

TRAPPIST monitoring of the activity and composition of 41P/Tuttle-Giacobini-Kresak and 252P/LINEAR

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Abstract

We report on photometry and imaging of the Jupiter Family Comets (hereafter JFC) 252P and 41P/Tuttle-Giacobini-Kresak with TRAPPIST telescopes (Jehin et al., 2011). We observed 252P with TRAPPIST-South from February 4 until June 8, 2016, while we collected the data for 41P with TRAPPIST-North from February 16 to July 27, 2017. We monitored the evolution of OH, NH, CN, C₃ and C₂ production rates as well as the evolution of the dust proxy, $A(\theta)f\rho$ parameter (A'Hearn et al., 1984). The peak of the water production rate of 41P reached $(3.5\pm 0.2)\times 10^{27}$ molecules/s on April 3, 2017 when the comet was at 1.05 au from the Sun. 41P is a unique comet that showed a rapid slow down of its rotation period from 20 hrs to 50 hrs in 2 months (Moulane et al., 2018a; Bodewits et al., 2018). The peak of water production rate of comet 252P reached $(8.5\pm 0.08)\times 10^{27}$ molecules/s on April 10, 2016 two weeks after perihelion (March 15, 2016). The similarity of the orbit of 252P and the asteroidal object P/2016 BA14 may indicate that the later could be a fragment of the comet (Moulane et al., 2018b). Our results have shown that two JFCs have a "typical" composition according to the $Q(C_2)/Q(CN)$ and $Q(C_3)/Q(CN)$ ratios and have also a low gas and dust activity. The comparison of the coma morphologies exhibited by the gas species and the dust will be discussed for both comets.

References

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