

The strange case of Main Belt comets

M.T. Capria and M.C. De Sanctis

INAF – IASF, Rome, Italy
(mariateresa.capria@iasf-roma.inaf.it)

Abstract

Until now three objects classified as “main belt comets” have been discovered [1] [2]. These objects have peculiar properties. They are comets, in the sense that they display coma and/or tail, but they are also native members of the Main Asteroid Belts, with a stable orbit similar to the ones of the “true” asteroids. It is highly probable that this activity is originated by the sublimation of volatile material. This poses several questions:

- how is it possible that this volatile material has survived for such a long time at this distance from the Sun?
- which is the process that has triggered the present-day activity?
- How long could last such a kind of activity?

We are investigating this issue by using a numerical model for the thermal evolution and chemical differentiation of cometary nuclei [3] [4]. We are making and testing various assumptions on the nature, properties and location of this volatile material. On the basis of the results of our models, we can derive some constraints on the nature, present and future activity of these comets. If we make the assumption that the main belt comets are similar to the more usual comets, we can also derive some constraints on thermal properties of cometary ices.

References

- [1] Hsieh, H.H. and Jewitt, D. (2006) *Science*, 312, 561.
- [2] Hsieh, H.H. et al. (2009) *The Astronomical Journal*, 137, 157-168.
- [3] Capria, M.T. (2002) *Earth, Moon and Planets*, 89, 161-178.

[4] De Sanctis, M.C. (2007) *The Astronomical Journal*, 133, 1826.