

Re: Why I am satisfied with the new IAU definition of planet

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- *From:* Wally <woodfield@xxxxxxx>
 - *Date:* Sun, 10 Sep 2006 01:06:22 -0500
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Greg Crinklaw wrote:

I tried to post this to a Yahoo group but because of the narrow focus of the groups I belong to, it is deemed an inappropriate subject. So I'll toss it out to the wolves here instead.

It was inevitable that no matter what the IAU decided about the definition of "planet" (even if they decided not to decide) there were going to be a lot of people unhappy with the decision. The reality is that astronomers have long been split on the status of Pluto as a planet and obviously that split remains.

Going into the debate I was in favor of keeping Pluto as a planet.

Here are the things I felt should be accomplished by a definition of the word. It should require:

- (1) a non-arbitrary definition with a basis in science, having to do with how planets form or a basic characteristic such as primary composition.
- (2) a minimal impact on the societies of the world, unless justified strongly by (1). In other words, let's not give up Pluto, and let's not introduce dozens of new planets without a compelling reason to do so.

Because of the second point I felt Pluto should simply be left as it was. I saw no sign that we understood the formation of the planets well enough such that we would satisfy requirement (1). I saw no physical distinction between "major" and "minor" bodies in the solar system to easily fit our preconceived notions. It seemed like we were trying to force an arbitrary distinction on a continuum.

But I was unaware of this:

<http://arxiv.org/abs/astro-ph/0608359>

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From the abstract:

"A planet is an end product of disk accretion around a primary star or substar. I quantify this definition by the degree to which a body dominates the other masses that share its orbital zone. Theoretical and observational measures of dynamical dominance reveal a gap of four to five orders of magnitude separating the eight planets of our solar system from the populations of asteroids and comets."

What this work does is conclude that there is in fact a clear distinction for "a major solar system body" based on how these bodies dominate their zone during the process that formed them. Pluto fails this test completely, whereas the other planets pass it with flying colors.

While the IAU definition of a planet failed to cite this work implicitly, it was presumably understood by those voting that this was the underlying basis; above is what is meant by "clearing its neighborhood." I assume it is the intention of the IAU to define more clearly what is meant by that statement in time—the statement itself is meant only as a general principle.

In other words, the IAU failed to clear its own orbital zone?

This definition is based in the science of how planets and other bodies form around a star. It satisfies my requirement No. 1 and, for me, it satisfies it well enough to give up Pluto as a planet.

So in other words, the word planet is now a code word for a "formative process"?

And if this is/are true, then lets get this business of "clearing a neighborhood" down

straight – pleeeez!?! It isnt the "planetesimalista" (or the accretion disk) that clears

itself? In other words, stellar formation is not static and benign during the same periods accretion disks are supposedly politely sweep their neighborhoods clean, gravitationally?

So "planet" is now time–dependent? Not just a "wanderer" in the here and now but something with a scientifically provable formative history?

And not just an object perhaps with satellites within a certain specified zone around a parent star, but anything beyond the magical line is a Kuipertino?

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In the last week or so I've been thinking about this quite a bit; I've looked at adopting the IAU definition for use in future versions of my software.

Sales will follow of course. Then redefine star, constellation, and RA & DEC must be dispensed with also! Sales will followeth!

In doing so, I have been "living" with this new definition and I'm surprised by how comfortable I have become with it.

One of the things I've been working on lately is how the asteroids are classified with regard to their orbits. When you look at it from this perspective it becomes pretty clear that Pluto is one of the largest and certainly the brightest of the Scattered Disk Objects.

Scatterinos of the Diskotinos! O–yeh ay–Kay?

That clearly makes it special. But on par with Jupiter? The honest, objective answer is no.

Was there a serious juxtaposition of Jupiter with Pluto? For what purpose? Little Juplutinos?

It took me a while, but I've come to really like the idea of a dwarf planet class:

There already was major vs minor planets.

bodies that stand out from the rest of the rubble because they are massive enough to be round, yet have not come to dominate their surroundings in the same way that Jupiter or even Mercury have.

There is something in this that smacks of deep unrealism.

Pluto is now the prototype of this new class of objects, which is a fitting tribute to its discoverer. Ceres is now elevated to a status that it deserves, and I hope more attention will be paid to it in the future

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because of it. And finally, 2003 UB313 (Xena) and the many other similar large objects in the outer solar system have a class to call their own.

Good sales pitch.

So, who is going to be the first to see all three dwarf planets?

The same as always saw the same minor planets!

Ceres is easy. It can be seen in any telescope (or even large binoculars). Pluto is visible in a six-inch from a dark site, although an eight-inch or larger is probably best. Xena *might* be glimpsed in a 40-inch scope... but it can be detected in amateur instruments equipped with an imager. And they are well placed for observation this month!

And what is gained that was not already there? More and clearly labeled address signs on every road in the county, I think. Should generate more sales and more intrusive commercialism but science?

Clear skies,
Greg

—

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