EPSC Abstracts
Vol. 15, EPSC2021-307, 2021
https://doi.org/10.5194/epsc2021-307
Europlanet Science Congress 2021

Trajectory and dark-flight estimation for meteoroids detected by the MOROI network

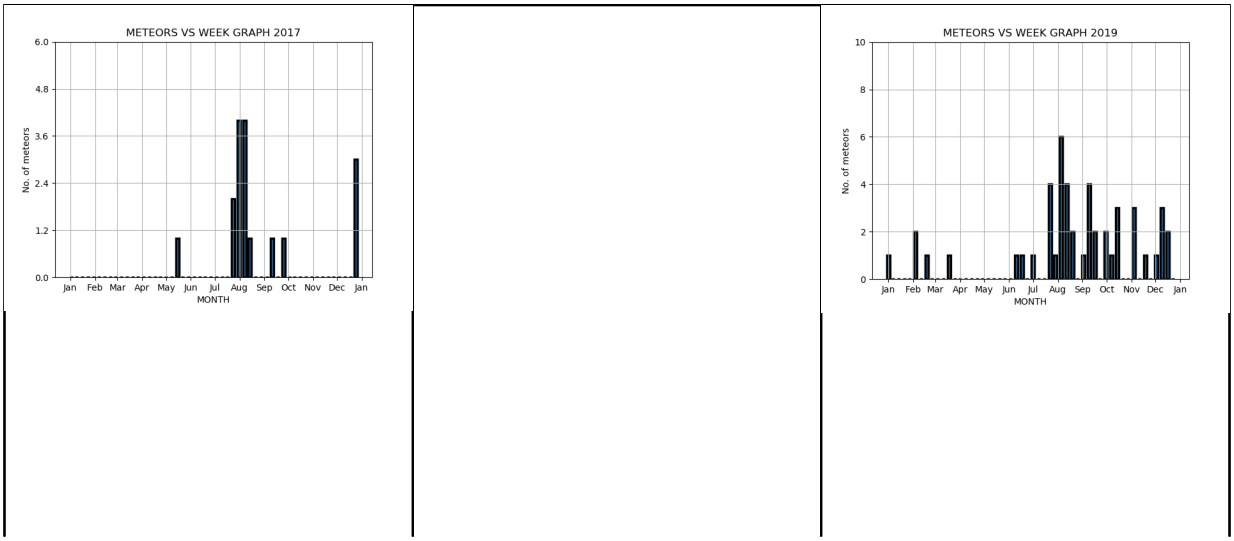
Ioana Lucia Boaca[1], Alin Nedelcu[1,2], Mirel Birlan[2,1], Tudor Boaca[3], and Simon Anghel[1,2,4]

[1]Astronomical Institute of Romanian Academy, Str. Cutitul de Argint 5, 040557 Bucharest, Romania
[2]IMCCE, Observatoire de Paris 77 av Denfert Rochereau, 75014 Paris cedex, France
[3]Department of Computer Science, Information Technology, Mathematics and Physics, Petroleum-Gas University of Ploiesti, 39 Bucharest Bvd Street, 100680 Ploiesti, Romania
[4]Faculty of Physics, University of Bucharest 405-Atomistilor, 077125 Magurele, Ilfov, Romania

The Romanian all-sky network Meteorites Orbits Reconstruction by Optical Imaging (MOROI) was deployed in 2017 [3] and it is fully compatible with the FRIPON one [2]. In 2020 we started to integrate the MOROI database into the FRIPON one. Figure 1 presents the statistics of the weekly multiple events (detected by two or more cameras) for 2017-2019. Figure 2 presents the preliminary statistics of number of meteors vs. duration of luminous phenomenon for 2017-2020. Nowadays the MOROI network consists of 16 all-sky cameras (to be extended to 24).

In [1] is presented a mathematical model for the dark-flight trajectory of a meteoroid based on the influence of the wind, the properties of the atmosphere, the Coriolis force and the centrifugal force. This model uses the ellipsoid shape of the Earth instead of the classical spherical one and a stochastic analysis of meteoroids inside a range of velocities using a Gaussian distribution.

In this paper we present some of the detections from the MOROI network. We present their luminous trajectory and we apply the dark-flight model from [1] in order to obtain their strewn field.



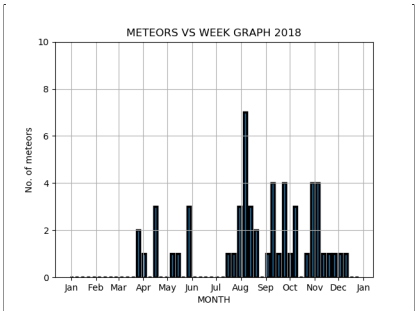


Figure 1: Number of weekly events for 2017-2019

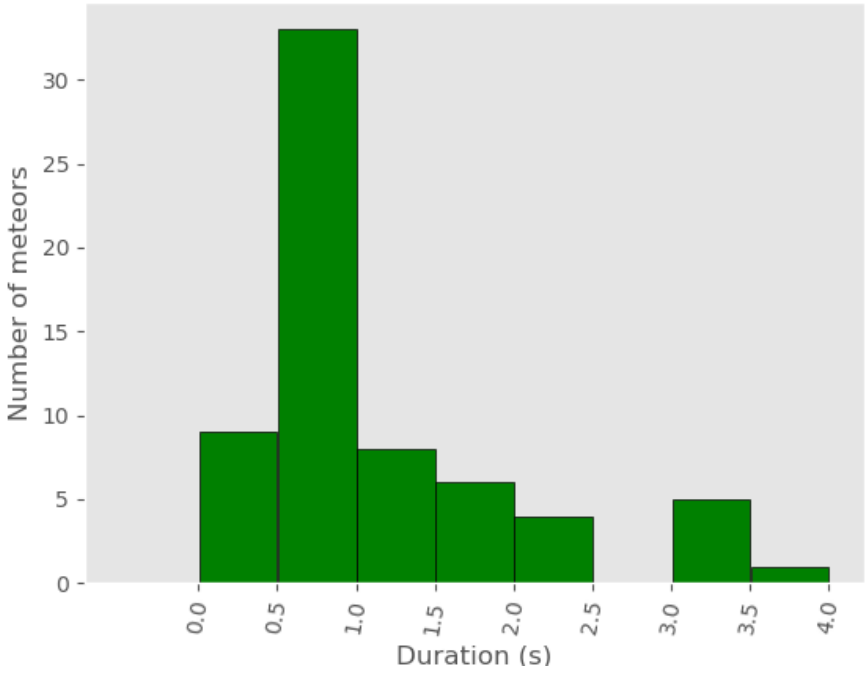


Figure 2: Distribution of duration of meteors for 2017-2020

Acknowledgements:

This work was supported by a grant of the Romanian Ministry of Education and Research, CNCS-UEFISCDI, project number PN-III-P1-1.1-PD-2019-0784, within PNCDI III.

References:

[1] Boaca I., Nedelcu A., Birlan M., Boaca T., Anghel S. Mathematical model for the dark-flight trajectory of a meteoroid, submitted to Romanian Astronomical Journal.

[2] Colas F., Zanda B., Bouley S., Jeanne S., Malgoyre A., Birlan M., Blanpain C., Gattacceca J., Jorda L., Lecubin J., et al. (385 more) FRIPON: a worldwide network to track incoming meteoroids. Astronomy &. Astrophys. 644, A53. doi:10.1051/0004-6361/202038649. 2020.

[3] Nedelcu D.A., Birlan M., Turcu V., Boaca I., Badescu O., Gornea A., Sonka A.B., Blagoi O., Danescu C., Paraschiv P. Meteorites Orbits Reconstruction by Optical Imaging (MOROI) Network. Romanian Astronomical Journal 28(1), 57 – 65. 2018.