

# Annular Solar Eclipse of 2012 May 20

Geocentric Conjunction = 23:59:09.1 UT    J.D. = 2456068.499411  
 Greatest Eclipse = 23:52:46.6 UT    J.D. = 2456068.494984

Eclipse Magnitude = 0.9439    Gamma = 0.4827

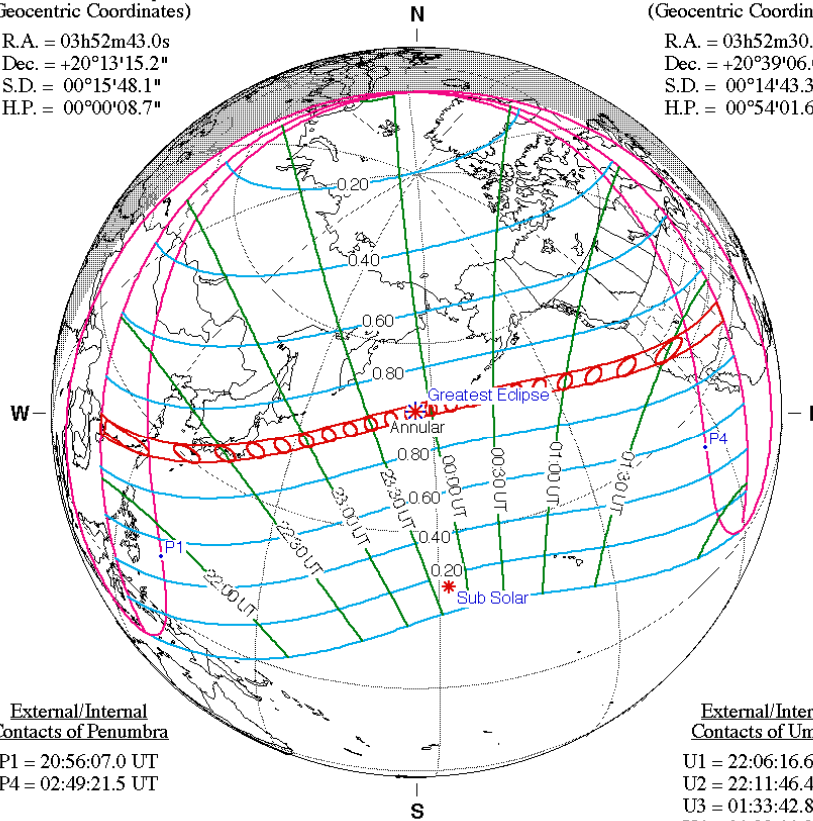
Saros Series = 128    Member = 58 of 73

**Sun at Greatest Eclipse**  
 (Geocentric Coordinates)

R.A. = 03h52m43.0s  
 Dec. = +20°13'15.2"  
 S.D. = 00°15'48.1"  
 H.P. = 00°00'08.7"

**Moon at Greatest Eclipse**  
 (Geocentric Coordinates)

R.A. = 03h52m30.7s  
 Dec. = +20°39'06.0"  
 S.D. = 00°14'43.3"  
 H.P. = 00°54'01.6"



**External/Internal**  
**Contacts of Penumbra**

P1 = 20:56:07.0 UT  
 P4 = 02:49:21.5 UT

**External/Internal**  
**Contacts of Umbra**

U1 = 22:06:16.6 UT  
 U2 = 22:11:46.4 UT  
 U3 = 01:33:42.8 UT  
 U4 = 01:39:11.2 UT

**Local Circumstances at Greatest Eclipse**

Lat. = 49°05.3'N    Sun Alt. = 60.9°  
 Long. = 176°16.8'E    Sun Azm. = 171.0°  
 Path Width = 236.9 km    Duration = 05m46.4s

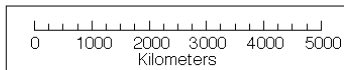
**Ephemeris & Constants**

Eph. = Newcomb/ILE  
 $\Delta T = 69.0$  s  
 $k1 = 0.2724880$   
 $k2 = 0.2722810$   
 $\Delta b = 0.0''$      $\Delta l = 0.0''$

**Geocentric Libration**  
 (Optical + Physical)

$l = -1.29^\circ$   
 $b = -0.58^\circ$   
 $c = -13.67^\circ$

Brown Lun. No. = 1106



F. Espenak, NASA's GSFC - Fri, Jul 2,  
[sunearth.gsfc.nasa.gov/eclipse/eclipse.html](http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html)

# Total Solar Eclipse of 2012 Nov 13

Geocentric Conjunction = 22:18:04.3 UT    J.D. = 2456245.429217

Greatest Eclipse = 22:11:48.0 UT    J.D. = 2456245.424861

Eclipse Magnitude = 1.0500    Gamma = -0.3718

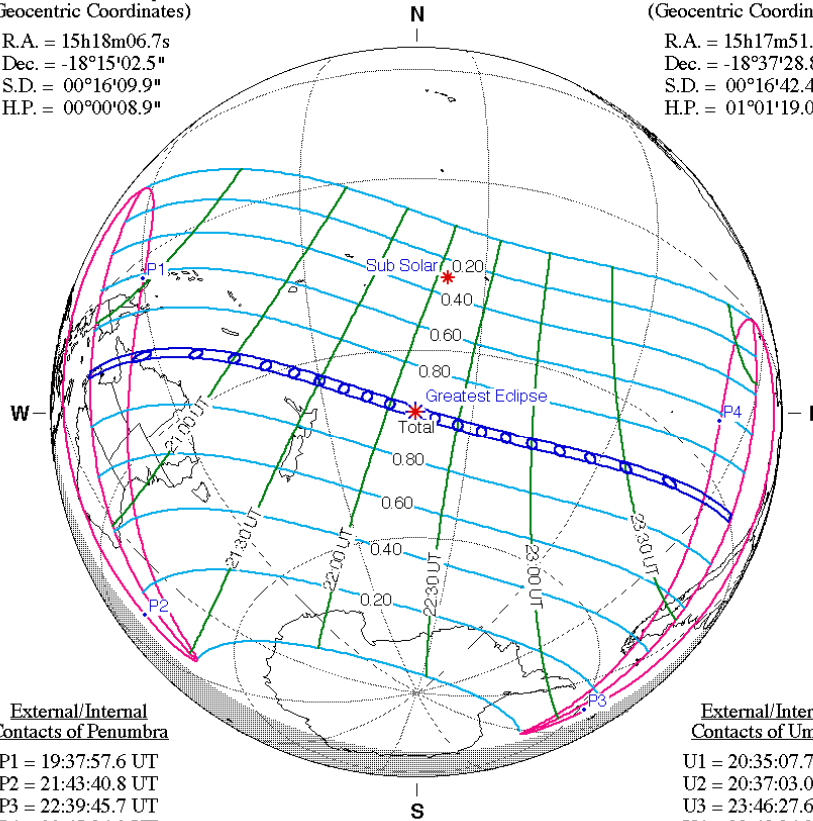
Saros Series = 133    Member = 45 of 72

**Sun at Greatest Eclipse**  
(Geocentric Coordinates)

R.A. = 15h18m06.7s  
Dec. = -18°15'02.5"  
S.D. = 00°16'09.9"  
H.P. = 00°00'08.9"

**Moon at Greatest Eclipse**  
(Geocentric Coordinates)

R.A. = 15h17m51.2s  
Dec. = -18°37'28.8"  
S.D. = 00°16'42.4"  
H.P. = 01°01'19.0"



**External/Internal Contacts of Penumbra**

P1 = 19:37:57.6 UT  
P2 = 21:43:40.8 UT  
P3 = 22:39:45.7 UT  
P4 = 00:45:34.0 UT

**External/Internal Contacts of Umbra**

U1 = 20:35:07.7 UT  
U2 = 20:37:03.0 UT  
U3 = 23:46:27.6 UT  
U4 = 23:48:24.2 UT

**Local Circumstances at Greatest Eclipse**

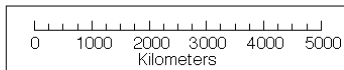
Lat. = 39°56.9'S    Sun Alt. = 68.0°  
Long. = 161°19.8'W    Sun Azm. = 11.4°  
Path Width = 178.9 km    Duration = 04m02.2s

**Ephemeris & Constants**

Eph. = Newcomb/ILE  
 $\Delta T = 69.5$  s  
k1 = 0.2724880  
k2 = 0.2722810  
 $\Delta b = 0.0''$      $\Delta l = 0.0''$

**Geocentric Libration**  
(Optical + Physical)

l = -1.00°  
b = 0.50°  
c = 16.49°  
Brown Lun. No. = 1112



F. Espenak, NASA's GSFC - Fri, Jul 2,  
[sunearth.gsfc.nasa.gov/eclipse/eclipse.html](http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html)

