

## Physical and Cultural Landscapes of the Hamoukar Area

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The low relief landscape of the Khabur basin and adjacent parts of Upper Mesopotamia is blessed with one of the richest archaeological records in the Near East, but in order to maximize our interpretation of this record it is necessary to understand the geoarchaeological evolution of this terrain. Here I describe key aspects of the physical landscape of the NE Khabur basin and how this landscape has developed in conjunction with the cultural landscape. Emphasis is upon describing the terrain as it now exists and as it appears on satellite images as an aid to the recognition of the extant record of archaeological features determined by archaeological survey (Ur, this volume). Finally a site of special significance, namely the southern extension of Hamoukar, is examined. This site although lacking many of the "normal" characteristics of sedentary occupation in the Jazira clearly provides a special case of large-scale human activity that was recognizable by the combination of remote sensing and field survey.

Overall, the low relief terrain consist of relatively recent rocks and sediments of Tertiary and Quaternary date. To the north near the Turkish border virtually continuous sheets of Quaternary basalt occur whereas further south these become more discontinuous. To the NE of Hamoukar and immediately to the west of the Wadi Khanzir, extend Pliocene clays, sands, and gravels, similar to outcrops recognized in the area of the Wadi Jaghjagh near Tell Brak (FAO 1967). Although physically separated today, these deposits may originally have formed a more continuous sheet that was then broken up by long-continued erosion.

Ecologically and topographically the Hamoukar area closely resembles the area of the North Jazira Project immediately to the east within NW Iraq (Wilkinson and Tucker 1995). Climatically the area is semi-arid, with moist winters and hot, dry summers. Today the area receives a mean annual rainfall of 350-450 mm per annum, but the climate appears to have fluctuated somewhat throughout the Holocene with a tendency toward drier conditions during the last 4000 years (Courty 1994). The highly degraded landscape is virtually without trees today and land use consists of a prairie type agricultural regime of rain-fed wheat, barley and irrigated cotton, with grazing on stubble after the harvest.

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In contrast to those parts of the Khabur basin located further to the west, where tells form alignments mainly along well-defined meandering wadis, the area of Hamoukar is characterized by very subtle traces of wadis. In fact the site of Hamoukar is positioned very close to the watershed that divides wadis flowing to the Tigris (to the east) from those flowing to the Wadi Radd and the Euphrates to the south and west. Hamoukar is situated just on the Euphrates side of the watershed on a minor watershed itself so that unlike most major sites in the regions which are located along wadis, there was no immediate perennial water supply. This lack was presumably rectified by the digging of wells as a primary water supply.

#### I. Archaeological and physiographic regions of the Hamoukar area (CORONA image : Fig. 1)

The following descriptions are primarily based upon interpretation of CORONA satellite imagery. Only minimal ground control was possible, primarily in Zone 2 immediately around Tell Hamoukar.

1) Tertiary uplands to the NE of Figure 1 developed on Pliocene clays, sands and gravels. This area exhibits a high drainage density with moderately incised shallow valleys drained by well-defined wadis. Few major tells occur in this area except for Rumeilan situated at the boundary between Zones 1 and 2. It can be surmised that Zone 1 (which is the water gathering zone for Zone 2), probably contained relatively little cultivation during the Bronze Age, and may have provided a long term pastoral resource.

2) Low-relief silt-clay plains with Tell Hamoukar located roughly in a central position. Zone 2 has numerous tells including Hamoukar and Rumeilan. Wadis appear to have flowed originally from the uplands of Zone 1 toward the SW, but many now exhibit indeterminate traces and are only recognizable as slightly darker traces of infilled sediments on the satellite images. Zone 2 appears to have been an area of long-term cultivation, especially in the Bronze Age when the food demand of Hamoukar, Rumeilan and their tributary settlements must have been considerable.

3) Low basalt plateaus of Quaternary date to the west of Wadi Rumayla. On some CORONA satellite images this undulating area has a slightly paler appearance than Zone 2. This plateau is cut by the N-S Wadi Khunayzir, which according to the pits at Tell Aalo may have followed the line of a major N-S Plio-Pleistocene channel system. Wadi Rumeilan forms the boundary between Zones 2 and 3. The low plateau of pale gray-green basalt is overlaid by usually deep reddish brown calcareous soils classed by UNESCO/FAO as calcic xerosols. This plateau is drained by several roughly N-S wadis which exhibit rather indistinct traces. Unlike the basalt plateau in the Western Khabur (near Tell Beydar) where soils on basalts are thin, Zone 3 has considerable agricultural potential, a point that is underscored by the presence of a number of small and medium sized tells dotted along the wadis. During the Early Bronze Age, Zone 3 must have been a secondary cultivated zone in which intervening open land could have been used for pastoral production with valley floors showing potential for irrigation.

4) To the south of Zone 3, immediately to the northeast of the Wadi Radd (Zone 5), occurs an area of flat terrain. Zone 4 is crossed by a series of branching and locally meandering N-S channels and relict channels. In some places these show the pale traces of what

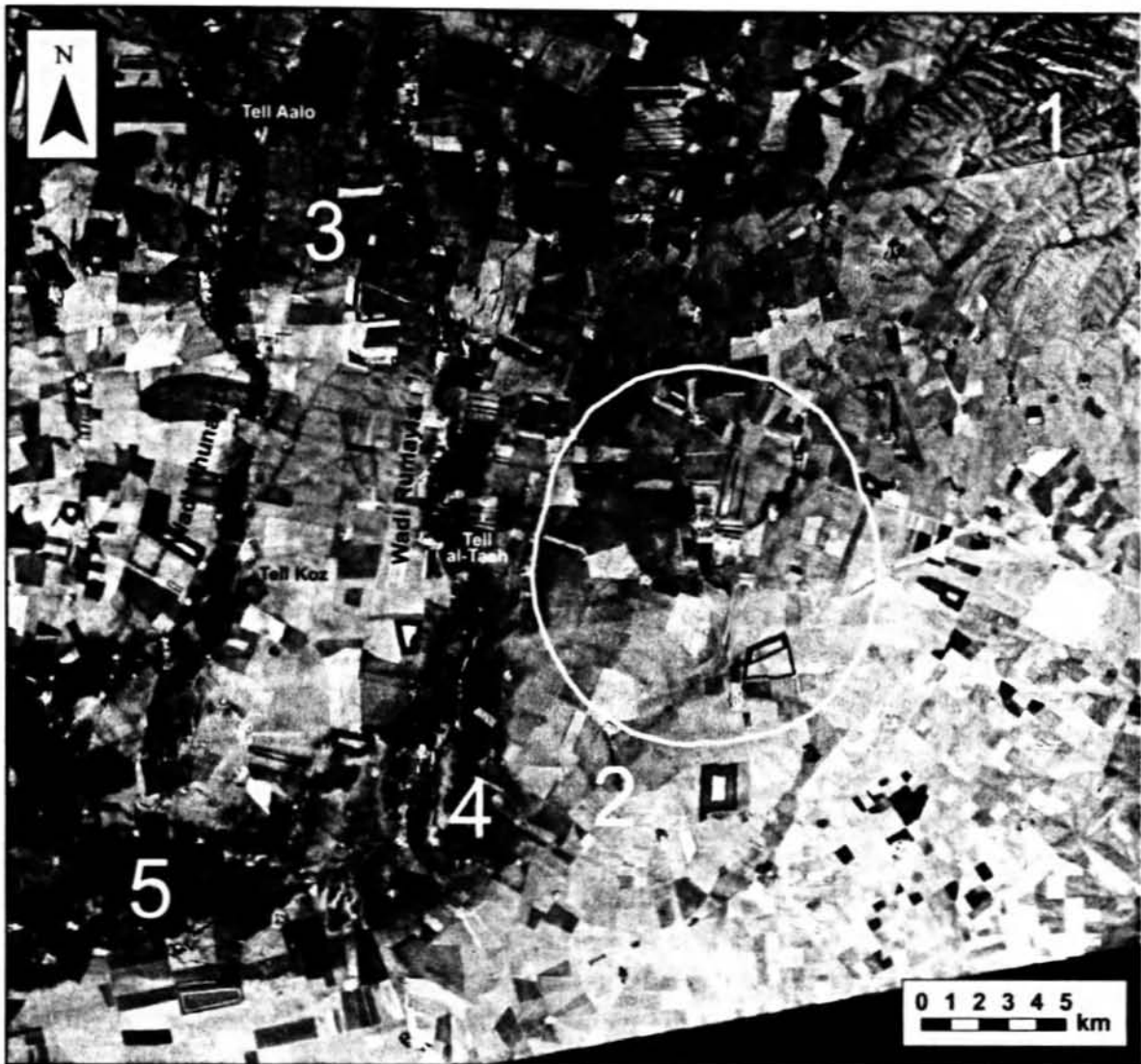


Fig. 1. CORONA image of the Hamoukar region showing the broad geographical Zones 1 to 5 described in the text.

appear to be possible levees and their bifurcations are suggestive of the presence of irrigation channels of unknown date. The presence of two large (i.e. 10-20 ha) sites, namely Tells Koz and Tash, near the head of the bifurcating and / or pale colored terrain suggests that the postulated relict irrigation systems might be Bronze Age in date. Whether these are irrigation systems or not, this is clearly the area where the major wadis of Rumayla and Khunayzir branch out into distributaries.

5) The frequently flooded salt marsh area of the Wadi Radd. Recognizable by its very dark appearance on the CORONA images, this area is sub-divided into a fine grid pattern of small channel-like cuts and other linear features. These appear to represent some form of drainage system dug to drain the marsh of the Radd or to act as an outfall for water from the irrigation systems ; alternatively they may represent excavations dug in order to exploit the products of the marshes. These features are undated, but to judge by their clarity on the images, they could be quite late in date.

The low Tertiary hills to the NE of Hamoukar (Zone 1) are dissected by numerous shallow valleys which produce the variegated pattern on CORONA satellite images. When these wadis reach the plains around Hamoukar (Zone 2), some, such as that to the east of Hamoukar, are evident on satellite images as dark sinuous traces which represent the accumulation of Holocene period moisture-retaining wadi sediments. The wadi to the west of Hamoukar does not appear to originate in the Tertiary uplands, but may have its source in a possible relict spring originally located adjacent to al-Asayla (Site THS 21). The channels to the east and west of Hamoukar eventually made their way to the Wadi Rumeilah that runs N-S some 8 km to the west of Hamoukar.

## II. Development of the Pleistocene and Holocene landscape

Northwest of Hamoukar on the Wadi Khunayzir (by Tell Aalo Fig. 1) deep quarry sections have exposed up to 7 m of weakly cemented gravels and pedogenically altered silts, clays and relict soils representative of an undefined but very long period of sedimentary aggradation. The gravel deposits accumulated within ephemeral channels that conducted large quantities of sand and gravel via rapidly shifting braided channels. Although not dated by artifacts these deposits appear to result from long phases of deposition that took place during the Pliocene and Pleistocene periods. That these channels drained a large area of eastern Anatolia is suggested by the wide range of rock types contained within the gravels. These include limestone, a range of basic and granitic igneous rocks, quartz and siliceous stones, all of which are derived from a large drainage basin of varied geology, such as the Anatolian highlands to the north. The high degree of stone roundness, which is suggestive of long-distance transport, implies that the catchment basin for the Aalo palaeo-rivers must have been sufficiently large for the gravels to have become well-rounded by attrition. Overall, the Tell Aalo sequence shows that during earlier but presently undated stages of the Plio-Pleistocene high-energy braided channels accumulated within a broad incised channel. This incised channel was then refilled by an aggrading sequence of clay and silts with rare gravel lenses and palaeosol horizons.

Related deposits of apparently similar east Anatolian provenance outcrop on a low plateau terrace to the NW of the village of Bir Halu near Tell Brak. These heavily cemented (i.e. calcreted) gravels represent the aggradation of a sequence of gravels probably related to those recorded at Tell Aalo. Both the Aalo and Bir Halu gravels appear to derive from proto-Tigris channels which flowed from the north east, that is from where the Tigris debouches from the Taurus Mountains. This flow apparently resulted in the accumulation of a broad sediment sheet across the eastern Khabur plains leading to the proto Euphrates to the south. Subsequent Pleistocene and Holocene erosion then cut this sediment sheet into the remaining isolated patches that are evident on published geological maps (e.g. FAO 1967).

By the Holocene period a series of north-south wadis draining from the Tur abd-Din hills (in southern Turkey) across the Khabur plain appears to have been well in place. A sedimentary sequence by Tell Arbate (SE of Qamishle) illustrates a distinctive succession of

two Holocene alluvial fills which aggraded under conditions of distinct environmental change, perhaps in part induced by human interference within the water supply catchment. This sequence comprises two superimposed alluvial units :

A : an earlier bipartite unit consisting of a lower layer of olive and dull orange sand and fine gravel below a gray brown calcareous deposit (tufa) and cemented wadi bed deposits, in turn overlain by an upper layer of some 40 cm of bedded silt and sand with pale brown sandy loam. This deposit, which included a single probably prehistoric sherd, appears to have accumulated within a perennially flowing channel which drained a local catchment, namely one that derived its gravel load from within the Tur Abd Din/Khabur catchment.

B : a later unit which overlies the lower unit A. This represents an aggradation of the stream bed which clearly, at this point, flowed at a higher level than unit A. This deposit again comprised a bipartite sequence. The lower stratum consisted of rounded limestone pebbles in a sandy matrix with a mean stone size of 8 cm (max. dimension 20 cm) deposited in a high-energy channel. This stratum was overlaid by up to 120 cm of pale brown silt. Unit B, which represents an increase in overall flow energy of the river showed no traces of year-round flow. The presence of chaff-tempered sherds within the gravel of unit B suggests that deposition occurred either in the Late Chalcolithic or perhaps mid/late Assyrian times.

The Tell Arbate sequence suggests that an earlier Holocene channel with rather steady year-round flow was replaced by a mid-late Holocene channel which exhibited much more flashy and episodic flow that took the form of occasional high-energy events. The deep pale brown silt may have been derived from the erosion of neighboring soils or those on the Tur Abd Din Mountains immediately to the north.

Unlike the Tell Aalo and Bir Halu gravels, those at Tell Arbate derive from a purely local catchment that was restricted to the upper Khabur plains and Tur Abd Din. The dramatic contrast in flow conditions at Tell Arbate may result from the following conditions, or all three in combination :

- A shift from a wetter early Holocene climate (involving more vegetated conditions, year-round channel flow, and relatively minor variations in flow) towards more arid conditions. The primary water source during the moist phase is likely to have been springs.
- A shift from a well-vegetated earlier Holocene catchment toward a more denuded environment in the mid-late Holocene. In this case removal of woodland from the Tur Abd Din Mountains and adjacent parts of the Khabur basin would have increased runoff, possibly resulting in lower water tables and overall higher peak floods.
- Withdrawal of water from the main channel by irrigation canals (as evident on some CORONA images) would have decreased the perennial flow, that is the base flow of the channel. As a result, earlier year-round flow would have been reduced effectively to ephemeral seasonal flow. Such removals, although accounting for a

decrease in flow, would not account for the increased flow energy as demonstrated by the larger stone size of the gravel in unit B. Therefore this factor cannot suffice to explain this sequence on its own.

In conclusion, the shift in sedimentary regimes probably results from a combination of the above factors, namely drying of the late Holocene climate (Courty 1994) in combination with increased degradation of the local environment and perhaps the withdrawal of stream flow for irrigation (Wilkinson 1999).

Although wadi channels are only occasionally evident in the region of Hamoukar, when they do occur they characteristically exhibit a very meandering trace on satellite images; on the ground, channel banks typically consist of brown blocky silt and clay. Such fine grained cohesive bank materials are commonly associated with meandering channels. In the area of Tell Brak alluvial sections along the Wadi Jaghjagh indicate that by the earlier Holocene, perennial flow appears to have replaced the episodic flow of the Late Pleistocene, and this Holocene flow occurred within a more meandering channel which continued to conduct some bedload of sand and gravel. Finally during the later Holocene (i.e. probably during the last 4000-5000 years) increasing quantities of silt and clay appears to have clogged the wadis to some degree. This phase of valley infilling was probably caused, in part, by erosion resulting from the extension of settlement and agricultural land during the last 4,000 - 6,000 years. Because bedload appears to have declined significantly during the Holocene, both the energy gradient of the channels and their width were able to be reduced. The reduction was achieved by the development of a more meandering channel with a decreased width : depth ratio. In the Jaghjagh near Brak, wadis appear to have aggraded with up to 4.5 m of blocky silt and clay during the later Holocene and it is this fine silt-clay moisture-retaining aggradation that forms a distinctive dark trace on the satellite images. Similar traces are evident near Hamoukar, although unfortunately deep wadis sections appear to be rare. In addition, in the vicinity of Hamoukar low lying areas more distant from the wadis have accumulated a thin cover of up to 1-2m depth of silt and clay (see area D, below). Between the wadi systems, that is on the gentle slopes and along watersheds (which comprise > 90% of the terrain), soil profiles show that these areas are typically covered by deep, reddish brown calcareous soils (calcic xerosols). Such soils are often visible below archaeological sites (e.g. the Hamoukar southern extension discussed below) and comparison of the level of the buried soil with the adjacent plain clearly demonstrates that these areas have received little or no sedimentation over the past 6000 years or so and have predominantly experienced an erosional regime. Overall, on CORONA images this terrain appears pale gray with various darker gray features apparently representing wadis and linear hollows (see Ur this volume) and lighter gray traces of archaeological sites.

Although apparently flat, the terrain around Hamoukar is, in fact, a very low relief plain drained by extremely broad, shallow infilled wadis which show no traces of having conducted perennial flow in recent centuries. Overall the wadis in the vicinity of Hamoukar lack cut channels and appear to have been infilled by a silt clay ploughwash. Being on a very low

watershed, Hamoukar must have been largely dependent on water either from wells or perhaps a spring (long since disappeared) for its water supply. Such is the low relief of the terrain, around 1-2 m (2-3 m at most with the exception of tells), that any minor change in the local relief, such as the development of hollow ways of 1-2 m depth, may have resulted in a shift in the pattern of overland drainage. Thus a machine cut to the NW of Hamoukar in 1999 demonstrated that during the 4th and 3rd Millennia BC the ground surface in depressions to the NW of the tell had a relative relief between 1.75 and 2.5 m greater than that evident today.

The wadi to the east of Hamoukar is a very broad and shallow swale that lacks a visible channel. It flowed from in the vicinity of Tell al-Sara (THS 8: Ur Fig. 3) southward past the east side of the southern extension of Hamoukar and thence to the SW past Umm Adham (THS 44: Fig. 2). Today there is very little evidence for this drainage line except from the form of the contour lines as well as a narrow dark sinuous feature immediately to the south east of the southern extension (Fig. 2). To the west of Hamoukar a broad dark soil mark trending from NE-SW appears to be a second relict wadi. Where the soil mark disappears to the NE, the wadi can be inferred from re-entrants in the contour lines to have extended to the west of site THS 3 and immediately S of site 21 (Fig. 2). Today this feature is virtually invisible having been infilled with an accumulation of ploughwash which has resulted in the dark soil mark. Nevertheless, there is reason to believe that this feature conducted flow before the fourth millennium BC, i.e. before Hamoukar became a major settlement.

### III. Hamoukar beyond the site perimeter

#### *Hamoukar area D*

Late Holocene flow conditions in the area of Hamoukar are best illustrated by three deep machine-cut trenches excavated in 1999 in Area D to the NW of the main site (Fig. 3). These provide some general information concerning changing runoff conditions in the area over the last 6000 years. Altogether three trenches were excavated in Area D during the 1999 field season: Trench 1 to the south, Trench 2 in the center, and Trench 3, to the north.

*Trench 1* was dug in a very shallow depression immediately to the north of the city mound and was then extended southward toward the presumed location of the city wall. Profile 1 revealed the presence of a buried land surface some 1.5-1.7 m below present ground level. The depth of this surface was variable however, especially toward the north end of the trench where the surface appears to have been cut by a pit. The southern end of the trench, abutting the tell itself, shows the presence of complex and deep fills which extend well below the buried ground surface. The soft brown fills of this feature suggests that it descended well below the 3 m depth of the excavated machine trench. This deep depression appears to be the remains of either a moat that surrounded the town wall or alternatively pits for the excavation of mud brick.



Fig. 2. Off-site features and sites in the surveyed area showing the broad shallow wadis to the SE and NW of Hamoukar and the possible diversion of overland flow towards Hamoukar area D (arrowed).

*Trench 2*, to the north of *Trench 1*, revealed a buried land surface at some 60-100 cm (but in some places less) below the present ground surface. Two pits cut into this buried land surface contained chaff-tempered late Chalcolithic pottery (i.e. Late Chalcolithic 3 according to the Santa Fe sequence (Schwartz 2001)).

*Trench 3* (Fig. 4) was cut across a broad extremely shallow depression which today exhibits a sparse growth of plants of *prosopis* type. Here the natural soil, in the form of a reddish brown clay with prismatic soil structure and common well-developed calcium carbonate soft concretions was cut by a broad, shallow depression which was infilled by a complex



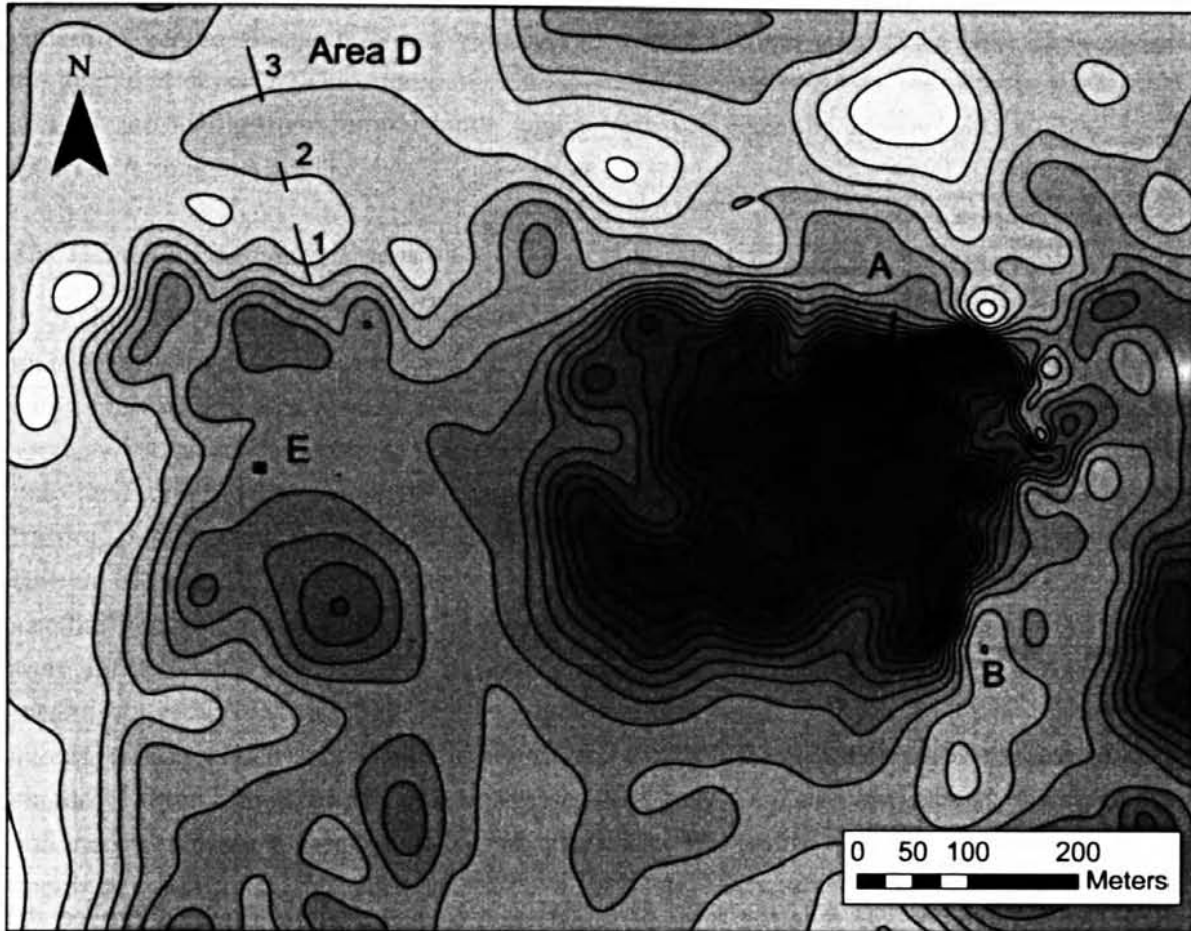


Fig. 3. The location of the area D trenches to the NW of Hamoukar.

of sand and fine gravel (Fig. 4: layers 1,2 3, 4 and 6). At the south end the poorly sorted fine gravel and sand deposits overlay a brown clay loam which contained occasional potsherds. The gravels are mainly of rolled calcium carbonate concretions indicating that they were eroded from a nearby natural calcareous soil, and the presence of sherds with fabrics resembling those of the 3rd Millennium BC suggest a date within this range. The presence of fine gravel, sands and other deposits containing cultural material suggests that wadi development went hand-in-hand with human occupation, most of which at the site of Hamoukar itself can be dated to the 4th or 3rd Millennium BC.

The sudden appearance probably during the 3rd Millennium BC of an accumulation of sediments deposited by low energy water flows may be explained by reference to the topographic development of the area as follows. Draining roughly NNW-SSE toward Hamoukar from the NNW is a shallow hollow way, the southern part of which was mapped during the 2001 field season. This hollow appears to have concentrated flow and led water into the area of Trench 3 where the resultant deposit appears in the form of the coarse sand and fine gravels. Similarly in the vicinity of Tell Brak, well-developed linear hollow features were seen to contain spreads of fine gravel along their lowest points. Enhanced flow frequently occurs along linear hollows because earthen trackways gather and concentrate runoff from the sur-

Tell Hamoukar 1999 - Area D Trench #3 West Section (central part)

- ① Fine compact sand with rare green sand & chaff sherds
  - ② Gravel
  - ③ Patch of gravel
  - ④ Fine compact sand
  - ⑤ Thick lens of dark brown fine compact clay (glassy-looking) with 2 yellow-green sherds (lot A.359)
  - ⑥ Fine compact sand
  - ⑦ At this spot in the E section, there are baked brick fragments
- Kiln slag
  - ≡ Sherds

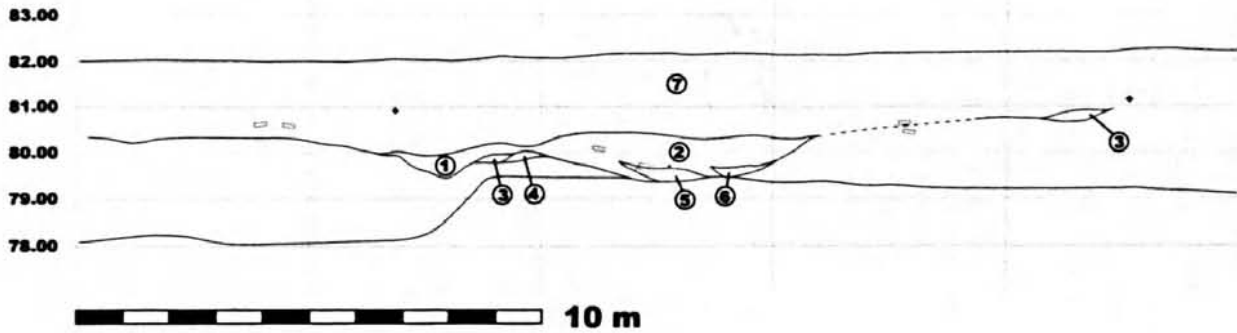


Fig. 4. Western section of Trench 3, area D (1999).

rounding terrain to conduct it in the form of weakly constrained channel flow. Moreover, the shallow hollow way feature extending NNW of Hamoukar (arrow : Fig. 2) appears to have extended northward toward the old wadi channel which flowed SW from site 21. This linear hollow appears to have consisted of a depression as deep or deeper than the original wadi draining to the SW ; as a result it could have conducted and effectively captured part of the wadi flow. From the 3rd Millennium BC (as suggested by the potsherds in trench 3), the SW-flowing wadi appears therefore to have contributed part of its flow toward Trench D, either conducting it toward the site itself or to its moat or surrounding mudbrick extraction pits. The presence of the 5th and 4th Millennium BC site 47 along the wadi suggests that it conducted sufficient flow to attract settlement between the 5th and early 4th Millennium BC. After this, although the wadi became partly infilled with ploughwash, it probably continued to conduct some flood water. Today it appears to be effectively a relict wadi. Although such a diversion could have been a deliberate policy of the occupants in order to bring more water to the site of Hamoukar, the lack of upcast spoil along the linear hollow does not support this interpretation. On the other hand, the development of hollow ways in such locations makes the capture by hollow ways of wadi flows more likely.

In addition to demonstrating that these episodic wadi flow conditions started around the 3rd Millenium BC, the area D trenches demonstrate the old land surface in the lower terrain immediately adjacent to the site of Hamoukar has been aggraded by between 60 cm and 170 cm of silt and clay. Overall, this finding is in keeping with evidence from elsewhere in the Khabur Basin that along wadis and in depressions immediately surrounding sites the dominant

pattern of geomorphic activity has been aggradation of sediments together with pedogenesis of the aggraded deposits. The source of such aggraded sediments can be assumed to be the large area of surrounding agricultural lands which form the generally pale-colored surface on the CORONA image.

#### *The Hamoukar Southern Extension*

In 1999 a roughly 280 ha area of mottled dark and light coloration to the south of the main site of Hamoukar was recognized on the CORONA satellite image (Fig. 5). Topographically, most of this area formed a low, flat bench overlooking low ground to the west, east and south, whereas to the north it is separated from the main site by a broad depression which may have resulted from or been enlarged by the excavation of a moat and/or mud-brick extraction pits. Despite the apparent flatness of the southern extension, which local people call Khirbat al-Fakhar (THS 7) because of its abundant sherd scatter, some of the mottling on the satellite image can be interpreted as resulting from local rises and falls in the topography that were infilled with silts. Toward the southeast a complex area of mounding elevated a few meters above the surrounding terrain covered some 31 ha. In addition to late Chalcolithic sherds, this mounded area yielded a significant scatter of Parthian, Sasanian and early Islamic sherds. Although most of this area comprised soft, gray ashy soil, one mound of reddish-hued soil may represent a large structure of mudbrick. The entire site exhibits a dense (> 200 sherds per 100 sq. m) but variable scatter of frequently large late Chalcolithic sherds. In addition to potsherds, surface material comprises large quantities of obsidian flakes and blades including debitage from tool manufacture.

Surface collection demonstrated that sherd scatters were remarkably dense across most of this area and was well in excess of off-site "field scatters" (J. Ur, this volume). Despite its low elevation it could be fairly well defined on most sides because there was a rapid drop-off to much lower scatter densities beyond what must have been the perimeter of the site. In order to ascertain the depth of occupation, in the 2000 field season nine test pits were excavated in the site by Colleen Coyle and Mark Altaweel (Fig. 5). Together these trenches demonstrated that the terrace area that surrounds the main mounded area consisted of very shallow cultural deposits. In Z3 these deposits had been partly transformed by soil forming activities whereas in Z4 and Z5 thin midden deposits rested on natural soils at 20-25 cm depth. Only in Trenches Z1 and Z3 were the deposits of significant depth. In the case of Z3 there was 70-80 cm of cultural deposits down to virgin soil. In between Trenches Z3 and Z4/Z5, the sounding at Z1 was located within a large depression below the general level of the site. Trench Z1, which was excavated to a total depth of 1.9 m had infilled with a large amount of soil from slopewash, as well as some occupational material washed from upslope. The presence of cultural deposits in the base suggests that there was some *in situ* occupation in the center of the basin.

The most coherent traces of *in situ* human activity came from Trench Z3 situated on a rise overlooking trench Z1 and to the east of it. Excavation by Mark Altaweel demonstrated

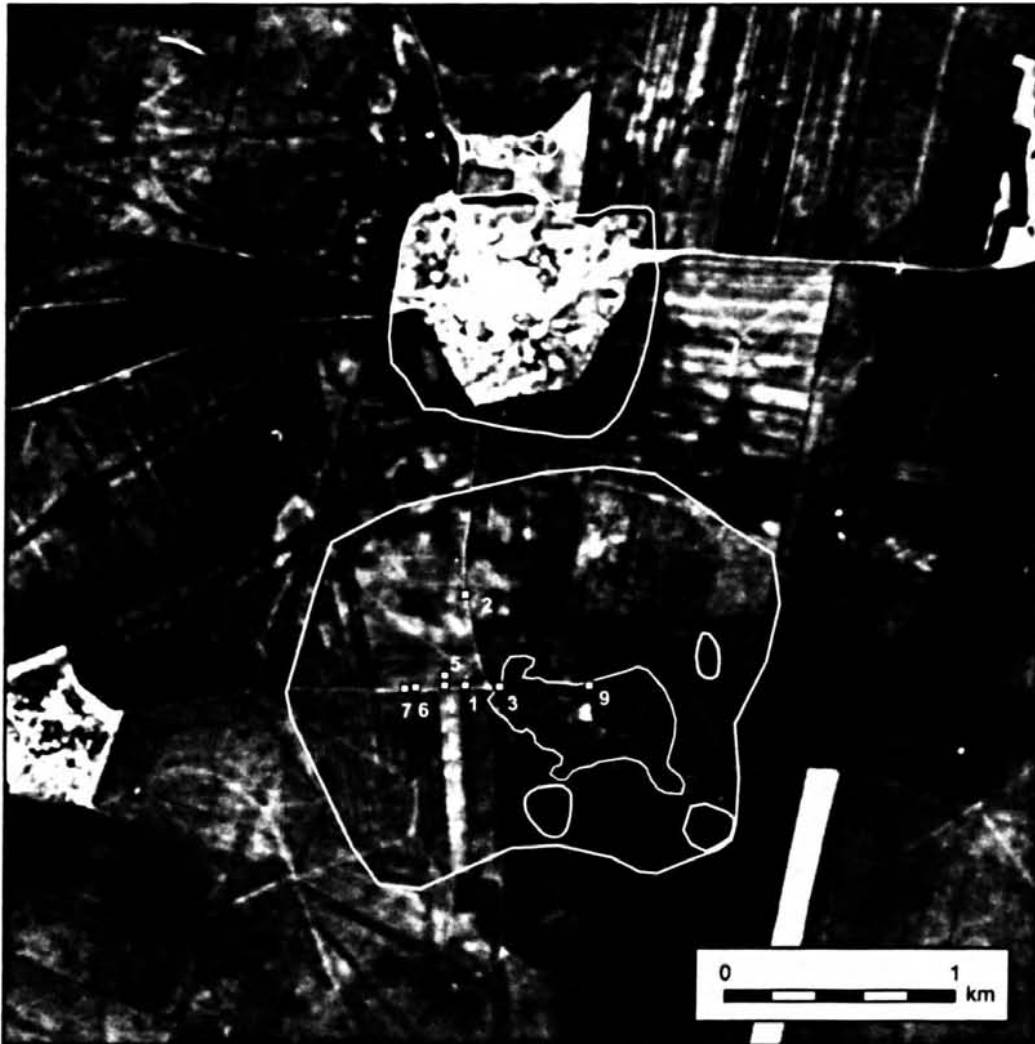


Fig. 5. CORONA image of the Hamoukar southern extension showing the location of Trenches Z 1-7 and Z 9.

that this trench consisted of some 70-80 cm of cultural material of the earlier part of the late Chalcolithic period cut by at least three inhumation burials. The Late Chalcolithic deposits therefore were only recovered within part of the trench, but where they did remain there was evidence that a thin clay floor layer (tempered with chaff) had been laid over a heavy clay substratum of the buried soil. On top of this floor a wall of mudbrick remained to a height of five courses. The wall was then cut by grave 1. This substratum of blocky clay coated with dark gray manganese-like coatings, is very different from the reddish brown calcareous palaeosol encountered in Trench Z2, and it is tentatively interpreted as an ancient clay deposit of Pliocene/Pleistocene date. Although basalt stones were present in Trench Z3, these all seem to have been associated with the grave fills, not the floor and associated walls.

Trench Z 6 contained a possible burial also, as well as a mudbrick wall at ca. 1m depth, with associated sherds over a reddish brown calcareous soil. Z9 contained two pits as cultural deposits which included both complete and decayed mud bricks.

The soundings demonstrated that with the exception of the mounded area, the depth of cultural material was minimal, and usually bottomed out within 20-50 cm of the surface. Nevertheless traces of *in situ* cultural material in the form of ashes, mud brick walls and graves suggests that evidence for occupation was not restricted simply to middens. The burials lacked grave goods and it appears probable that these graves resulted from burial practices that occurred after the Chalcolithic settlement was abandoned.

Overall, the pottery from the surface of the southern extension comprised a wide range of forms which included globular bowls with external beading, internally beaded or thickened bowls, "double-rim" vessels, a range of wide open bowls and simple everted rim jars (Figs. 6 and 7). In addition Late Chalcolithic 1 "sprig ware" was occasionally evident (Fig. 8). Overall, the pottery falls in the range of Late Chalcolithic 1 and 2 at Umm Qseir (Tomita 1998: fig. 84), or the Post Ubaid of the Middle Khabur basin and Jebel Abd al-Aziz area as recently defined by Frank Hole. These Middle Khabur types suggest an extended range for the earlier late Chalcolithic into the range 4000 - 4700 BC (calibrated: Hole 2001: 74-75). The ceramics of the southern extension fall into the "pre-contact" phase of the late Chalcolithic of the north Jazira survey as defined by Alan Lupton (1996: 17-18). According to the recent Santa Fe chronology this would place them in the range Late Chalcolithic 1-2 (Rothman 2001: 384-5).

Clearly this extensive site cannot be compared with conventional stratified sedentary sites in northern Syria and we should perhaps view it as being the remains of a site complex represented by a wide range of activities. Such activities would have included obsidian working, the accumulation of midden material, some *in situ* occupation, and a range of post-occupational burials. Overall, the cultural signatures recovered from the soundings cannot convincingly be argued as being the remains of long-term sedentary occupation and instead occupation appears to have been sporadic and dispersed, at least over much of the site. Consequently, from this as well as from the lack of deep cultural sequences, it can be inferred that settlement population densities were significantly lower than can normally be inferred from sedentary settlements. Moreover, the area may have been visited over a number of years or centuries, with settlement having been associated with occupation by seasonally mobile groups who used the site as a temporary residence, perhaps for exchange, and specialized manufacturing activity as well as episodic religious or social gatherings. In general, most sites of the earlier part of the late Chalcolithic in the region (Lupton's pre-contact period or LC1-LC2) are rather small mounds less than 6 ha in area, although Tell el-Hawa was probably 33 ha in size or even larger (Ball et al. 1989; Lupton 1996: 24-25). To the SW, Tell Brak must also have been a large site at this time. Nevertheless, both Brak and Hawa were conventional mounded settlements, presumably occupied by long-term sedentary occupants. Interestingly, the location of the Hamoukar southern extension near to the watershed of the Tigris and Euphrates rivers and not on a major wadi system suggests that abundant water resources were hardly the primary locational factor behind the development of this settlement, and it seems more likely that its position between major sedentary centers such as Brak and Hawa may have made it ideally situated as a periodic gathering ground and meeting place for perhaps more mobile groups.

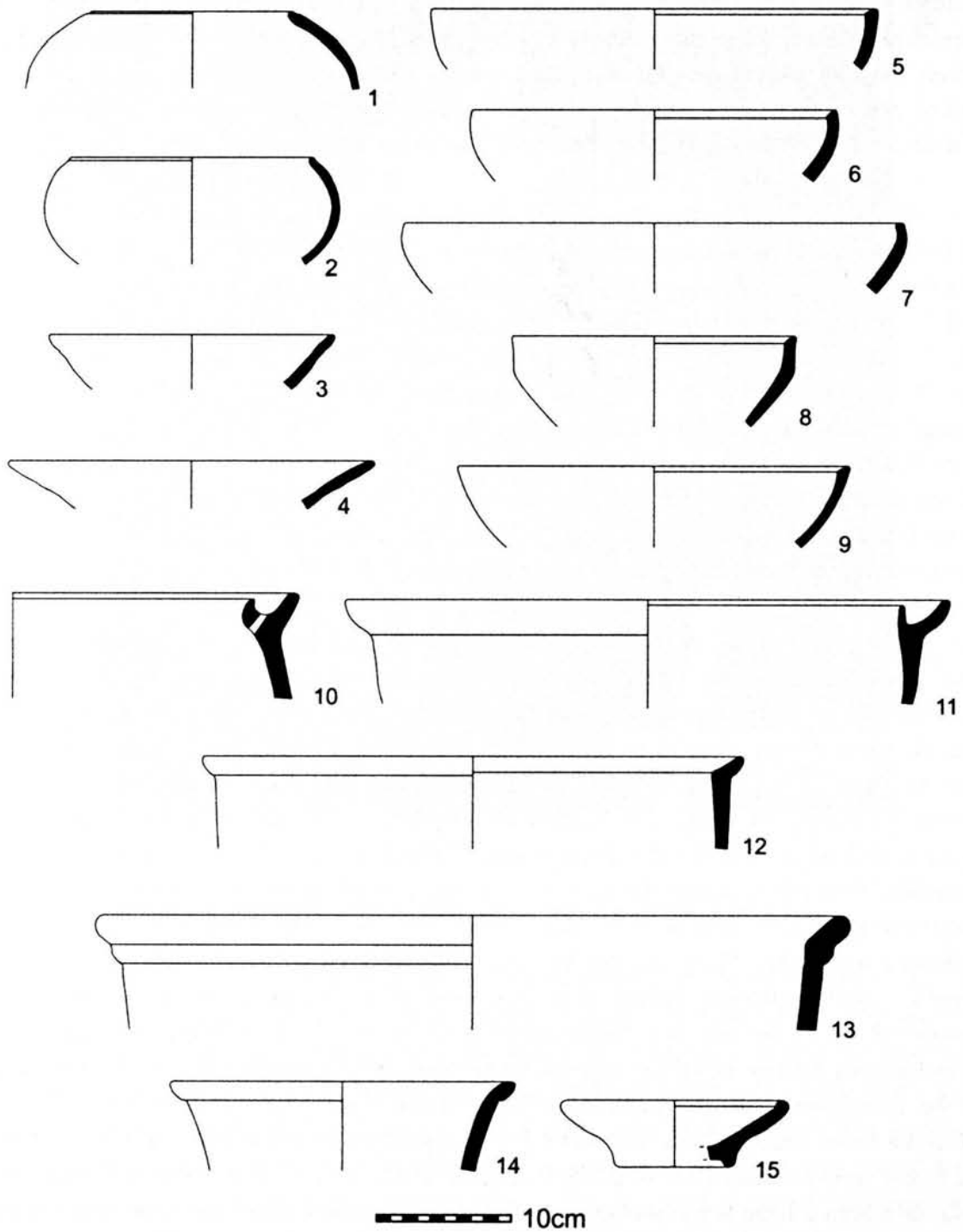


Fig. 6. Examples of bowls and open forms from the surface of the southern extension.

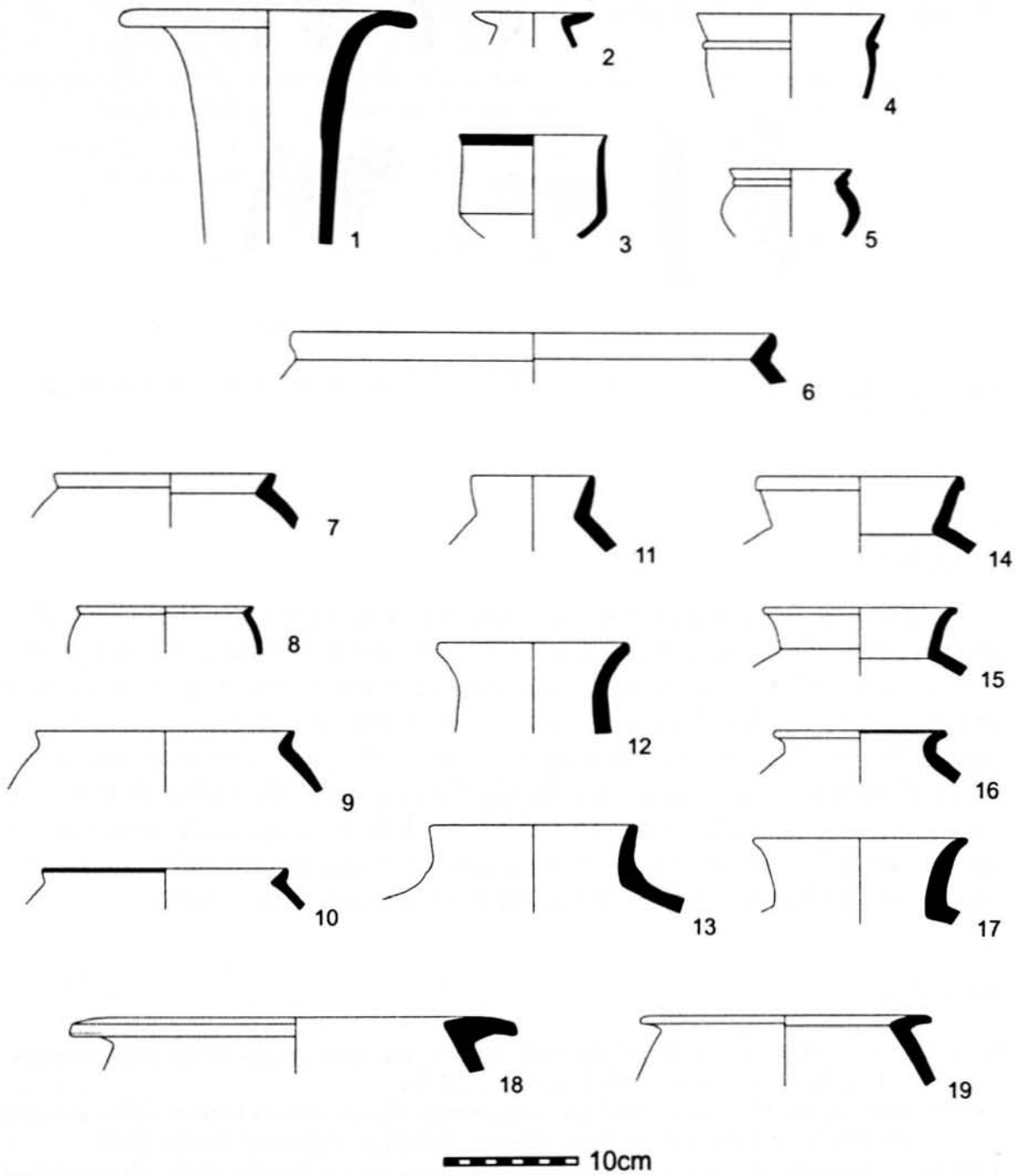


Fig. 7. Examples of jars and closed forms from the southern extension.

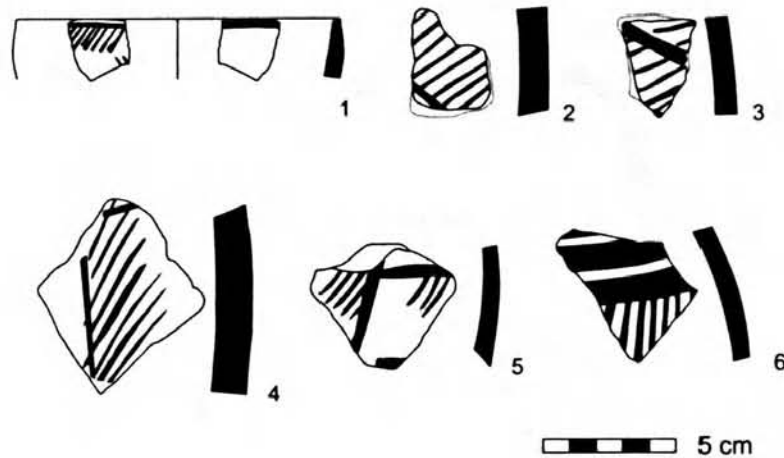


Fig. 8. Sprig wares (orange sandy fabric with dark brown to black paint) from the surface of the Hamoukar southern extension.

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