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Contributions of amateurs astronomers to the studies of comets: a French participation

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Abstract

Amateur astronomers have always played an important role in cometary science. Nowadays, with the improvement CCD equipment, automation of data reduction and softwares, they can and do still provide very valuable data to the cometary community, mainly concerning astrometry, photometry and recovery of comets.

1. Cometary amateur astronomy in France

The national amateur association "Société Astronomique de France" (SAF) was funded in 1887 by Camille Flammarion, well known for its work on popular astronomy. The study of the various astronomy topics are grouped in sections, one of these being the comet section ("Commission des comètes"). Its goal is to strengthen the interest in comets among amateurs, and coordinate the work done by experienced amateur astronomers in this field. Over a dozen of amateur astronomers in France carry out regular observations of comets and provide reports to the CBAT/MPC/ICQ in form of astrometry or photometry. Table 1 list examples of the most prolific astrometrists, but it is far from being complete and many amateurs also make visual estimates and other work on comets with instruments ranging from naked eye to 0.5 m class telescopes.

2. Astrometry

Comet astrometry has become a regular practice from several French observers. Their contributions to the MPC appears regularly in the Minor Planet Electronic Circulars [1] and amounts to over one thousand astrometric positions per year. The contribution of amateurs to the astrometry of comets has increased steeply over the past years. At least two of the French contributers lie within the five most prolific worldwide (either regarding the number of comets observed or the number of cometary astrometric measurements). On the other hand, such work has been extremely well appreciated from the professional side: more and more professional equipment (ground based radio telescopes and interferometers, space telescopes and space missions) rely on precise ephemerides of comets, that could not be done without the help of precise and numerous astrometry.

3. Comet recovery

Another activity amongst French amateur astronomers has been the attempts for early recovery of periodic comets. Today's equipment allow searches beyond the 20th magnitude. One of the recent example has been the recovery of comet 21P/Giacobini-Zinner at magnitude 20 on 1 May 2011 by stations A77 and C10. Early recovery of comets of astrophysical interest is also of great value to the professional community as it helps scheduling observations ahead of time.

4. Photometric support

The photometry is the other essential input from the observations of comets by amateurs. Automatic surveys while providing useful and abundant astrometry are generally yielding poor or even useless comet photometry. Although the magnitudes provided with astrometric reports are quite often hard to use, additional and more precise photometry is often provided by amateurs. They range from fixed aperture "m2" CCD magnitude, or even more rigorous Afρ measurements to global magnitudes "m1" reported to the ICQ either by CCD or visual observers. Dedicated project are also underway, e.g. V and R photometry of the inner coma of comet 29P/Schwassmann-Wachmann 1 and

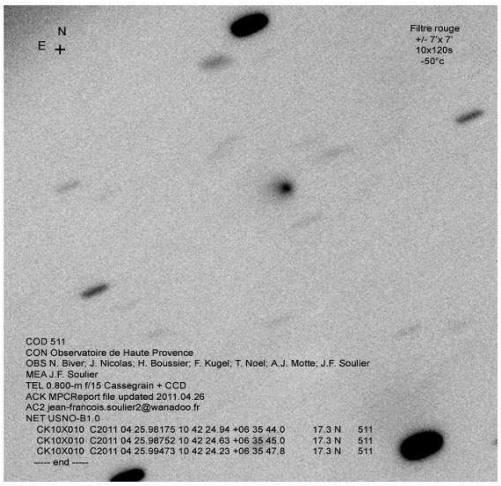

Figure 1: Comet C/2010 X1 (Elenin) observed by the SAF commission des comètes on 25 April 2011 with the 0.8 m telescope of Haute Provence Observatory during its annual meeting.

the connection to its outbursting activity. The photometric survey of this comet 29P has been greatly appreciated by professional, especially in the frame of the support of its observations by the Herschel Space Observatory [3].

Table 1: Sample of comet astrometrists in France

IAU Obs. Code	Location in France	Telescope Diameter	Observer	Comets observed in 2010–2011
A77	South-East	0.50, 0.20 m	F. Kugel	103+49
C10	Center-East	0.26 m	J.F. Soulier	50+31
958	South-West	0.20, 0.32 m	P. Dupouy	22+38
B83	South-East	0.20 m	T. Noel	17+ 5
B51	South-East	0.41 m	J. Nicolas	9+ 3
C09	South	0.13 m	G. Sachot	21+16
B26	South-East	0.35 m	H. Jacquinot	25 in 2009
A11	North	0.07 m	S. Takbou	7 in 2009
C61	Center	0.13 m	T. Lemoult	

5. Useful links

A dedicated web page has been set up by Thierry Noel [2] in order to gather all the astrometry, photometry and images of comets by (French) amateur astronomers to provide a database freely accessible with thousands of up-to-date measurements. It is of easy access and can be used to view the latest trend in brightness for many comets.

References

[1] MPEC website:
http://www.minorplanetcenter.net/iau/services/MPEC.html

[2] SAF commission des comètes web database:
http://comet.observations.free.fr/index.php

[3] Bockelée-Morvan, D., Biver, N., Crovisier, J., et al. 2010, Bull. Amer. Astron. Soc. 42, 946