

The last total solar eclipse of the millennium in Turkey

A. Özgüç, T. Ataç, and L. Altas

Kandilli Observatory, Boğaziçi University, Çengelköy, İstanbul, Turkey

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Abstract. The last total solar eclipse of the millennium will be observed from Turkey which bridges two continents and has been the cradle of so many past civilizations. Wouldn't you like to witness this magnificent event in the mystic ambiance of central Anatolia which offers its guests Turkish hospitality and a lot of historical examples of paganism, Christianity and Islam. Among the countries from which the eclipse will be visible, Turkey seems to be one of the most suitable countries in terms of its climate and observational facilities. Kandilli Observatory and Earthquake Research Institute has arranged field-work on the eclipse path to determine the suitable points for the observations. The shadow of the moon will be first seen from the Black Sea coast at 14:20 L.T. It will then pass through central Anatolia and will leave Turkey from south-east at 14:42 L.T.

Key words: The Sun – solar eclipse

1. Site inspections

I would like to present you the site inspections, which we have done during the last two years around Turkey for the last total solar eclipse of the millennium. The aim of this talk is to inform you about the situation in Turkey and what you will find when you come to Turkey.

Our first adventure began in August 1997 along the eclipse line through Turkey. As you know, the eclipse totality line crosses Turkey diagonally (see Figures 1 & 2). We started from the coast of Black Sea; small town called CİDE, where the totality reaches to the land after Romania. Although, it has very beautiful beaches along the coast, but unfortunately cloudiness is always in high degree. Because the mountains situate parallel to the coast and the clouds coming from the north can not pass over them. Our first decision was to omit the coast of Black Sea as an observation area.

After going beyond those mountains we reached to KASTAMONU, and AMASYA cities. We chose town OSMANCIK that is on the totality line. Just near the village there is a very suitable area where the wrestling competitions are organised. Well surrounded by wire fence. Electricity, toilets are available.

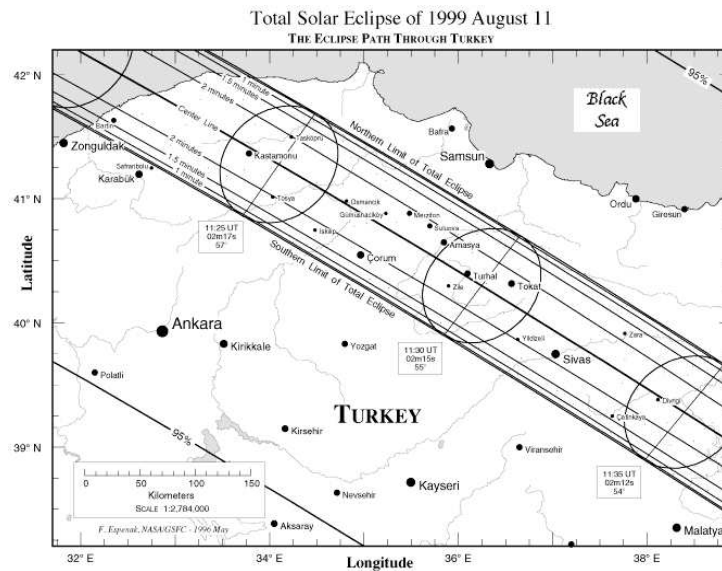


Figure 1. The path of totality across the west part Turkey (Espenak and Anderson, 1998).

Meteorological values are moderate for OSMANCIK. But TOKAT the neighbour city is located just on the path of the fronts, which come from the Black Sea. Therefore cloudiness is changing very fast. So it is not reliable place to the observations.

Going on our way we reached SIVAS where it was raining during August 11, 1997. But in SIVAS seeing conditions are very well and no scattered light. We have chosen three places in and around SIVAS. One in the university campus, in and around the football field. Coordinates of these areas can be obtained from our web page (http://www.boun.edu.tr/~koeri/eclipse_99). The second place is just on the line of totality EMREKÖY and HAFİK some 10 km far from this point.

ELAZIĞ was the next stop on our way. The city surrounded by the dam lake. It is now a peninsula. Just near the city there is a hill and an old town called HARPUR on it. This hill is almost 200 m higher than the city. It means that the air pollution of the city is under your view of site, you will find dust free, clean sky with no scattered light. This site is chosen for our experiments as well as for three Japanese groups, Dr. Hiei and his team from Mesei University, Dr. Ichimoto and his team from Tokyo Observatory, and Dr. Ueno's team from Kiyoto University. By the way, we are in collaboration with Dr. V. Rušin and his team from Tatranská Lomnica Observatory (Slovakia). The last site inspection was performed with him and with Dr. W. C. Livingston from NSO, Tucson (USA) in August 1998.

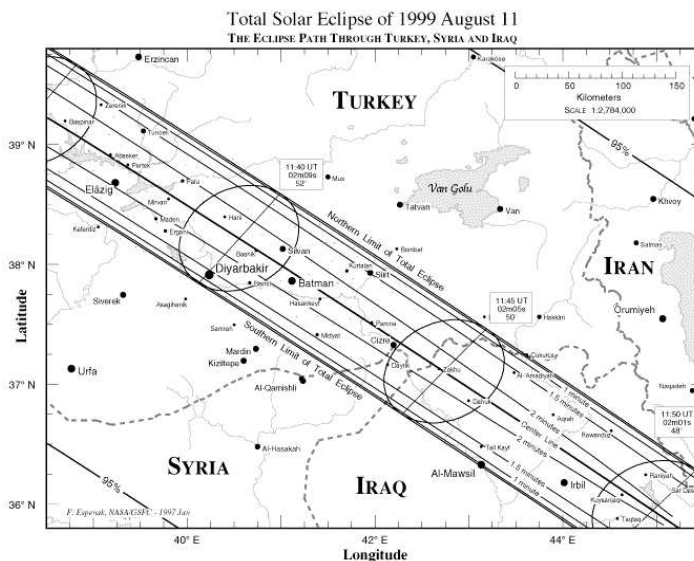


Figure 2. The path of totality over the south-east part of Turkey (Esenak & Anderson, 1997).

If you decide to observe the eclipse near the lake, you will find a place just near the water where the horse race is running. This place is also well protected by wire fence, and all the facilities will be available. All the observational parks we will organise will have guardians by 24 hours. One more place will be organised in ELAZIĞ is the garden of the sugar factory (Figure 8). August is the off season for this factory, so we will use this huge area as an observational park.

DİYARBAKIR is located in a very large plain just near the 1-minute line of totality. You should drive some 55 km to the eastward to reach the village BASNİK which is just on the totality line. The meteorological values for DİYARBAKIR are excellent. We will establish one observational park near BASNİK (now the name is BAĞDERE). J. Anderson co-author of NASA Reference Publication No. 1398, has chosen this place as a campsite.

City of BATMAN was our last stop for the expedition. We do not consider any other place more southern than BATMAN. There is one helicopter port just near the city, in a half-private oil company campus, which is very well preserving. We did those site inspections four times during the last two years. The last one was during the last August. At 11th of August we were in BATMAN. The weather was very bright as all along the eclipse line.

One more point, I would like the mention. If you drive 30 km to the east, there is a really exciting and very ancient place just on the line of totality. HASANKEYF is situated in Mesopotamia Region, which is one of the oldest settling places in the world. The river Tigris is passing in it. On these days a

dam will be built on the river Tigris and this historical place will cover by the dam lake forever. So this may be the last chance to visit that area, and you may observe the totality among the ruins of the many cultures.

2. International meeting

An international meeting will be held in Istanbul on August 13-15, 1999. The preliminary list of topics of this meeting is listed below.

Space/ground-based comparisons

- SOHO coronal results
- YOHKOH coronal results
- TRACE coronal and transition-region results
- Identification of EUV structures with the 530.3nm and 637.5nm lines and white-light corona pictures from the ground-based eclipse
- Determining the run of temperature with the height using EUV and visible lines
- Calibration of stray light on spacecraft
- Waves in the corona
- Theory of coronal heating
- Spacecraft results (if any)
- Eclipse results
- Velocity structure
- Coronal rotation; is it rigid?
- Origin of the solar wind
- Magnetic fields
- The morphology of white-light corona structures and why they must be magnetic in origin
- Connection between EUV loops and radial structures and the white-light corona
- Coronal holes: X-ray vs EUV vs white-light vs He 1083.0nm views
- How rapidly do they evolve?
- What is the source (footpoints) of these fields?
- Polarisation measurements in white-light to get 3D structure
- Prospects for direct Zeeman effect measurements (see IR below)
- Corona-prominences relationship
- Temperature gradients
- Role of magnetic loops
- Observations very close to the limb and the question of magnetic footpoints
- Relation to CMEs and solar-terrestrial effects

Detection of neutral matter in the inner corona

- Status of and question of coronal models

Infrared coronal diagnostics

- Theory and line prediction
- New spectral lines such as Si IX at 3.9 microns
- How certain is our observational line list
- Solar limb darkening in the visible, IR, and mm wavelengths
- Corrections to existing atmospheric models

Eclipse timings and changes of the solar diameter

- Influence of eclipse on Earth environment
- Ionospheric disturbances
- Atmospheric gravity waves
- Shadow waves and scintillation
- Scattering and the moon's shadow
- Circadian and biological upsets
- Eye damage near 2nd and 3rd contact; public awareness
- Ozone variations

Public education regarding eclipses

Plans for future eclipse experiments

References

Espenak, F. and Anderson, J.: 1997, *NASA Reference Publication No. 1398*, Greenbelt