

The Jupiter impact flash watch Campaign

The probability of collisions of small bodies to Jupiter had been supposed by many researchers. Their results contain an uncertainty that it was caused by a lack of knowledge about abundance of small bodies in outer solar system. Just after impacts of comet Shoemaker-Levy 9 to Jupiter in 1994, many people thought that these phenomena were very rare. 15 years after the big impact, we looked at the collision of the single body to Jupiter again. An 2009 impact caused the process of rise up of a plume and made a black scar on surface of Jupiter that is the same as many case of impacts of SL9. Unfortunately, this impact was not observed directly.

In 2010, we got two more impact to day side of Jupiter. The first event was observed as a flash of 2 seconds imaged by Anthony Wesley in Australia and by Christopher Go in Philippines. The second event was observed as similar as the first case reported by three Japanese amateur astronomer Masahiro Tachikawa, Kazuo Aoki and Masayuki Ichimaru in August. These two events were just bolides entering into the upper atmosphere of Jupiter as fireballs without leaving no explosion process causing scars. Rough estimates of the size of the parents bodies until now summarize in Table 1.

	time(UT)	observer	absolute magnitude (100km)	mass of parent body	density of body(assumed)	diameter of body	references	remarks
1	1979/3/5	Voyager 1	-12.5	11kg	2g/cm^3	0.2m	Cook and Duxbury 1981	bolide
2	1994/7/19	OA0				<1000m	Watanabe et al 1993	SL-9
3	2009/7/23	-	-	-	2.5g/cm^3	200-500m	Orton et al 2011	Only scar
4	2010/6/5	Go and Wesley	-25.2	$5\times 10^5 \sim 2\times 10^6 \text{ kg}$	2g/cm^3	$8\sim 13\text{m}$	Hueso et al 2010	bolide
5	2010/8/20	Tachikawa Aoki and Ichimaru	-22.4	$7.6\times 10^4\text{kg}$	2g/cm^3	4m	This work	bolide

Table 1 Summary of impact bodies to hit planet Jupiter

Two observations in 2010 were just found as impact flashes by chance. If we can detect impact flashes by small body less than 1m diameter, and observations are done by systematically, we expect that possibility we get a several flashes per year.

Examining of our assumption and expectation, a campaign of monitoring observation of the Jupiter impact flashes is planned from the end of August through September 9th. Participants of the observation Campaign fixed until now summarize in Table 2.

	name of observatory	location	telescope	band	periods	contact
1	Hokkaido University Nayoro Observatory	Nayoro, Hokkaido, JAPAN	Pirika Telescope 1.6m Cassegrain	889nm Methane band	31 Aug. to 9 Sep. 2012	Miwa Saito
2	National Astronomical Observatory in Japan	Mitaka, Tokyo, JAPAN	0.5m Cassegrain	889nm Methane band	31 Aug. to 9 Sep. 2012	Tatsumi Murakami
3	Kawasaki Municipal Science Museum	Kawasaki, Kanagawa JAPAN	0.4m Cassegrain	IR	31 Aug. to 9 Sep. 2012	Takuya Ohkawa
4	Yamazaki Astronomical Observatory	Machida Tokyo JAPAN	0.3m Cassegrain	visible	31 Aug. to 9 Sep. 2012	Akihiro Yamazaki

Table 2 Participants of this campaign

Many other amateur astronomers will perform monitoring observation of Jupiter in this period. To extract bolide of retaining high frame rate (over 15fps), it is efficient to reduce the surface luminosity of Jupiter using of methane band filter.

There are some phenomena such as flash of artificial satellites resembling impact flash, so we have to confirm simultaneous observations from distant places. One of the purpose of this Campaign is to share the observational results, we confirm that the phenomena occur on the surface of Jupiter. Main goal of this study is not only to investigate bolide phenomena but also to clarify the size distribution of small bodies of sub-meter size at outer solar system using Jupiter as a detector.

Any groups or any professional and amateur astronomers are welcome to our campaign. Please contact to me if you hope to participate.

Dr. Jun-ichi Watanabe

National Astronomical Observatory of Japan

jun.watanabe <at> nao.ac.jp