

# 398P/Boattini a new JFC carbon-chain poor comet

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E. Jehin, Y. Moulane, J. Manfroid, F. Pozuelos, M. Ferrais, D. Hutsemekers (STAR Institute, University of Liege, Belgium) report that they obtained with TRAPPIST-North (code=Z53, at Oukaimeden Observatory, Morocco) 0.6-m robotic telescope, three sets of observations of the recently recovered comet 398P/Boattini (= 2009 Q4 = 2020 P2, CBET 4829) on November 10, 15 and 20 UT under photometric conditions using HB cometary narrowband filters (Farnham et al. 2000). All these observations are showing the clear detection of a diffuse CN (390nm) gaseous coma and no detection of the C2 (515nm) and C3 (450nm) gas emission, making 398P a new member of the Jupiter-family carbon-chain depleted comets as confirmed after computing the production rates. On November 20 UT, at a heliocentric and a geocentric distance of 1.40 and 0.47 au respectively, after proper flux calibration and solar dust continuum subtraction, production rates (at 10.000 km and using a Haser Model ( $V_p=V_d=1\text{km/s}$ )(Haser 1957)) of  $(8.62\pm 0.27) \text{ E}23 \text{ s}^{-1}$  for CN and upper limits of  $1.29 \text{ E}23 \text{ s}^{-1}$  for C2 and  $0.50 \text{ E}23 \text{ s}^{-1}$  for C3, were derived. This provides a maximum C2 ratio with respect to CN,  $\text{Log}[Q(\text{C}2)/Q(\text{CN})] < -0.82$ , well below the carbon-chain depleted comets limit of  $-0.18$  (A'Hearn et al. 1995, Moulane et al. 2020). No emission from OH (310nm) was detected and an upper limit of  $2.61 \text{ E}23 \text{ s}^{-1}$  was derived. The production rates derived on the two other dates are in very good agreement and provide the same conclusion. A spectroscopic confirmation is welcome as the comet is approaching perihelion.

The dust production rate proxy  $A(0)f(\rho)$  was estimated by profile fitting at 5.000 km (A'Hearn et al. 1984) and corrected for the phase angle (Schleicher 2007). On Nov 20 UT, values of  $A(0)f_p(\text{RC})=37\pm 4 \text{ cm}$  for the narrow band red solar continuum filter and  $A(0)f_p(\text{RC})=38\pm 5 \text{ cm}$  for the broad band Johnson-Cousin filter are derived. The dust/gas ratio  $\text{Log}[A(0)f_p(\text{RC})/Q(\text{CN})]=-22.41\pm 0.20$  is in agreement with the average value for depleted comets of  $-22.61$  and larger than for typical comets (A'Hearn et al. 1995).

Notation:  $r_h$ = heliocentric distance (in au),  $\Delta$ =geocentric distance (in au),  $DT$ = Time to perihelion. OH, C3, CN, C2 are the HB gaseous narrowband filters for the corresponding species, and BC, RC are the blue and red solar dust continuum filters (Farnham et al. 2000)

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