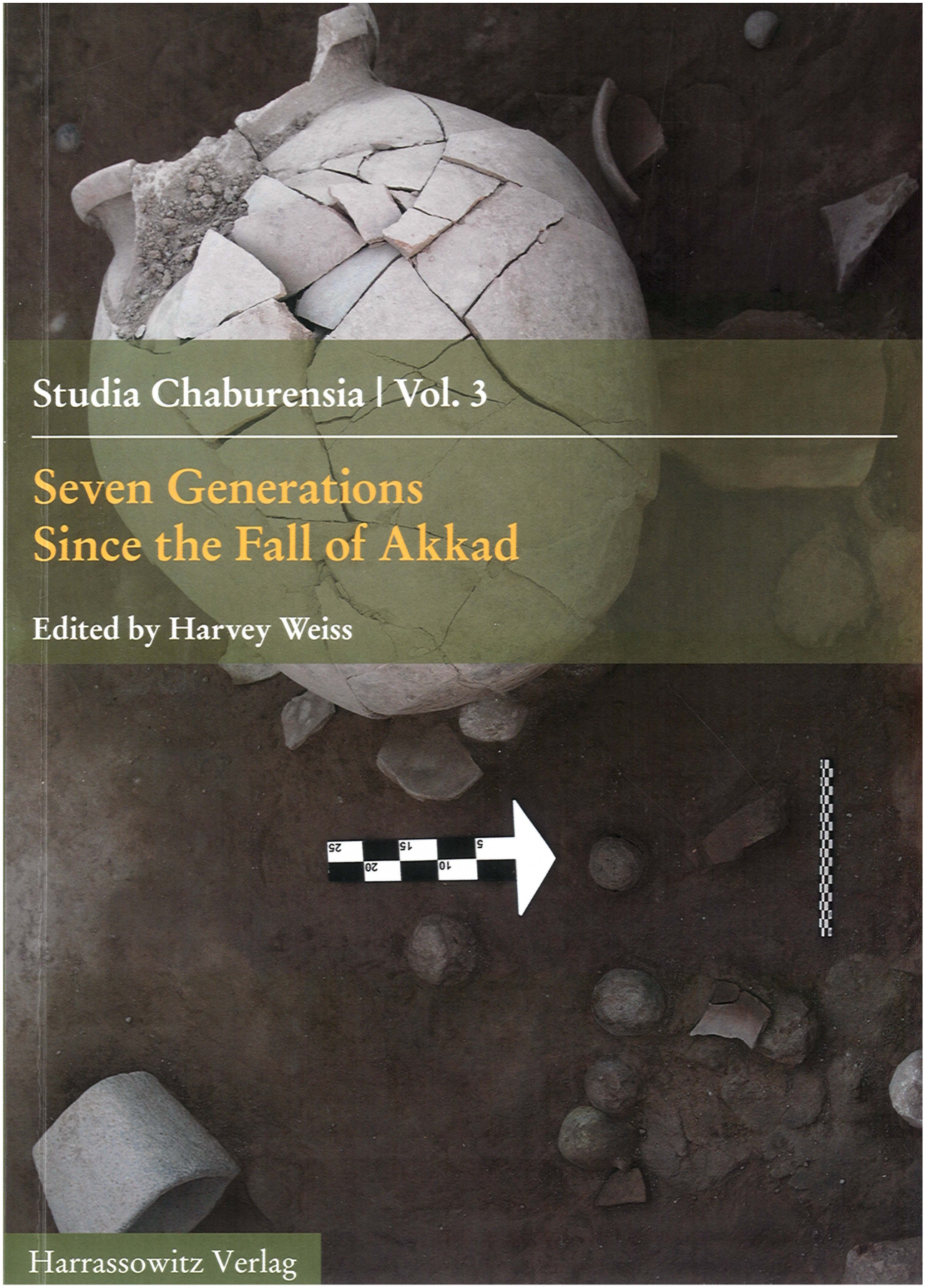

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Seven Generations Since the Fall of Akkad

Edited by Harvey Weiss

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Cover illustration: Tell Leilan, 2006, Acropolis Northwest, Akkadian Administrative Building, room 12, period IIb1, terminal stratum 10a floor with grain-storage jar, ground basalt 2-liter ration measure, 10 clay balls, 5 uninscribed clay tablets (photo: Harvey Weiss) ; cf. Weiss et al., this volume pp. 163-192 Fig. 10.

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- History, with an emphasis on regional, local, and micro-historical approaches.
- Archaeology, with an emphasis on studies on material-cultural phenomena from excavation contexts and on functional analysis.
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- Social studies, with an emphasis on rural communities, their organization and relationship to the central government; every day life and social systems.
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Contents

Preface

This volume catches midstream the surge since 1993 of research directed at examining the Akkadian collapse and subsequent history of the Khabur Plains, a period recognized as unique at its terminus even in the 19th century BC as "the seven generations since the Fall of Akkad." The fifteen papers of this volume were prepared for a workshop at the 8th International Congress on the Archaeology of the Ancient Near East, May 2, 2012 at Warsaw University. To encourage collaborative discussion, workshop participants pre-distributed their papers in April and were also asked to address "The Four Questions": When did Akkadian imperialization of the Khabur Plains collapse? How many settlements/persons (Akkadian and local) abandoned the Khabur Plains? What was the size of remnant post-Akkadian settlement on the Khabur Plains? What was the duration of remnant post-Akkadian settlement on the Khabur Plains? However, the number of papers and the limited workshop time available precluded lengthy discussion of divergent views among the contributors, and time was spent mostly on the illustrated and detailed presentation of the pre-distributed papers.

About half of the papers presented focus upon ceramic types and typologies, of various analysis and reporting qualities, for the continuation of some settlement at some sites for some time after the Akkadian abandonment. Other papers, enhanced with multiple high-resolution radiocarbon-dates for settlement durations (Weiss et al, Emberling et al), precise measurement of agricultural and administrative activities (Smith, McCarthy, Emberling et al), and regional settlement distributions (Ristvet, Arrivabeni, Colantoni), develop a framework for Khabur Plains research that confirms and refines adjacent region observations for this period. Alongside the independent paleoclimate data, these researches now provide the archaeological data for the dynamics of regional collapse across the Khabur Plains and northern Mesopotamia.

The essence of this quantitative framework is derived from the Tell Leilan excavations' stratigraphic occupation sequence, its associated high-resolution radiocarbon chronology, and the Leilan Region Survey, which define (1) region-wide collapse and abandonment at 2254-2220 BC (68.2%), (2) minor remnant settlement for ca. 30-50 years terminating at ca. 2233-2196 (68.2%), with subsequent occupation only at the 84% reduced Tell Mozan refugium, (3) the region-wide Amorite resettlement beginning "seven generations" later at ca. 1969-1919 BC (68.2%). Still awaiting integration within some Khabur Plains analyses is the coincidence of the 4.2 – 3.9 kaBP megadrought, – an abrupt, high magnitude, centuries-long event in west Asia, and globally – with reduced dry-farming agro-production, regional abandonment and the "Fall of Akkad," habitat-tracking, and the Amorite resettlement.

To be sure, several contributors to this volume do not share in these perspectives. Rafal Kołiński reasons Tell Arbid ceramic assemblage analyses will prove the site was inhabited ca. 2200-1900 BC as part of a trade route from Tell Brak to Tell Mozan. Valentina Orsi suggests Tell Barri was occupied through spans across the late third-early second millennium. Carlo Colantoni and Augusta McMahon deploy a chronology unfettered by radiocarbon dates and imagine that Tell Brak excavations will someday locate a major post-Akkadian Hurrian city. Christophe Nicolle reconfigures labile Mohammed Diyab stratigraphy and posits a new reverse occupational chronology. Peter Pfälzner contends that Tell Mozan was a trade-enriched dry-farming city surrounded by Khabur Plains occupations from the Akkadian to the Khabur ware period.

In retrospect, some shared perspectives appear a function of shared data constraints: small excavation exposures (Mohammed Diyab, Barri, Arbid), scarce or uncertainly dated ceramic assemblages (Arbid, Mohammed Diyab, Hamoukar), no radiocarbon data (Chagar Bazar, Barri, Mohammed Diyab, Mozan, Hamoukar), no paleobotanical data (Mohamed Diyab, Barri, Arbid, Chagar Bazar, Hamoukar), no regional survey data (Arbid, Chagar Bazar, Mozan), or unintegrated paleoclimate, geoarchaeological, paleobotanical, and occupational data (Mozan). The value of this volume, therefore, resides in its self-evidence. Archaeologists can evaluate the available data, analyses, and interpretations, and to some degree can assess their limitations, falsifiability, and verisimilitude. Conversely, we can now identify the types and qualities of data required for further testing and refinement region-wide.

For these many accomplishments the contributors deserve thanks and congratulation. A special debt of gratitude is owed Professor Rafał Koliński, who energetically facilitated the workshop's programming within the 8th ICAANE meeting in Warsaw. Moreover, the workshop participants heartily acknowledge the grace and diligence with which Professor Hartmut Kühne arranged for the swift publication of this volume within the series *Studia Chaburensia*. All offer a toast to Tobias Schmidt for his superb typesetting.

Harvey Weiss

New Haven CT
September 2012

HARVEY WEISS
Yale University

Quantifying Collapse: The Late Third Millennium Khabur Plains

"The temple Emenue, on the site of the old Emashmash temple, which Manishtushu, son of Sargon, king of Agade, built, had fallen into ruin. Since the Fall of Akkad until my reign, until the capture of Nurrugum, seven generations having passed, no king among my predecessors had rebuilt this temple."

Shamshi-Adad, 1813-1781 BC (Grayson 1987: 53)

Introduction

From 1872 to 1896 between twelve and twenty-nine million Indians were sacrificed to famine during El Niño-Southern Oscillation-forced droughts, lest the British Empire replace the indigenous social safety nets dismantled earlier by their revenue-maximizing administrators. For this and similar periods of imperial social accounting and instrumental climate recording, natural drought is distinguishable from anthropogenic famine (Watts 1987; Davis 2001; Li 2007). Prior to the instrumental climate record, however, is there an archaeological path to this famine-drought distinction, or to weighing the contribution of natural and cultural forces within drought responses – such as regional abandonment, politico-economic collapse and habitat-tracking?

In 1971, the editors of the *American Journal of Archaeology* published "The Dark Ages of Egypt" (Bell 1971) to almost deafening silence. Bell's thesis was simple, but profound: the collapse of the Old Kingdom, ca. 2200 BC, was caused by Nile flow failure that ushered in the First Intermediate Period. In the absence of instrumental records and paleoclimate proxies, Bell's data were Vandier's (1931) Egyptian famine records. But only one Egyptologist felt challenged sufficiently to respond, and he did that in an obscure Egyptological journal (Vercoutter 1973).

Twenty years later similar and synchronous issues were revisited by Tell Leilan archaeological research (Weiss et al 1993) that hypothesized north Mesopotamian and Akkadian regional collapse at ca. 2200 BC/4.2 kaBP caused by abrupt climate change-forced reductions in dry-farming agro-production. These arguments were antithetically challenged soon thereafter by some new and many old arguments, and were also soon challenged and buttressed by new paleoclimate and archaeological data. Now, twenty years later, however, these same issues still dominate the concerns of another generation of archaeologists. What is the problem?

Essentially, the static, invariable, post-Pleistocene climate has been replaced by the dynamic, punctuated Holocene, with global abrupt climate changes characterized by decadal onsets and terminations, and with society-transforming magnitudes and durations. This abrupt climate change revolution only became a credible, and alluring, research program in 1993 with publication of the GISP2 annual lamination record for the Younger Dryas,

Studia Chaburensia 3 (2012), pp. 1–24.

12.7-11.5 kaBP (Alley et al 1993; Mayewski et al 1993). Thereafter, the climate change magnitudes of the European Little Ice Age (ca. 1550-1850) and Medieval Climate Anomaly (ca. 800-1550), with mean annual temperature changes less than 0.5˚C (Trouet et al 2009; Mann et al 2009), approached insignificance before the annual-, and sub-annual, resolution proxy records for the Younger Dryas: 10±4ºC change within decades at GISP2 (Greachev and Severinghaus 2005; Severinghaus et al. 2005; Steffensen et al. 2008). This is but one of the triumphs of late twentieth century geoscience, the equal of the discovery of greenhouse industrial carbon dioxide (Revelle and Suess 1957).

The startling observation now, however, is that subsequent Holocene abrupt climate changes were of considerably lesser magnitude and shorter duration than the Younger Dryas – and had radical societal effects, observable archaeologically in west Asia at 8.2 kaBP (Weiss 2000; Clare et al 2010), 5.2 kaBP (Staubwasser and Weiss 2006; Charles, Pessin and Hald 2010), 4.2 kaBP (Weiss et al 1993; Weiss 2012) and 3.2 kaBP (Kaniewski et al 2008; Kaniewski et al 2010). The considerable variability in the qualities of these abrupt climate changes and in their societal responses now comprises major research foci. Prominently, for example, social adaptations to the Little Ice Age in western Europe required only slight behavioral alterations (deVries 1980), while generating severe agricultural landscape changes in Ottoman west Asia (Kaniewski, van Campo and Weiss 2012). The integrative time lag, however, between under-capitalized archaeology and well-funded geoscience explains much of the archaeological tumult that now surrounds these abrupt climate changes and recognition of their adaptive societal responses. But, of course, the ideological foundations are being rocked and established social science paradigms, and their proponents, are also being rattled. Famously, Max Planck suggested that new facts require a new generation for acceptance (Planck 1949, cited in Kuhn 1952: 150; Eldredge and Gould 1972: 83).

Twenty Years Since the Fall of Akkad

In west Asian dry-farming realms, coincident with the 4.2 – 3.9 kaBP abrupt climate change, adaptive transformations to reduced precipitation included sedentary settlement abandonments and site-size reductions, nomadization, and habitat-tracking (Weiss et al 1993; Weiss 2012). The rain-fed Khabur Plains of northeastern Syria, locus for the 1993 observation of regional population abandonment, have been among the most intensely re-examined for these societal responses, as the papers in this volume attest. What is at stake here? Seven hypotheses were presented in Weiss et al 1993:

1. northern Mesopotamia was agro-imperialized by southern Mesopotamian Akkadians at ca. 2300 BC;
2. an abrupt climate change event causing aridification and increased atmospheric dust occurred at ca. 2200 BC and persisted ca. 300 years until its abrupt termination;
3. micro-tephra, and a volcanic event, observed in Leilan and regional excavation strata immediately before the abrupt climate change could not have caused century-scale aridification;
4. aridification reduced sedentary settlement cereal agro-production and forced settlement abandonment in dry-farming, Akkadian-dominated, north Mesopotamia and adjacent non-imperialized realms, as well as habitat-tracking to riverine refugia, leaving but remnant north Mesopotamian settlement, documented epigraphically, at places such as Urkish and Nineveh;

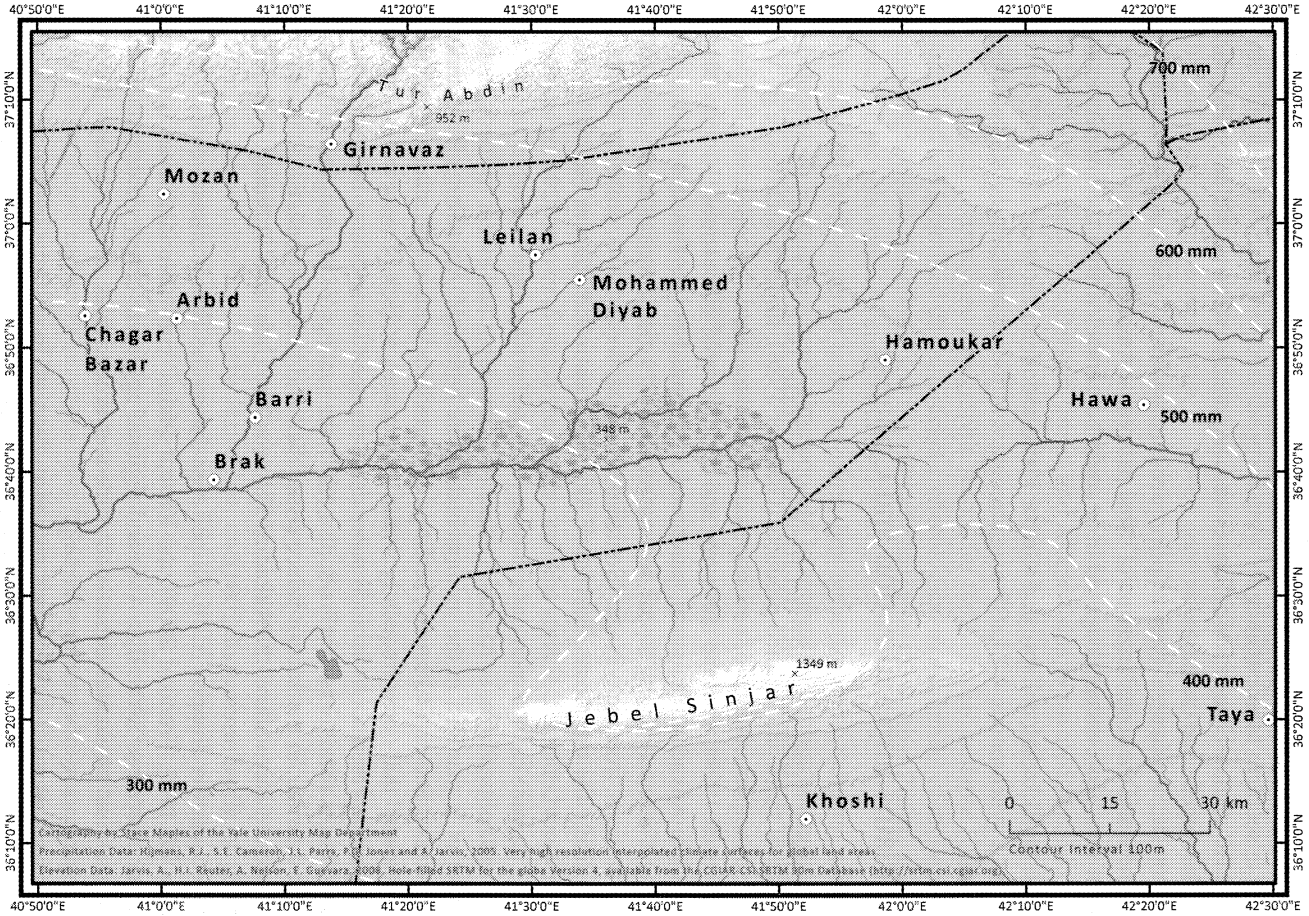

Figure 1: Khabur Plains, excavated Akkadian urban centers Brak (70 has.), Mozan (120 has.), Leilan (90 has.), Hamoukar (100 has.), Mohammed Diyab (50 has.), and small towns Chagar Bazar (10 has.), Barri (6 has.), and Arbid (4 has.). Occupation at Beydar, 40 kms southwest of Chagar Bazar, terminated earlier in the Akkadian period.

5. reduced northern Mesopotamian imperial agro-revenues generated Akkadian imperial collapse in southern Mesopotamia;
6. the 2200 BC climate change and collapses were regionally extensive, including Palestine, Egypt, the Aegean and the Indus
7. at ca. 1900 BC, the sudden return of prior precipitation levels made possible the regional resettlement and the sedentarization of tribal pastoralist Amorites.

The folds of data and concepts engaged here could be unraveled with the answers to two questions:

(1) was there an Akkadian collapse and Khabur Plains abandonment at ca. 2200 BC?

(2) was there a synchronous 4.2 kaBP megadrought that forced dry-farming Khabur Plains abandonment?

Khabur Plains Imperialization and Collapse

The Akkadian imperialization extracted and deployed cereal revenues from both the rain-fed and the irrigation agriculture regions of Mesopotamia. Imperialization is documented in the collection of taxes and finished products (Glassner 1986), imperial archives (e.g., Visicato 1999), the implementation of new imperial standard measures for collection of imperial revenues (Powell 1990), and land surveying and agrimensorial innovations (Høyrup 2011). One private late Akkadian document, purchased in Baghdad by the British Museum after Rassam's excavations at nearby Sippar, records receipt of 29 metric tons of barley, or 20,000 man-days of rations, from a city Nagar (Sommerfeld, Archi, Weiss 2004), probably Tell Brak. These were likely the transported harvest of Akkadian-controlled lands in the high cereal-yield areas around Leilan and Mozan, where a cultivated hectare or two, at 1200 kg/ha (Weiss 1986), could produce ca. 400 man-days of barley rations for Akkadian workers.

Across the Khabur Plains, at Mozan, Leilan, Brak the depth and extent of the Akkadian imperial control is manifest in the monumental public buildings, Akkadian administrative texts, school texts and scribal rooms, sealings of imperial revenues, and standardized flat-based "sila-bowls" that occur frequently within excavations at each of these cities. Impressive epigraphic representations include some name-stamped lower-course bricks at Brak's Naram-Sin fortress (Mallowan 1947: 66, pl. LXIV), the sealings of the daughter of Naram-Sin, wife of the ruler, at the Mozan palace (Buccellati and Kelly-Buccellati 2002), and the seal impression of Ḫaya-abum, the Akkadian *šabra*, at The Unfinished Building, Tell Leilan (Weiss 1997; deLillis-Forrest *et al.* 2004).

When precipitation dropped *c.* 30-50 per cent during the abrupt climate change (Bar-Matthews *et al.* 1997; Frumkin 2009), the Khabur Plains' cultivable land areas narrowed (Staubwasser and Weiss 2006: figs. 4-5) and regional aggregate cereal yields plummeted. Previously marginal production areas, such as the area around Brak, dropped below the precipitation requirements of cereal dry-farming.

The Akkadians departed suddenly and with them departed most of the indigenous regional population. The Tell Leilan Region survey, a thirty-kilometer wide north-south, 1650 square kilometer, transect through the heart of the eastern Khabur Plains, documents an 87 per cent reduction in settled area for the post-Akkadian Leilan IIc period (Arrivabeni, this volume: 261), and complete abandonment 30-50 years later. The elimination of imperial revenues from the Khabur Plains and the other imperialized dry-farming plains, truncated imperialized grain flow to the Akkadian capital, but this flow and its southern Akkadian deployment remain to be quantified.

Evocative epigrams for the subsequent Akkadian collapse in southern Mesopotamia include "On its canal-bank towpaths the grass grew long" (The Curse of Akkade: Black *et al.* 2004: 124) and "Who was king, who was not king" (Sumerian King List: Glassner 1993: 140), and in northern Mesopotamia, "...seven generations since the Fall of Akkad" (Shamshi-Adad: Grayson 1987: 53; Glassner 2004: 5, 21), and of Shamshi-Adad's predecessors, "the seventeen (Amorite) kings who lived in tents" (Assyrian King List: Glassner 2004: 147). Legendarily, offerings to the deified statues of Sargon and Naram-Sin continued through Old Babylonian and even Persian times, and Akkade was excavated several times, most famously by Nabu-zēr-lišir, Nabonidus's note-taking archaeologist (van de Mieroop 1989; Kennedy 1969; Weiss 1975).

The minimal contemporary epigraphic record for the Akkadian collapse (Glassner 1986) is amplified and quantified through recent archaeological measurement of regional site abandonments, site-size reductions, and the rates of change on the Khabur Plains, as can be synthesized from this volume's contributions (Figure 2).

Akkadian collapse and abandonment on the Khabur Plains

Tell Brak. The Akkadians built several public structures at the north and south edges of the approximately 40-hectare Tell Brak/Nagar acropolis and created a worker settlement of about 30 hectares at its southern base. Less than seventy-five years later the acropolis and the lower town were abandoned suddenly, while the Naram-Sin Palace (Mallowan 1947), a grain storeroom, was probably still under construction (Weiss 2012).

Was there any subsequent occupation at Tell Brak? Mallowan wrote of an Ur III-period rebuilding of the fortress, but floors were not located. The cuneiform tablets reported to be from the fortress proved not to be from the Ur III-period when re-examined (Finkel 1985). There is one "possibly" Ur III sealing, but all others are Akkadian, including the unprovenienced sealing of "Talpuš-atili," (Matthews 1997: no. 316).

Succeeding the Akkadian abandonment, short-lived houses were constructed at sparsely distributed loci across the Brak Acropolis (Colantoni, this volume: 45). These included the ramshackle pisé construction on top of the abandoned formal Akkadian building in area TC (Emberling, this volume: 65). A ca. 1 meter deposit of collapse and dust on top of this building has been sampled and OSL-dated, but without any useful precision (Wilkinson and Deckers 2011; cf. Cullen et al 2000 and Matthews 1994). However, the ceramic assemblage of this building is post-Akkadian / Early Jezireh 4c, and the radiocarbon dating of this building places its abandonment, and the synchronous FS 1 ("Ur III") abandonment, at ca. 2200 BC (Emberling, et al., this volume: 65), also the end date for the Leilan IIc post-Akkadian house.

The past twenty-year's search for Ur III, Isin-Larsa, or "Hurrian" occupation at Brak was focused upon the north ridge, the last area of the site where occupation had not already proven to terminate earlier. Excavations have failed, however, to locate occupations of these periods. On the western side of the north ridge, excavation HN had no occupation between the mid-3rd millennium and the second millennium, while on the east side, a last effort in the small excavation unit HHG has yielded a room with some uncertainly dated sherds (Colantoni, this volume: 45). Brak excavations and surveys have shown that the Akkadian collapse there included the immediate 50% abandonment of the site area, including all monumental buildings and the lower town, followed by less-dense, dispersed pisé residences that were abandoned within thirty to fifty years later.

BC	Leilan	Moh Diyab	Brak	Chagar Bazar	Arbid	Barri	Mozan	Hamoukar
	LTE/N Palaces					34A		
	I Acrop NE-				IIa, b	34B		
	Temples	VIII cemetery	P HH, HN	Khabur houses	IIc	O 34C	houses 5	
1950	Early Khabur	IX pisé bldgs / fdtns			III kilns, pits	34D cemetery	C4 burials	
2000							C5	
2050							C6	
2100								
						P 35A *abandoned*		
2150						35B kiln 1016	C7	
2200	pits			I pits	IV pits			pits
		XIc	FS1_SS1/TC PB		Vb-a Main Bldg		houses 4	
	IIc pA 4-rm	XIb	N FS2 SS2	II Chant. D, Bât. 1	VI pA houses		erosion 3	?
	abandoned	*abandoned*	*abandoned*	*abandoned*	*abandoned*	*abandoned*	*abandoned*	*abandoned*
2250	IIb1 AAB, TUB	TUB (6a-4, 5a-12)	FS3_SS3 NSP			36	C8 Palace 2	
	CG, Lower Town		Lower Town				Lower Town	
	Op 4, Op 7, Op 8						C9	
2300	IIb2 AAB	XIa	M FS4_SS4		VII houses	Q 37 small rms	C10	3
							C11	
2350	IIb3 Scribal Room		FS5 SS5					
	IIa late	XII	L		VIII	R	C12 phase 1	2

BC is Leilan ^{14}C (Weiss et al this volume):
start early Khabur 1995 - 1896 (95.4%), 1969 - 1919 (68.2%)
end IIc 2253 - 2156 (95.4%), 2233 - 2196 (68.2%)
end IIb1 2266 - 2211 (95.4%), 2254 - 2220 (68.2%)

Figure 2: Chronostratigraphy Late Third Millennium BC Khabur Plains.

The Nawar of the short-lived Ur III / Isin-Larsa period "kingdom of Urkish and Nawar" was likely not at Brak, beyond the limits of dry-farming precipation during this period, but possibly at Gir Nawaz, 19 kms east of Tell Mozan, at the debouchment refugium of the Jaghjagh (Erkanal 1988; Matthews and Eidem 1993: 204; Sallaberger 2011). Thereafter, at ca. 1950 or 1900 BC some Khabur ware-related houses appeared at the western (HH) and northwestern (HN) edges of the site (McDonald and Jackson 2003).

Tell Leilan. An Akkadian scribal room, dated stratigraphically, paleographically, and by radiocarbon, was established late in Leilan period IIa on the Leilan Acropolis Northwest (deLillis, Milano, Mori 2007; Weiss et al., this volume: 163). Shortly thereafter, the period IIa palace, across the stone-cobbled street, was destroyed by the Akkadians, and then reconstructed with a more than 17-room structure in Leilan IIb2-1 as the Akkadian Administrative Building, using the remnant IIa palace glacis and some of its brickwork (Weiss et al., this volume: 163; Quenet and Ristvet, this volume: 193). For several decades in the late twenty-third century, large-scale grain storage, processing, and distribution were Akkadian-directed imperial activities here (Smith, this volume: 225; McCarthy, this volume: 217). When the Akkadians suddenly abandoned 90-hectare Tell Leilan, the Acropolis and the Lower Town, they left clay balls for tablet manufacture, uninscribed clay tablets, a large storage vessel, and a 2-liter ground stone measure on the terminal room 12 floor in the Akkadian Administrative Building. That abandonment of the Akkadian Administrative Building, and the end of Leilan IIb1, is now radiocarbon dated to 2254-2220 BC (68.2%) (Weiss et al., this volume: 163).

The Unfinished Building, across the stone-cobbled street from the Akkadian Administrative Building, was similarly abandoned. Here were rough-dressed basalt block walls yet without brick, and some mudbrick walls built to only three or four courses upon a mud-set sherd layer atop the basalt blocks (Weiss et al., this volume: 163). This construction effort had not yet reached the stage of floor preparation, but sub-floor plumbing had already been installed (deLillis, Milano, Mori 2007). A semi-circle of partially dressed blocks awaited finishing and wall placement, and a line of basalt blocks extended west to the edge of the Acropolis (where they were still a visible outcrop in 1978). At desertion the string-impressed clay sealing of "Ḫaya-abum, *šabra*" (L93-66) was left on the TUB construction surface (Weiss 1997; Weiss et al. 2002).

The immediately subsequent post-Akkadian Leilan IIc period, previously known only from the Leilan Region Survey (Ristvet, this volume: 241; Arrivabeni, this volume: 261), is now excavation-documented: 4-rooms around a courtyard were re-built on top of the Akkadian administrative building and used with the post-Akkadian ceramic assemblage that is paralleled at Brak TC Pisé Building and Chagar Bazar Bâtiment 1 (Quenet and Ristvet, this volume: 193). The abandonment of the Leilan IIc house is radiocarbon-dated to 2233-2196 BC (68.2%). Similar radiocarbon dates derive from Brak TC Pisé Building and, loosely, from Arbid Vb-a (Emberling et al, this volume: 65; Kolinski, this volume: 109). The end date for the post-Akkadian, Leilan IIc abandonment is set, therefore, at ca. 2200 BC, only a few decades after the Akkadian Leilan IIb1 abandonment. Thereafter, only Early Khabur ware strata, radiocarbon-dated to some 250 years later, appear at Tell Leilan (Weiss et al, this volume: 163).

The Leilan Region Survey, a ca. 1650 square kilometer transect through the eastern Khabur Plains documents Akkadian settlement and imperial reorganization followed by collapse and 87% settlement abandonment at the end of Leilan IIb (Ristvet, this volume: 241). The remnant regional population only survived a few decades with no traces of subsequent EJZ 5 / Ur III – Isin/Larsa related ceramic assemblages (Arrivabeni, this volume: 261).

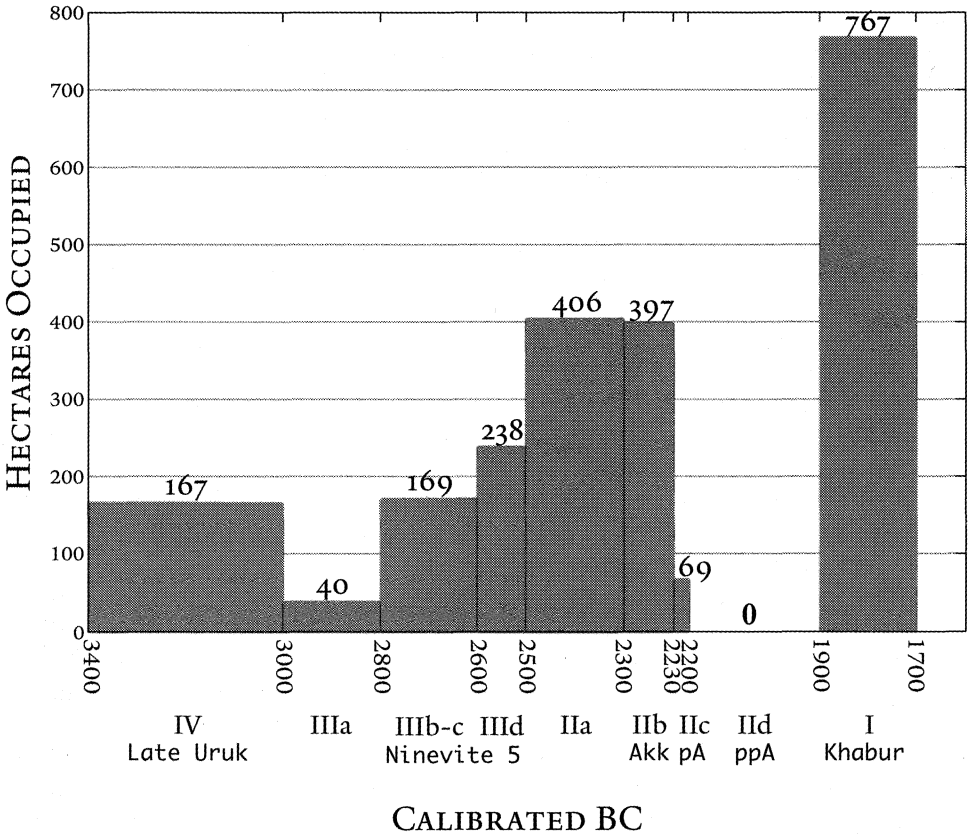

Figure 3: Leilan Region Survey (ca. 1650 sq kms) settlement hectares / period spans. End Period IIb Akkadian collapse reduced settlement 87% at ca. 2230 BC, followed by post-Akkadian period IIc remnant's abandonment within ca. 30-50 years. Leilan IId occupational hiatus period is synchronous with EJZ 5 / Ur III-Isin/Larsa period-related occupation at Tell Mozan (Ristvet, this volume: 241; Arrivabeni, this volume: 261). Major resettlement by formerly pastoralist Amorite populations (Khabur ware occupations) is evident by ca. 1900 BC (Ristvet and Weiss 2005).

Mohammed Diyab. Only eight kilometers east of Leilan, on the east bank of the wadi Siblah, Tell Mohammed Diyab adds new dimensions to Akkadian imperialism and collapse. Two buildings (levels 6a-4 and 5a-12) similar to Leilan TUB were unfinished at abandonment in period X (Nicolle 2006: 64, 133, 168). This occupation, along with the rest of the Mohammed Diyab 50-hectare settlement, is now reassigned by Nicolle to period XIa and the EJZ 4c phase, in the early post-Akkadian period. This reassignment has led, complicatedly and uncertainly, to the suggestion that there is no Akkadian period occupation at Mohammed Diyab (Nicolle, this volume: 129), although the excavated EJZ 4b / Akkadian period ceramics of period X are illustrated (Nicolle 2006: figures 7-19, -20, -21, -22).

The ceramics associated with the redefined occupation, now including a level 7a-4, are not restricted, however, to the EJZ 4c ceramic phase; they occur in both Akkadian and post-Akkadian contexts elsewhere (Arrivabeni, this volume: 261). As well, the Leilan Region Survey of Mohammed Diyab documents an Akkadian / Leilan IIb occupation across 50 hectares

(Ristvet, this volume: 241) followed by a brief post-Akkadian occupation of 14 hectares (Arrivabeni, this volume: 261). The subsequent period IX pisé foundations have not been dated, but could be centuries younger.

Mohammed Diyab comprised with Leilan an Akkadian conurbation of 140 hectares in the center of the Khabur Plains. The Akkadian period settlement at Mohammed Diyab remains to be excavated, and the distribution of Akkadian imperial functions across this conurbation remains to be defined, perhaps along the lines suggested here (Ristvet, this volume: 241; Arrivabeni, this volume: 261). The relative chronology of the Akkadian abandonment of Mohammed Diyab is also intriguing: here TUB wall construction was abandoned prior to any brick laying (Nicolle 2006: 64, 133).

Chagar Bazar, Arbid and Barri. At the Akkadian collapse, ninety percent of Chagar Bazar was abandoned, leaving an approximately 1 hectare village with a large building interpreted as possibly communal (Tunça, McMahon, Baghdo, eds., 2007). Upon its abandonment, this Bâtiment 1 was succeeded by a level of pits. Together the two levels are similar ceramically to the two levels of post-Akkadian occupation at Brak (McMahon, this volume: 25), which terminated ca. 2200 BC (Emberling et al, this volume: 65). There was no subsequent occupation at Chagar Bazar until Khabur ware times, when the site was a Šubat Enlil-related town.

Tell Arbid level VII houses were abandoned at the Akkadian collapse, and then reoccupied at an estimated 20% size reduction, first with some uncertain houses lacking floors, then with the period Vb Main Building, and its renovation in period Va, followed by a level of pits, as at Mohammed Diyab, Chagar Bazar, and Hamoukar. The site was then abandoned until the Khabur ware period. The two radiocarbon dates for Arbid Vb, AA98356: 2281-2136 (68.2%) and AA98357: 2436-2208 (68.2%), suggest the building did not extend beyond 2200 BC, i.e., Leilan IIc / Brak TC Pisé Building. The single radiocarbon date available for Arbid Va, AA 98355: 2204-2040 BC (68.2%), is not definitive by itself, but suggests the renovation of Vb followed shortly (cf. Kolinski, this volume: 109). The ceramic assemblage for Arbid Va-b is not yet analyzed, hence it is the stratigraphy and three radiocarbon dates that define the period VII Akkadian abandonment, the brief post-Akkadian occupation VI and Vb-a, the level IV pits, and the abandonment until the Khabur ware Arbid III reoccupation.

Tell Barri, on the wadi Jaghjagh near Tell Brak, was a small Akkadian period village that was abandoned in level 36. A kiln-associated reoccupation in level 35B had ceramics similar to Ur III-linked Mozan C7. The excavation area was not occupied again until the Khabur ware level 34D cemetery (Orsi, this volume: 89). There are no radiocarbon dates from Tell Barri.

Tell Mozan. At 120-hectare Tell Mozan/Urkesh, near the Tur Abdin Mountains, the area AA level 2 Akkadian period palace, built of dressed basalt blocks and mudbrick, was abandoned along with the 100-hectare lower town at the time of the Akkadian abandonments at Brak and Leilan (Buccellati and Kelly-Buccellati 2000). Parts of the remnant 20-hectare acropolis were occupied thereafter (Pfälzner et al 2004). After the palace abandonment, wall collapse, in-filling, and phase 3 erosion, a scattered phase 4 post-Akkadian occupation of houses was built here. This area was then abandoned for three centuries until a Khabur ware occupation (Buccellati and Kelly-Buccellati 2000: figs. 5 and 6). In another area of the acropolis, C2, an Ur III period-linked house was set upon earlier wall stubs (Schmidt 2011) and reduced occupation continued through to the Khabur ware period, when the town was a caravan stop after Leilan / Šubat Enlil (Weiss 1985). There are no radiocarbon dates for the C2 occupations.

The archaeological retrieval of the reduced Mozan town complements the epigraphic data for the solitary Ur III-period Urkesh (Weiss et al 1993: 999 fn.42), the period when the Leilan Region Survey area, and Brak, Barri, Chagar Bazar, Arbid and Hamoukar were unoccupied. Mozan is described as a rich city sustained by long-distance trade during a humid period when dry-farming was uninterrupted, and when there are no data for irrigation agriculture (Pfälzner, this volume: 145; Riehl 2010). One data-free projection assigned high precipitation for this period at Qamsihli (Bryson 1997), but this publication ignored the Mediterranean westerlies' paleoclimate proxies, and was quickly retracted (Bryson and Bryson 200: 80-81). This occupation is also cited as an example of adaptive variability during the 4.2 kaBP – 3.9 ka BP aridification event (Emberling, et al., this volume: 65).

During this period, the replacement of rain-fed agriculture with moist-soils agriculture at Tell Mozan seems a likely product of the Tur Abdin wadi flow through the site and around its earlier city wall and moat (Deckers and Pustovoytov 2011): Mozan is only 8 kilometers from the Tur Abdin debouchement (Leilan is 30 kilometers, and Brak is 60 kilometers), hence reduced wadi flow is probable here (Kerbe 1987). The unusual high frequencies of free-threshing wheat and the unique *Phalaris*-dominated weed assemblages (Riehl 2010) seem the likely artifacts of moist-soils agriculture (Jones et al 2010; Charles and Hoope 2003) at a refugium for the remnant Mozan town. Neither the houses hypothesized (Pfälzner, this volume: 145) as Mozan-like at Chagar Bazar Bâtiment 1 (Tunça, McMahon, Baghdo, eds,. 2007) and Tell Chuera Steinbau E (Pruss 2000), nor other settlements themselves, were occupied after 2200 BC.

Hamoukar. This 100-hectare site, situated between the Akkadian imperialized cities of Leilan/Mohammed Diyab and Taya (and likely Hawa), has a terminal phase 3 with Akkadian period pottery and two types elsewhere documented (Arrivabeni, this volume: 261) as Akkadian and early post-Akkadian. The single radiocarbon date is useless. Some pits with early post-Akkadian potsherds sealed the phase 3 abandonment (Gibson 2001).

Summary

A significant refinement of the Akkadian collapse and regional abandonment process emerges from the past two decades of Khabur Plains excavations, survey, ceramic assemblage typologies, relative chronologies, and high-resolution radiocarbon dating. The Akkadian collapse and regional abandonment was a two-stage process:

Stage 1. End Leilan IIb1, radiocarbon dated 2254-2220 (68.2%). Major Akkadian abandonments, including public buildings and lower towns: Leilan 99% (Akkadian Administrative Building, The Unfinished Building, and Lower Town), Mohammed Diyab 72% (including two TUB-s), Mozan 84% (Palace and Lower Town), Brak >50% (FS 3 and SS3, Naram-Sin Palace, and Lower Town), Hamoukar 100%, and Leilan Region Survey 87% within which the 13% post-Akkadian settlements were comprised of only remnant occupations.

Stage 2. End Leilan IIc, radiocarbon dated 2233-2196 (68.2%). Reduced-size post-collapse remnants at Leilan, Brak, Mohammed Diyab, Chagar Bazar, Arbid, and in the Leilan Region Survey, occupied the Khabur Plains for a few decades prior to complete abandonment. There are no later, Ur III-related and Isin/Larsa-related, occupations apart from the

83%-reduced Mozan/Urkesh, and the isolated Barri stratum 35B kiln, – and Nawar, possibly at Gir Nawaz – both Urkesh and Nawar probably wadi-debouchement refugia on the north edge of the Khabur Plains.

Synchronous and similar scale abandonments occurred across the dry-farming realms of western Syria, Palestine, the eastern Mediterranean, and Turkmenistan, while habitat-tracking to refugia occurred along the Euphrates in both southern Mesopotamia and central Syria, along the Orontes, and at the karstic springs of Palestine (Weiss 2000; Weiss 2012).

site	Akk	pA/EJZ 4c	ppA/EJZ 5	Khabur
ca. BC	2350-2250	2250-2200	2200-1950	1950-1700
Leilan	90	.002 (-99%)	0	90
Mozan	120	20 (-83%)	<20	<20
Brak	70	<35 (-50%)	0	10
Moh Diyab	50	14 (-72%)	0	35
Chagar Bazar	10	1 (-90%)	0	9
Hamoukar	100	0* (-100%)	0	0
Arbid	4	3.2 (-20%)	0	1.75
Barri	<6	0 (-100%)	0**	6
Leilan Region Survey	397	69 (-87%)	0	767

***chronology uncertain; unlikely but possible partial occupation this period.**
****isolated stratum 35 kiln within this period.**

Figure 4: Site Size (has.) Reductions. Khabur Plains Late Third Millennium BC.

The relationship between the dry-farming region abandonments and the 4.2–3.9 ka BP abrupt climate change.

The radiocarbon dating of the two-stage collapse permits a chronologically refined linkage to the 4.2–3.9 ka BP megadrought. North Atlantic cyclogenesis drives the Mediterranean westerlies, the precipitation delivery system for the eastern Mediterranean littoral and west Asia. The westerlies' paths onto and across the west Asian land mass have been known from antiquity and well-documented since the early twentieth century (Wirth 1971: 82). The westerlies' variability, a function of the North Atlantic Oscillation, has been analyzed recently and in detail for the instrumental period (Marshall 2001; Türkeş and Erlat 2003; Cullen and deMenocal 2000; Cullen et al 2002; Lionello, Malanotte-Rizzoli, Bosclo, eds. 2006; Lionello et al. 2012).

For the pre-instrumental period, paleoclimate proxies from lake, marine, glacial, and speleothem cores provide a detailed record of the Pleistocene and Holocene Mediterranean westerlies variability. There are more than sixty paleoclimate proxy records for the period six to two thousand years ago in the east Mediterranean, west Asia, and immediately adjacent

regions. With varying resolution, these record decadal and century-scale anomalous episodes of decreased North Atlantic cyclogenesis at 9.2, 8.2, 5.2, 4.2, and 3.2 ka BP. The 4.2–3.9 kaBP anomaly has been tracked across the Khabur Plains' Mediterranean westerlies precipitation delivery system:

a. the northern Mediterranean in Spain (Railsback et al 2011; Carrió et al. 2003; Scussolini et al 2011), France (Brisset et al 2012), Italy (Magny et al 2008, 2011; DiRita and Magri 2009; Magri and Parra 2002), Greece (Schmiedl et al 2010), Albania (Wagner et al 2009);
b. the Anatolian Plateau (Gökturk 2011; Lemcke and Sturm 1997, Eastwood et al 2007; Kuzucuoglu et al 2011; Pustovoytov, Schmidt, Taubald 2007);
c. the Levant (Migowski et al 2006; Arz et al 2006; Edelman-Furstenberg, Almogi-Labin, Hemleben 2009; Bar-Matthews, Ayalon and Kaufman 1997; Bar-Matthews, et al 1999; Bar-Matthews and Ayalon 2004),
d. the Persian Gulf: (Cullen et al 2000; Parker et al 2006)
e. the Iranian plateau (Stevens et al 2006; Leroy et al. 2007; Djamali et al. 2009).

Summaries of the Mediterranean and west Asian proxy records, and the significant global distributions (Weiss et al, this volume: 163), are also available (Staubwasser and Weiss 2006; Roberts et al 2011; DiRita and Magri 2009; Magny et al 2011; Wanner et al 2010; Weiss 2012; Walker et al 2012). Here a multi-proxy stack plots eight variables at eleven paleoclimate proxy sites to illustrate the 4.2–3.9 kaBP megadrought at different levels of chronological resolution (Weiss et al, this volume: 163, Figure 26).

The imprecision of many paleoclimate proxies' dating, age-depth models and linear interpolation across centuries, is contrasted with high-resolution archaeological dating. While the Anatolian lake proxies suffer from labile chronologies, the Mediterranean lakes, and several west Asian proxies offer high-resolution dating (Zanchetta et al 2012). The tephrochronostratigraphy of the Oman core (Cullen et al 2000), and the densely sampled proxies such as the Koçain speleothem (Gökturk 2011), Lake Van varves (Lemcke and Sturm 1997), Shaban Deep foraminifera (Arz et al 2006) and Mt. Sedom tamarisk stem (Frumkin 2009), provide chronological linkage with the Leilan radiocarbon chronology (Weiss et al, this volume: 163) and with the new high-resolution chronologies at Mawmluh Cave, with 6-year sampling intervals (Berkelhammer et al. 2012), and Mt. Logan, Yukon with 10-year sampling intervals (Fisher et al 2008, 2011).

Conclusions

Would regional abandonment have occurred without the 4.2 kaBP megadrought (Maudlin 2004; Hitchcock 2008)? Although fictive accounts abound, neither archaeology nor epigraphy provide alternate and testable causes for the Khabur Plains and adjacent regional abandonments and habitat-tracking. The abandonment of Khabur Plains rain-fed agriculture settlement was probably, therefore, a function of 4.2 ka BP drought abruptness (less than 5 years), magnitude (20-50% precipitation reduction) and duration (200-300 years) in the absence of available technological innovation or regional subsistence relief. Outside the bounds of testability at this time, however, there remains the quantification of imperialized grain-flow to Akkad and its imperial transformation.

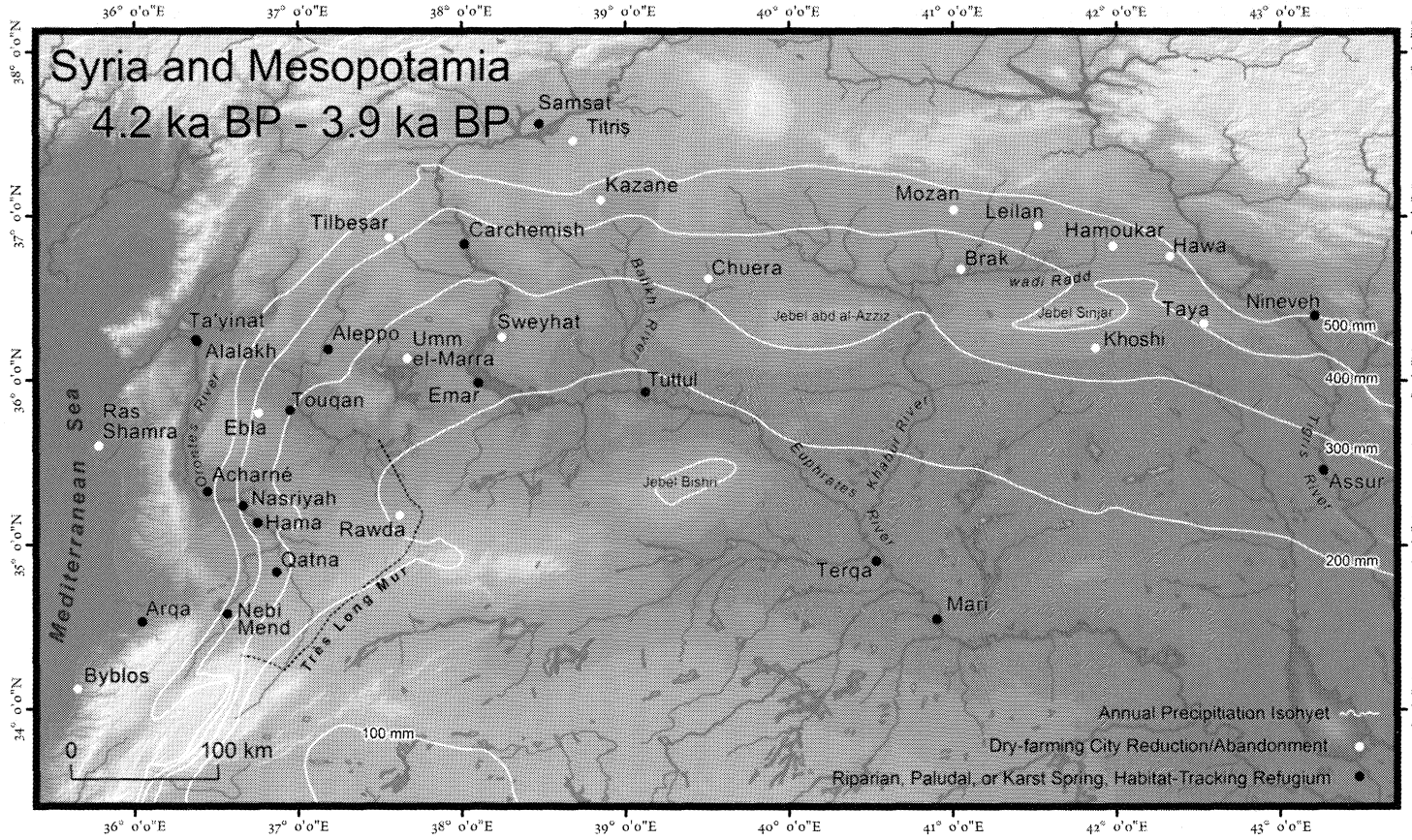

Figure 5: Syria and Mesopotamia, 4.2–3.9 ka BP. West Asian settlement reductions and abandonments in rain-fed terrains, and riparian, paludal, and karstic-spring habitat-tracking refugia. The "Très Long Mur" protected the new karstic-spring Orontes River urban refugia from 'Amorite' nomad incursions much as did its contemporary analog "The Repeller-of-the-Amorites Wall" in southern Mesopotamia.

Prospects

The quantification of archaeological and paleoclimate data for the Akkadian collapse and the abandonment of the Khabur Plains provide the dynamic frame for the adaptive refraction of the almost millennial Mesopotamian trajectory, but incremental archaeological and paleoclimate advances seem attainable in the near term. Higher chronological resolution of paleoclimate proxies and additional radiocarbon datings of archeological abandonments will measure the coincidence of the Khabur Plains and contemporary west Asian and Aegean collapses and resettlements. Transfer functions from isotopic values to precipitation values will chart precipitation reductions across rain-fed landscapes. Refined surveys of regional abandonments and population increments will measure nomadization and habitat-tracking at refugia along the lower Euphrates, at the Jebel Bishri (Ohnuma, ed., 2010; Lönnqvist 2006, 2009), in the Hauran (Braemer, Echallier, Taraqji 2004), and along the Orontes River (al-Maqdissi 2010). Quantification of the abrupt return of precipitation, settlement, and cultivation at c. 1900 BC will prompt analysis of the regional social and economic forces behind the resettlement.

Additionally, we might search for the "unconscious tool of history" (Marx 1853), although the state-level Khabur Plains societies were pre-adapted to imperialization and natural forces appear to have truncated potential successor states. More promising are tests for the two-stage Akkadian imperial dynamic, first long-distance conquest for plunder (Sargon, Rimuš, Maništušu), then fortress construction and agro-imperialism across transport-efficient realms (Naram-Sin and Šar-kali-šarri). The pre-imperial Akkadian penetration of northern Mesopotamia, already documented at Nineveh, Brak, and Leilan, suggests another stage with goals still unknown. A fourth problem is the untreated genesis of Akkadian imperialism. Resource scarcity, real or imagined, frequently explains imperial resource acquisition (e.g., Cain and Hopkins 1980; Carrasco 1999). The rare quantification of late Early Dynastic cereal agriculture yield reductions (Maekawa 1974) and the high-resolution paleoclimate proxy chronologies suggest testing, among several hypotheses, the curious possibility that the 4.2 kaBP event forced both the genesis and the collapse of Akkadian imperialism first, through the reduction of Euphrates flow for southern irrigation-agriculture and second, through the truncation of imperialized northern dry-farming.

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For the past twenty years, the Khabur Plains of northeast Syria have been a testing ground for the Akkadian collapse c. 2200 BC and remnant post-Akkadian occupations. On May 2, 2012, a workshop for the presentation and discussion of the latest archaeological data was convened in Warsaw, at the 8th International Congress for the Archaeology of the Ancient Near East. The fifteen research papers from that conference present the analyses and perspectives from eight excavated sites, Arbid, Barri, Chagar Bazar, Brak, Mohammed Diyab, Leilan, Mozan, and Hamoukar, and two regional surveys. The new data include the Tell Leilan high-resolution radiocarbon chronology for the Akkadian collapse, an Akkadian palace built within the shell of a destroyed pre-Akkadian palace, The Unfinished Buildings at Tell Leilan and Tell Mohammed Diyab, the terminal occupations at Tell Brak, Chagar Bazar, Hamoukar, Arbid, Mohammed Diyab and Leilan, quantified regional settlement distributions across the Akkadian collapse, measured paleobotanical data for imperial Akkadian and remnant post-Akkadian agriculture, and documentation for the collapse of the imperial Akkadian administration.

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