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Color changes and dynamics of the third largest oval on Jupiter

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Because of its large size, fast rotation and multiple atmospheric jets, Jupiter's atmosphere holds a large variety of vortices. A large anticyclone at 19ºN planetographic latitude persists since at least 2006 after a complex dynamic history. This North Tropical Oval (NTrO) is located in the transition region between the North Equatorial Band (NEBn) and North Tropical Zone (NTrZ) and it is one of the longest-lived anticyclonic oval in the planet, following the Great Red Spot and oval BA. The region where it is located has a strong latitudinal shear, which allows the formation of dark cyclones and usually white anticyclones that stay stable in latitude. The NTrO has survived for years after mergers and disturbances: in February 2013, it merged with another oval and some months later, in September 2013, its color changed from white to red and then, in December 2014, back to white with an external red ring. The oval also survived the North Temperate Belt Disturbance (October 2016) which fully covered the oval, leaving it unobservable for a short time. It reappeared at its expected longitude as a white large oval keeping the same color and morphology from 2017 to 2020. Using JunoCam, Hubble Space Telescope (HST) and PlanetCam-UPV/EHU multi-wavelength observations, we describe the historic evolution of this oval's properties. We used JunoCam and HST images to measure its size and its internal rotation obtaining a mean value of (10,500±1,000) x (5,800±600) km for the size and a mean relative vorticity of $-(2\pm1)\cdot10^{-5}s^{-1}$. Contrarily to GRS and BA, which have higher vorticity values than their surroundings, the NTrO's vorticity is nearly the same as the ambient vorticity of the area, which suggests that this oval is probably sustained by the zonal jets confining it. We also used HST and PlanetCam observations to characterize its color changes. The color and the altitude-opacity indices show that the oval is higher and has redder clouds than its environment but has lower cloud tops than other large ovals like the GRS, and it is less red than the GRS and oval BA. Despite the changes, mergers and disturbances experienced by the oval, its main characteristics remain unaltered and this suggests a vertically extended vortex with properties that could be related with the atmospheric dynamics below the observable cloud deck.