



What If It Rains on Your Eclipse? Planning Ahead for August 2017



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Abstract

It was a dark and rainy morning, not far out of Shanghai, when we saw the 2009 July 22 total solar eclipse. Many of the Americans who were puttering around their equipment that morning in hopes that the sky would clear enough to catch some of event they had traveled around the world to view, were already planning ahead for 2017 August 21, when a narrow strip of the United States will experience up to 2 minutes and 44 seconds of totality. For most people, a total solar eclipse is once in a lifetime event steeped in legend. If you are situated along this privileged corridor, you will have a wonderful opportunity for public outreach. But what if it rains?

Historically, August is mostly sunny at the location of greatest eclipse, the Shawnee National Forest near Makanda, Illinois. Even with such propitious circumstances, having a rain plan will ensure you make the most of the occasion. Such a plan should include flexibility to avoid or accommodate inclement weather, measurements that are possible in poor conditions, and possible observations of changes in wildlife behavior. If the skies are clear, such projects could enhance your program during the partial phases of the eclipse and provide enrichment materials for those unable to attend.

While 2017 may still seem in the distant future to all but eclipse fanatics, some creativity and advance brainstorming will ensure that your outreach program shines during the event, even if the Sun does not cooperate.

Maintain Flexibility

The flexibility to relocate your program to take advantage of the most favorable weather would be ideal. Evaluate some alternate sites in advance. The amount of lead time you need in order to switch sites will depend on your initial arrangements: will attendees meet you at the site (more lead time to disseminate information) or will you provide transportation from a central location (less lead time unless travel time increases significantly). If relocating is unrealistic, include adequate protective gear with your equipment so that you can prepare despite misty or drizzling conditions.

Near Shanghai, these intrepid eclipse chasers moved to a better site but were unable to escape the rain completely. They improvised protection from the elements for their equipment and themselves as they hoped for some glimpse of the Sun.



Monitor Climate Changes

While a clear and unobscured view of the Sun is ideal, rain and overcast do not prevent all measurements from being made. Monitoring changing light levels and temperatures should be possible even under cloudy skies.

To the right are pictures taken for a Chinese newspaper showing Shanghai change from overcast day before the eclipse to gloomy "night" during the eclipse. The impact of the eclipse was diminished in the city because lights came on.

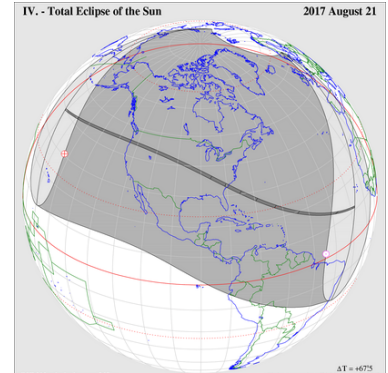
Take images of a particular feature and temperature readings at regular intervals throughout the event to demonstrate the changing conditions and generate excitement as totality approaches.



The solar eclipse in Shanghai, the day was like the night.

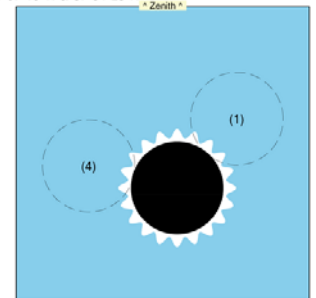
Yesterday morning about 9:40, the solar eclipse occurred in Shanghai, and the day was like the night for a while. The lighting facilities on city main roads opened. Due to climate reasons, the public is difficult to see the solar eclipse in the centre urban area. The photos, overhead taken from the Oriental Pearl TV Tower in Lujiazui area yesterday, show the city landscape before (above) and after (below) the solar eclipse. (trans. Yu Na)

2017 August 21—Total Solar Eclipse



Circumstances	Time (UT)	Longitude	Latitude
Eclipse begins: first contact with Earth	15 46.9	W 153 05.4	N 30 32.5
Beginning of southern limit of penumbra	16 33.0	W 159 19.3	N 8 38.7
Beginning of southern limit of umbra	16 48.8	W 171 25.4	N 39 27.7
Beginning of centre line; central eclipse begins	16 49.1	W 171 35.2	N 39 43.9
Beginning of northern limit of umbra	16 49.4	W 171 45.2	N 40 10.2
Beginning of northern limit of penumbra	18 06.2	E 71 39.2	N 77 34.4
Central eclipse at local apparent noon	18 13.2	W 92 33.4	N 38 55.3
End of northern limit of penumbra	18 45.2	E 12 37.5	N 61 55.3
End of northern limit of umbra	20 01.9	W 27 19.6	N 11 16.1
End of centre line; central eclipse ends	20 02.1	W 27 26.7	N 11 00.9
End of southern limit of umbra	20 02.4	W 27 33.7	N 10 45.8
End of southern limit of penumbra	20 18.0	W 38 12.4	S 20 17.2
Eclipse ends: last contact with Earth	21 04.4	W 44 59.9	N 1 42.2

Shawnee Forest, IL, United States 2017 August 21
89°07' 15" W & 37°34' 28" N Maximum Obscuration 100.00%



Local Circumstances of the Total Eclipse

Phenomenon	Time (UT)
	h m s
Eclipse begins - First Contact	16:52:42.0 (1)
Totality begins - Second Contact	18:20:25.8
Maximum magnitude of 1.0157	18:21:48.1
Totality ends - Third Contact	18:23:10.1
Eclipse ends - Fourth Contact	19:47:53.1 (4)

Observe Wildlife

Animals react to the untimely loss of sunlight in different ways. Birds may nest and roosters may crow. Morning glories and moonflower blossoms may open or close as conditions change. Scouting your site at dusk several times before the eclipse may give you a sense of what to expect or at least of what to avoid. An apocryphal story describes the travails of an eclipse observer who tried to protect his equipment by using an empty chicken coop only to have the indignant residents return during the event (Hartmann & Impey 1994). If your site has distinctive wildlife or is active at dusk, you may consider using postcards or other hand-outs to guide participants similar to those used at the Novosibirsk Zoo during the 2008 eclipse (Saladrigues 2009). Such materials should help participants identify local wildlife and either provide guidelines for behavioral observations or direct their attention to particular activities.



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References

Hartmann, W. & Impey, C. 1994. *Astronomy: The Cosmic Journey* (Belmont, CA: Wadsworth Pub.)
Saladrigues, M. 2009. *Zooar Eclipse* (Turku, Finland: CapSola) http://issun.com/capsola/docs/cuaderno_engl_s
Weather Underground. 2009. "Trip Planner Weather: Harrisburg, IL from 2001 to present." <http://www.wunderground.com/history/airport/KHSB/1972/12/11/PlannerHistory.html>

For More Information

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Visit the USNO Eclipse Portal: http://www.eclipse.org.uk/ukchina/query_usno.cgi