

## SETTLEMENT PATTERNS IN THE SOUTHERN LEVANT DESERTS DURING THE 6TH–3RD MILLENNIA BC: A REVISION BASED ON <sup>14</sup>C DATING

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**ABSTRACT.** Archaeological surveys conducted in the Negev and Sinai during the 20th century were commonly interpreted as representing short settlement periods interrupted by long gaps. The time factor was usually based on archaeological estimates rather than comprehensive physical dating. For example, the perceived age and time duration of “hole-mouth” pottery sherds and tabular flint scrapers became a source of circular reasoning to “date” sites and their “duration.” Thus, desert sites became to be perceived as temporary, seasonal, short-lived, while the cultures of desert populations were somehow undervalued. However, radiocarbon dating of desert sites from the Late Neolithic to the Early Bronze Age IV presents a very different scenario. The deserts of the Southern Levant exhibit a full sequence of settlement, a longer life span of individual sites, and a higher level of activity and creativity of the desert people. This paper describes the controversy and presents the <sup>14</sup>C data that form the basis for the revised view.

### INTRODUCTION

The southern Levant deserts discussed in this paper include the areas of southern Jordan, the Negev, and Sinai. The climate of the region is arid or hyper-arid, characterized by summer temperatures that often rise above 40 °C in the hottest parts. Annual average precipitation is below 100 mm, while the potential evaporation may reach 4000 mm per year. The mountains of southern Jordan, southern Sinai, and the Negev Highlands enjoy better conditions, but are still very dry. The climate during the periods under discussion, the 6th to 3rd millennia BC, was somewhat moister than at present, but the environment clearly remained a desert.

In view of the negative water balance of the region most scholars described the occupational history of the Southern Levant deserts as a series of short settlement periods separated by long intervals of abandonment. During historical periods settlement in the desert was attributed to the initiative of strong political entities from the neighboring fertile regions. The dearth of archaeological remains during the intervening periods was related to nomads, who did not leave traces. The commonly accepted occupation scenario of the deserts in the southern Levant includes: 1) several pre-pottery Neolithic B sites (PPNB), 2) hardly any human presence during the 6th–4th millennia BC (Late Neolithic, Chalcolithic, and Early Bronze I), 3) a sudden and extensive settlement throughout the desert in the Early Bronze II (EBII, about 3000–2650 BC), 4) another period of emptiness during EBIII, and 5) extensive human presence in the EBIV period (about 2300–2000 BC).

This picture of “ups and downs” is well represented by the publications of the Negev Highland surveys. So far, nine survey maps have been published, covering altogether 900 km<sup>2</sup> encompassing about 65% of the Negev Highlands. Figure 1 presents a compilation of site numbers in each period.

### Settlement Patterns Based on Radiocarbon Dating

In 1994 we published a detailed description and discussion of the settlement pattern in the deserts of the southern Levant during the 6th–3rd millennia BC with emphasis on the southern Negev (Avner et al. 1994). Based on archaeological surveys, excavations, artifacts, and 84 radiocarbon dates, we asserted a full sequence of settlement in the desert from the PPNB until the EBIV. Since then, more information accumulated on desert settlements and this concise paper provides an update.

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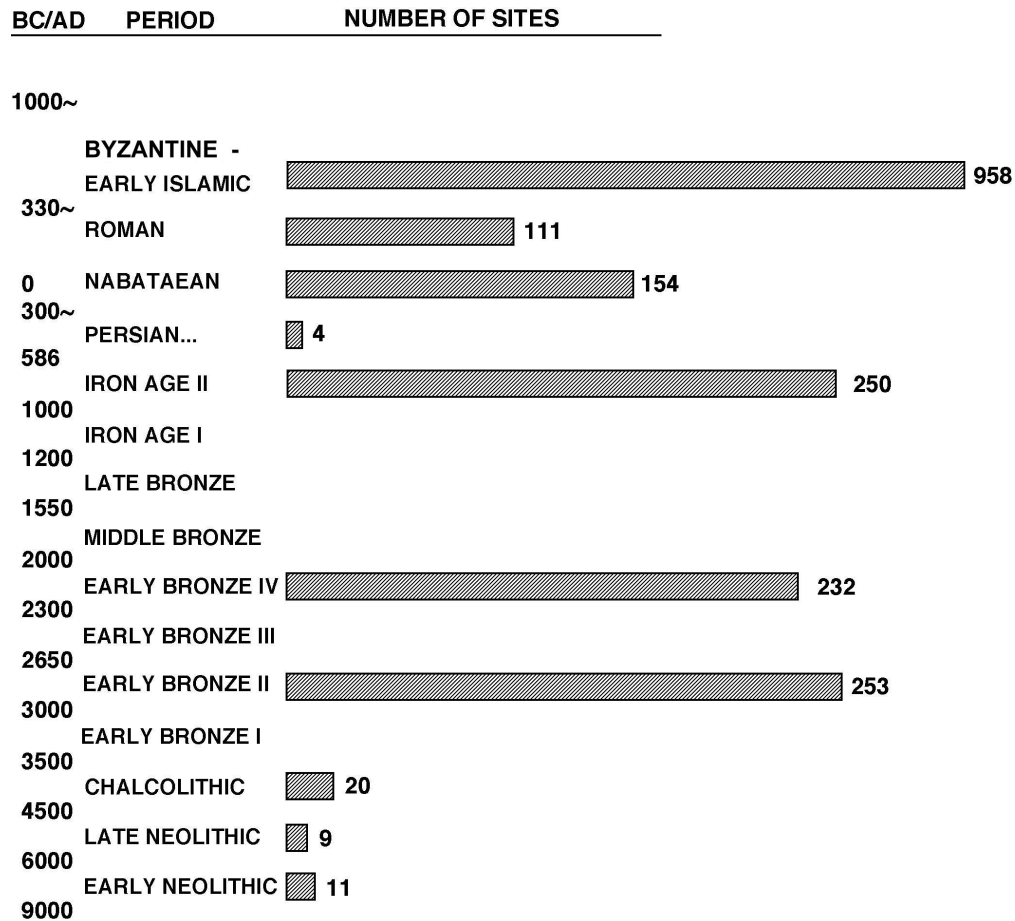


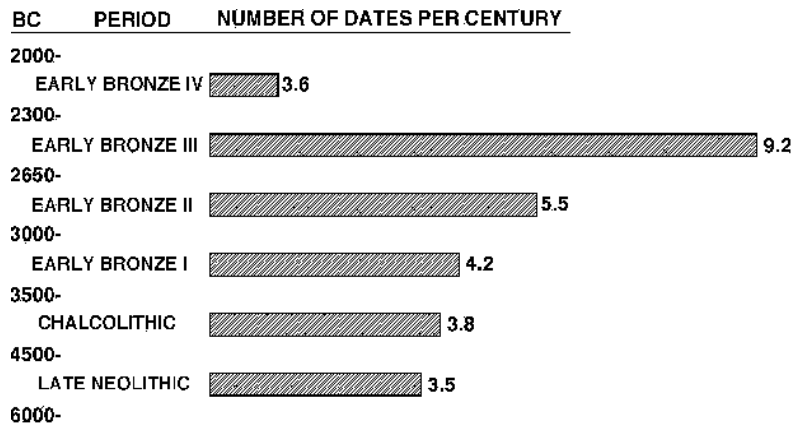
Figure 1 The traditional view of settlement patterns in the Negev Highlands based on archaeological age assessment. Compilation of site numbers in each period is derived from the Negev Highland surveys published by the Israel Antiquities Authority (Avni 1992; Cohen 1981, 1985, 1999; Haiman 1986, 1991, 1993, 1999; Lender 1990; Rosen 1994).

The new  $^{14}\text{C}$  list from the area includes 175 dates from 73 sites in the time period of about 6000–2000 BC (see also Figures 2 and 3). This list provides a higher resolution of the settlement sequence and better illuminates the “dark ages” in the desert: the Late Neolithic, Chalcolithic, EB-I, and EB-III. In fact, these periods proved not to be “dark” at all. An arbitrary division of these dates by cultural periods gives a general idea of the settlement patterns as shown in Table 1.

The sequence of settlements by numbers of dates per century in each period is demonstrated in Figure 2. It shows that only one part of the sequence remains with a low number of dates: the period 4000–3500 BC, or the Late Chalcolithic in cultural terms. This is partly related to the fact that some sites previously dated as Chalcolithic were later proven to be EB-I (Adams and Genz 1995; Genz 1997; Khalil and Eichmann 1999). Nevertheless, no settlement gaps are apparent and additional excavations will most probably provide further information on the Late Chalcolithic.

Table 1 Number of  $^{14}\text{C}$  dates according to cultural period

| Cultural Period  | Number of $^{14}\text{C}$ dates |
|------------------|---------------------------------|
| Late Neolithic   | 53                              |
| Chalcolithic     | 38                              |
| Early Bronze I   | 21                              |
| Early Bronze II  | 25                              |
| Early Bronze III | 23                              |
| Early Bronze IV  | 11                              |

Figure 2 A different picture of settlement patterns in the Southern Levant deserts during the 6th–3rd Millennia BC is clearly emerging from  $^{14}\text{C}$  dating

### Settlement Duration of Desert Sites

Another point illuminated by the  $^{14}\text{C}$  dating is the life span of individual sites. Usually, desert sites were described as “short lived and a passing phenomenon” or “seasonally used for only several years” (Haiman 1986:16, 1989:185) and having a “brief lifespan” (Beit-Arieh 1982:155, 1986:51). However, when a series of  $^{14}\text{C}$  dates is retrieved from excavated sites, a long timeline is revealed spanning hundreds of years or even more (Figure 4, Sites 22, 25, 39, 50). The best example is the Nahal Issaron site (Figure 4, Site 29) in the Uvda Valley, where 35 dates cover 4500 years from early PPNB to late Chalcolithic (Figure 5). It is not asserted here that these sites were inhabited every day or even every year, but still, their long duration contradicts common notions about desert settlement and suggests a great demographic and cultural significance.

What is the reason for the time difference between settlement patterns obtained through archaeological surveys and through  $^{14}\text{C}$  dating? The main answer, in our opinion, lies in the archaeological age estimate attributed to ceramics and flint tools. The two major types of artifacts collected from the surface in the Negev and Sinai surveys—the “hole-mouth” pottery sherds and tabular flint scrapers—were considered to identify only EB-II. However, a closer examination shows that a much longer time range is obtained when these artifacts are found with other datable finds and with  $^{14}\text{C}$  dates (Avner et al. 1994:280–81). As a result of the limited dating, the EB-II period was overemphasized, at the expense of the Late Neolithic, the Chalcolithic, the EB-I, and EB-III. It still seems that

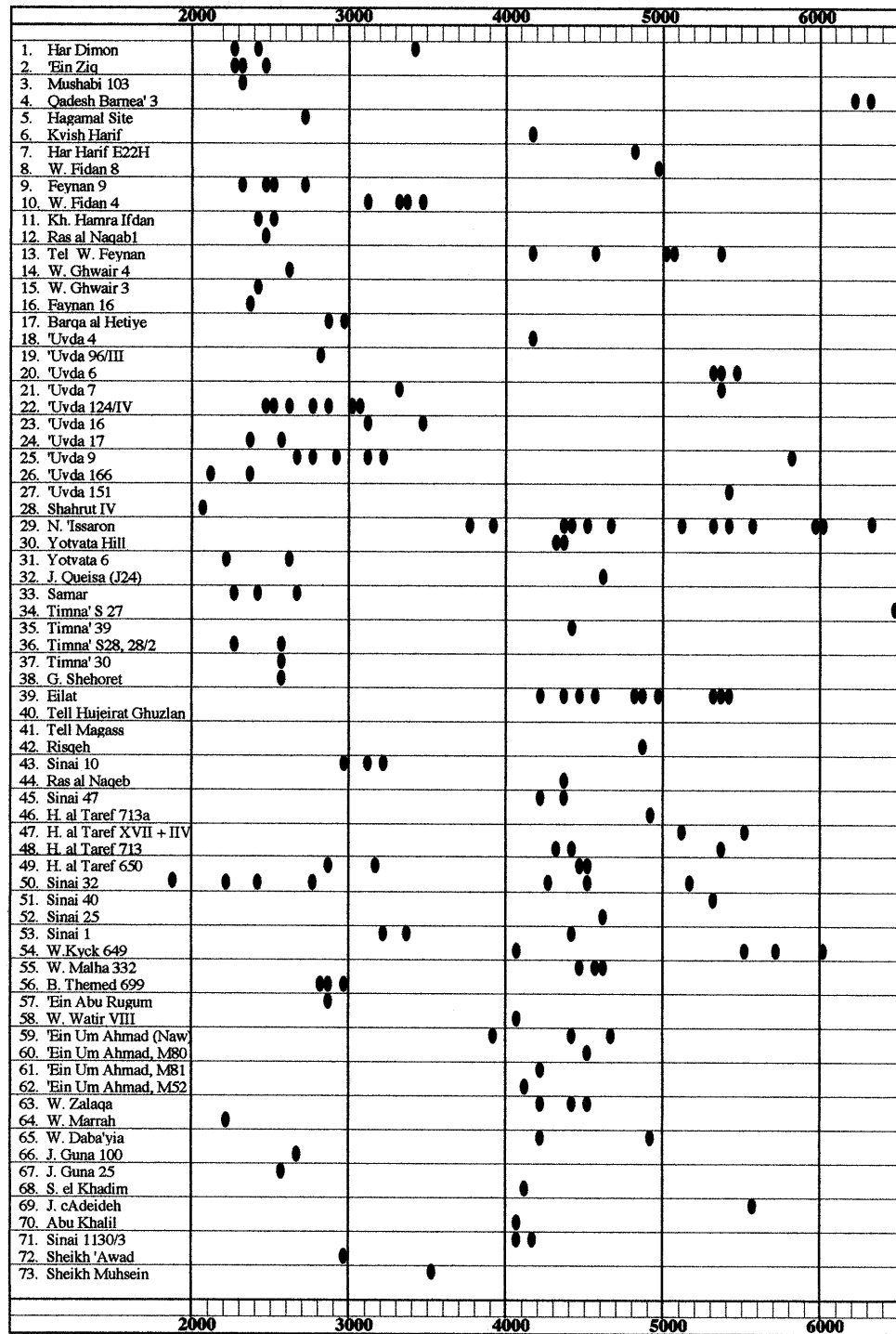


Figure 3 Histogram of calibrated BC dates: Late Neolithic to EBIV from southern Jordan, the Negev and Sinai from north to south. Each spot represents the mean value of one or more calibrated dates based on OxCal 3.4 (Ramsey 2000). For locations of the sites see Figure 4.

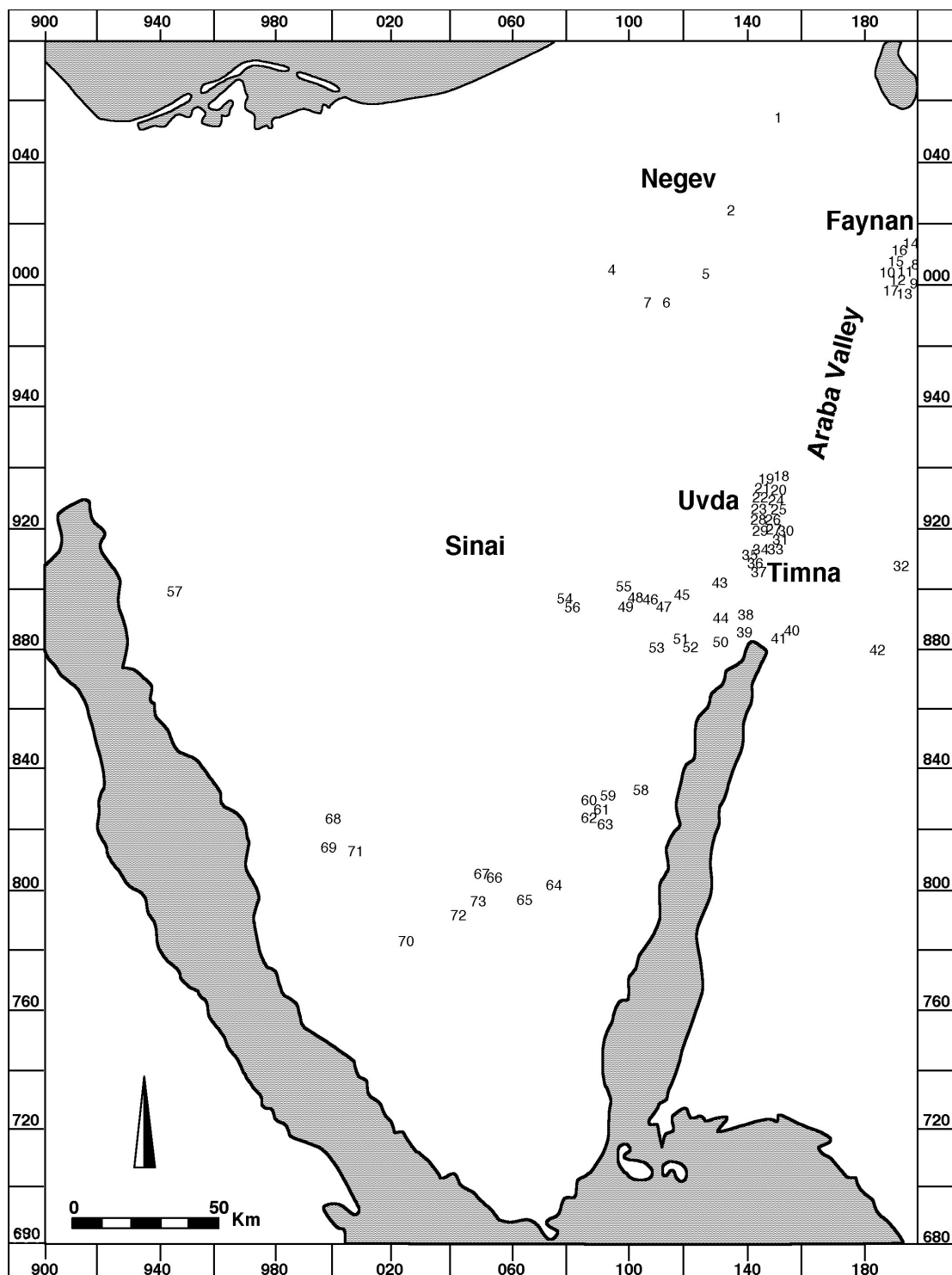


Figure 4 Location of archaeological sites dated by  $^{14}\text{C}$ . The site numbers refer to Table 2.

EB-II was indeed the climax of settlement in the southern Levant deserts, but the other periods should not at all be considered as “missing.”

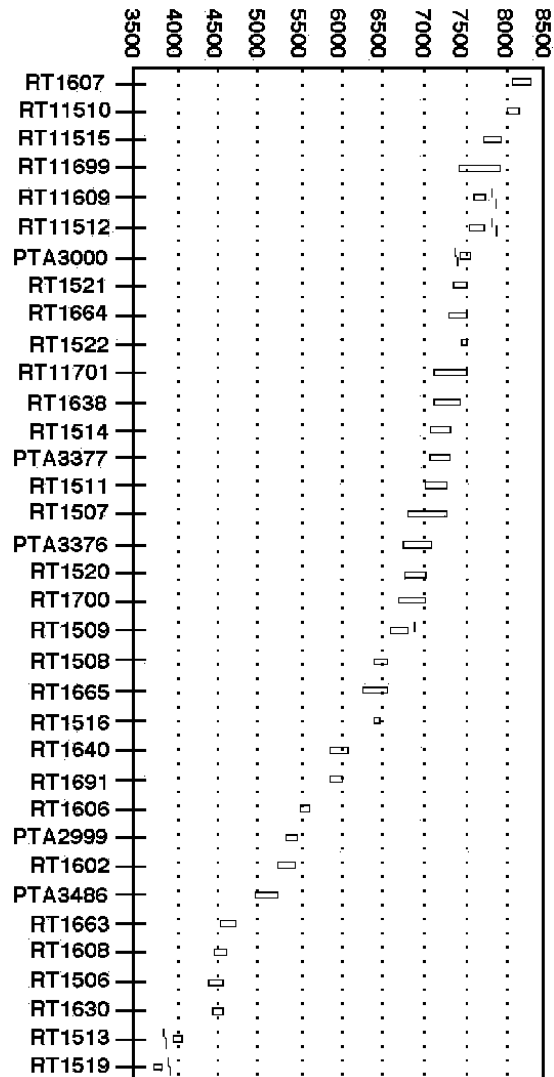


Figure 5 Distribution of  $^{14}\text{C}$  dates at the Nahal Issaron site (Carmi et al. 1994).

## CONCLUSION

Our knowledge of archaeological history in the deserts of the Southern Levant is still far from satisfactory. Much work is still needed before we can reconstruct the desert's past with some reliability. Most areas in these deserts have not been surveyed in detail. The typology and chronology of sites and artifacts is not clear enough as yet. And there is still much to be done in interpreting the known types of sites. However, as the speed of destruction of desert sites is very high, we cannot be sure how many sites will survive for investigation in the near future.

Even with our limited knowledge, archaeological remains in the desert can no longer be attributed only to foreign initiatives during the late prehistory and early historic periods. Moreover, it can no longer be claimed that the desert population had no role in the cultures of the Near East. On the contrary, the desert peoples were innovative enough to develop a successful and sustainable form of agriculture under harsh conditions (Avner 1998). They were also involved in the development of copper mining and metallurgy (Rothenberg and Glass 1992) and they were especially creative in the realm of religion and philosophy. In these fields they had an important influence on the population of the fertile zones for many generations (Avner 1993, in press 1, 2, 3).

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## APPENDIX

Table 2 Calibrated  $^{14}\text{C}$  dates of Late Neolithic to Early Bronze-IV sites in the deserts of Southern Jordan, the Negev, and Sinai. The sites are arranged in geographical order from north to south. The references for the  $^{14}\text{C}$  dates of each site are presented in the last column, next to the first date of the respective site<sup>a</sup>

| Nr | Site name        | Site type    | Lab nr  | M <sup>b</sup> | Years (BP) | Cal BC <sup>c</sup> | Mean | Reference              |
|----|------------------|--------------|---------|----------------|------------|---------------------|------|------------------------|
| 1  | Har Dimon        | Habitation   | RT1556  | C              | 4660 ± 55  | 3520–3360           | 3440 | Segal and Carmi 1996   |
|    | Har Dimon        |              | RT1557  | C              | 3845 ± 50  | 2410–2200           | 2305 |                        |
|    | Har Dimon        |              | RT1558  | C              | 3915 ± 50  | 2470–2300           | 2385 |                        |
| 2  | ‘En Zik          | Habitation   | RT885A  | C              | 3960 ± 90  | 2580–2300           | 2440 | Cohen 1999             |
|    | ‘En Zik          |              | RT885B  | C              | 3880 ± 50  | 2460–2200           | 2330 |                        |
|    | ‘En Zik          |              | RT885B1 | C              | 3880 ± 50  | 2460–2290           | 2265 |                        |
|    | ‘En Zik          |              | RT2514  | W              | 3700 ± 45  | 2200–1980           | 2090 |                        |
| 3  | Mushabi 103      | Habitation   | RT447B  | C              | 3800 ± 330 | 2700–1700           | 2200 | Sharpensel et al. 1976 |
| 4  | Qadesh Barne’a 3 | Habitation   | SMU662  | C              | 7530 ± 80  | 6450–6250           | 6350 | Bar Yosef 1987         |
|    | Qadesh Barne’a 3 |              | Pta3662 | C              | 7350 ± 80  | 6340–6070           | 6205 |                        |
| 5  | Hagamal site     | Habitation   | Rt2043  | C              | 4115 ± 50  | 2860–2580           | 2720 | Segal and Carmi 1996   |
| 6  | Kvish Harif      | Habitation   | Pta3374 | C              | 5260 ± 60  | 4230–3980           | 4105 | Rosen 1984             |
| 7  | Har Harif E22H   | Habitation   | Tx1122  | C              | 5960 ± 100 | 4960–4710           | 4835 | Forenbaher 1997        |
| 8  | W. Fidan         | Habitation   | HD17471 | C              | 6082 ± 44  | 5050–4850           | 4950 | Hauptmann 2000         |
| 9  | Faynan 9         | Copper smelt | HD10577 | C              | 4140 ± 110 | 2880–2580           | 2730 |                        |
|    | Faynan 9         |              | HD10993 | C              | 3981 ± 50  | 2580–2400           | 2490 |                        |
|    | Faynan 9         |              | HD10994 | C              | 3973 ± 85  | 2620–2310           | 2465 |                        |
|    | Faynan 9         |              | HD10584 | C              | 3812 ± 77  | 2410–2130           | 2270 |                        |
| 10 | W. Fidan 4       | Habitation   | HD13776 | C              | 4654 ± 50  | 3520–3360           | 3340 |                        |
|    | W. Fidan 4       |              | HD16378 | C              | 4424 ± 51  | 3270–2920           | 3095 |                        |
|    | W. Fidan 4       |              | HD16379 | C              | 4576 ± 44  | 3500–3120           | 3310 |                        |

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| No | Site name        | Type of site  | Lab No. | M <sup>b</sup> | years (BP)     | cal BC <sup>c</sup> | Mean | Reference          |
|----|------------------|---------------|---------|----------------|----------------|---------------------|------|--------------------|
|    | W. Fidan 4       |               | HD16380 | C              | 4702 $\pm$ 37  | 3630–3370           | 3500 |                    |
|    | W. Fidan 4       |               | HD16327 | C              | 4718 $\pm$ 25  | 3630–3380           | 3505 |                    |
| 11 | H. Hamdan If-dan | Habitation    | HD16533 | C              | 4044 $\pm$ 44  | 2630–2470           | 2550 |                    |
|    | H. Hamdan If-dan |               | HD16534 | C              | 3914 $\pm$ 45  | 2470–2310           | 2390 |                    |
| 12 | Ras al Naqab 1   | Copper smelt  | HD10574 | C              | 3971 $\pm$ 67  | 2580–2350           | 2465 |                    |
| 13 | Tel W. Faynan    | Habitation    | HD10567 | C              | 6410 $\pm$ 115 | 5490–5260           | 5375 | Najjar et al. 1990 |
|    | Tel W. Faynan    |               | HD12335 | C              | 6360 $\pm$ 45  | 5470–5300           | 5385 |                    |
|    | Tel W. Faynan    |               | HD13775 | C              | 6312 $\pm$ 50  | 5210–4950           | 5080 | Hauptmann 2000     |
|    | Tel W. Faynan    |               | HD12338 | C              | 6110 $\pm$ 75  | 5210–4850           | 5030 | Najjar et al. 1990 |
|    | Tel W. Faynan    |               | HD12337 | C              | 5740 $\pm$ 35  | 4680–4500           | 4590 |                    |
|    | Tel W. Faynan    |               | HD12336 | C              | 5375 $\pm$ 30  | 4330–4110           | 4200 |                    |
| 14 | W. Ghwir 4       | Copper smelt  | HD10573 | C              | 4059 $\pm$ 55  | 2840–2470           | 2655 | Hauptmann 2000     |
| 15 | W. Ghwir 3       | Copper smelt  | HD16529 | C              | 3919 $\pm$ 26  | 2470–2350           | 2410 |                    |
| 16 | Fainan 16        | Copper smelt  | HD10579 | C              | 3923 $\pm$ 61  | 2490–2300           | 2395 |                    |
| 17 | Barqa al Hetiye  | Habitation    | HD13975 | C              | 4376 $\pm$ 57  | 3090–2900           | 2995 |                    |
|    | Barqa al Hetiye  |               | HD13976 | C              | 4267 $\pm$ 43  | 2920–2780           | 2850 |                    |
| 18 | ‘Uvda 4          |               | RT724D  | C              | 5400 $\pm$ 110 | 4350–4040           | 4195 | Avner et al. 1994  |
| 19 | ‘Uvda 96/III     | Threshing fl. | RT648B  | C              | 4250 $\pm$ 50  | 2920–2700           | 2810 |                    |
| 20 | ‘Uvda 6          | Sanctuary     | RT628A  | C              | 6560 $\pm$ 200 | 5710–5310           | 5510 |                    |
|    | ‘Uvda 6          |               | RT628B  | C              | 6400 $\pm$ 70  | 5470–5310           | 5390 |                    |

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| No | Site name          | Type of site           | Lab No. | M <sup>b</sup> | years (BP)     | cal BC <sup>c</sup> | Mean | Reference             |
|----|--------------------|------------------------|---------|----------------|----------------|---------------------|------|-----------------------|
|    | 'Uvda 6            |                        | Pta3621 | C              | 6400 $\pm$ 60  | 5470–5310           | 5390 |                       |
|    | 'Uvda 6            |                        | RT1739  | O<br>E         | 6390 $\pm$ 60  | 5470–5310           | 5390 | Segal and Carmi 1996  |
| 21 | 'Uvda 7            | Habitation             | RT724B  | C              | 6410 $\pm$ 120 | 5490–5260           | 5375 | Avner et al. 1994     |
|    | 'Uvda 7            |                        | RT724C  | C              | 4540 $\pm$ 100 | 3490–3040           | 3267 |                       |
| 22 | 'Uvda 124/IV       | Habitation             | RT1419  | C              | 4370 $\pm$ 100 | 3310–2880           | 3095 | Avner et al. 1994     |
|    | 'Uvda 124/IV       |                        | RT1452  | C              | 4370 $\pm$ 50  | 3090–2910           | 3000 |                       |
|    | 'Uvda 124/IV       |                        | RT1449  | C              | 4285 $\pm$ 60  | 3020–2710           | 2865 |                       |
|    | 'Uvda 124/IV       |                        | RT1451  | G<br>C         | 4280 $\pm$ 60  | 3020–2700           | 2860 |                       |
|    | 'Uvda 124/IV       |                        | RT1448  | C              | 4120 $\pm$ 60  | 2870–2570           | 2720 |                       |
|    | 'Uvda 124/IV       |                        | RT1450  | C              | 4075 $\pm$ 55  | 2860–2490           | 2675 |                       |
|    | 'Uvda 124/IV       |                        | RT3174  | G<br>C         | 4030 $\pm$ 45  | 2620–2470           | 2545 |                       |
|    | 'Uvda 124/IV       |                        | RT3172  | G<br>C         | 4015 $\pm$ 40  | 2580–2470           | 2525 |                       |
|    | 'Uvda 124/IV       |                        | RT3173  | G<br>C         | 4010 $\pm$ 45  | 2580–2460           | 2520 |                       |
| 23 | 'Uvda 16           | Habitation             | RT640A  | C              | 4800 $\pm$ 70  | 3660–3380           | 3520 | Avner et al. 1994     |
|    | 'Uvda 16           |                        | RT640B  | C              | 4400 $\pm$ 60  | 3260–2910           | 3085 |                       |
| 24 | 'Uvda 17           | Habitation             | Pta3340 | C              | 4100 $\pm$ 50  | 2860–2500           | 2680 | Bet Arieħ unpublished |
|    | 'Uvda 17           |                        | Pta3342 | C              | 3870 $\pm$ 40  | 2460–2280           | 2370 |                       |
| 25 | 'Uvda 9 (124/XVII) | Upright standing stone | RT670D  | C              | 7960 $\pm$ 200 | 7200–6550           | 6875 | Avner et al. 1994     |
|    | 'Uvda 9 (124/XVII) |                        | Pta3646 | C              | 6960 $\pm$ 70  | 5890–5730           | 5810 | Avner in press        |

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| No | Site name             | Type of site   | Lab No. | M <sup>b</sup> | years (BP)     | cal BC <sup>c</sup> | Mean | Reference         |
|----|-----------------------|----------------|---------|----------------|----------------|---------------------|------|-------------------|
|    | 'Uvda 9 (124/XVII)    |                | RT3369  | C              | 4130 $\pm$ 90  | 2880–2580           | 2730 |                   |
|    | 'Uvda 9               | Habitation     | RT899A  | C              | 4530 $\pm$ 50  | 3360–3100           | 3230 | Avner et al. 1994 |
|    | 'Uvda 9               |                | RT889B  | C              | 4520 $\pm$ 60  | 3360–3100           | 3230 |                   |
|    | 'Uvda 9               |                | RT864B  | C              | 4440 $\pm$ 180 | 3360–2890           | 3125 |                   |
|    | 'Uvda 9               |                | RT1436  | O<br>E         | 4440 $\pm$ 60  | 3330–2920           | 3125 |                   |
|    | 'Uvda 9               |                | RT864A  | C              | 4310 $\pm$ 90  | 3110–2700           | 2905 |                   |
|    | 'Uvda 9               |                | RT714A  | O<br>E         | 4070 $\pm$ 100 | 2860–2470           | 2665 |                   |
| 26 | 'Uvda 151             | Standing stone | RT684A  | O<br>E         | 5670 $\pm$ 85  | 4610–4360           | 4485 | Avner et al. 1994 |
| 27 | Shaharut IV           | Tombs          | RT899C  | W              | 3700 $\pm$ 55  | 2200–1970           | 2085 | Avner et al. 1994 |
|    | Shaharut IV           |                | RT771B  | W              | 3582 $\pm$ 130 | 2140–1740           | 1940 |                   |
| 28 | 'Uvda 166             | Habitation     | RT714B  | C              | 3850 $\pm$ 80  | 2460–2200           | 2330 | Avner et al. 1994 |
|    | 'Uvda 166             |                | RT1421  | C              | 3680 $\pm$ 50  | 2140–1970           | 2055 |                   |
| 29 | 'Uvda 14 <sup>d</sup> | Habitation     | RT1516  | C              | 7460 $\pm$ 95  | 6410–6230           | 6320 | Carmi et al. 1994 |
|    | 'Uvda 14              |                | RT1640  | C              | 7135 $\pm$ 95  | 6160–5890           | 6025 |                   |
|    | 'Uvda 14              |                | RT1691  | C              | 7100 $\pm$ 70  | 6030–5840           | 5935 |                   |
|    | 'Uvda 14              |                | RT1606  | C              | 6680 $\pm$ 85  | 5670–5480           | 5575 |                   |
|    | 'Uvda 14              |                | Pta2999 | C              | 6460 $\pm$ 70  | 5480–5360           | 5420 |                   |
|    | 'Uvda 14              |                | RT1692  | C              | 6350 $\pm$ 90  | 5470–5210           | 5340 |                   |
|    | 'Uvda 14              |                | Pta3486 | C              | 6130 $\pm$ 70  | 5210–4940           | 5075 |                   |
|    | 'Uvda 14              |                | RT1663  | C              | 5755 $\pm$ 85  | 4710–4490           | 4600 |                   |
|    | 'Uvda 14              |                | RT1608  | C              | 5690 $\pm$ 55  | 4600–4450           | 4525 |                   |
|    | 'Uvda 14              |                | RT1506  | C              | 5635 $\pm$ 70  | 4540–4360           | 4450 |                   |

Table 2 Calibrated  $^{14}\text{C}$  dates of Late Neolithic to Early Bronze-IV sites in the deserts of Southern Jordan, the Negev, and Sinai. The sites are arranged in geographical order from north to south. The references for the  $^{14}\text{C}$  dates of each site are presented in the last column, next to the first date of the respective site.<sup>a</sup> (Continued)

| No | Site name       | Type of site | Lab No.  | M <sup>b</sup> | years (BP)     | cal BC <sup>c</sup> | Mean | Reference                  |
|----|-----------------|--------------|----------|----------------|----------------|---------------------|------|----------------------------|
|    | 'Uvda 14        |              | RT1630   | C              | 5625 $\pm$ 70  | 4530–4360           | 4445 |                            |
|    | 'Uvda 14        |              | RT1513   | C              | 5170 $\pm$ 55  | 4050–3810           | 3930 |                            |
|    | 'Uvda 14        |              | RT1518   | C              | 4990 $\pm$ 50  | 3910–3700           | 3805 |                            |
| 30 | Yotvata Hill    | Ramp         | RT1548   | C              | 5468 $\pm$ 55  | 4360–4240           | 4300 | Segal and Carmi 1996       |
|    | Yotvata Hill    | Copper smelt | RT1546/7 | C              | 4650 $\pm$ 70  | 3520–3360           | 3340 |                            |
| 31 | Yotvata 6       | Habitation   | RT1439   | C              | 3980 $\pm$ 60  | 2580–2350           | 2565 | Avner et al. 1994          |
|    | Yotvata 6       |              | RT1438   | C              | 3770 $\pm$ 50  | 2290–2060           | 2175 |                            |
| 32 | J. Queisa (J24) | Habitation   | SMU804   | C              | 5770 $\pm$ 40  | 4690–4550           | 4620 | Henry 1995                 |
| 33 | Samar           | Kite         | RT2716   | C              | 4080 $\pm$ 25  | 2840–2500           | 2670 | Avner et al. 1994          |
|    | Samar           |              | Pta3627  | C              | 3940 $\pm$ 60  | 2560–2310           | 2435 | Holzer and Avner in press  |
|    | Samar           |              | RT2715   | C              | 3775 $\pm$ 40  | 2290–2130           | 2210 |                            |
| 34 | Timna S27       | Copper mine  | Bonn2538 | C              | 7680 $\pm$ 120 | 6650–6410           | 6530 | Rothenberg, unpublished    |
| 35 | Timna 39        | Habitation   | OxA7632  | C              | 5485 $\pm$ 45  | 4430–4250           | 4340 | Rothenberg and Merkel 1998 |
| 36 | Timna S28/2     | Copper mine  | Bonn2363 | C              | 4000 $\pm$ 90  | 2840–2340           | 2590 | Conrad and Rothenberg 1980 |
|    | Timna S28       |              | Bonn2632 | C              | 3890 $\pm$ 70  | 2470–2230           | 2350 |                            |
| 37 | Timna 30        | Copper smelt | Ham215   | C              | 4020 $\pm$ 100 | 2900–2350           | 2625 | Rothenberg 1990            |
| 38 | Shehoret hill   | Copper smelt | RT591    | C              | 4010 $\pm$ 150 | 2900–2300           | 2600 | Avner et al. 1994          |
| 39 | Eilat IV/16     | Tumuli       | RT989    | C              | 6470 $\pm$ 80  | 5490–5320           | 5405 | Avner et al. 1994          |
|    | Eilat IV/3      |              | RT926A   | C              | 6340 $\pm$ 60  | 5470–5260           | 5365 |                            |
|    | Eilat V/27      |              | RT1215   | C              | 6400 $\pm$ 210 | 5650–5050           | 5350 |                            |

Table 2 Calibrated  $^{14}\text{C}$  dates of Late Neolithic to Early Bronze-IV sites in the deserts of Southern Jordan, the Negev, and Sinai. The sites are arranged in geographical order from north to south. The references for the  $^{14}\text{C}$  dates of each site are presented in the last column, next to the first date of the respective site.<sup>a</sup> (*Continued*)

| No | Site name   | Type of site | Lab No. | M <sup>b</sup> | years (BP)     | cal BC <sup>c</sup> | Mean | Reference |
|----|-------------|--------------|---------|----------------|----------------|---------------------|------|-----------|
|    | Eilat V/28  |              | RT1216  | C              | 6060 $\pm$ 65  | 5050–4850           | 4950 |           |
|    | Eilat V/22  |              | RT1214  | C              | 5980 $\pm$ 130 | 5050–4710           | 4880 |           |
|    | Eilat V//18 |              | RT1212  | C              | 5930 $\pm$ 80  | 4910–4710           | 4810 |           |
|    | Eilat IV/8  |              | RT1210  | W              | 5710 $\pm$ 75  | 4680–4450           | 4565 |           |

<sup>a</sup> Sites where excavators are not mentioned in the table are: Har Dimon – G. Tal; Mushabi 103 – Sass & Klemer; Hagamal Site – Rosen; Feidan 8 – Adams; Feidan 4 – Adams & Genz, Adams & Levy; Hamra Ifdan – Adams; Baqa a Hatiye – Fritz; 'Uvda 4 – Eisenberg; 'Uvda 7 – Saas & Goren; 'Uvda 16 – Yogeve; 'Uvda 17 – Beit Arie; 'Uvda 9 – Amiran, Arnon, Ilan and Avner; Yotvata Hill – Meshel; Yotvata 6 – Meshel & Sass; Ras el Naqeb – Avner; Hashem el Taref XVII – Avner; Hashem el Taref 650, 317, 317a, W. Kyke 649. W. Malha 332, Themel 699 – Kosloff; ein Abu Rugum – Sass; W. Watir – Avner; 'Ein Um Ahmed – Goren; W. Zalaqa – Avner; W. Dab'yia – Goren, Avner; Serabit el Khadim – Beit Arie; J. 'Adeideh – Goren; Abu Khalil – Goren; Sinai 1130/3 – Beit Arie; Sheikh 'Awad – Beit Arie.

<sup>b</sup> The abbreviation are: M – material; C – charcoal; GC – goat coprolite; OE – ostrich eggs; W – wood; SS – sea shell

<sup>c</sup> Calibration based on OxCal 3.4 (Bronk Ramsey, 2000). 1 $\sigma$  confidence is used. Mean values were calculated for the construction of the histogram.

<sup>d</sup> Uvda 14 is the same as N. 'Issaron. For additional 22 dates see Figure 3.