

sci.space.policy: Re: nitrogen sources and comets (was Re: Cassini a genuine human triumph)

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**From:** Christopher M. Jones (*marmiteNOTSPAM\_at\_dualboot.net*)

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Henry Spencer wrote:

- > *And speaking of nitrogenous organic glop, the dust-analyzer results of the*
- > *Stardust encounter with Wild 2 indicate that the dust being expelled from*
- > *this particular comet is mostly nitrogenous organic glop. (I'm just*
- > *reading the collection of papers and commentary on this encounter in the*
- > *18 June issue of Science.) Which is interesting, because this isn't even*
- > *a particularly well-aged comet -- it's more or less freshly in from the*
- > *Kuiper Belt.*

I would imagine nitrogenous organic glop would be pretty common, as it seems to be. Methane and ammonia aren't all that stable on their own, even at low temperatures. They're most likely going to slowly "degenerate" into more stable chemicals with a higher number of CNO-CNO bonds instead of mostly CNO-H bonds.

- > *Mind you, one of the pieces in Science agrees :-)* with a prediction I've
- > *been making for a little while: comets seem to be quite a diverse*
- > *population and we don't understand the different kinds well yet. There's*
- > *a "Comets II" book in the works from U of Arizona Press, and one of its*
- > *themes -- that comet nuclei seem to be weak "rubble pile" objects -- has*
- > *already been torpedoed by the Stardust observations. Wild 2's nucleus is*
- > *\*not\* a rubble pile: its features indicate that its materials have*
- > *significant structural strength. We need to visit a bunch more comets.*

Very much so. Unfortunately, the best probe for that job blew up before leaving Earth orbit. I really hope a new mission of a similar design gets funded, that was just such a perfect science sweet spot. We've seen so few small bodies of any kind up close, especially comets and that design would have duplicated the Stardust mission for 3 comets except for the sample return. Perhaps there'll be a son-of-Contour with the same instruments and a different propulsion system. Or maybe a revenge-of-Contour on a New Frontiers budget with electric propulsion, it could

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probably perform flybys of old and new comets for decades.  
We need something similar for asteroids too; or, heck,  
just use the super SEP version to flyby ever damned thing  
it can.