TRAPPIST comet production rates: 19P/Borrelly, 67P/C-G, 104P/Kowal 2, C/2019 L3 (ATLAS), and C/2021 A1 (Leonard)

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*on **27 Jan 2022; 08:36 UT***
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Subjects: Optical, Comet

E. Jehin, Y. Moulane, J. Manfroid, M. Vander Donckt, F. Pozuelos, M. Ferrais, and D. Hutsemekers (STAR Institute, University of Liege) report that they obtained from TRAPPIST-North (code=Z53, Morocco) and TRAPPIST-South (code=I40, Chile) robotic telescopes (Jehin el al. 2011) recent observations using cometary HB narrowband filters (Farnham et al. 2000) for the following comets and computed preliminary production rates at 10.000 km using a Haser Model (Vp=Vd=1km/s) (Haser 1957). The dust production rates proxy A(0)f(rho) was estimated by profile fitting at 10.000 km (A'Hearn et al. 1984) and corrected for the phase angle (Schleicher 2007).

19P/Borrelly
Date UT=2022-01-17, r_h=1.32 au, Delta=1.22 au, DT=-7 days
Q(OH)=(2.76+/-0.41) E28 s-1; Q(NH)=(1.44+/-0.10) E26 s-1; Q(CN)=(5.75+/-0.65) E25 s-1; Q(C2)=(3.83+/-0.08) E25 s-1; Q(C3)=(6.74+/-0.22) E24 s-1
A(0)fp(BC)= 1847+/-35 cm

67P/C-G
Date UT=2022-01-21, r_h=1.55 au, Delta=0.58 au, DT=+70 day
Q(OH)=(2.16+/-0.24) E27 s-1; Q(NH)=(2.67+/-0.55) E25 s-1; Q(CN)=(6.10+/-0.56) E24 s-1; Q(C2)=(6.55+/-0.55) E24 s-1; Q(C3)=(4.38+/-2.30) E23 s-1
A(0)fp(BC)= 365+/-10 cm

104P/Kowal 2
Date UT=2022-01-18, r_h=1.08 au, Delta=0.65 au, DT=+10 day
Q(OH)=(5.05+/-0.22) E27 s-1; Q(NH)=(4.12+/-0.39) E25 s-1; Q(CN)=(1.34+/-0.15) E25 s-1; Q(C2)=(1.40+/-0.16) E25 s-1; Q(C3)=(2.92+/-0.18) E24 s-1
A(0)fp(RC)= 100+/-10 cm

C/2019 L3 (ATLAS)
Date UT=2022-01-19, r_h=3.56 au, Delta=2.61 au, DT=+12 day
Q(CN)=(1.26+/-0.10) E26 s-1; Q(C2)=(1.19+/-0.11) E26 s-1; Q(C3)=(5.16+/-0.49) E24 s-1
A(0)fp(BC)= 24710+/-125 cm
With a dust/gas ratio of Log[A(0)fp(BC)/Q(CN)]=-21.71, C/2019 L3 appears as a very dusty comet, compared to the ratio of -23.30+/-0.32 for typical comets (A'Hearn et al. 1995).

C/2021 A1 (Leonard)
Date UT=202-01-22, r_h=0.64 au, Delta=1.17 au, DT=+18 days
Q(OH)=(5.78+/-0.41) E28 s-1; Q(NH)=(1.61+/-0.15) E26 s-1; Q(CN)=(4.75+/-0.10) E25 s-1; Q(C2)=(6.70+/-0.13) E25 s-1; Q(C3)=(4.33+/-0.20) E24 s-1
Afp(BC)= 2597+/-46 cm

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

Acknowledgments: TRAPPIST is a project funded by the Belgian F.R.S.-FNRS under grant PDR T.0120.21. TRAPPIST-North is funded by the University of Liège, and performed in collaboration with the Cadi Ayyad University of Marrakesh. Observations were carried on from the ESO La Silla Paranal Observatory. We thank NASA, David Schleicher and the Lowell Observatory for the loan of the HB comet filters. https://www.trappist.uliege.be/