EPSC Abstracts
Vol. 7 EPSC2012-711 2012
European Planetary Science Congress 2012

Call for observation of asteroid 2012 FZ23 and its association with southern meteor shower

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This talk addresses the topic of meteoroid stream parent body in relation to meteor showers observed in the southern hemisphere. We carry out a further search to investigate the possible genetic relationship of the asteroid 2012 FZ23 with δ Chamaeleontids meteor shower. Finally, we suggest that the future investigations need to be directed to the observations in southern hemisphere.

The asteroid 2012 FZ23

The 2012 FZ23 asteroid belongs to Apollo group. The Tisserand parameter for the orbit has a value of 2.283 with respect to Jupiter, which indicates a comet-like orbit. Diameter of the asteroid, calculated from the absolute magnitude, is in the range of 1.33-2.66 km. It all makes the 2012 FZ23 a good candidate for a dormant comet.

Simulation

The model of generation and evolution of meteoroid stream in the solar system is taken from [3]. The asteroid's orbital elements and physical properties are taken from JPL horizons website.

The ejections of meteoroids from the asteroid surface took place when the asteroid was passing its perihelion between 1000 and 2012. Next, the orbits of ejected meteoroids were integrated to year 2050. If a meteoroid is sufficiently close to the Earth (within 0.05 astronomical units from our planet), its orbital parameters are saved.

Results

The mean radiant of the generated meteoroid stream is shown in Table 1. In the IAU MDC [4] we found that the radiant position of the simulated particles looks similar to the radiant of δ Chamaeleontids shower (from working list). The most distinct difference between the simulated stream and the δ Chamaeleontids is in the solar longitude, possibly due to precession.

Stream	$\lambda_\odot$ [°]	α [°]	δ [°]	V_g [km/s]
δ Chamaeleontids	325.00	254.40	-86.10	42.60
Generated stream	359.38	271.84	-84.67	41.88

Table 1: Radiant locations of the δ Chamaeleontids and mean radiant of the generated meteoroid stream.

Conclusion

We have investigated the orbital evolution of meteoroid stream originated from the asteroid 2012 FZ23. If the asteroid was active in the past, it might be a parent body for a meteor shower observed on the southern hemisphere.
The δ Chamaeleontids shower still remains on the working list of the IAU MDC. First notice about this shower comes from 1975 [2]. Since then there is no other informations about this stream. Unfortunately, most of meteor observations have been carried out in the northern hemisphere. While observations in the southern hemisphere are limited. Thus, we suggest that southern streams should become high-priority targets for further new observation campaigns.

References

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