

## Could Extrasolar Comets be Detected with Darwin?

Didier Despois

*Observatoire de Bordeaux OASU/LAB*

*FRANCE*

*[despois@obs.u-bordeaux1.fr](mailto:despois@obs.u-bordeaux1.fr)*

Jacques Crovisier

*LESIA, Observatoire de Paris-Meudon*

*FRANCE*

A. Léger

*Institut d'Astrophysique Spatiale*

*FRANCE*

In our Solar System, comets have been a source of volatiles and organic molecules for the early Earth. They also are a cause of major impacts. For both reasons, they have played a role in the apparition and evolution of life on Earth.

Comets formed as icy planetesimals in the protosolar disk, beyond the snowline . These planetesimals participated to the formation of the giant planets. With little or much perturbation from the newly formed planets, some have populated the two comet reservoirs, the Kuiper Belt and the Oort cloud. From time to time, some come from these reservoirs to visit the inner planets region.

In our present understanding of planet formation, the broad lines of this scenario should apply to other planetary systems, but huge variations are possible in the parameters (snowline position, initial number of icy planetesimals, existence, type and location of massive planets, orbital evolution of planets - resonances, migrations- and of comets,...). These variations will have large consequences on the number of comets, and thus on the conditions for the apparition and evolution of life in these systems

Future powerful astronomical instruments will help to constrain progressively the comet frequency in extrasolar planetary systems. In our solar system, each 1-2 year a bright comet appears in the terrestrial planet zone, and sometimes a much brighter one appears temporarily in the sky (like recently C/1996 O1 (Hale-Bopp) for several months or C/2006 P1 (McNaught) for several days).

We discuss here the possibility of detection of such bright comets with future large space telescopes dedicated to planetary search by direct imaging as (in the mid infrared) Darwin.