

2013 bright spots on Neptune

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Abstract

In 2013, for the first time amateurs have been able to capture a white spot in the southern hemisphere of Neptune.

1. Introduction

After Uranus spot observed in 2011 from Pic du Midi one meter telescope (T1M) by an amateur (see [1]), bright spots could be observed from Earth by amateur either with their backyard telescope, or from Pic du Midi T1M.

2. Amateur data

Amateurs use mostly reflectors with an aperture from 25 to 40 cm. Their observations are in 4 months around Neptune's opposition but this planet was not often observed, as it was not considered that details could be imaged with small apertures telescopes. The data comes from different sources (French Astronomical Society, ALPO Japan, IOPW, ...). Observations by a few amateurs from US and Europe from July to October 2013 have been studied, included some from the T1M at Pic du Midi, yielding 18 individual measurements of white spots, in near infrared long-pass filters. This allowed to track in particular spots in the northern hemisphere. WinJUPOS software, used by amateur astronomer associations on Jupiter and Saturn, was used to measure the position of features, and derive one drift rate in longitude.

3. Results

3.1 Persistent white spot in the northern hemisphere

Throughout the apparition, 13 candidate white spots could be observed between -55° and -33° latitude. These are visible in figure 1.

Out of these, 5 observations are well aligned on a drift rate line of $-0,45^\circ/\text{JD}$ (Julian day) ($\pm 0,3^\circ/\text{JD}$), at a $-45,6^\circ$ latitude ($\pm 1,2^\circ$).

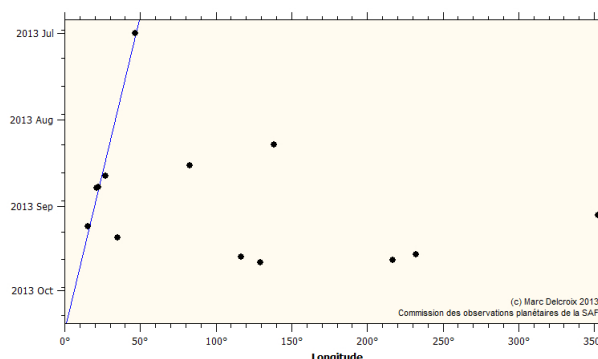


Figure 1: White spots in the $[-55^\circ, -35^\circ]$ latitude range. A few white spots have been observed including a persistent one following a constant drift rate line.

Peter Gorczynski (USA) discovered that spot on Aug. 21th 2013 (see figure 2), but it had been first observed previously on July 1st 2013 by amateur Marc Delcroix and François Colas using the one meter telescope at Pic du Midi, France (see figure 3 and [2]). This white spot appeared extremely bright in the observations from end of August to mid September 2013.

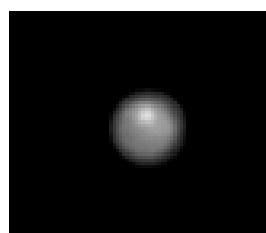


Figure 2: White spot discovered on 2013.08.21 at 4h46UT with a 355mm reflector and a $>685\text{nm}$ long pass infrared filter.

Peter Gorczynski



Figure 3: infrared ($>685\text{nm}$) image of Neptune taken on 2013.07.01 02h57UT

Marc Delcroix/François Colas

3.2 Other potential spots

A few single observations of candidate spots were done at other latitudes ($+2^\circ$, -12° , -24° , -33° , -73°). These are non confirmed observations due to the very small images that amateurs can get of this faint and low apparent diameter planet.

4. Summary and Conclusions

In 2013, amateurs proved successfully their ability of observing a very bright spot at $\sim 45^\circ\text{S}$ latitude on Neptune in infrared wavelength, despite the very small apparent diameter of the planet and its' faint luminosity. Their observations allowed to estimate the spot's drift rate of $-0.45^\circ/\text{JD}$. This proves the interest of having this difficult planet as a target for regular amateur observations. This could be the case as well for Uranus, despite its less contrasted spots still never observed with amateur equipments, as this planet's apparent diameter is twice as big, and which is 2 magnitudes brighter.

Such regular observations would be useful for targeting professional studies as these planets are not observed very often with professional telescopes.

Acknowledgments

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References

- [1] Stromovsky L. et al.: Episodic bright and dark spots on Uranus, *Icarus* vol.220 issue 1 pp 6-22, 2012
- [2] Delcroix M. et al., Amateur observations with one meter professional telescope at Pic du Midi, EPSC2014