STUDY OF THE COMET 2017 K2 (PANSTARRS). A. Q. Vodniza[1], [1]Director of University of Narino Observatory (Universidad de Narino, Pasto-Narino-Colombia, aquijanov@gmail.com)

Introduction: When this comet was discovered in 2017, it was thought that it would be one of the largest comets, with a nucleus of several hundred kilometers; but now with the observations of the Hubble telescope it is known that its nucleus is much smaller than 18 kilometers [1]. Still, it's relatively large, since most comets' nuclei are in the 1-3 kilometer range.

The comet made its closest approach to Earth on July 14/2022 (270 million kilometers), and its closest approach to the sun on December 19/2022 (1.8 AU) [2].

Other major observatories around the world have investigated whether C/2017 K2 is a dynamically old or new comet, and according to Małgorzata Królikowska and Piotr A. Dybczyński, to obtain the answer it is necessary to obtain the orbital parameters in the previous perihelion and in the near future:

"We did backward calculations for about 3–4 Myr as well as to the future, forward calculations for about 0.033 Myr. C/2017 K2 has already visited our planetary zone during its previous perihelion passage. Thus, it is almost certainly a dynamically old Oort spike comet." [3].

Due to the great activity of the comet at great heliocentric distances, it has been postulated that: "Nucleus temperatures are too low (60–70 K) either for water ice to sublimate or for amorphous ice to crystallize, requiring another source for the observed activity" [4].

"Its activity began at large heliocentric distances (up to 35 au), supervolatile sublimation, most likely of carbon monoxide (CO), has been proposed as a plausible driver of the observed mass loss" [5].

Spectrometric studies have found: "Emission of CN and C2 on 28/03/2022, C3 on 28/04/2022, OH on 09/04/2022, and NH on 17/08/2022" [6].

Methodology: From the University of Narino Observatory, located in Pasto-Colombia, I captured several pictures, videos and astrometry & photometry data during several days.

My images were published by Spaceweather. Examples of some of them: August 13 [7], August 17 [8], August 25 [9].

The images of the comet were captured with the following equipment: CGE Pro 1400 CELESTRON telescope and STL-1001E SBIG camera.

Conclusions: With the data I calculated the following orbital parameters: eccentricity = 0.99949 +/- 0.00337, orbital inclination = 87.54 +/- 0.08 deg, longitude of the ascending node = 88.244 +/- 0.030 deg, argument of perihelion = 236.27 +/- 0.24 deg, perihelion distance = 1.79540897 +/- 0.00529, H=8.1, G=0.15, U=6.0. The parameters were calculated based on 20 observations (Aug. 09-17/ 2022) with mean residual = 0.23 arcseconds. I also designed the comet's light curve for those dates. The average magnitude for these dates is 12.0 +/- 0.4.

From August 9 to 17, the R.A decreased linearly by the factor of -0.0177 hours/day, and the absolute value of the declination increased by the factor of 0.3969 degrees/day.

Acknowledgments: My thanks to Dr. Mario Perez (NASA) for his important suggestions.

References:

[1]https://science.nasa.gov/comet-c2017-k2-panstarrs
[2]https://www.space.com/goodbye-comet-k2-next-stop-perihelion
[3] M. Królikowska and P. A. Dybczyński. (2018) A&A, Volume 615, July.
[4] D. Jewitt, et al. (2017) The Astrophysical Journal Letters, 847(2):L19. September.
[5] B. Yang, et al. (2021) The Astrophysical Journal Letters, 914:L17 (4pp), June 10
[6] S. Hmiddouch, et al. (2022) EPSC 2022-593-presentation-h766567
[7]https://spaceweathergallery2.com/indiv_upload.php?upload_id=187576
[8]https://spaceweathergallery2.com/indiv_upload.php?upload_id=187700
[9]https://spaceweathergallery2.com/indiv_upload.php?upload_id=187885