Jupiter's Great Red Spot

Agustin Sanchez-Lavega
Universidad Pais Vasco UPV/EHU, Escuela de Ingeniería de Bilbao, Física Aplicada I, Bilbao, Spain (agustin.sanchez@ehu.es)

Jupiter's Great Red Spot (GRS), is a giant anticyclone, the largest and longest-lived of all the vortices observed in planetary atmospheres. Perhaps observed for the first time in the 17th century, during its history, the length of the GRS has shrunk since 1879 from ~ 40,000 km to 15,000 km in 2020. The GRS is distinguished in the disk of Jupiter as an oval of intense red color, although this coloration changes in time depending on the interactions it undergoes with the meteorological formations and disturbances that flow in its surroundings. The maximum tangential rotation velocity is reached at the periphery of the oval with values from 120 ms\(^{-1}\) in 1979 to 150 ms\(^{-1}\) in 2020, decreasing gradually to the center of the vortex. The GRS, embedded within two jets that oppose in direction, oscillates in longitude with respect to its mean value with a period of 90 days and amplitude of 1°. In this lecture I will review our current knowledge of the GRS, in particular the structure of upper hazes and cloud, its dynamical properties, as well as ideas and models about its nature. Finally, the GRS will be compared with other Jovian vortices, putting into context their relationship with the jet streams pattern of the planet.