3I/Atlas Update

November 5, 2025

Summary of predictions posted on 20th August 2025

- The interstellar object 3I/Atlas could experience extra non-gravitational acceleration during the period 1st September 2025 through 31st October 2025 due to its proximity to Mars.
- Cloud discontinuities will appear on Venus from 26th October 2025 until 26th March 2026 due to the influence of Mars.
- Saturn's equatorial zonal wind speed will significantly slow down from December 2025 until June 2037 due to the influence of Uranus.

3I/Atlas Non-gravitational Acceleration

There is now potential strong evidence that supports the first of these predictions. On 29th October 2025, JPL updated their Small-Body Database Lookup (https://ssd.jpl.nasa.gov/sbdb.cgi) for 3I/Atlas that included extra parameters for non-gravitational acceleration for the first time. The initial figures (jpl28 solution date 2025-Oct-29) for A1(Non-gravitational radial acceleration) and A2(Non-gravitational transverse acceleration) were $1.66(53) \times 10^{-6}$ au/day^2 and $7(3) \times 10^{-7}$ au/day^2 respectively. The latest figures (jpl29 solution date 2025-Nov-04) are $1.11(30) \times 10^{-6}$ au/day^2 and $4(2) \times 10^{-7}$ au/day^2.

To put this into context, I've adapted figure 1(Nature 2018)[1] to include A1 values for comets 2I/Borisov and 3I/Atlas (jpl29) (see figure 1).

References

[1] Micheli, M. *et al.* Non-gravitational acceleration in the trajectory of 1i/2017 u1 ('oumuamua). *Nature* **559**, 223–226 (2018).

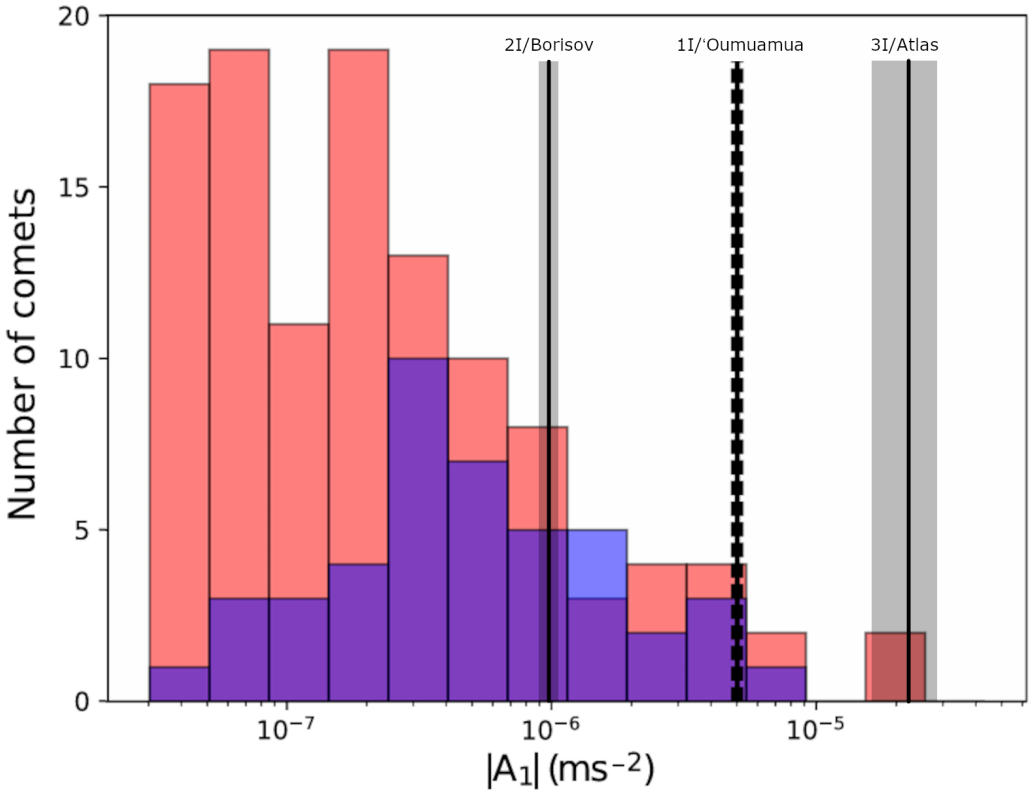

Figure 1: Non-gravitational radial accelerations of interstellar objects. Red represents short-period comets. Blue represents long-period comets. Black lines indicate A_1 values for 1I/'Oumuamua, 2I/Borisov, and 3I/Atlas. Grey represents the 1-sigma uncertainties.