MACRO-SCALE ANALYSIS OF MATERIAL CULTURE IN THEIR LANDSCAPES: CASE-STUDIES IN 'INVISIBLE FLOWS'

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ABSTRACT

A long tradition of research suggests that during the 3rd and 2nd millennia BC, both urban and non-urban societies of south-west Asia and wider Afro-Eurasia, became progressively more interconnected. Whilst recovered texts hint at considerable multi-directional flows of materials, including precious stones, organic material, metals and textiles, the archaeologically representative evidence for these same materials is often very difficult to find or completely invisible. This paper explores how a selection of such invisible flows of materials and ideas might be integrated into our analysis of landscape and society, through the visualization of geospatial data with modern GIS mapping and analysis. The archaeological case studies will focus on proxy evidence from eastern Anatolia and western Central Asia and the routes of interaction within and beyond these regions, to make sense of these difficult-to-study materials. The results show that the physical exchange routes along which such connections were made appear to pre-figure parts of the later historical Silk Road.

VISIBILITY, ACCESSIBILITY AND SYNTHESIS OF ARCHAEOLOGICAL DATA

Modern archaeological research, especially in a region like the Near East, must deal with two contrary challenges. On the one hand, there is the 'too little': the in-built bias of archaeological visibility and preservation which mean many of the flows of those objects and materials which were most important to the ancient people in which we are interested (including metals, textiles, foodstuffs), are invisible or only partly visible in the archaeological record. On the other hand, there is the 'too much': the massive amount of data which has been generated by archaeological research over the last 150 years (of varying quality and accessibility) which makes an empirically-grounded 'big picture' ever more difficult to construct. One answer to both of these problems lies in the improvement and standardisation of archaeological publication

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in digital forms. These can facilitate the manipulation of much more comprehensive and flexible databases than has previously been possible, to help deal with the 'too much'. Potential data models are being pioneered by projects like Archane, OCHRE/ ArchaeoML and OpenContext.org – though their ease-of-integration into the workflow of the average archaeologist and their acceptance by the wider archaeological community sadly remains limited as yet. More often each project re-invents their digital data models, making synthesis a process of laborious data translation rather than interrogation and comparison. However, a better synthesis of the evidence uncovered by archaeologists will also pay dividends on the field of the 'too little'. By getting better at tracing proxy indicators for human interaction, we can put forward sounder reconstructions of the role of those objects and phenomena that are otherwise inaccessible in the archaeological record. The following outlines a tentative foray into the combination of landscape, material culture and GIS technology to address a large-scale archaeological question of such 'invisible flows'.

'International' Interaction in the Bronze Age

A long tradition of research suggests that during the 3rd and 2nd millennia BC, both urban and non-urban societies of south-west Asia and wider Afro-Eurasia, become ever more interconnected, undergoing particular periods of progressively more economic and socio-cultural integration (Kohl 1989; Algaze 1993; Frank 1993; Sherratt 2000; Sherratt 2006). The middle to late part of the 3rd millennium (and perhaps continuing into the early 2nd millennium) is characterised as a period of 'internationalism' between Mesopotamia and the regions to the east (Amiet 1986; Ratnagar 2001, 2006). This is defined by raw materials and finished goods shared or traded between Mesopotamia, the Indus valley, southern Iran and the regions adjacent to the Persian gulf. Historical texts of the 3rd millennium from Mesopotamia refer to the procurement of copper from *Dilmun* – today believed to represent Bahrain – and lapis lazuli from *Meluhha* – possibly the Indus region. The distribution of lapis lazuli, for example, demonstrates very long-distant connections. This stone occurs naturally in only a few areas in the world, most importantly in Afghanistan and Baluchistan, but was transported and then used to make high value objects as far afield as Egypt, Troy and the Royal Cemeteries of Ur (Casanova 1992, 1993, 2000). Similarly, certain finished goods, such as the chlorite/steatite carved bowls are found over a wide area, at sites in Mesopotamia, south-eastern Iran, the northern coast of Arabia and in the Indus (Kohl 1978; Perrot and Madjidzadeh 2006). In fact, similar forms of intense interaction are also typical for the regions to the west of Mesopotamia in this period – though recognised through a different set of material indices (Mellink 1998; Rahmstorf 2006b). Possibly linked to the emergence of long-distance trade in metals (Weeks 2003; Lyonnet 2005), the late 3rd millennium is also characterised by evidence for standardised and interrelated weighing systems (Rahmstorf 2006a). By contrast, the 'internationalism' of the mid

to late 2nd millennium is focussed primarily on the west, between Syro-Mesopotamia and the lands adjacent to the Eastern Mediterranean. In the late 2nd millennium, more complex, literate and urbanising cultures emerge in Anatolia, the Levant and the Aegean; and between Egypt, Syria and Anatolia, elites exchanged letters, wives and gifts, as well as signing treaties: suggesting both political and economic integration if not interdependence (*cf.* Moran 1992). Even earlier texts, written by Assyrian traders living at the town of Kültepe-Kaneš, near modern Kayseri, also give us access to a complex trading system active in the first few centuries of the 2nd millennium (Veenhof 1972). From these letters and records, we discover that traders were bringing textiles and tin from Assur on the Tigris, in order to exchange them for silver and gold from Anatolia (Dercksen 2005). What is fascinating about this particular information is that these materials (ie. metals and textiles) are of course very poorly represented in the archaeological record. This reminds us to think carefully about flows of materials which are either completely invisible or only tangentially accessible to archaeologists, but which were central to ancient cultural life. How do we characterise these interconnections, and how do we include these invisible or low-visibility flows in our analysis of the past?

<div style="text-align:center">ROUTES AND LANDSCAPE</div>

Specific forms of exchange and interaction between different communities or regions take place along specific routes, involving repeated journeys along particular pathways and highways. Materials, people, animals and ideas pass along these conduits in non-random ways, constrained by topography and environment on the one hand, and social, political and economic systems on the other. The challenge to the archaeologist is identifying those forms of evidence that may indicate the location and development of routes *empirically*, and not simply to project backward based on known routes from later periods. Since the 19th century, the distribution map has been a vital tool of macro-archaeological interpretation of trade and interaction, but such interpretations have become increasingly difficult to manage as the bulk of archaeological evidence has expanded, resulting in a split between empirically informed small-scale or regional analysis, and much more theoretically informed macro-scale accounts of interaction. The development of GIS over the last 30-40 years has facilitated the ease with which distribution maps may be produced, but so far, little effort has been devoted to the ways in which the same technology might be used to help us solve problems of scale, through better data-management, geographical visualisation and synthetic accounts. For example, GIS mapping can help us to create a macro-model of friction or travel 'cost' in order to analyse and visualise the potential 'natural routes' across the entire Near East and Central Asia (Fig. 1). By combining different environmental data such as topography and climate, we are able to model the difficulty to cross particular terrains. Whilst the same 'natural routes' may be available for travel over very long

periods of time, the actual degree to which they are used is dependent on shifting human factors which include the presence of political and cultural boundaries, the demand for particular raw materials or finished goods from distant locations, and the availability of travel technology. To assess the intensity of material movements we must thus combine our knowledge of these 'natural routes' with the distribution of material culture. Environmental models must be integrated with the object distribution map to help visualise this combination of material distribution with the effects of landscape upon travel. This combination of landscape and objects should help us to reveal cultural zoning and networks of interaction.

<div align="center">Invisible Flows 1: Textiles</div>

Identifying the flow of 'invisible' or low-visibility materials must therefore rely on bringing proxy evidence relating to routes together. One major example of an 'invisible' flow is that of textiles, a central category of material which was apparently exchanged widely, but which is also highly perishable. The production, exchange and consumption of textiles appears to have been a very important part of traditional culture amongst urban, rural and nomadic groups alike during the Bronze Age. Modern anthropological accounts of textiles show that clothing is a central location for identity politics: particularly of gender, morality, modernity and ethnicities (e.g. Weiner and Schneider 1991). The flexibility of textile shapes and patterns, and their location on the bodies of human actors, allows them to serve both practical and semiotic purposes. How then can we study these important but low visibility materials, and is there any hope of reconstructing the routes and intensity of their trade?

Direct evidence for the actual forms that textiles took in the 3rd and 2nd millennium BC is extremely small, and normally only found in Egypt (e.g. Barber 1982; Hall 2001), or waterlogged sites in northern Europe (e.g. Mannering *et al*. 2010). Other sporadic examples (Fig. 2) include a tiny fragment of woollen fabric found in the northern Caucasus, at Novosvobodnaya (Shishlina *et al.* 2003), dated earlier to the 4th millennium, the 'Chalcolithic' fragment from Alişar Höyük (Kendall 1937), or the collection of fragments from Shahr-i Sokhta (Good 2006). Clearly proxy evidence must be deployed to get to grips with textiles. Such proxy evidence can include the textual records of Mesopotamian traders, patterns of sheep husbandry from faunal remains, iconographic representations, clothing attachments, weaving or dyeing artefacts, or representations of textile patterns – ideally of course all studied in parallel. One untapped thread of evidence is the intriguing trend for decorating pottery with patterns likely to be textile-inspired, particularly during the early parts of the 2nd millennium. For example, in Eastern Anatolia and Transcaucasia, at beginning of the 2nd millennium, the traditional dark or red burnished pottery known as Kura-Araks ware is replaced in the archaeological record by a range of painted wares (Özfırat 2001), whose patterns evoke textile designs (Belli and Sevin 1999). It is tempting to conclude, therefore,

that the distribution of these decorated wares relates to the movement range of textile patterns in this region, and, by implication, textiles themselves (Fig. 3).

Why would anyone want to paint pottery with textile patterns, however? As a highly plastic medium, pottery tends to mimic the aesthetics of other, normally more valuable, media such as metal or glass. Unlike with metal or glass, however, it is somewhat harder to make practical vessels from cloth (unless of course we include basketry), so using textile-like patterns on vessels is all the more surprising. Likewise, quite obviously many societies produce culturally significant textiles, but not all of them decorate their pottery in similar ways. Given this, how can we explain what is going on in the 2nd millennium in Eastern Anatolia?

First, we should avoid the trap of localism, and note that these Aras/Transcaucasian painted wares do not exist in a vacuum. Given the emergence of a vast array of painted pottery across Anatolia, Syria and the Aegean in the same period (Öktü 1973; Emre 1966), many of which may be argued to have patterns with a textile-based inspiration, we should recognise the Transcaucasian wares as only one case-study of a much wider process of pottery 'patternisation'. Seen from the macro-scale, it seems highly possible that aesthetic ideas recalling textile patterns, if not actual decorated cloth items themselves, were travelling hundreds if not thousands of kilometres. One possibility is that all of these proliferating polychromatic patterns on ceramics merely represent an exuberant cross-craft response to the colour possibilities offered by new techniques of dyeing and weaving wool (Sherratt 1983) – in turn related to new forms of asserting identity and difference, through clothing, in an increasingly internationalising context. We may take this further by looking at the design schemes in more detail. It is notable that much of the early (late 3rd or early 2nd millennium) painted pottery, including the Transcaucasian examples, comprises simply the application to a vessel of a patterned 'belt' or 'border', often unique in design. There are indications from Assyrian texts that such patterned borders or belts may have had strong a strong association to individual identity, since we know the hems of garments, presumably made of patterned borders, were sometimes used to seal contracts where an actual seal was not available (Dalley 1991, 125). Perhaps then, these painted Transcaucasian vessels were being 'dressed' in a similar way to human bodies, to emphasise ownership or affiliation to identity groups, using models of identity borrowed from northern Mesopotamia. This might correspond to an increased emphasis on the signalling individual identity over communal equality, also documented by the emergence of elaborate burial traditions in the region in the late 3rd and early 2nd millennium (Edens 1995).

Similarly, in contrast to the preceding, relatively uniform, Kura-Araks wares, the various Transcaucasian/East Anatolian painted wares are distributed over smaller distinct regions and therefore have been taken to represent smaller cultural units. This idea has been combined with the paucity of settlement evidence to conclude that the producers of these objects were transhumant or nomadic pastoralists (Sevin 2004). However, fine painted ceramics are an unlikely constituent in an everyday nomadic toolkit, and perhaps this pottery style fragmentation instead points toward

the mechanism of interaction and exchange of more mobile materials, namely textiles, during this period. Given the smaller distributions, it seems likely that the bulk of interaction was taking place within craft networks dependent on marriage, clan and kinship relationships, rather than market exchange. Regional communities were exchanging motifs and techniques within defined networks via the exchange of cloth and movement of crafts people (such as women 'migrating' through marriage) – akin to how carpets and carpet motifs were made across the Middle East until very recently. These textile motifs were then fossilised on the pottery intended mostly for cemeteries, the patterns perhaps copies from the belts of the deceased. The distributions of the various pattern groups represent the sedimented indices of these interaction networks along certain routes and within certain geographic regions. However, the full extent of the patterned pottery phenomenon implies that this region was also linked into much wider networks of aesthetic preferences and technological possibilities, which established the patterned belt as symbolically charged. In turn this hints at a long-distance exchange of luxury or exotic textiles between elites, an exchange even harder to trace, which could have facilitated the movement of motifs over huge distances, and inspired the transfer of a range of new technologies and ideas: including the production of coloured textiles, the wearing of belts and sashes for signalling identity, and the 'dressing' of pottery in similar ways to human bodies.

Invisible Flows 2: Figurines

Bodies, or at least their representation in plastic media, also form the basis of the next case-study. This example of an apparently 'invisible flow' takes us on a journey of over 1000km to the east, to ancient Khorasan, a region which today includes the modern states of Turkmenistan, Iran, and Afghanistan; and which was deeply connected to cultures to the south and west during the late 3rd millennium and early 2nd millennium. Whilst the inhabitants of highland East Anatolia and Transcaucasia were just starting to paint their pots, the folk of this distant eastern region had already gone through a contrary aesthetic shift away from what may be basket- or textile-inspired decoration on pottery (the painted 'tapestry' designs of early Namazga wares) toward an aesthetic based, most likely, on polished metals (Wilkinson 2009). Uncovered in this region and associated with this new unpainted pottery, is a set of intriguing figurines (see, e.g., Rossi Osmida 2007). When these items first came to the attention of archaeologists, very little was known about their archaeological contexts. A fairly comprehensive study of the then known figurines was undertaken by Russian scholars Sarianidi and Masson (Masson and Sarianidi 1973), who dated them to the Namazga V/VI period, and thus associated them with the first major urbanising settlements in Central Asia, such as that at Altyn Depe.

These figurines are generally made from terracotta, with great effort spent on differentiating head-ware or hair styles. Sexual differences are apparently clearly

marked, and are in some cases exaggerated. Legs are often missing or unrepresented, at least for 'female' figurines. Some figurines apparently show indications of jewellery or personal adornment around necks, arms and head. Some also display marks, perhaps indicating scarification, tattooing, painting or clothing features, or even a kind of proto-writing. Most strikingly, these figurines differ markedly from earlier figurines from the region in their form: earlier 'Eneolithic' figurines of the 4th millennium were much more three-dimensional (almost boomerang-shaped), compared to the relatively flat shapes of these later types, suggesting different contexts or ways of use. What is interesting about this last feature is that the change from three- to two-dimensional figural representation is also to be found in other regions, far to the west. Earlier Neolithic and Chalcolithic figurines which generally focus on corpulent or at least three-dimensional bodies, are superseded by flat, more or less abstract figures. In the Indus, Iran, Syria, Anatolia, the Aegean and Egypt, a range of flat, abstract figurines, or figurines with exaggerated headdress- or hair-styles have been uncovered in varying numbers. Of course when examined closely, the styles of depiction are far from identical. However, the overall effect of similarity is intriguing, especially where alternative modes of representing the human body, quite distinct from these types, existed concurrently. Can this pattern of more or less synchronous formal changes in figurines be more than just a remarkable co-incidence?

A variety of mechanisms, not mutually exclusive, might be put forward to explain, the broad similarities in features, but distinct local traditions. Making the comparison with the wide emergence of painted pottery, we could posit some kind of low-level cross-cultural 'diffusion' of aesthetic values, which would encourage 'flatness' in figurine design, for example. It is difficult to imagine such a process involving very dispersed groups of communities, however, without concrete media through which such aesthetic ideas could travel. It is possible, then, that actual flat figurines were being actively exchanged (or moved with their owners) over large distances, but were made in materials that have not survived in the record (eg. metal, wax or wood). Alternatively, very concrete religio-philosophical ideas or conventions about ritual meanings (especially those relating to depicting bodies) may have travelled these routes, in each region taking on local features, much as later religious movements borrow the cultural frameworks and material culture from the societies into which they enter. If such mechanisms are plausible, then we may be glimpsing much deeper interconnections between regions than we normally assume to be the case for this period. It is also worth placing the figurines into their geographic context, by which means an interesting pattern emerges. When the distribution of these figurines is plotted on a topographical map (Fig. 4) the location broadly echoes the supposed main western trunk of the much later sections of the Silk Roads, as well as some of the more famous classical journeys and routes, such as Alexander's expedition into Asia, or the Persian Royal Road described by Herodotus. What this may indicate is that, partly due to the geography itself, during the 3rd and 2nd millennium BC chains of interlinked communities were already exchanging both desirable materials and profound ideas

about the human condition along very similar routes to their better known historical descendants.

DISCUSSION: CONTINUITY AND CHANGE

What conclusions can we draw from these different strands of evidence? The above examples of 'invisible flows' suggest via proxy evidence both continuities and changes over the long-term. Though on the local level, interaction pathways and travel routes may have been in constant flux, it seems the seeds of the silk roads were sown at least 2000 years earlier than the first Chinese silk reached the Mediterranean. A broad east-west axial route, or backbone of interchange, across south-western Asia appears to have been active through several millennia. Examples of things which travel along these routes include: lapis, tin, and body images (such as the figurines explored above), and later silk and spices. On the other hand, at the small-scale particular overlapping networks of interaction or exchange ebb in and out of existence, as demand for different raw materials and finished goods shifts in time to cultural requirements, demonstrated by the sorts of shifting cultural zones shown by the painted pottery distributions already mentioned. But these shifting local networks are also linked into larger-scale consumption patterns and cultural values. Of course, there are many unanswered questions here: about transportation (including the significance of the horse, wheel, camel and sail), about sources of raw materials and the movement of many other materials (including copper and tin), and about the exact mechanisms by which these invisible materials were transmitted from place to place. Likewise, there are other invisible flows (furs, spices and particularly people) that may have travelled on a north-south axis, which are even harder to identify. Such limited results emphasise the importance of compiling and overlaying *multiple* overlapping distributions to build more comprehensive pictures of past exchange networks. Here I have only been able to assemble a few selective examples for demonstrative purposes, but as archaeologists, prehistorians and historians, we desperately need to find ways to make our results available in databases and standardised digital forms which allow us to easily synthesise the ever-increasing amounts and quality of data produced by archaeological researchers. Without this, the study of landscape and material culture over the large-scale will fall ever further apart, with competing micro-studies unable to integrate their results and era-defining processes left unseen, unidentified or unexplained.

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          Retrieved 1st September 2010.
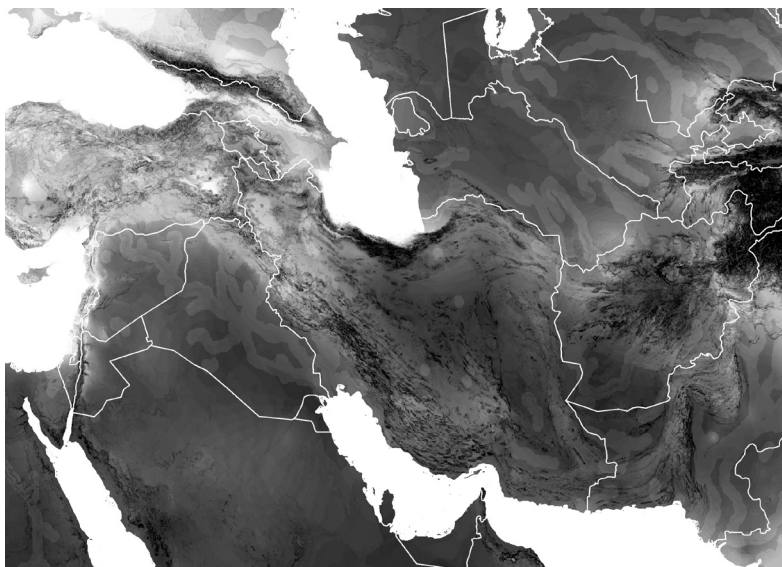   http://www.archatlas.org/workshop09/works09-wilkinson.php

Fig. 1: GIS model of 'cost' to traverse landscape taking into account topography and water distribution (black = high cost, white = low cost). Sea routes not included in this model.
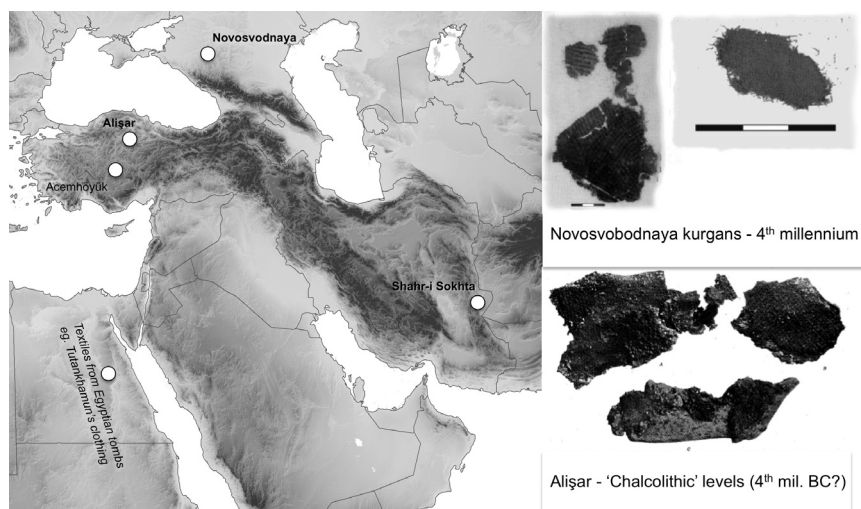

Novosvobodnaya kurgans - 4th millennium

Ališar - 'Chalcolithic' levels (4th mil. BC?)

Fig. 2: Location of some early textile fragments.
Map background: topography based on NASA SRTM.
Textile fragment photographs:after Von der Osten (1937: 51 *cf.* figs. 58 and 60);
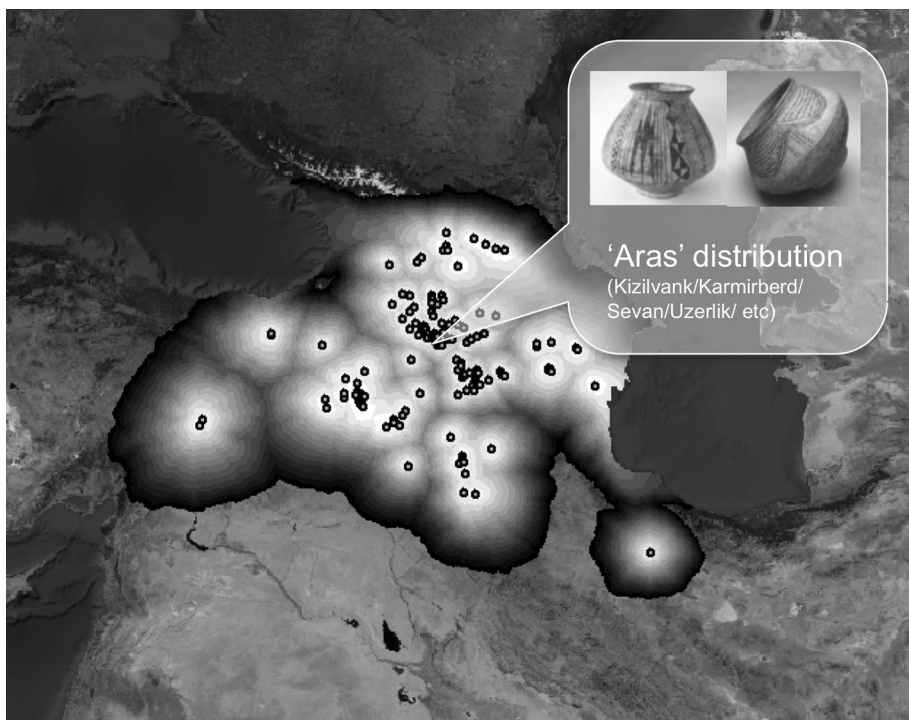Shishlina *et al*. (2003: 333).

Fig. 3: Distribution of "Aras" and closely related painted pottery of the Middle/
    LateBronze Age, with graded distance when topography is taken into
    account.
    Map background: NASA Blue Marble (green channel).
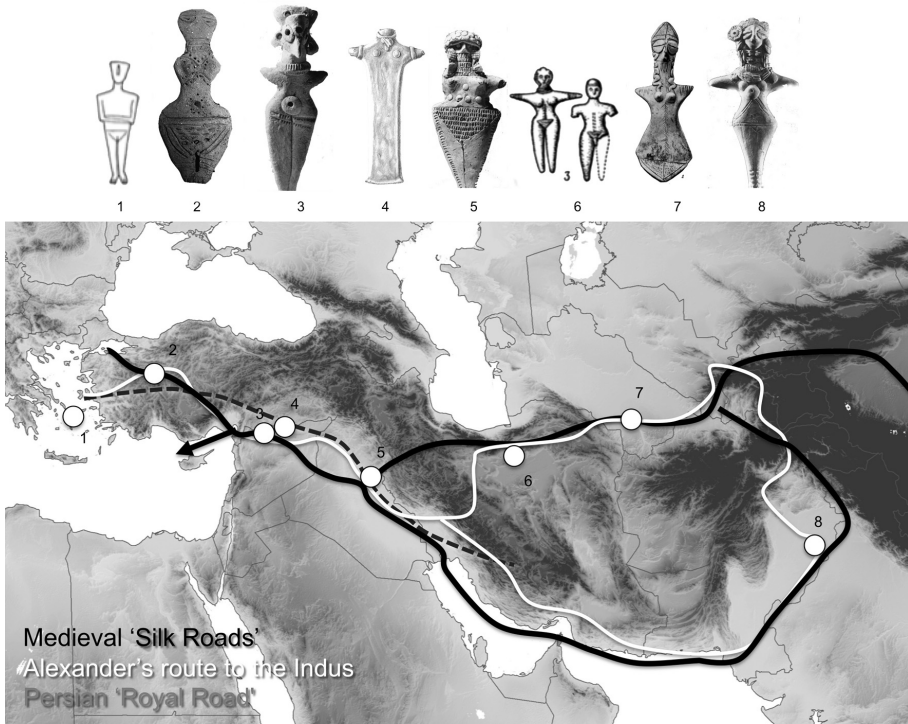   Pottery photographs: after Özfırat 2001.

Fig. 4: Examples of flat/abstract figurines from across 3rd millennium Near East,
         with later historically attested routes.
         Map background: topography based on NASA SRTM.
         Figurine images:
                 1: after Renfrew (1969: p. 28);
                 2: after Aydıngün (2005: 95);
             3, 5, 8: after Feininger (1960: 114, 115, 117);
                 4: after Braidwood and Braidwood (1960: p. 469);
               6, 7: after Masson and Sarianidi (1973: 46, pl. 1).