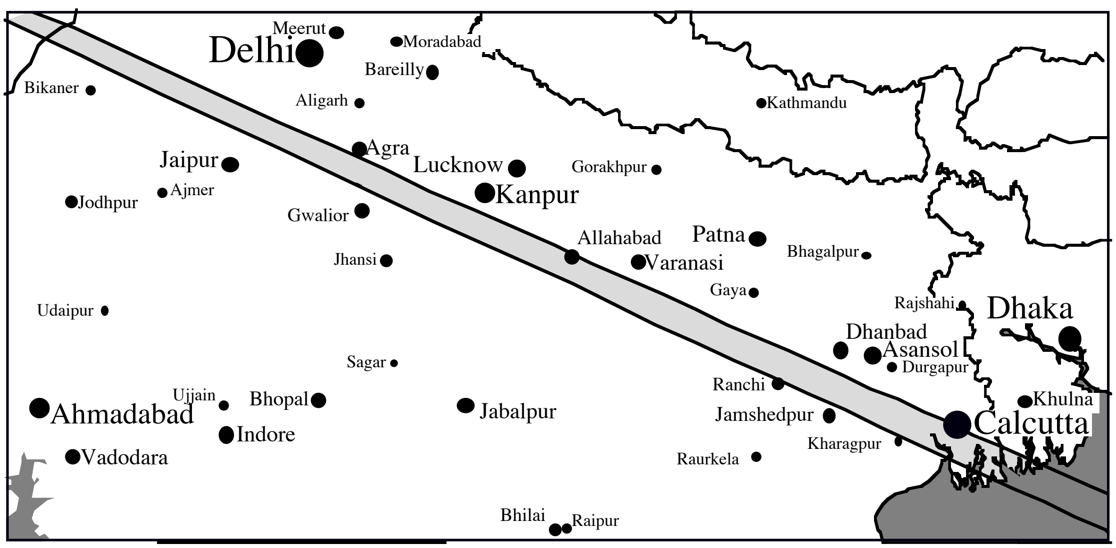
Dear Fellow Eclipse Chasers,

On the morning of October 24, 1995, the city of Tehran, Iraq will awaken to an extended dawn as the Sun peaks over the horizon 97% eclipsed. At nearly the same instant, less than 60 miles to the South, the tip of the Moon's umbral shadow, a cone stretching 369641 km into space, but only 16 km wide at the Earth's surface, will crash down on the desert sand. Here, at Latitude 43° 50.5' N, Longitude 51° 5.8' E a blackened disk, replacing the burning morning orb will hang on the horizon at 02:52:31 U.T., a fleeting ephemeral mirage for a scant 17 seconds. Such will be the onset of the next Total Solar Eclipse.

A partial eclipse across Asia and the South Pacific. Only from a very narrow zone, the *Path of Totality*, will the Sun be completely obscured. Universal Times of mid-eclipse, and the maximum percentage of the Sun's disk covered are indicated in the above figure.

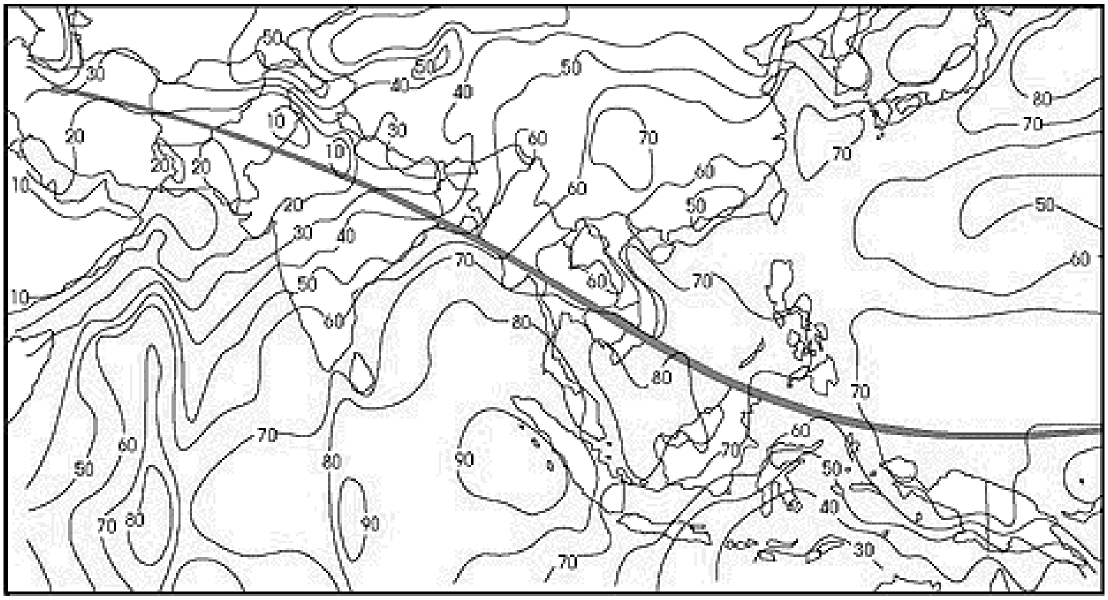
The lunar shadow will swiftly sweep ESE over the towns of Tabas and Birjand, and heeding no terrestrial borders will cross the Afghanistani border at 02:53:56 U.T. Here, as the path of totality widens and the shadow begins to slow, the duration of total phase of the eclipse will increase to 27 seconds. In only 2 minutes and 58 seconds the Moon will paint a dark swath across Afghanistan and the umbra will enter Pakistan. Midway though it's Pakistani trek, at longitude 70°E the duration of totality will lengthen to 40 seconds as the path width doubles from it's size at sunrise.

India will next be privileged to receive this blight on it's landscape, as the shadow moves into Delhi Adiz at 03:00 U.T. With the northern limit of the path of totality nearly grazing the city of Agra at 03:05 U.T., a 99.7% partial eclipse will be witnessed from the grounds of the Taj Mahal. But a miss only counts in horse shoes. The centerline of the path of totality, 22 kilometers to the south, provides observers at this location with 55 seconds of totality as the occulted Solar disk stands 27° above the horizon.



The Path of Totality across India for the Total Solar Eclipse of 24 October 1995. Note the widening of the path as the shadow moves south eastward toward Calcutta.

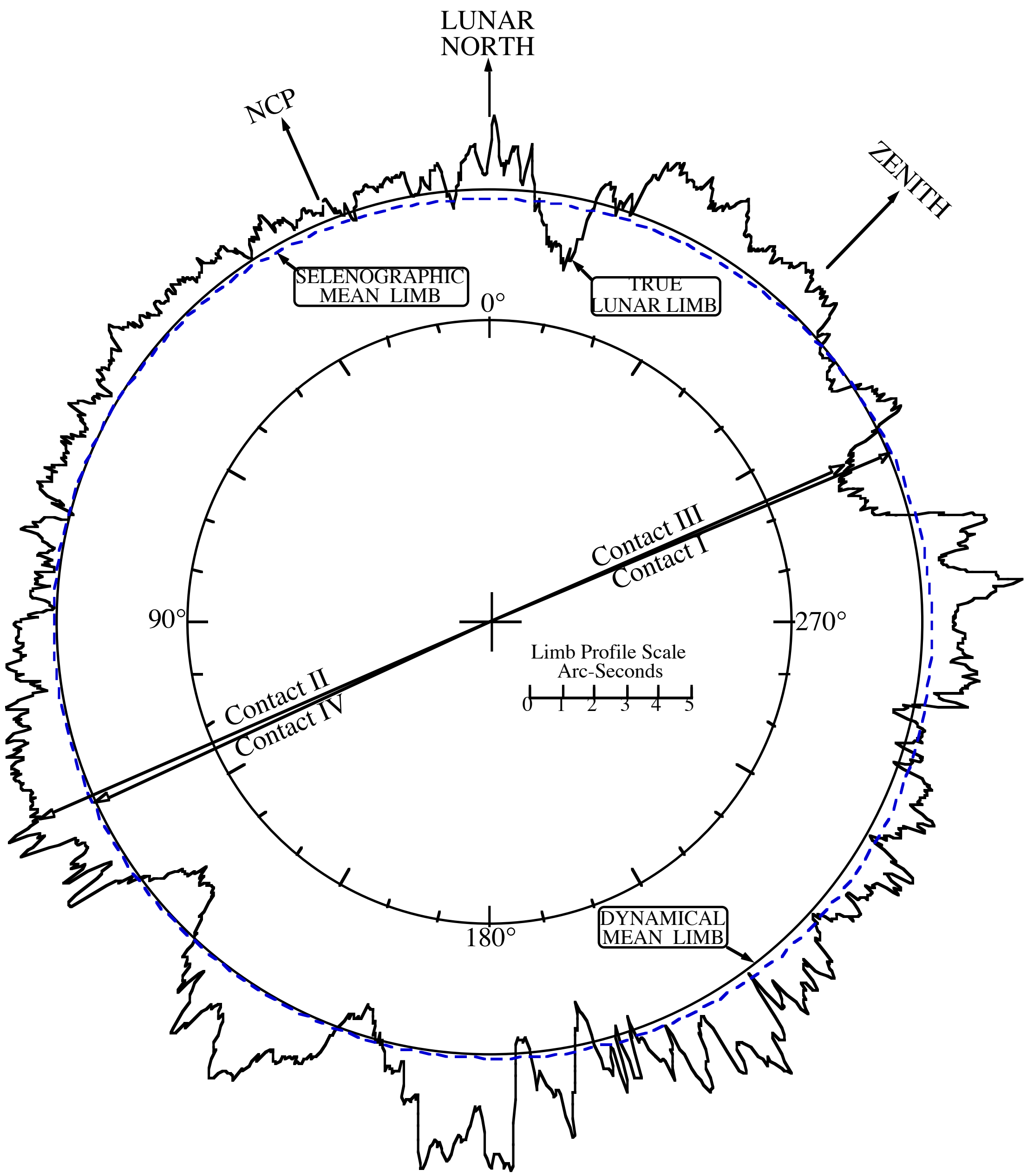
This region to the south of Agra, and stretching south eastward to Allahabad (Latitude 25° 27'N, Longitude 81° 51'E), where totality will be viewed for 31 seconds from the city, and for 1 minute and 3 seconds from centerline at 03:10 U.T., has the highest probability of clear skies across the entire path of totality. From a climatological perspective this general area was identified as a prime location for observing this eclipse more than 20 years ago. Synoptic meteorologic observations, both ground-based and space-borne, over the intervening two decades have quantitatively reinforced this earlier conjecture. It is from this location that our expedition is planning to witness one of natures greatest and most awe inspiring spectacles, a Total Eclipse of the Sun.



"Mean cloud cover (in percent) for October along the eclipse path... extracted from 8 years of satellite data as part of the International Satellite Cloud Climatology Project..." from NASA RP- 1344, 1994.

Even with the odds strongly in our favor, weather can be notoriously fickle (and from personal observation it appears that the propensity of Murphey's striking at eclipse time is inversely proportional to the centerline distance). Planning for mobility is not only wise but essential. Conveniently, this geographic region also provides a suitable infrastructure (roadways, communications, proximity to population centers, etc.), which is amenable to the art of "eclipse chasing" should such an eventuality become necessary. It is for this reason that we have chosen this area to establish our home base for this eclipse. Our hope is to view the eclipse from our established camp. But standing by with overland transportation and armed with detailed topographic maps, GPS topocentration, communication tie-in to weather satellite data, and the ability to dynamically recompute the circumstances of the eclipse for any location we will be ready to stalk the moon's shadow and strike out for clear skies should the eventuality of cloudy skies threaten us.

The circumstances of the eclipse vary continually with location. Given the relatively narrow path width for this eclipse this variation is significant even in the relatively short (approximately 500 kilometer long) area of anticipated "best weather". From our primary site the duration of totality will be 55 seconds with the Sun 27° above the horizon. While the prospects of clear skies may be appear to be marginally better a bit further West this is not of statistical significance. The duration of totality, along this portion of the path, increases as one moves eastward, as does the solar altitude (and hence less the column-density of the atmosphere along the line-of-site). Thus, this site, where mid-totality occurs at 03:05 U.T. represents an optimal compromise between anticipated good weather, eclipse duration, and solar altitude.



The detailed structure of the lunar limb, as seen from centerline at 03:05 U.T. is enhanced scaling radial (local vertical) structures by a factor of 75.

Our location will be slightly off centerline, to allow for asymmetries in the Moon's profile. The mountains and valley's along the Moon's limb, seen in silhouette during the eclipse are responsible for the well-known limb phenomena of Bailey's beads and the detailed features of the second and third contact "diamond ring" effects. They also result in the actual times of second and third contact being shifted from what one would predict if the Moon's limb were smooth. This results in an overall reduction in the length of totality. For an eclipse of relatively short duration this can be significant, and by being located slightly off the dynamical centerline this effect due to the topology of the lunar limb can be minimized.

LOCAL CIRCUMSTANCES - NOMINAL SITE

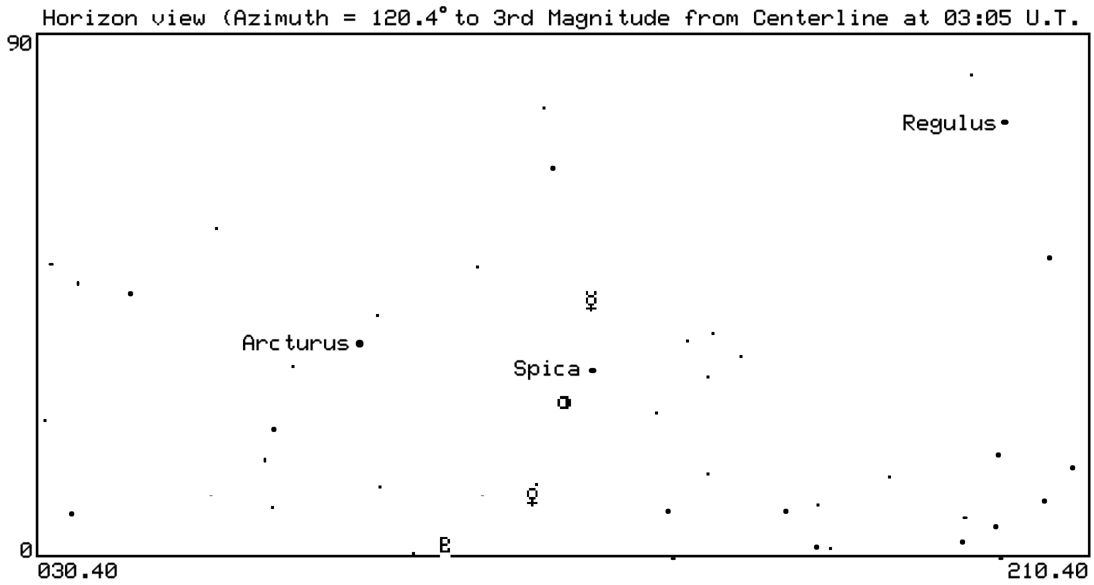
Longitude = 26° 50.2'N, Latitude = 78° 03.15'E

Mid-Eclipse = 03:00:00 U.T.

Contact	Universal Time	Altitude	Description of Event
I	01:55:02	13°	(Start of Partial Ingress Phase)
II	03:04:33	27°	(Start of Totality)
III	03:05:27	27°	(End of Totality)
IV	04:24:26	41°	(End of Partial Egress Phase)

The selenographic chart of the Moon's limb may also be used to get a sense of the local geometry of the eclipse as it will appear in the sky. By orienting the indicated directions toward the local zenith, and the North Celestial Pole, the points of contact on the disk, relative to the horizon can be visualized. The deep depression at selenocentric position angle of ~ 130° should give rise to a third contact diamond ring of approximately 5 seconds in duration (~10% of the duration of totality!). Note that this is oriented toward the nadir, and hence will be at the "bottom" of the disk as viewed from our observing site.

From this location, at Mid-eclipse, the Moon will appear to be a scant 1.23% larger than the Sun - but anything larger than 0% is sufficient to give rise to Totality. At this instant we will be immersed in an elliptical cross-section of the Moon's shadow 42 kilometers wide, and 94 kilometers long, moving at 6037 kilometers per hour. During totality planets and bright stars may be seen against the darkened sky. Spica (V-magnitude =1.0) should be visible nearby to the West. Arcturus (V-magnitude = -0.04), brighter by more than a factor of 2.5, will be seen to the North. Venus, at V-magnitude = -3.3, will be the brightest object (other than the eclipsed sun) in the sky, and should be visible to the naked eye for several minutes before and after totality. Mercury, at V-magnitude = -0.6 will be northwest of the Sun.


Horizon view (Azimuth = 120.4° to 3rd Magnitude from Centerline at 03:05 U.T.
90
Regulus
Arcturus
Spica
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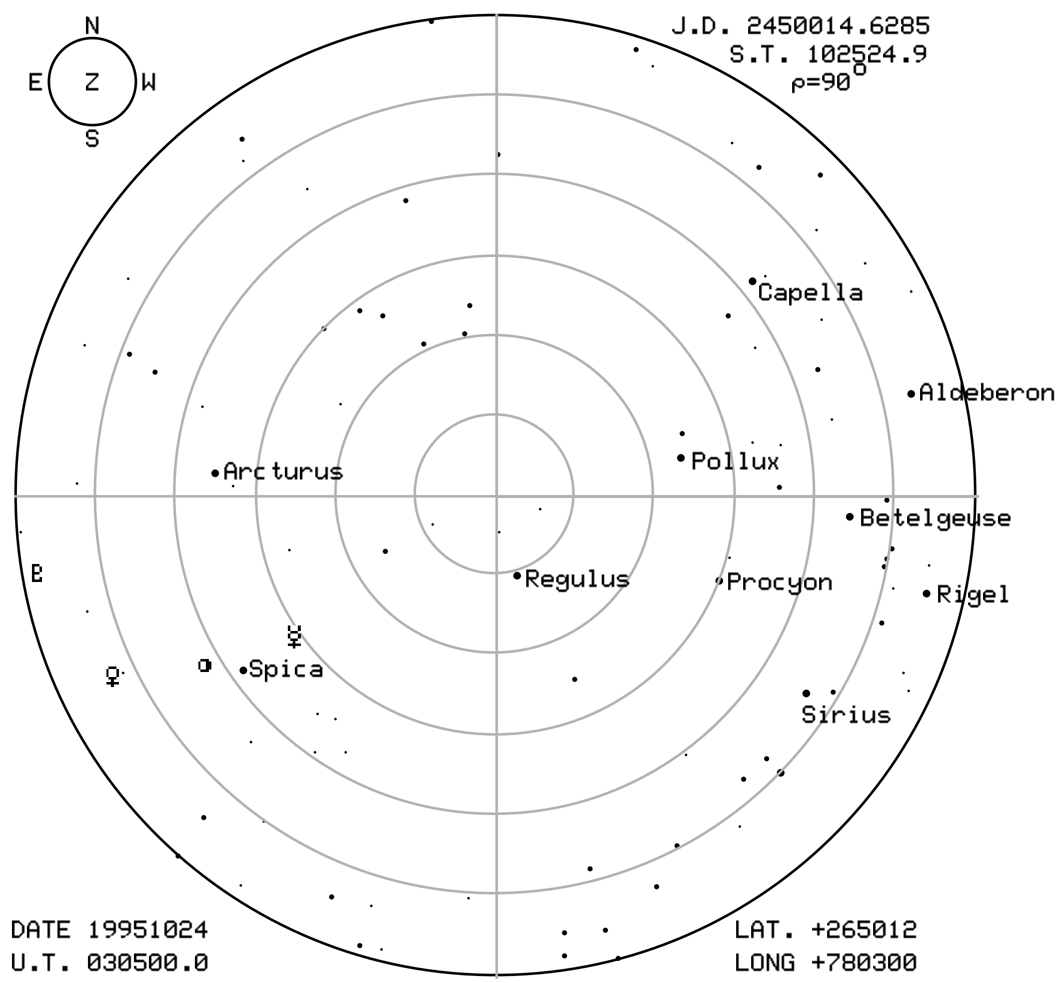
210.40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S.T. 102524.9
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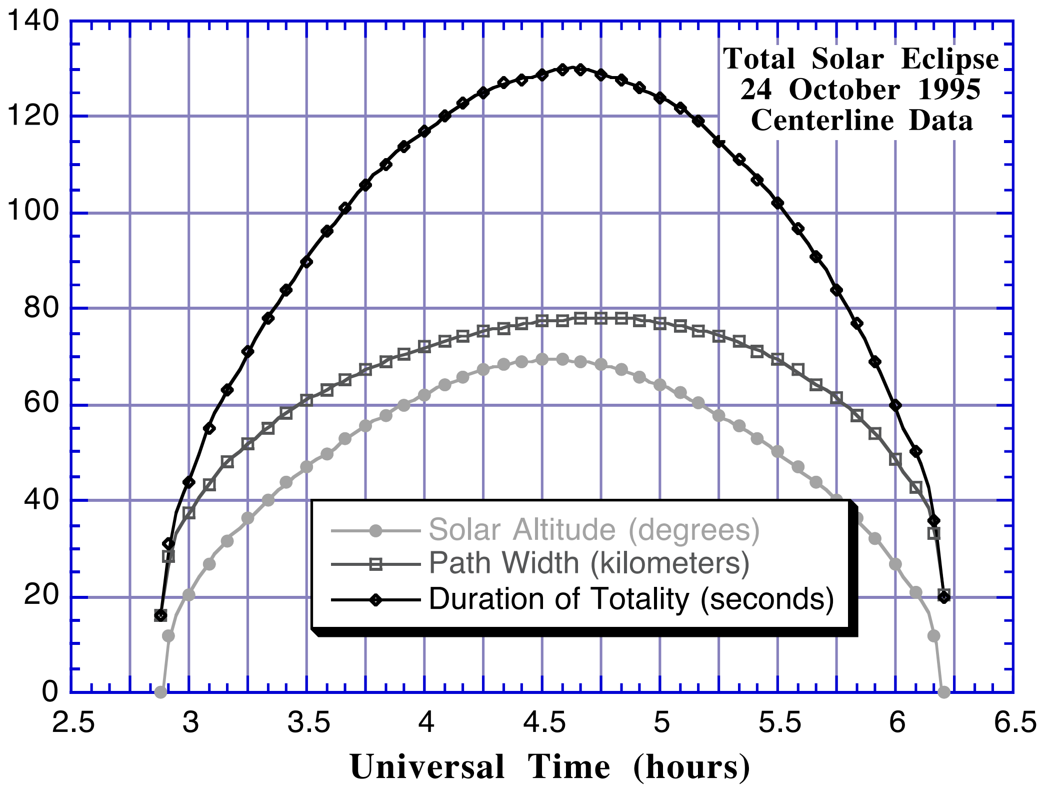
Capella
Aldeberon
Arcturus
Pollux
Betelgeuse
Regulus
Procyon
Rigel
Spica
Sirius
DATE 19951024
U.T. 030500.0
LAT. +265012
LONG +780300

While the specific details of the timing, geometry, and aspect of the eclipse vary with location, the circumstances of these as described for our nominal observing site gives a good sense of this for any near-centerline location in our chase zone. One must move hundreds of kilometers (except at the extreme limits of the path) before celestial leverage makes dramatic changes to the specific circumstances. Such moves, however, cannot be ruled out when stalking the elusive shadow.



Major aspects of the eclipse as a function of time.

Yet such changes, even over much smaller distances, can be very significant, particularly for those who are planning photographic or other programs of scientific inquiry. The included table which provides this, and other location specific information (on centerline) across the eclipse path, may be consulted to see how these and other related parameters change with both time and location. Should we have to move to an alternate site the exact circumstances of the eclipse will be computed for that location, and made available to expedition members.