C14 and one U238 calibrated determinations indicating a time-span 1950-1650 BC, was dated on the chronological tables 1850-1700 BC (Salvatori - Tosi 2005: 289 fig. 12, 290 fig. 13). It is evident that the date of Phase 0, extending Period IV into 2nd millennium BC and giving it a total length of 450 years, is based only on these two determinations.

It must also be remarked that the pottery of Phases 1 and 0 is identical (Biscione 1979: 293; Tosi 1983: 92), and therefore they are a single cultural horizon. It is difficult to suppose that the ceramic of Period IV continued without any change for almost half a millennium, including a gap of 150 years. Comparing the 500 years before Period IV we see that the sequence of Shahr-i Sokhta in the same time-span includes the whole of Periods II and III (Phases 7-2), and that the pottery changed in a significant way. It is therefore unlikely that the pottery of Period IV went on for such a long period without any change.

Based on these facts and on the presence itself of GKC, whose flourishing phase and expansion into Eastern Iran and Pakistan ended by 1800/1700 BC, and preferring a conservative date until new elements elucidate the question of the absolute chronology of periods Shahr-i Sokhta III and IV, it is reasonable to think that the gap between Phase 1 and 0 was very short and that Phase 0 too was short. We presume that the whole Period IV, phases 1-0, can be dated approximately 2200-2000 BC, matching the date of Bampur V-VI proposed by Salvatori and Tosi, 2200-2000 BC (Salvatori - Tosi 2005: 290). This means that GKC reached Sistan immediately after the end of the Hirmand Civilization around 2000 BC, at the same time of the expansion into Mehrgarh area (Jarrige 1995: 42, 44, 47; Jarrige 1996: 871). This date allowed GKC about 200 years to reach its maximum expansion in Sistan and in Mehrgarh region, and after that about 200-300 years to develop in Sistan a complex of at least 23 sites and graves (graveyards?) with the luxury objects found at Dam in secondary deposition (see above).

Of course, higher dates for Periods III and IV, proposed by Jarrige *et al*. (2011) and by Helwing *et al*. (2019), would solve the problem and even imply a gap between the end of Period IV and the arrival of GKC pottery in Sistan. Anyhow, as already said above, the authors of this article prefer to wait for additional evidence before pushing back a few centuries the dates of Shahr-i Sokhta, Bampur and of other sites of south-eastern Iran. The 17 GKC sites of Iranian Sistan and their localization in well-defined areas, compared to the 55 sites surely datable to Period IV (unpublished data from the surveys by Dales and the University of Zahedan) distributed all over the ancient delta, suggest that possibly the shifting of the Hirmand, that led to the drying up of the Rud-i Biyaban, began in Period IV, and that GKC arrived in Sistan when it was already drier than in the heydays of the Hirmand Civilization.[13] Possibly the shifting was complete by 1800/1700 BC, as indicated by the total absence in Iranian Sistan of sites between the end of flourishing GKC and the Achaemenid period. It is not probable that the mighty Hirmand River dried up totally between 1800-1700 and 550 BC, nor it is possible to think that if there was water the area would not have been settled. It is therefore likely that between 1800/1700 BC and the Achaemenid period the Hirmand delta shifted to another area of Sistan. The *Istituto di Scienze per il Patrimonio Culturale*, ISPC, is studying this problem on satellite imagery.

Settlements are indeed present in Afghan Sistan. Until very recently the only known site was Nad-i Ali, whose sequence, after the probable GKC period (see above), includes also Iron Age, presumably dated 8th–6th centuries BC (Dales 1977c: 101-104, 111; Allen, Trousdale 2019: 62), Achaemenid and Parthian-Sasanian periods (Dales 1977c: 101-104). Satellite imagery shows that the area around Nad-i Ali is presently watered by a branch of the Hirmand delta and by the Khash Rud river. This last river has a mean yearly discharge corresponding to 7% of the one of the whole Hirmand (van Beek - Meijer 2006: 12), a discharge that was definitely enough for the life of the site. So the possibility that in late

13. The expansion of GKC in Eastern Iran took place in many areas presently drier than the neighbouring ones that, whatever the climatic conditions of late 3rd millennium, presumably were drier also 4,000 years ago. This could mean, for instance, that water management techniques of GKC were more efficient than the previous ones, or that GKC techniques of food productions needed less water (Biscione - Vahdati 2021: 543).

3rd – early 2nd millennium BC Nad-i Ali did not depend on the Hirmand but on the Khash Rud should be taken into consideration.

Recently some early sites, identified by the survey of the Hirmand Valley carried out by the Smithsonian Institution in the Seventies and directed by W.B. Trousdale, were published, revealing a new Iron Age culture hitherto unknown, dated approximately 1200-900 BC (Allen - Trousdale 2019: 30, 56-58, 63) and therefore preceding Nad-i Ali.[14] These sites (Allen - Trousdale 2019: 36, 42-47), known only in Afghan Sistan in the Sar-o Tar basin, in the Rudbar area on the Hirmand and possibly near Nad-i Ali (Figs. 13-14), suggest that in the late 2nd millennium BC the Hirmand delta could have been located in the Sar-o-Tar region. This is confirmed by geological evidence of a 2nd millennium delta exactly in that area (Whitney 2006: 3 fig. 2, 29 fig. 18, 30). The delta anyhow seems to be largely artificial, with excavation of canals beginning in Iron Age and continuing for 2500 years with increasing length and complexity (Allen - Trousdale 2019: 35).

Many tasks face us in the future for a better understanding of the proto-history of Sistan, and studying the mid-late 2nd millennium delta is one of the most important. When it will be surely found, we will have the key for the understanding of the 'dark period' and for a full comprehension of the history of Sistan, one of the key areas for the ethnogenesis of ancient Iran and for the formation of the Iranian culture, religion and traditions.

Bibliography

Allen, M., and W.B. Trousdale, 2019. Early Iron Age culture of Sistan, Afghanistan. *Afghanistan* 2/1, 29-69.

Balali, N., 2010. *Bronze Age in Afghanistan*, Poster presented at the 20th EASAA Conference, http//www.easaa.org/conference%202010/images/post_proc/easaa_pp_balil.pdf, Vienna. Consulted on 15-02-2016.

Ball, W., 1996a. Provisional chronology. In A. McNicoll and W. Ball (eds.), Excavations *at Kandahar 1974 and 1975. The first two seasons at Shahr-i Kohna (old Kandahar) conducted by the British Institute of Afghan Studies*, Oxford, xvii.

Ball, W., 1996b. Chapter 12. General conclusions and overview of the Kandahar sequence. In A. McNicoll and W. Ball (eds.), *Excavations at Kandahar 1974 and 1975. The first two seasons at Shahr-i Kohna (old Kandahar) conducted by the British Institute of Afghan Studies*, Oxford, 391-402.

Bāsafā, H., and M.H. Rezāi, 1395. Avvalin fasl-e kāvush dar mohavvateh-ye Kalāteh Shuri (Khorāsān-e Razāvi, Nishābur). In *Gozāreshhā Pānzdahomin Gerdehamāi Sālānehi Bāstān Shenāsi-ye Irān, 15 tā 17 Esfand Māh 1395*, Teheran, 28-31.

Beek van, E., and K. Meijer, 2006. *Integrated Water Resources Management for the Sistan Closed Inland Delta, Iran. Main Report*. *Delft Hydraulics and Water Research Institute*. Delft.

Besenval, R., and H.P. Francfort, 1994. The Nad-i Ali Surkh Dagh. A Bronze Age monumental platform in Central Asia? In J.M. Kenoyer (ed.), *From Sumer to Meluhha: Contribution to the Archaeology of South and West Asia in Memory of George F. Dales Jr*., Madison, 3-14.

Biscione, R., 1973. Dynamics of an early South Asian civilization First period of Shahr-i Sokhta and its connections with Southern Turkmenistan. In N. Hammond (ed.), *South Asian Archaeology, Papers of the First International Conference of South Asian Archaeologists held in the University of Cambridge*, London, 105-118.

Biscione, R., 1974. Relative chronology and pottery connections between Shahr-i Sokhta and Mundigak, Eastern Iran", *Memorie dell'Istituto Italiano di Paleontologia Umana*, II, 131-145.

Biscione, R., 1977. The crisis of the Central Asian urbanization in II millennium B.C. and villages as an alternative system. In J. Deshayes (ed.), *Le Plateau Iranien et l'Asie Centrale des Origines à la Conquête Islamique*, Paris, 113-127.

Biscione, R., 1979. The Burnt Building of Shahr-i Sokhta IV. An attempt to functional analysis from the distribution of pottery types. In G. Gnoli and A. Rossi (eds.) *Iranica*, Napoli, 291-306.

Biscione, R., 1990. The Elusive phase 2 at Shahr-i Sokhta, Iran. In M. Taddei (ed.), *South Asian Archaeology 1987. Proceedings of the IX International Conference*, I, Rome, 183-194.

Biscione, R., Bulgarelli, G.M., Costantini, L., Piperno, M., and M. Tosi, 1974. Archaeological discoveries and methodological problems in the excavations at Shahr-i Sokhta: spiral stratigraphy at Shahr-i Sokhta. In J.E. van Lohuizen-de Leeuw and M. Ubaghs (eds.), *South Asian Archaeology 1973*, Leiden, 12-52.

Biscione, R., and A.A. Vahdati, 2012. The Iranian-Italian archaeological mission: Season 2012. The identification of cultural areas. *Studi Micenei ed Egeo-Anatolici*, 355-360.

Biscione, R., and A.A. Vahdati, 2021. The BMAC Presence in Eastern Iran: State of Affairs in March 2018. Towards the Greater Khorasan Civilization? In B. Lyonnet and N. Dubova (eds), *The World of the Oxus Civilization*, Routledge, London and New York, 527-550.

Biscione, R., and A.A. Vahdati, in press. The diffusion of Bactria-Margiana Archaeological Complex in Eastern Iran: new evidence and considerations. In *Reports of the congress "Farmers, Traders and Herders: the Bronze Age in Central Asia and Khorāsān (3rd-2nd Mill. BC)", Berlin, 30th November - 1st December 2015.*

Casal, J.M., 1961. *Fouilles de Mundigak*, I-II, Paris.

Cattenat, A., and J.-C. Gardin, 1977. Diffusion comparée de quelques genres de poterie caractéristiques de la période achéménide sur le Plateau Iranien et en Asie Centrale. In J. Deshayes (ed.), *Le Plateau Iranien et l'Asie Centrale des Origines à la Conquête Islamique, leurs Relations à la Lumière des Documents Archéologiques*, Paris, 225-248.

Cortesi, E., Tosi, M., Lazzari, A., and M. Vidale, 2008. Cultural relationships beyond the Iranian Plateau: the Hirmand Civilization, Baluchistan and the Indus Valley in the 3rd millennium BC. *Paléorient* 34/2, 5-35.

Dales, G.F., 1972. Prehistoric researches in Southern Afghan Seistan. *Afghanistan* 4/25, 14-40.

Dales, G.F., 1977a. Shifting Trade Patterns between the Iranian Plateau and the Indus Valley in the Third Millennium BC. In J. Deshayes (ed.), *Le Plateau Iranien et l'Asie Centrale des Origines à la Conquête Islamique*, Paris, 67-78

Dales, G.F., 1977b. Hissar IIIC stone objects in Afghan Sistan. In L. Levine and T. Cuyler Young (eds.), *Mountains and Lowlands, Essays in the Archaeology of Greater Mesopotamia*, Malibu, 17-27.

Dales, G.F., 1977c. *New Excavations at Nad-i Ali (Sorkh Dagh), Afghanistan, Research Monograph no.16, Center for South and Southeast Asia Studies*, Berkeley.

Dales, G.F., 1993. A line in the sand, explorations in Afghan Seistan. In G. Possehl (ed.), *South Asian Archaeology Studies*, New York,19-32.

Dales, G.F, and L. Flam, 1969. On tracking the woolly Kullis and the like. *Expedition* 12/1, 15-23.

Dixit, Y., Hodell, D.A., and C.A. Petrie, 2014. Abrupt weakening of the summer monsoon in northwest India ~4100 yr ago. In *Geology*, published online on 24 February 2014.

Fairservis, W.A., 1956. *Excavations in the Quetta Valley, West Pakistan*. *Anthropological Papers of the American Museum of Natural History* 45/2, New York.

Fairservis W.A., 1961. *Archaeological studies in the Seistan Basin of Southwestern Afghanistan*, *Anthropological Papers of the American Museum of Natural History* 48/1, New York.

Farjami, M., 1394. Nowyāftehā-ye 'Asr-e Mefragh dar Khorāsān-e Jonubi (Motāle'e-ye moredi: Mohavate-ye Gavand-e Bāghestān-e Ferdows). In H. Hashemi (ed.), *Dovvomin Hamāyesh-e Melli-e Bāstān Shenāsi-ye Ira*n, vol. 2, Birjand, 231-257.

Farjami, M., 1395. Ta'in'Arse va Harim-e Gavand-e Bāghestan-e Ferdows. In *Panzdahomin Gerdehamāi-ye Sālāneh-ye Bāstānshenasi-ye Iran, 15-17 Esfand Māh 1395*, Tehran, 474-479.

Fouache, E., Francfort, H.P., Cosandey, C., and C. Adle, 2015. La crise d'aridité climatique de la fin du 3ème millénaire av. J.-C., à la lumière des contextes géomorphologiques de 3 sites d'Iran Oriental (Bam, Tepe Damghani, Jiroft). In R. Rante (ed.), *Greater Khorasan (Studies in the History and Culture of the Middle East)* Berlin, De Gruyter, 27-38.

Fouache, E., Cez, L., Andrieu-Ponel, V., and R. Rante, 2021. Environmental changes in Bactria and Sogdiana (Central Asia, Afghanistan, and Uzbekistan) from the Neolithic to the Late Bronze Age: Interaction with human occupation, in B. Lyonnet and N. Dubova (eds), *The World of the Oxus Civilization*, Routledge, London and New York, 82-109.

Francfort, H.P., 2009. L'Âge du Bronze en Asie Centrale. La civilization de l'Oxus. *Anthropology of the Middle East* 4/1, 91-111.

Francfort, H.P., and X. Tremblay, 2010. Marhaši et la civilization de l'Oxus". *Iranica Antiqua* 45, 51-224.

Garajian, O., 2012. Patterns of change during the transitonal process from Chalcolithic cultures to the Bronze Age in Northeastern Iran, based on pottery studies. In H. Fahimi and K. Alizadeh (eds.), *Namvarnameh. Studies in honour of Massoud Azarnoush*, Tehran, 55-68.

Giacummo, M., 1987. *La ceramica del periodo IV del Palazzo Bruciato di Shahr-i Sokhta*, unpublished dissertation, Istituto Universitario Orientale, Naples.

Gupta, A., Anderson, D.M., Pandey, D.N., and A.K Singhvi, 2006. Adaptation and human migration, and evidence of agriculture coincident with changes in the Indian summer monsoon during the Holocene. *Current Science* 90/8, 1082-1090.

Helwing, B., Vidale, M., and H. Fazeli Nashli, 2019. Radiocarbon dates and absolute chronology. In H.A. Kavosh, M. Vidale, H. Fazeli Nashli, *Tappeh Graziani, Sistan, Iran: Stratigraphy, Formation Processes and Chronology of a Suburban Site of Shahr-i Sokhta*. Roma, 151-155.

Jarrige, J.F., 1988. Le complexe culturel de Mehrgarh (Période VIII) et de Sibri. Le 'Trésor' de Quetta". In J.-F. Jarrige (ed.), *Les cités oubliées de l'Indus. Archéologie du Pakistan. Catalogue de l'exposition du Musée National des Arts Asiatiques Guimet*, Paris, 111-128.

Jarrige, J.-F., 1989. Excavation at Nausharo1987-88. *Pakistan Archaeology* 24, 21-67.

Jarrige, J.-F., 1995. *Mehrgarh, Field Reports 1974-1985. From Neolithic Times to the Indus Civilization*, Karachi.

Jarrige, J.-F., 1996. Les fouilles de Nausharo et leur contribution à l'étude de la civilization de l'Indus. *Comptes-rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 140/3, 821-878.

Jarrige, J.-F., Didier, A. and G. Quivron, 2011. Shahr-i Sokhta and the chronology of the Indo-Iranian regions. *Paléorient* 32/2, 7-34

Jarrige, J.-F., and M.U. Hassan, 1989. Funerary complexes in Baluchistan at the end of the third millennium in the light of recent discoveries at Mehrgarh and Quetta. In K. Frifelt and P. Sørensen (eds.), *South Asian Archaeology 1985*, London, 150-166.

Kaniuth, K., 2006. *Metallobjekte der Bronzezeit aus Nordbaktrien, Archäologie in Iran und Turan, 6,* Mainz.

Kavosh, H.A, Vidale, M., and H. Fazeli Nashli, 2019. *Tappeh Graziani, Sistan, Iran: Stratigraphy, Formation Processes and Chronology of a Suburban Site of Shahr-i Sokhta*. Roma.

Lamberg-Karlovsky, C.C., and F. Hiebert, 1992. The relations of the finds of Shahdad to those of the sites in Central Asia. *Journal of the American Oriental Society* 21, 135-140.

Lamberg-Karlovsky, C.C. and D.T. Potts, 2001. *Excavations at Tepe Yahya, Iran, 1967-1975. The Third Millennium*. Cambridge, Mass.

Lecomte, O., 2005. The Iron Age of Northern Hyrcania. *Iranica Antiqua* 40, 461-478.

Lecomte, O., 2009. Origine des cultures agricoles du Dehistan, sud-ouest Turkménistan, Mise en oeuvre et gestion de l'irrigation de l'Âge du Fer à la période Islamique. In M. Al-Dbiyat and M. Mouton (eds.), *Stratégies d'acquisition de l'eau et société au Moyen-Orient depuis l'Antiquité,* Beyrouth, 69-77.

Lhuillier, J., 2013. Les cultures à céramique modelée peinte en Asie centrale. Un aperçu de l'assemblage céramique de la deuxième moitié du IIe millénaire av. n.è. *Iranica Antiqua* 48, 103-146.

Luneau, E., 2015. A new assessment of the end of the Oxus Civilization (southern Central Asia, ca 1750-1500 to 1400 BC): Overview of the transformations of the society. In G. Affanni, G., Baccarin, C., Cordera, L., Di Michele, A., and K. Gavagnini (eds.), *Broadening Horizons 4, A conference of young researchers working in the Ancient Near East, Egypt and Central Asia, University of Torino, October 2011*, Oxford, 303-308.

Luneau, E., 2016. The fall of the Oxus Civilisation and the role of exchanges with neighbouring societies during the first half of the second millennium BC. In V. Lefèvre, A. Didier and B. Mutin (eds.), *South Asian Archaeology and Art, 1, Man and Environment in Prehistoric and Protohistoric South Asia: New Perspectives. Indicopleustoi, Archaeology of the Indian Ocean, 12*, 169-183.

Luneau, E., 2019. Climate change and the rise and fall of the Oxus Civilization in Southern Central Asia. In L.E. Yang, H.-R. Bork, X. Fang and S. Mische (eds.), *Socio-Environmental Dynamics along the Historical Silk Road*, Cham, 275-298.

Luneau, E., 2021. The end of the Oxus Civilization. In B. Lyonnet and N. Dubova (eds), *The World of the Oxus Civilization*, Routledge, London and New York, 496-524

Lyonnet, B., Dubova, N.A., 2021. Questioning the Oxus Civilization Or Bactria-Margiana Archaeological Culture (BMAC): An overview. In B. Lyonnet and N. Dubova (eds), *The World of the Oxus Civilization*, Routledge, London and New York, 7-65

Mariani, A., 1993-94. *Tepe Rud-i Biyaban 3: Produzione e Consumo della Ceramica in un Villaggio del Sistan Protostorico*. Unpublished dissertation, Istituto Universitario Orientale, Naples.

Moradi, H., Sarhaddi Dadian, H., and S. Nik Abdurahman , 2014. " Development and fall of the Bampur Valley, Based on the New Archaeological Evidence from Prehistoric Period ", in : *Iranian studies (Journal of the International Society for Iranian studies*), Vol. 47, issue 2: 263-287

Mutin, B., and C.C. Lamberg-Karlowsky, 2021. The relationship between the Oxus Civilization and the Indo- Iranian borderlands. In B. Lyonnet and N. Dubova (eds), *The World of the Oxus Civilization*, Routledge, London and New York, 551-589.

Rante, R., 2015. Khorasan Proper' and 'Greater Khorasan' within a politico-cultural framework. In R. Rante (ed.), *Greater Khorasan (Studies in the History and Culture of the Middle East)*, Berlin, 9-26.

Roustaei, K., 2010. Tepe Hesar, once again. In P. Matthiae, F. Pinnock, L. Nigro and N. Marchetti (eds.), *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East May, 5th-10th 2008, "Sapienza" - Università di Roma*, Wiesbaden, 613-633.

Salvatori, S., 1995. Protohistoric Margiana: on a recent contribution. *Rivista di Archeologia,* 19: 38–55.

Salvatori, S., 2016. Bactria-Margiana Archaeological Complex: How Terminology Hides Historical Processes. In N.A. Dubova (ed.), *Trudy Margianskoj Arkheologicheskoj Ekspeditsii*, 6, Moscow, 449– 460.

Salvatori, S., and M. Tosi, 1997. Postscriptum. Some reflections on Shahdad and its place in the Bronze Age of Middle Asia. In A. Hakemi, *Shahdad, excavation of a Bronze Age center in Eastern Iran*, Rome, 121-132.

Salvatori, S., and M. Tosi, 2005. Shahr-i Sokhta revised sequence. In C. Jarrige (ed.), *South Asian Archaeology 2001*, 281-292.

Salvatori, S., and M. Vidale, 1997. *Shahr-i Sokhta 1975-1978: Central Quarters Excavations*, *Preliminary report. Reports and Memoirs, Series minor, I*, Roma.

Santoni, M., 1984. Sibri and the Southern Cemetery of Mehrgarh: third millennium connections between the northern Kachi Plain (Pakistan) and Central Asia. In B. Allchin (ed.), *South Asian Archaeology 1981*, Cambridge, 52-60.

Santoni, M., 1988. Aspects matériels des cultures de Sibri et de Mehrgarh VIII (plaine de Kachi, Baluchistan, Pakistan) à la fin du troisième et au début du deuxième millénaires". In *L'Asie Centrale et ses Rapports avec les Civilisations Orientales des Origines à l'Age du Fer*. Paris, 135-141.

Schmidt, E.F., 1937. *Excavations at Tepe Hissar, Damghan*, Philadelphia.

Sołtysiak, A., Vahdati, A.A., and R. Biscione, 2016. Human remains from Tepe Chalow, Iran, 2013-2015. *Bioarchaeology of the Near East* 10, 91-96.

Sorush, M.R., and S. Yusefi, 1393. Mohavvateh-ye Razeh, shāhedi az esteqrahā-ye hezāreh-ye sevom tā dorān-e tārikhi dar Khorasān-e Junubi", in *Maqallehā-ye Kutā-e Davāzdahomin Gerdehamāi Sālāne-ye Bāstān Shenāsi-ye Irān, 29 tā 31 Ordibehesht 1393*, Tehran, 271-273.

Thornton, C., 2013. The Bronze Age in northern Iran. In D. T. Potts (ed.), *The Oxford Handbook of Ancient Iran*, Oxford, 179-202.

Tosi, M., 1976. A topographical and stratigraphical periplus of Šahr-e Suxteh", *Proceedings of the IVth Annual Symposium on Archaeological Research in Iran, Muzeh-e Irān-e Bāstān, Tehran, Iran, 3rd-8th November 1975*, Teheran, 130-158.

Tosi, M., 1983. Excavations at Shahr-i Sokhta 1969-70. In M. Tosi (ed.) *Prehistoric Sistan I*, Rome, 73-126.

Vahdati, A.A., 2018. The Early Iron Age in northern Khorasan. In J. Lhuillier and N. Boroffka (eds.), *A Millennium of History. The Iron Age in southern Central Asia (2nd and 1st Millennia BC). Proceedings of the conference held in Berlin (June 23-25, 2014) Dedicated to the Memory of Viktor Ivanovich Sarianidi*, Berlin, 51-67

Vahdati, A.A., and R. Biscione, in press. The Bronze Age cemetery of Chalow: a brief report on three seasons of excavations. In E. Luneau, N. Boroffka, and M. Teufer (eds.), *Proceedings of the conference Farmers, Traders and Herders: The Bronze Age in Central Asia and Khorāsān (3rd-2nd Mill. BC)*, Berlin, 30th November – 1st December 2015.

Vahdati, A.A., Biscione, R., La Farina, R., Mashkour, M., and M. Tengberg, 2019. Preliminary Report on the First Season of Excavations at Tepe Chalow: New GKC (BMAC) Finds in the Plain of Jajarm, NE Iran. In J. W. Meyer, E. Vila, M. Mashkour, M. Casanova and R. Vallet (eds.), *The Iranian Plateau during the Bronze Age: development of urbanization, production and trade*, *Archéologie(s) 1*, Lyon, 179-200.

Vahdati, A.A., Biscione R., Dan, R., M.C. Trémouille, 1399. Tadfin shomāreh 12 dar Chalow: gur-e bānui najibzādeh az tamadan-e Khorāsān-e Bozorg, *Majaleh-e Muzeh-e Iran-e Bastan*, 1, 1, 45-64

Vahdati, A.A., Biscione R., Dan, R., M.C. Trémouille, in print. Grave 12 at Chalow: The burial of a young lady of the “Greater Khorasan Civilization.

Whitney, J.W., 2006. *Geology, Water and Wind in the Lower Hirmand Basin, Southern Afghanistan*, Reston, Virginia