

Annual Report of Solar Eclipses activity 2024/2025

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ICRANet & IAU Solar Eclipses Working Group + Commission 3 History of Astronomy

The eclipse of 29 March 2025 follows after one Methon Cycle the one of 2006,¹ which was total in Egypt,² and observed there with the scope of measuring accurately the solar diameter with Baily's beads.

This year this eclipse will not be total anywhere, but it offers an interesting opportunity to measure the solar diameter accurately, by extrapolating the contact times from videos as already done for the Venus transit of 2004.³

I am preparing the observation of the partial eclipse of 29 March 2025 in order to measure the solar diameter using the first and last contact of the Moon.

I have involved: 1. The University of Rome Tor Vergata Solar Group 2. The IRSOL Istituto Ricerche Solari di Locarno/USI University of Italian Switzerland. 3. The Specola Vaticana at Castelgandolfo 4. Sapienza University of Rome 5. Liceo Scientifico Galileo Galilei of Pescara, Italy. 6. Basilica of St. Maria degli Angeli e dei Martiri, Rome (where the great meridian line of 1700 is located: the Sun will cross it eclipsed as in 2006) and 7. the Astrophysical Observatory of Asiago (University of Padova) and the 8. associated Group of Observing Solar Transients, the 9. Niccolò Cusano University Lab of Physics (Rome) and 10. the Universidad Nacional Autónoma de México.

The method of measuring the solar diameter has been already successfully applied to partial solar eclipses as it is reported for 21 June 2020.⁴

This year, in correspondence with the solar maximum of XXV cycle, the measure of the solar diameter will mark the 11-year maximum phase.

The measure of this year will be paralleled with the measure of the solar diameter with hourly circle transits, to verify their accuracy in the electronic era, being most of the timing obtained with naked eye transits at the 45 cm Gregory Coudé telescope of Locarno.⁵

The total lunar eclipse of 14 March 2025 also will be of scientific interest beyond the obvious divulgating event.⁶ The lunar surface, in fact, will be illuminated, at totality, by a larger and more active solar corona, than in solar minima, and the Danjon's index⁷ will reveal it. An agreement with the Kottamya Observatory of Egypt has been established for measuring the eclipse of 7 September 2025, because in March there will be visible only the beginning of the penumbra. Differential Colorimetry of the lunar eclipse will be realized in Italy during the March 2025 eclipse by our network.

Some divulgating conferences are accompanying these events:

1. I.C.R.A. Network - Special School on Solar Flares 2024/25: the conference of 17 January 2025, Liceo Galilei, Pescara, Italy.⁸
2. Biblioteca Angelica, Rome, Italy 14 March 2025, just after the lunar eclipse
3. The yearly conference of the equinox on St. Maria degli Angeli (Rome) meridian line (20 March 2025) will be dedicated also to the 29 March solar eclipse, because it will be visible from the meridian line after 25 October 2022, 20 March 2015 and -again on 29 March- 2006.
4. Ortona, Italy 23 March 2025, Istituto Nautico, Day of Planetarium 2025: Solar diameter in the maximum of XXV cycle and at the end of the Maunder minimum.⁹
5. Bellinzona, Switzerland, 29 March 2025. Conference at the Society of Ticinese Astronomy annual congress.

¹ [Solar radius in 2005 and 2006 eclipses – NASA/ADS](#)

² [Solar Radius Determination from Total Solar Eclipse Observations on 29 March 2006 – NASA/ADS](#)

³ [Effetto black drop e istanti dei contatti nel transito di Venere sul Sole – NASA/ADS](#)

⁴ [Convoluzione tra oscuramento al bordo e diffrazione, nell'eclissi solare parziale del 21 giugno 2020 – NASA/ADS](#)

⁵ [Wittmann, Alge e Bianda, 1991 - NASA/ADS](#)

⁶ <https://doi.org/10.3390/universe10020090>

⁷ [Measuring Danjon index and umbral magnitude of July 16, 2019 partial lunar eclipse – NASA/ADS](#)

⁸ [I.C.R.A. Network - Special School on Solar Flares \(2024/25\)](#)

⁹ <https://doi.org/10.20944/preprints202503.0185.v1>