



THE *Ithacation*

The Cornell Chapter of the American Meteorological Society
Newsletter

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October 2003

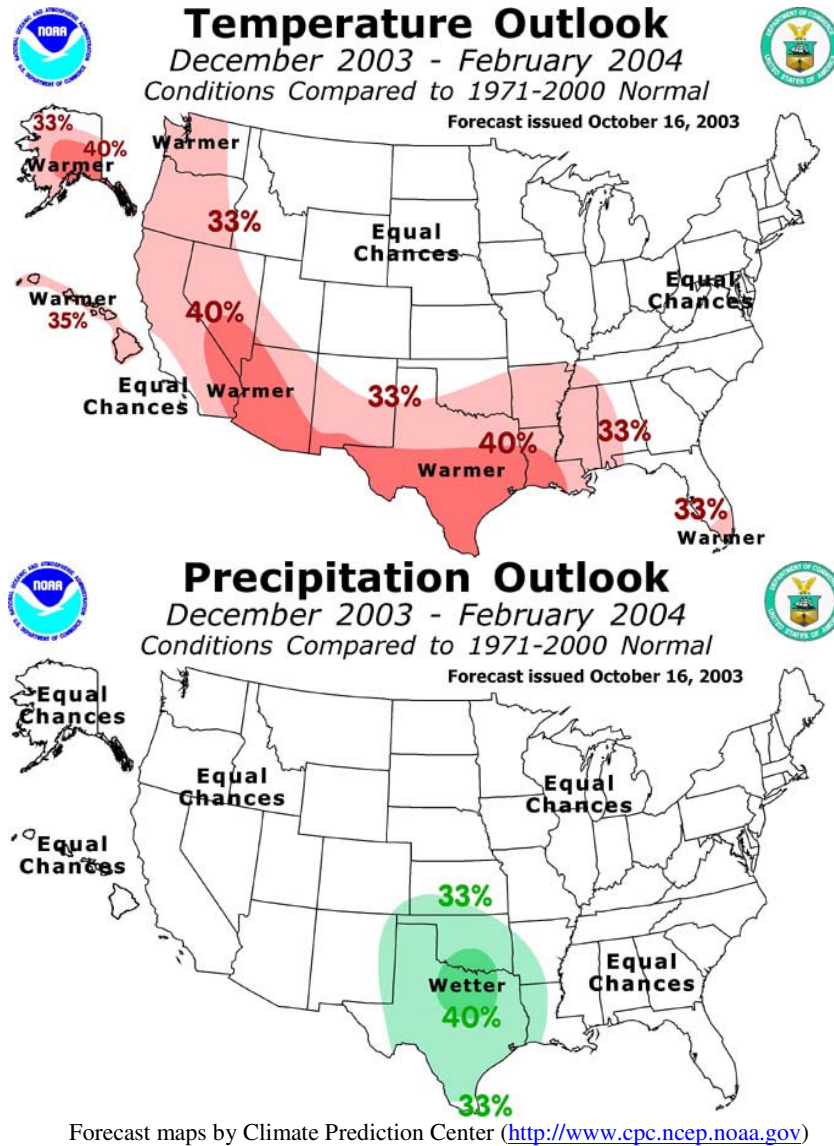
NOAA Issues Winter Climate Outlook

Forecasters at the Climate Prediction Center (CPC) recently issued the temperature and precipitation outlooks for the United States for the winter season 2003-2004. The forecasts are of probabilities of departure from normal conditions based on 1971-2000 data. What can the U.S. expect this year?

- warmer than normal conditions are expected across much of the Southern and Western portions of the U.S., from Alabama westward to California and northward to Washington. Hawaiï and much of Alaska are also expected to see warmer than normal conditions.
- Above average precipitation amounts are expected in portions of the south central U.S., including areas of Texas, Louisiana, Arkansas, Oklahoma, Kansas, and New Mexico.
- Drought conditions are expected to continue in much of the Western U.S., especially across the Rockies and also in portions of the Upper Mississippi Valley. Drought is expected to develop in Northern Florida and extreme Southern Georgia.

As for the Ithaca area, we have equal chances of seeing an above, below, or normal winter for temperature and precipitation. The question that is surely on everyone's mind is whether we will see a normal year for snowfall. While the average seasonal snowfall in Ithaca is 67.3 inches (as per the record period 1924-2002), the last two years have seen some rather night-and-day numbers. Cornell registered its least snowiest season ever in 2001-2002 with a mere 25.2", but saw its fifth snowiest season the very

next year, in 2002-2003 with 100.1". Bear in mind that "normals" are merely the averages of such extremes!



Storm of the Month – October

On 3 October 1979, one of the most destructive tornadoes ever to hit the Northeast touched down without warning near Windsor Locks, Connecticut. One of its first targets was the historic air museum at Bradley International Airport, where sixteen vintage aircraft were destroyed and another 13 damaged. Losses at the museum accounted for much of the tornado's \$420 million price tag (adjusted to 1995 dollars). Further north, the tornado destroyed several homes and killed 3 people. The home

destruction was such that the tornado was rated at F4, making it one of only 3 New England tornadoes to be rated as violent (the other two are the Worcester, MA tornado of 1953 and the Hamden, CT tornado of 1989). Ironically, it passed within sight of the National Weather Service office at Bradley Airport. Near the airport, an airliner was approaching on instruments due to the heavy rain, but the pilot saw the tornado and managed to pull out of the landing pattern in time to avert an even greater tragedy.

Moon to Turn Autumnal Shades in November

On 8 November, much of Eastern North America will be in prime position to witness a rather unique and spectacular astronomical phenomenon – a lunar eclipse. Lunar eclipses, although somewhat less common than solar eclipses, are much easier to see as they are visible to anyone with a view of the Moon.

Lunar eclipses occur only at the full phase as the Earth passes between the Moon and the Sun. During times when the Moon, on its slightly inclined orbit, passes through the plane of the ecliptic when full, it becomes enveloped for a time in the Earth's shadow, or umbra. As a result, while passing through the umbra, the Moon is seen to take on various shades ranging from copper red to rusty brown.

It is a sight that is breathtaking to behold, although not every culture has regarded it as wondrous. The Chinese, for example, were known in earlier times to shoot rockets and firearms at the Moon as it disappeared into the umbra, as they believed that a giant dragon in the sky was eating the Moon. Other tales tell that eclipses are an indication of a lunar “sickness,” and some in Japan still cover their wells during eclipses to avoid having the water contaminated by the Moon's disease.

Fear not, though, eclipses of the Moon are perfectly harmless. And, provided that our skies are clear enough, this upcoming event should be quite a show. The Moon will start to noticeably change color at about 7:30 PM EST on Saturday, 8 November, and between roughly 8:05 and 8:30 PM EST will be totally obscured in translucent shadow. For more precise timing plus a diagram of what will happen during the eclipse, see the chart below (note: all of the times listed below are in Universal time, thus the period of

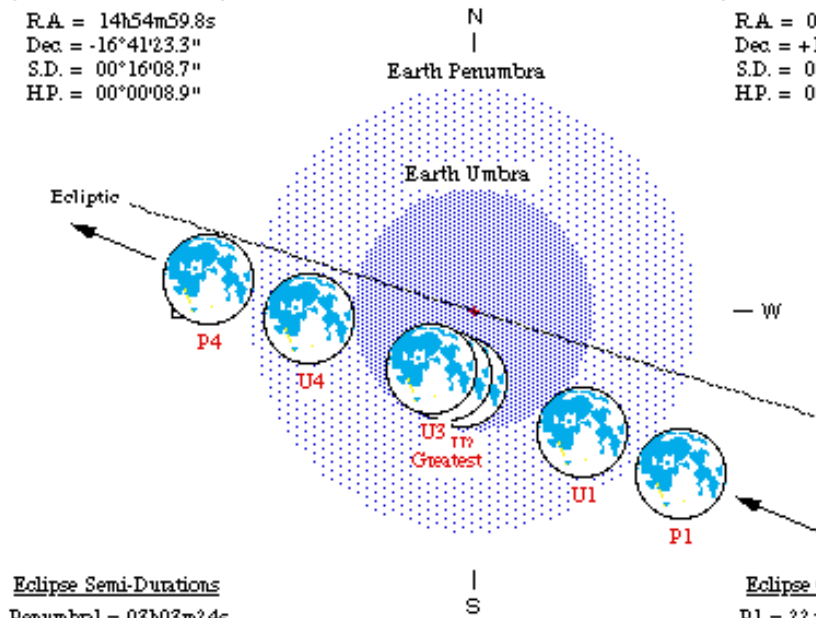
totality occurs on **9 November in UT**, not 8 November, so be sure to subtract 5 hours for *Eastern Standard Time*). Happy Moongazing!

Total Lunar Eclipse of 2003 Nov 09

Geocentric Conjunction = 00:57:13.2 UT J.D. = 2452952.539736
 Greatest Eclipse = 01:18:31.0 UT J.D. = 2452952.554525
 Penumbral Magnitude = 2.13984 P. Radius = 1.1945° Gamma = -0.43213
 Umbral Magnitude = 1.02185 U. Radius = 0.6455° Axis = 0.38931°
 Saros Series = 126 Member = 45 of 72

Sun at Greatest Eclipse
 (Geocentric Coordinates)
 R.A. = 14h54m59.8s
 Dec. = -16°41'23.3"
 S.D. = 00°16'08.7"
 H.P. = 00°00'08.9"

Moon at Greatest Eclipse
 (Geocentric Coordinates)
 R.A. = 02h55m37.0s
 Dec. = +16°19'47.9"
 S.D. = 00°14'43.8"
 H.P. = 00°54'03.6"

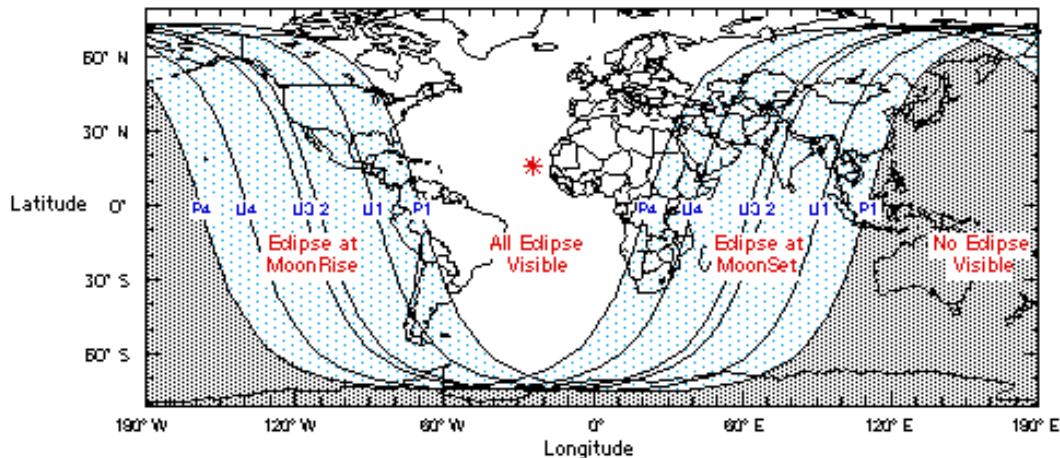


Eclipse Semi-Durations
 Penumbral = 03h03m24s
 Umbral = 01h46m01s
 Total = 00h12m10s

Eclipse Contacts
 P1 = 22:15:08 UT
 U1 = 23:32:29 UT
 U2 = 01:06:20 UT
 U3 = 01:30:41 UT
 U4 = 03:04:32 UT
 P4 = 04:21:56 UT

Eph. = NewcombJLE
 ΔT = 66.4 s

F. Espenak, NASA/GSFC - Tue, 1999 Jun 01

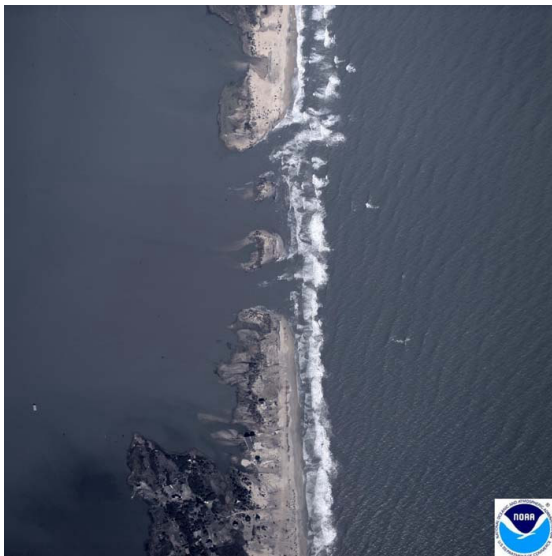


Isabel Re-Shapes U.S. East Coast

Although Hurricane Isabel will not top lists of the costliest or deadliest hurricanes, it nonetheless left its mark on the Mid-Atlantic states. Hard-hit were areas of North Carolina, Virginia, and Maryland. At least 13 deaths were blamed on Isabel, and total losses are expected to top \$1 billion.

One of the most visible reminders of Isabel was on the Outer Banks of North Carolina. During the storm, the wind-driven storm surge created a new inlet on southern Hatteras Island, between the towns of Hatteras Village and Frisco. This area is just southwest of Cape Hatteras. The inlet was cut in a section of the island that is only a third of a mile wide, but which contains North Carolina route 12, the only major road on the Outer Banks and a vital link between Hatteras Island residents and the mainland. Both land and road were washed away in a powerful act of nature that is seldom seen, although not unheard of.

In 1969, the monstrous storm surge ahead of Hurricane Camille plowed over a group of barrier islands off the coast of Mississippi, literally "cutting" several of them. During the great New England hurricane of 1938, a huge inlet was created on the barrier island between Southampton and Hampton Bays, New York which we know today as Shinnecock Inlet. And in 1846, a powerful hurricane opened up two large and navigable inlets on North Carolina's Outer Banks: Hatteras Inlet between Ocracoke and Hatteras Islands; and Oregon Inlet between Hatteras and Bodie Islands. The latter was named after



the first major ship to pass through it, the *Oregon*.

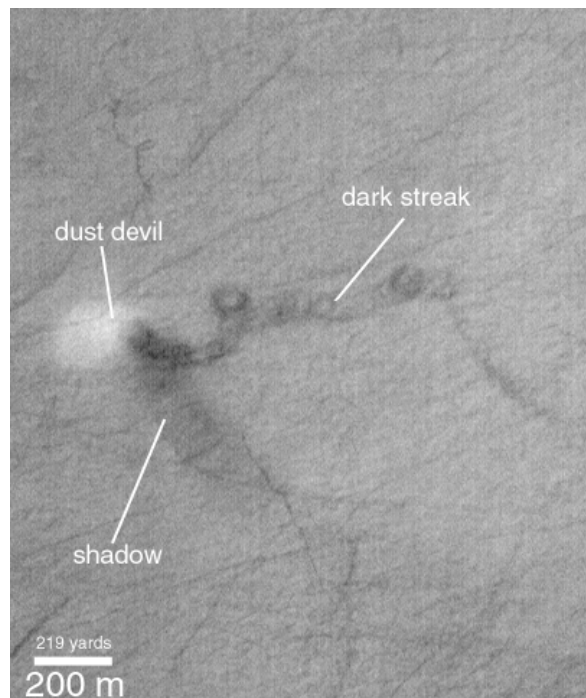
On 19 September, a NOAA surveillance aircraft took dramatic photos of the new inlet (left), as well as of other damage on Hatteras Island.

Although some questioned whether it is wise to rebuild NC 12 on such a vulnerable strip of land, the fate of the newborn inlet has already been sealed. Operations to fill the inlet are well underway, and NC 12 will soon afterward take its place on Hatteras Island again.

The Red Planet's Wild Weather

When Spirit and Opportunity, the twin Mars Exploration Rovers, land on opposite sides of our neighboring planet this January, they'll have to endure weather conditions far more extreme than anything Earth has to offer. Even though their landing sites are near the Martian equator - and therefore in the more temperate areas of Mars, climate-wise - the rovers will have to perform through wild temperature swings, high winds, and possible dust storms.

The good news is that although surface winds on Mars can reach speeds of up to 200 km/h at times, the air is so thin that these winds do not have nearly the force that they would on Earth. The average surface pressure is only about 6 millibars - as compared to the standard sea level pressure on Earth of 1013.25 millibars. The winds are strong enough to pick up dust from the surface, which can be as fine as cigarette smoke. The particles can be whipped up into dust devils kilometers high (right), or into huge dust storms that can cover the entire planet.




As far as temperatures go, a warm summer day on Mars would feature temperatures just right for snowball fights on this planet. The average planetary temperature is 218 Kelvin (-55 degrees Celsius), and the highest temperatures in the equatorial regions are just less than zero degrees Celsius. Temperatures drop to around 140 K (-133 degrees Celsius) in the solid carbon dioxide polar caps, and air temperatures in these regions occasionally get cold enough for atmospheric carbon dioxide to deposit on the surface - CO₂ snow!

While rain is never in the Martian forecast, some surface features indicate that liquid water may have once flowed on the surface. Some craters on the surface appear to have been carved into graceful, tear-drop shapes as if by a river. Other craters have inexplicable valleys running from them - valleys which resemble stream and river basins

on Earth. The Mars Exploration Rovers are currently en route to landings sites at Meridiani Planitia and Gusev Crater - two regions which appear to have high concentrations of minerals found in close proximity to water on Earth. Observations from these regions may yield important clues as to whether Mars once had a much wetter surface - as well as where all that water is now.

To learn more about the Mars Exploration Rover program, be sure to check out the science team's wonderful web site at <http://athena.cornell.edu> . For additional MER news and background information, try the Cornell News Service's web site at <http://www.news.cornell.edu/releases/athena/athenamenu.html> .

**	<u>Ithacation - October 2003</u>		**
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