

The potentially hazardous asteroid 1996 JG and the North omega-Scorpiid meteoroid stream

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During the end of May and mid June, meteor and fireball activity from the Scorpiid-Sagitariid complex can be noticed. One of the streams belonging to this complex is the North ω -Scorpiids (NSC), which was previously designated by some authors as the ω -Scorpiids [1]. This is included in the IAU Working list of meteor showers with the code 66 NSC (REF). The activity period of this minor shower goes from May 23 to June 15 with a maximum around June 1st. The Apollo-type orbit of NSC meteoroids let Drummond to propose 1862 Apollo as the parent asteroid of this meteor shower [2]. Nowadays, however, the potentially-hazardous asteroid (PHA) 1996 JG is included among the potential parent bodies of this stream [1].

We report here a magnitude -10 fireball recorded on June 6, 2010, at 23h18m38 \pm 1s UTC from two video stations working in the framework of the SPanish Meteor Network (SPMN). High-sensitivity CCD video cameras recorded the event and allowed the reconstruction of the atmospheric trajectory, velocity, and radiant determination. From such data the orbital elements of the meteoroid were obtained, finding a clear association with the North ω -Scorpiids meteoroid stream. The emission spectrum produced by this event, which received the code SPMN060610, is also analyzed.

From the deduced orbital elements, by using the ORAS software (ORbital Association Software) we confirm that asteroid 1996 JG is the likely parent body of the North ω -Scorpiid stream. Thus, for example, by using the Southworth and Hawkins dissimilarity criterion, we obtain a value of D_{SH} of about 0.09 [3]. In addition, we have performed an orbital integration by using the Mercury 6 software [4]. The gravitational fields of Venus, the Earth-Moon system, Mars, Jupiter and Saturn were considered. The orbits of 1996 JG and the SPMN060610 meteoroid were integrated back for 20,000 years. As shown in the figure, the DSH criterion reveals a link between both bodies, with the values of DSH being less than 0.15 over a time scale of about 9,900 years.

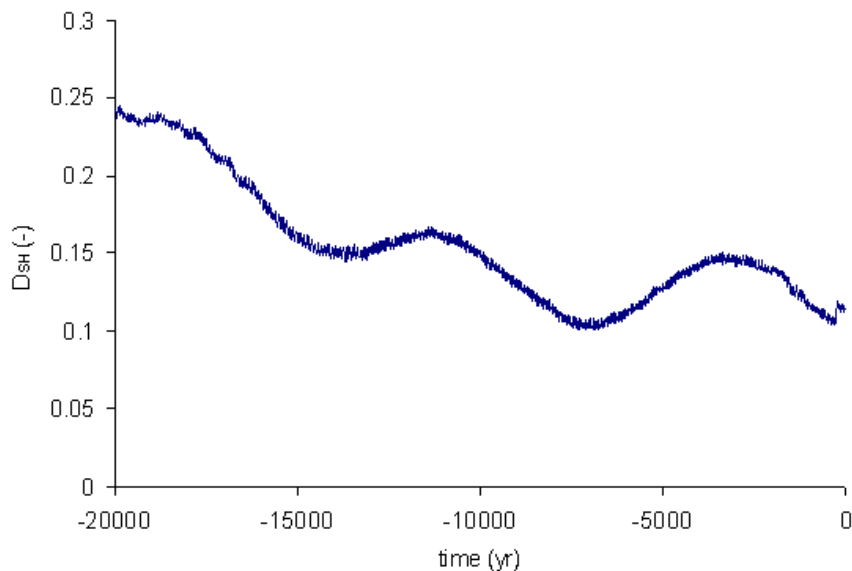


Figure: Evolution, as a function of time, of the D_{SH} criterion calculated by comparing the orbits of PHA 1996 JG and the SPMN060610 fireball.

References: [1] Jenniskens, P., Meteor Showers and their Parent Comets. Cambridge University Press, 2006. [2] Drummond, J.D. Icarus, Vol. 45, pp. 543-553, 1981. [3] Southworth, R.B., Hawkins, G. S. Smithson Contr. Astrophys. Vol. 7, pp. 261–285, 1963. [4] Chambers J.E., 1999, MNRAS, 304, 793.