

# EuroPlanet N2 DWG4+9

# A Science Case for Comets

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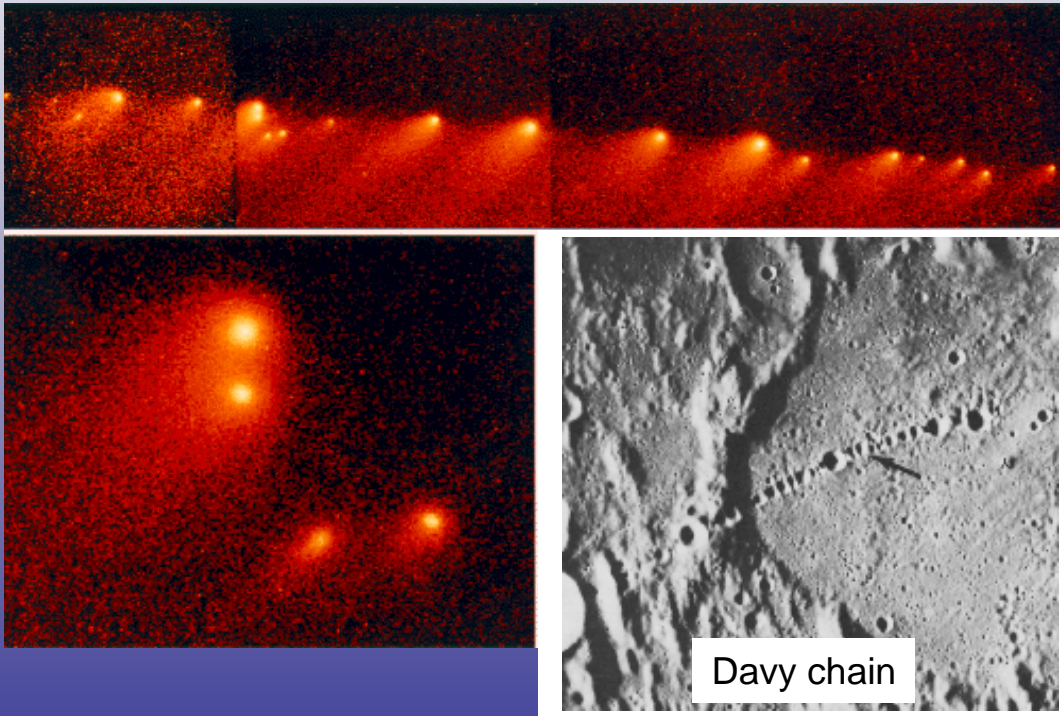
## N2 Meeting November 21-23 2005 Northeim, Germany

1. How can we best optimise from observations, numerical experiments, laboratory simulations, further analysis of past mission data the science return of Rosetta?
4. How representative are the comets that were intensively studied or that will be intensively studied, of the whole population of comets in space and time (i.e. everywhere in the solar system, now and in the past)?
6. What are the connections between TNOs, centaurs, trojans, comets and icy satellites and what is the dynamical and morphological structure of the Kuiper belt?
- 7. What are the physical/chemical processes leading to distant activity, outbursts, splitting and disruption of cometary nuclei?**
8. To which extent have the interstellar grains preserved their pristine properties and to which extent have they been processed in the cometary nucleus?
9. What are the values and ranges of key properties of a significant number of small bodies to constrain the formation environment and evolution of these bodies, e.g. density, bulk composition, mineral composition, isotopic, elemental, molecular composition, chemical and physical properties, dynamical evolution, etc.?

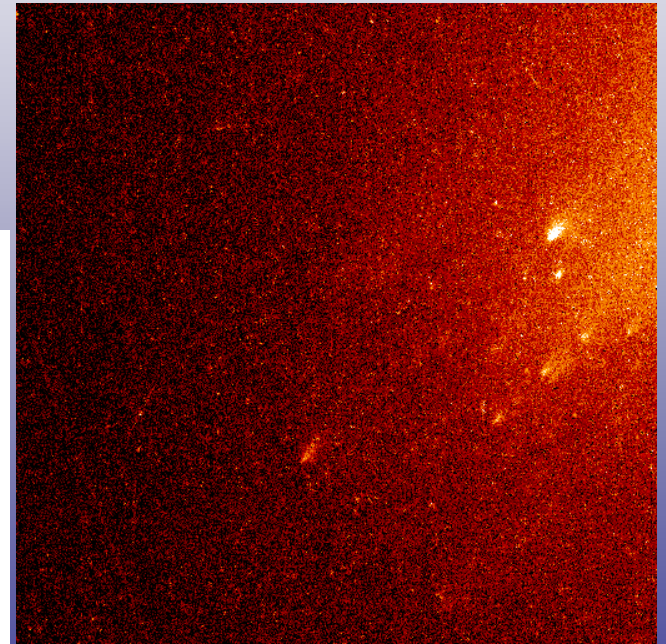
# Distant Activity, Outbursts, Splitting and Disruption of Cometary Nuclei

The activity of comets is determined by a complex combination of internal and external causes.

Shoemaker-Levy 9

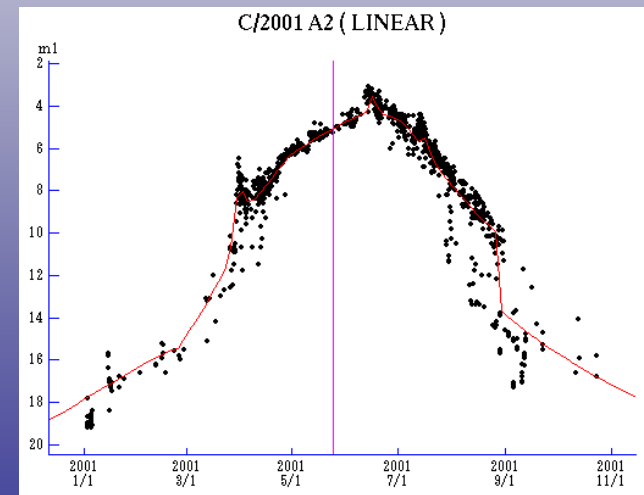


C/1999 S4 (LINEAR)



# Data Sets

- remote & in situ satellite observations
- ground based observations
  - from X-rays to radio wavelengths
  - astrometry, photometry, imaging, spectroscopy
  - visual magnitude estimates
- modeling



# Problems

- finding relevant data
- availability and coverage of existing data
- coordination of observations
- consistency of different data sets, models & analysis methods

Many scientist have easy access to a handful of different data sets only, and have to rely on personal contacts for comparisons between sets. Most publications are case studies with very limited scope.

# Solution

- a searchable database for various cometary observations
- a medium to coordinate short and long term observations and analysis
- standardized models, analysis methods and parametrizations for greater coherency between results
- existing infrastructure: CBAT/MPC/ICQ
- most scientist working on cometary activity will also need access to a database on solar activity