

## Akhenaten, Eclipses and the Chronology of the Egyptian XVIII Dynasty

Paul Dunbavin (2006)

**Summary:** According to the conventional chronology for the Egyptian XVIII Dynasty, this period coincides with a statistically rare concentration of total eclipses visible from Egypt. In addition, a boundary stela from Amarna links the building of the city to a series of 'evil omens'. This paper considers whether these omens could have been the eclipses; and discusses the consequences both for the conventional chronology of this period and the evidence for changes to the Earth's rotation.

Many would view the Eighteenth Dynasty pharaoh Akhenaten as a great religious reformer, the first monotheist; others might prefer to see him as a tyrant. It is known that in the first year of his reign, Amenhotep IV, as he then was, abandoned the old Egyptian gods and declared that henceforth he would worship solely the Aten: an aspect of the sun-disk. In the fourth year of his reign, he renamed himself *Akhenaten*, or 'Spirit of the Aten' and proclaimed Atenism as the official state religion, shunning Amun and the all the old gods. What is most surprising is that the Egyptian people went along with this heresy and indeed, it would persist into the reign of his successor Tutankhamun.

Towards the end of the reign of his father Amenhotep III, the young Amenhotep IV was installed as co-regent. A record of the ceremony has come down to us in a temple inscription at Karnak, dedicated to the god *Re-Horakhti* – Re-in-the-Horizon. The inscription describes the new deity as: '*Re Horakhti who rejoices on the horizon in his name of Solar light (Shu) which appears in the Solar Globe (Aten)*'.<sup>1</sup>

In the Dream Stela, positioned between the paws of the Sphinx, Akhenaten's grandfather Thutmose IV had claimed that *Horemakhet* 'Horus-in-the-Horizon' had spoken to him in a dream; he would make him king, if he would only remove the sand from around his paws! That this was the Aten is further confirmed by a commemorative scarab in the British Museum, with an inscription that he had led his army to subjugate the land of the Mitanni (Syria and north Palestine) 'with Aten before him'.<sup>2</sup> Here we glimpse an early form of the Atenist religion that Akhenaten would later extend.



In the fifth year of his reign, Akhenaten relocated his entire court to a new capital city at Tel-el-Amarna on the eastern bank of the Nile. He named his new city *Akhetaten*, "horizon of the Aten". The location was significant because at Amarna, the sun could be seen to rise in a cleft in the eastern mountains, which does look rather like the *Akhet* hieroglyph (left), depicting the sun rising (or setting) between two peaks. An inscription on a boundary stela, declares that the site was chosen by the Sun God himself, '*in the place which the Aten enclosed on the eastern bank for His own self*'.<sup>3</sup> A boundary stela dated conclusively to year 5 of Akhenaten, gives us again the various titles of the new deity: '*...Rē-Herakhte, rejoicing in the Horizon in his aspect of the Light which is in the sun-disk...*'<sup>4</sup> Before Akhenaten the Aten was regarded as simply the disk in which the Sun God resided, in various forms, such as Re or

Shu; after Akhenaten the sun-disk absorbed all these aspects and became itself the god.

Akhenaten's heresy was abandoned after only eighteen years by his successor, the boy-king Tutankhaten, who changed his name to Tutankhamun and returned the royal court to Thebes. Horemheb would later deface Akhenaten's statues and inscriptions; and his name would be struck from later king lists. The city of Akhetaten was demolished. Of the Aten, we subsequently hear no more.

A conventional dating of Akhenaten's reign (omitting co-regencies), is as follows:

Thutmose IV	1392-1382 BC	10 years
Amenhotep III	1382-1352 BC	30 years
Amenhotep IV-Akhenaten	1352-1336 BC	18 years
Tutankhamun	1336-1327 BC	9 years

The precise dates are a subject of ongoing debate. The length of Akhenaten's reign is also uncertain, as it is not known whether he was co-regent with Smenkhkare for the last two years of his reign; or whether this little-known king reigned alone.

The present author has researched the occurrence of eclipses across Egypt during this period and it may be seen that, on all generally accepted criteria, Egypt experienced an unusually high incidence of total eclipses during this dynasty.<sup>5</sup>

If the diurnal rotation were constant, then the location from which historical eclipses were viewed could be retro calculated with certainty. However, the tidal retardation of the rotation means that the eclipse track will fall further east than expected. Astronomers refer to this small discrepancy (TDT - UT) as  $\Delta T$  (delta-T). The cumulative discrepancy between clock and calendar due to this slowing has been calculated at about half a day since 1500 BC.<sup>6</sup> Therefore, any eclipse track of this era would actually fall on the opposite side of the world unless appropriate adjustment is made for  $\Delta T$ . There remains a range of statistical uncertainty in the value of  $\Delta T$  (about 15 minutes) and to fix the time with more certainty the astronomers would need a historically dateable report of an eclipse. However, the Egyptologists would like to fix historical events precisely by a reference to the astronomical event. Inevitably this becomes something of a circular argument.

The currently accepted values for  $\Delta T$  show that a total eclipse crossed the Nile on *August 15, 1352, BC* ( $\Delta T=35701.4$ ) and would have been total at Amarna.<sup>7</sup> According to the conventional chronology, this was the first year of Amenhotep IV/ Akhenaten.

However, on *May 14, 1338, BC* ( $\Delta T=35352.8$ ) another long eclipse crossed the upper Nile at Aswan and may just have been total at Thebes.<sup>8</sup> At just under seven minutes it came close to the maximum magnitude possible for a total eclipse. The conventional chronology puts this towards the end of Akhenaten's reign. Only four years later, on *December 30, 1332, BC* ( $\Delta T=35185.3$ ) another eclipse was visible from Egypt.<sup>9</sup> However, this was a dawn eclipse. From a location midway between Amarna and Cairo, it would have risen only partially eclipsed, and totality occurred just above the horizon. According to the conventional chronology, this was the fourth year of Tutankhamun's reign.

As this was a period when the sun-disk was the sole deity throughout Egypt, we should ask *why* these eclipses were not clearly recorded in inscriptions. During the Amarna period, we find numerous illustrations from the city of Akhetaten. These depict the sun-disk casting its rays down upon the favoured king and his family as they worshipped the Aten.

The apparent absence of any reference to these eclipses within contemporary inscriptions therefore raises the possibility that the conventional chronology is incorrect. This is a possibility that will no doubt appeal to the ultra-revisionists; and a question that conventional Egyptologists cannot simply ignore! For example, according to the new chronology promoted by David Rohl, the reign of Akhenaten would fall some 377 years later, between 1022 BC and 1006 BC.<sup>10</sup> The eclipse dates of course, remain unchanged, and on Rohl's analysis, they occurred during the Second Intermediate or 'Hyksos' period – a time from which little record of anything has survived.

Alternatively, the apparent lack of any references to the eclipses raises the possibility that the Atenist heresy could itself have been inspired by this series of prominent eclipses; and that Egyptologists just do not recognise the references.

Neither is it entirely clear what we should be looking for. Egyptologists do not know what the hieroglyph for an eclipse should look like. In a series of papers on the *Eclipse Chasers* website, the Egyptian astronomer Aymen Mohamed Ibrahim has proposed some interesting ideas.<sup>11</sup> He argues that the symbol *Akhet*, long thought to mean 'horizon' may sometimes stand for 'solar eclipse'; or more literally he believes '*Akhet net Pet*' to stand for 'horizon of heaven': as if the sun sets and rises on a heavenly horizon during an eclipse.<sup>12</sup> Another of his theories relates to the Sphinx: the Sphinx was the Egyptian lord of solar eclipses and its name '*Horemakhet*' would mean literally: 'Hor in the eclipse'. On this interpretation, the city of '*Akhetaten*' would therefore stand for 'eclipse of the sun disk'; perhaps telling us that it marks the place where a solar eclipse was viewed.

Another of Ibrahim's conclusions relate to the eclipse of June 24, 1312, BC ( $\Delta T=34695.4$ ) which passed over Anatolia. This may have been recorded in a Hittite text and the synchronisms provided by the Amarna letters have therefore enabled him to propose a revised chronology. However, on his interpretation, it is the eclipse of 1352 BC that fell during year 4 of Akhenaten and therefore inspired the building of the city.<sup>13</sup>

The eclipse of 1312 BC is certainly pertinent to these investigations. It seems it occurred during the preparations for departure of the Hittite army from its winter camp. The precise site of this camp cannot be determined, and neither can the date of departure, but Ibrahim convincingly argues that the 1312 BC eclipse is the only one that fits with the conventional dating – although he agrees that June might be rather late for the army to commence its campaigns.

The present author is sceptical of any major revisions to the standard Egyptian chronology. However, one possibility is that the conventional chronology could be just a few years in error; and only a small difference in the calculated value of  $\Delta T$  (well within the statistical margin of error) would suffice to make the dawn eclipse of 1332 BC total at Amarna. In my own recent book *Under Ancient Skies*, I wondered if Akhenaten himself could have been there to see it. Alternatively, it might have been reports of the blackened sun rising in the gap in the mountains which led Akhenaten to believe that Amarna was the site chosen by the god himself?

It is also possible, as we have seen above, that if the dawn eclipse of 1332 BC fell in year 4 of Akhenaten's reign, then the king could already have experienced two previous total eclipses during his lifetime. Most people

will be fortunate to see even one eclipse unless they chase them around the world! This common experience by the Egyptian people would at least explain why Akhenaten thought he was the chosen one; and also, why the priests at first went along with his heresy.

If Egyptologists could agree upon an unambiguous inscription that records one of these eclipses then not only would it fix the Egyptian chronology, but it would also establish the stability of the Earth's rotation back to the fourteenth century BC.

A boundary stela from the city of Akhetaten holds a fragmentary proclamation by Akhenaten, which Egyptologist Cyril Aldred translated as follows:

*...as Father Aten lived, something had been said which was more evil than that which the king had heard in his Year 4...more evil than what he had heard in his year 1...more evil than what King (Amenhotep III?) had heard...more evil than what king Tuthmosis IV had heard...<sup>14</sup>*

In *Under Ancient Skies*, I left unanswered the question of what king Thutmose IV might have heard? Perhaps it too, was a report of a prominent eclipse – but I was unable to find one that would fit the requirements during the conventional dating of his reign.

According to the scarab inscription, Thutmose IV led his army east into the land of the Mitanni with the Aten before him. If this is merely the rising sun, then what is so remarkable? The sun rises every day in the East. Could this be another reference to a dawn eclipse? There is one that might fit this requirement – but this would require a deviation from the standard calculation of  $\Delta T$ .

A retro calculation using the accepted value for  $\Delta T$  of 36295.9 seconds shows a dawn total eclipse occurring in Iran on *May 3 1375BC*, just southeast of modern Tehran.<sup>15</sup> However if we instead posit a  $\Delta T$  of 33000 seconds then its track falls further west in Northern Syria – the land of the Mitanni. The next question is: what effect would this revised value for  $\Delta T$  have upon the other eclipses discussed above?

It may be seen that if the tracks of the other eclipses are adjusted in proportion, then the track of the 1352 BC total eclipse would cross the Nile further south near Aswan. The eclipse of 1338 BC would have been seen much further north and should have been total at Thebes. The 'dawn' eclipse of 1332 BC, however, now falls over the Libyan coast, and the narrow path of totality crosses the Nile further south, indeed not far from the point where the 1352 BC eclipse also crossed the river. So, we may see that all three eclipses would remain visible from Egypt during the Amarna period, even on this revised scenario.

The track of the total eclipse of 1312 BC, being more east-to-west is scarcely affected, and is shifted only slightly further north, but closer to the Hittite capital of Boghazkoy. Since we do not know the precise location of the Hittite winter camp, this cannot harm the hypotheses discussed in any way. An element of statistical uncertainty remains in all of these retro calculations. There is little point in being pedantic as to the precise tracks, until such time as an inscription is found that supplies both an exact location and time of day for one of these eclipses.

So, on these astronomical arguments it is now possible to suggest a chronology for the Egyptian XVIII Dynasty. Consider:

- If the omen of year 4 of Akhenaten was the last of 4 eclipses, then it must have been that of 1332 BC.
- Therefore year 1 of Akhenaten was four years earlier in 1336 BC.
- Therefore, the omen of year 1 was a report of the 1338 BC eclipse.
- The year 1352 BC falls within the long reign of Amenhotep III
- Amenhotep III reigned between approximately 1366 BC and 1336 BC
- The year 1375 BC falls shortly before the reign of Thutmose IV (as the eclipse prophesied his accession).
- Thutmose IV reigned between 1374 BC and 1366 BC

However, since we can be confident that the eclipse of 9 May 1012 BC was viewed at sunset in Ugarit on the Syrian coast; this implies that the standard value of  $\Delta T$  holds for that date. This eclipse was discussed by Rohl in support of his new chronology;<sup>16</sup> and the present author finds little cause to disagree with this identification.<sup>17</sup> This would suggest that the postulated disturbance of the Earth's rotation must have occurred *sometime between* 1312 BC and 1012 BC, most likely during the 'dark age' that has long been referred-to as the Third Intermediate Period. It suggests that some event may have altered the length of day slightly.

For adherents of Velikovsky, who are accustomed to the idea of catastrophic upheavals, the possibility that a glitch in the diurnal rotation may have made the earth rotate about an hour faster over a period of 300 years, will not seem very significant. However, even this modest supposition would not be welcomed by conventional scholarship. So, upon this subject I shall speculate no further beyond the evidence presented above, for it relies crucially upon the identification of an eclipse that may have been seen by Thutmose IV; and upon a correct interpretation of the extraordinary events of the Amarna period.

**\*\* 2020 Additional Note**

In parallel with my own eclipse investigations: 1998-2005 for *Under Ancient Skies* the following paper by William Murray came out in 2003. It represents genuine parallel thinking on the same subject:

[www.egyptologyforum.org/EMP/DAPE.pdf](http://www.egyptologyforum.org/EMP/DAPE.pdf)

**Citation footnote added 2021**

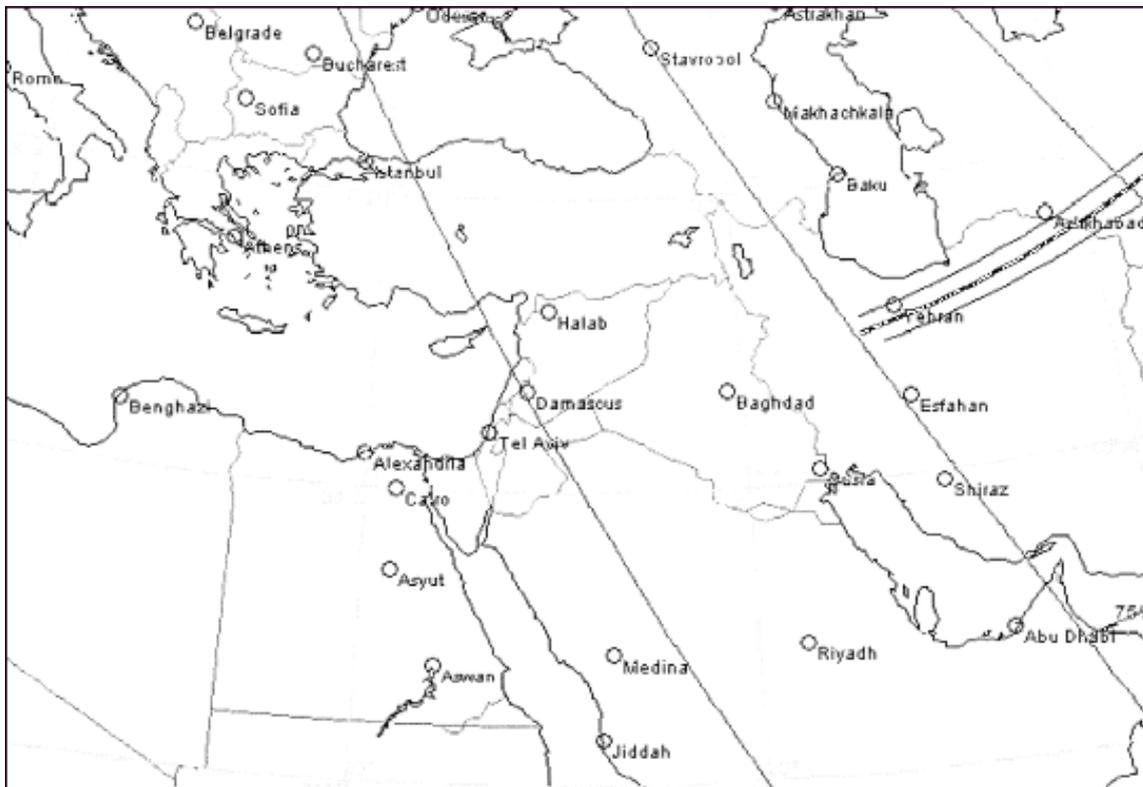
The above text is unchanged as the article was left in abeyance in 2006, other than formatting for publication in *Prehistory Papers* in 2020:

Dunbavin, Paul (2020) Akhenaten and Eclipses, in *Prehistory Papers*, pp 85-97, Third Millennium Publishing, Beverley, ISBN: 978-0-9525029-4-4 <https://www.third-millennium.co.uk/features>

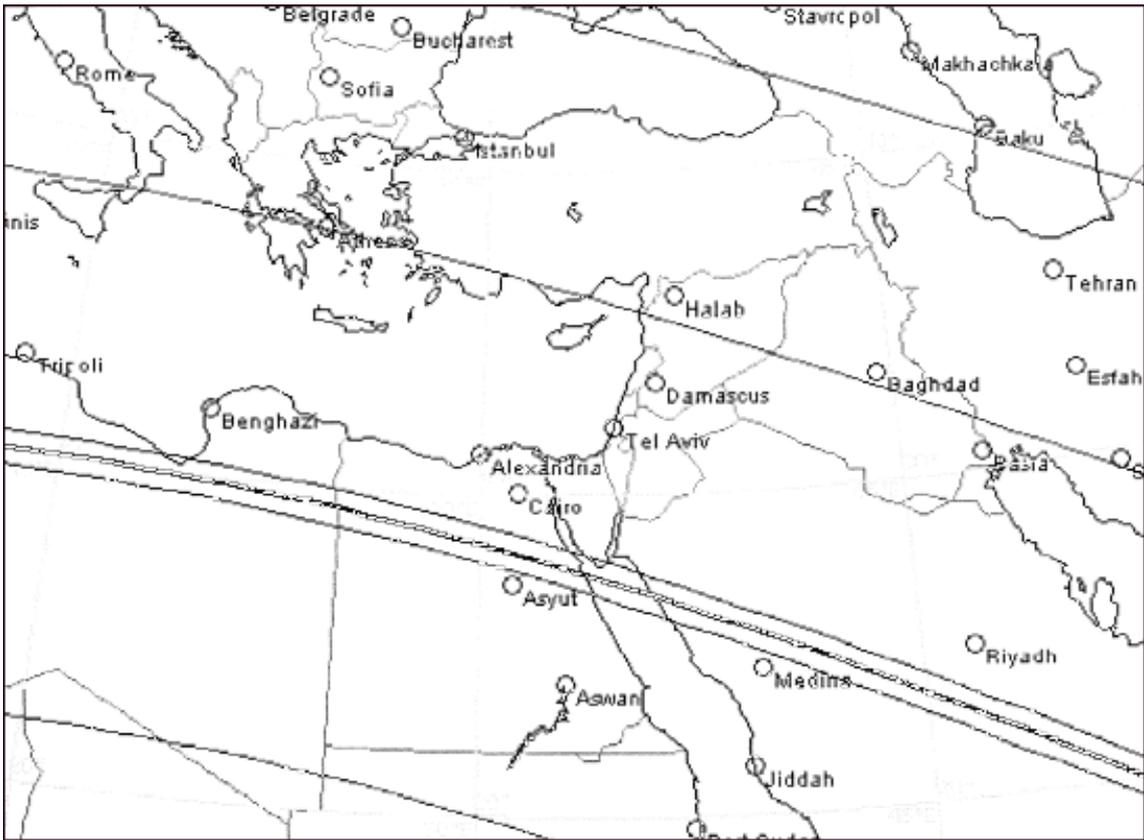
**Following Pages:**

The eclipse tracks as discussed above, firstly showing the 'standard' delta-T followed by an experimental value of 33000 seconds that gives a better fit to the historical references.

**Eclipse tracks with standard delta-T**



1375 BC 03 May



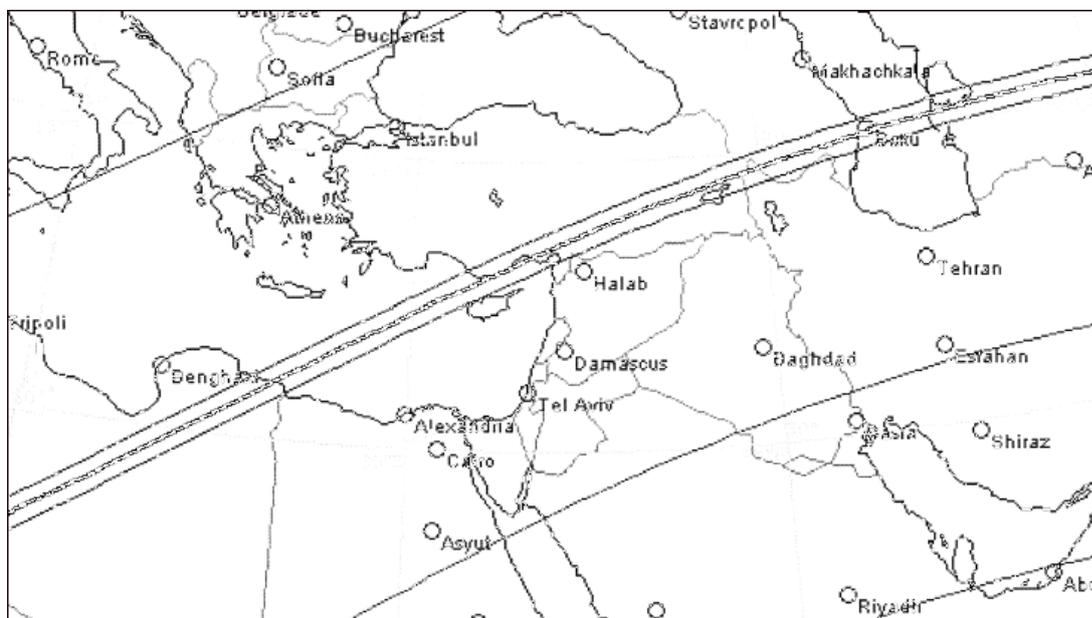
1352 BC 15 August



1338 BC 14 May

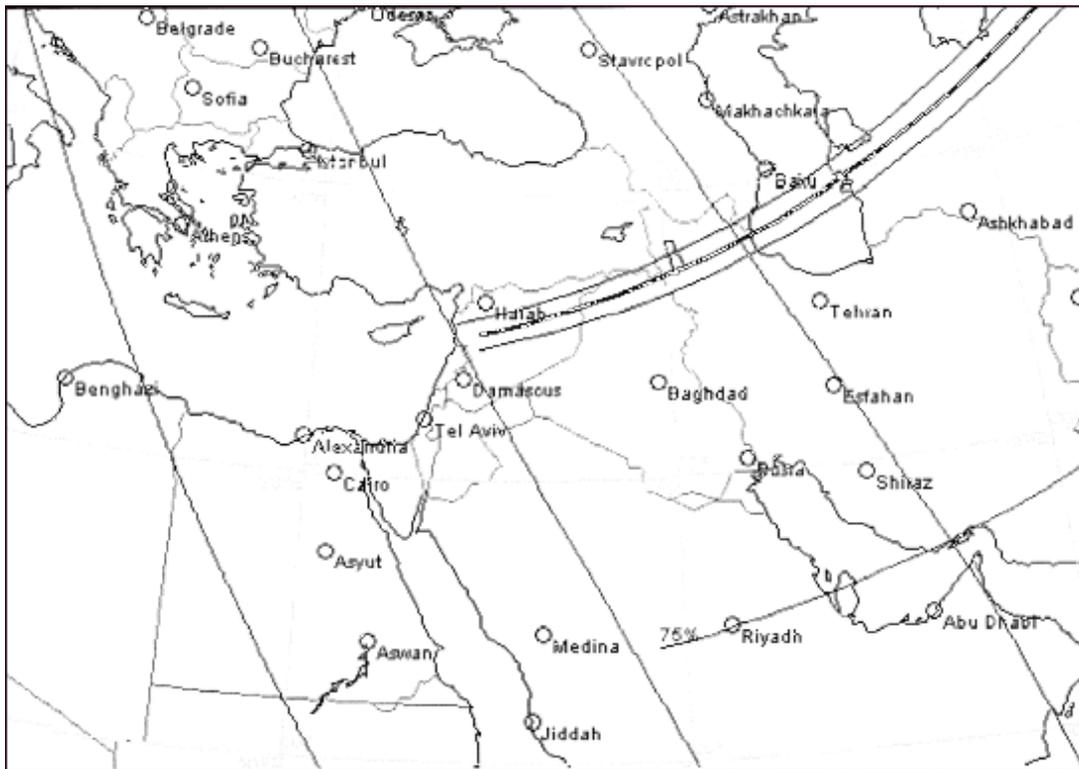


1332 BC 30 December

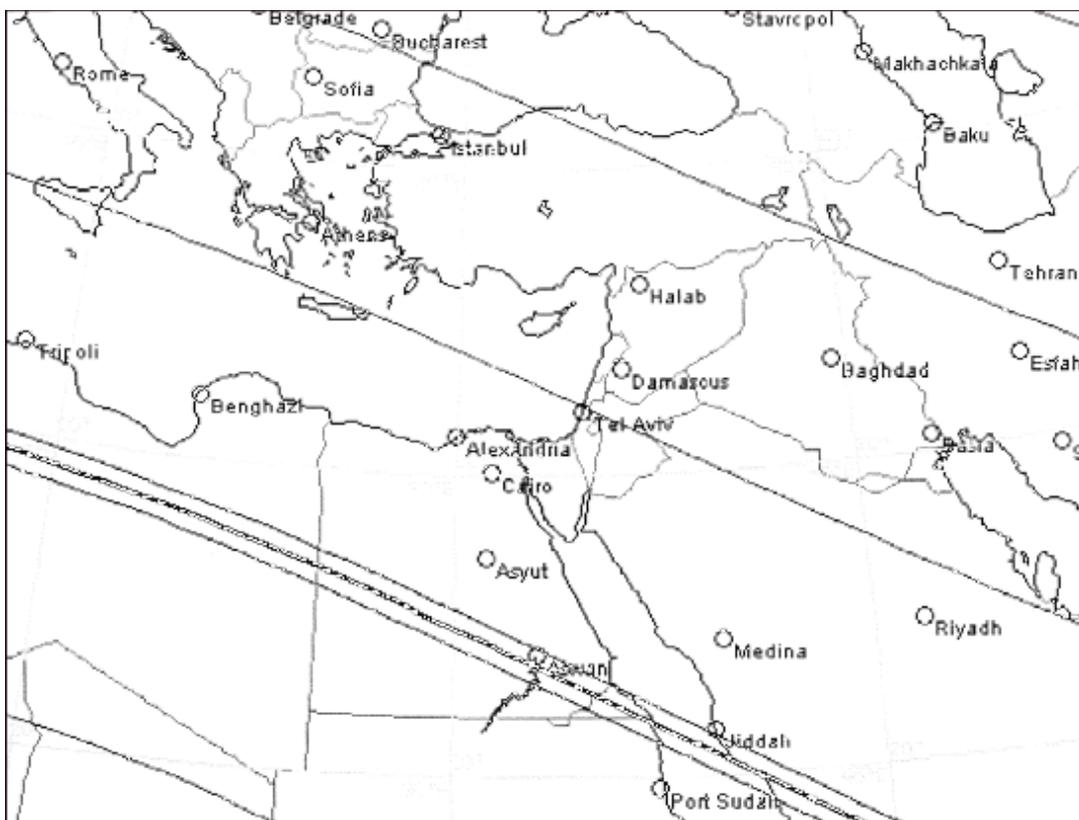


1312 BC 24 January

Eclipse tracks using an experimental delta-T of 33000 seconds



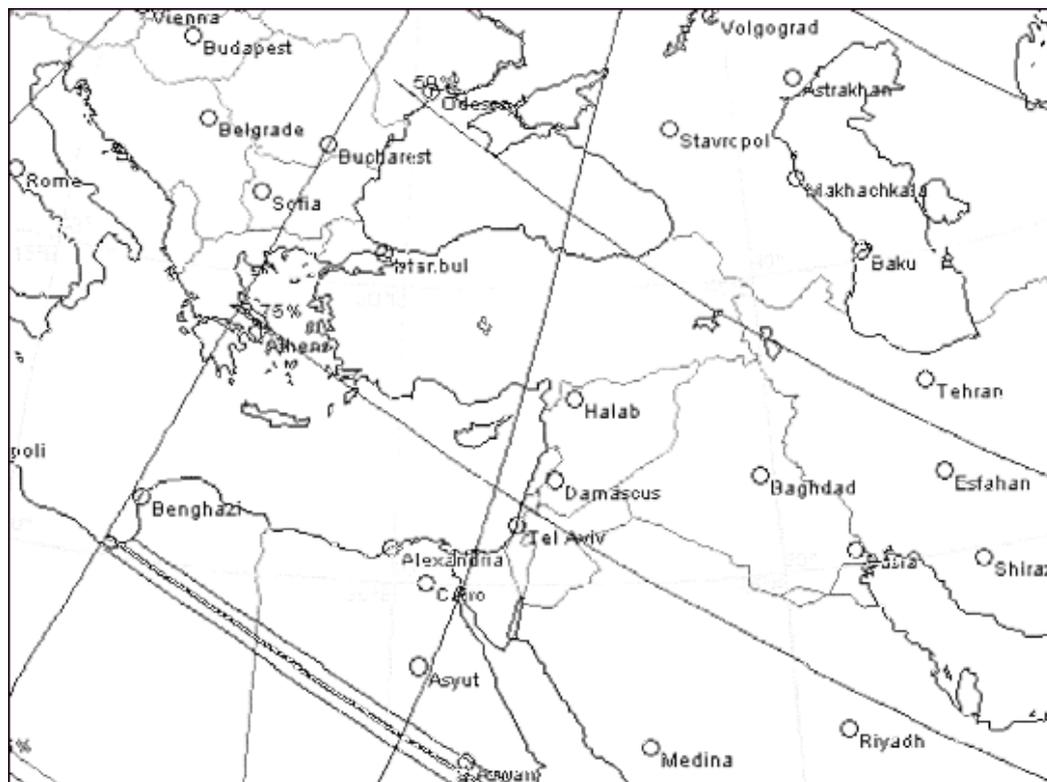
1375 BC 3 May



1352 BC 15 August



1338 BC 14 May



1332 BC 30 December



1312 BC 24 June

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## Notes and References

- <sup>1</sup> Translation given by Desroches-Noblecourt, C., *Tutankhamen*, Penguin, Harmondsworth (1965), p 92
- <sup>2</sup> *Ibid*, p 26
- <sup>3</sup> Aldred, C., *Akhenaten, King of Egypt*, London (1988), p 49
- <sup>4</sup> *Ibid*, p 47
- <sup>5</sup> On average, any location on the earth's surface should experience an eclipse about every 375 years. See: Meeus, J., *J. Brit. Astr. Assn*, 92, 124-6 (1982)
- <sup>6</sup> Stephenson F.R. and Holden M.A. *Atlas of Historical Eclipse maps*, Cambridge University press (1986) introduction, iix
- <sup>7</sup> Retro-calculations based on Skymap Pro 6
- <sup>8</sup> Retro-calculations based on Skymap Pro 6
- <sup>9</sup> Retro-calculations based on Skymap Pro 6
- <sup>10</sup> Rohl, D., *A Test of Time*, Century, London (1995), P 241
- <sup>11</sup> <http://www.eclipse-chasers.com/egygod1.htm>
- <sup>12</sup> Aymen Ibrahim, *Egyptian Cosmology, Part VII, Karnak the Horizon of Heaven*, (2000): <http://members.aol.com/KCStarguy/blacksun/egyptianeclipse.htm>
- <sup>13</sup> <http://eclipse-chasers.com/egypt4.htm>
- <sup>14</sup> Aldred, C., *Akhenaten, King of Egypt*, London (1988), p 50
- <sup>15</sup> Retro-calculations based on Skymap Pro 6
- <sup>16</sup> Rohl, D., *A Test of Time*, Century, London (1995),
- <sup>17</sup> Dunbavin, P. *Under Ancient Skies: Ancient Astronomy and Terrestrial Catastrophism*, Third Millennium Publishing, Nottingham (2005), p 133.