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# OBSERVING NEOs FROM FRENCH POLYNESIA

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## INTRODUCTION

It is of prime importance to bridge the observatory gaps in the Southern Pacific Ocean by installing at least one telescope that could be made available on short notice for tracking NEOs. The fly-by of 2014RC in September has been an actual opportunity for activating from CNES Toulouse a telescope operated by the “Société d’Astronomie de Tahiti (SAT)” in Papeete, French Polynesia. This NEO has an estimated diameter of 20 m, an absolute magnitude of 26.8 and a period of about 1.5 year.

As soon as this NEO has been discovered and that its closest approach to the Earth has been determined to be over the Southern Pacific (New Zealand) at an altitude of 33,550 km above the Earth's surface, the Geodesy Observatory of Tahiti (University of French Polynesia, UPF) in Papeete has been contacted by CNES and in less than two days, the planning for the observation of 2014 RC has been established.

## OBSERVATIONS OF 2014 RC

Twelve observations (Figure 1) were then carried out by SAT on September 7, with operators Claude Lamotte and Hong-My Phong. A Celestron C-14 telescope was used, with an Atik-4000 2048x2048 pixel CCD provided by UPF. Pointing accuracy was in the 2” range. A comparison was done recently with the orbit computed by JPL (Horizons ephemerides webserver), taking into account 245 worldwide observations archived at the Minor Planet Center from 25 worldwide observatories, but with little coverage from the South Pacific. The observations done by SAT were not included to generate the JPL ephemeris.

A small discrepancy in right ascension is clearly visible between observations taken by SAT (red crosses, left) and the JPL ephemeris (blue line, right) in Figure 1. This discrepancy can be explained (red curve, left) by, for example, a very small change in the longitude of the ascending node of the JPL orbit, from 345.478473 degrees to 345.478223 degrees, showing clearly that very valuable information to constraint orbits can be obtained through observations from French Polynesia (see Figure 2 for the ground track of the asteroid and ground telescopes that observed the asteroid).

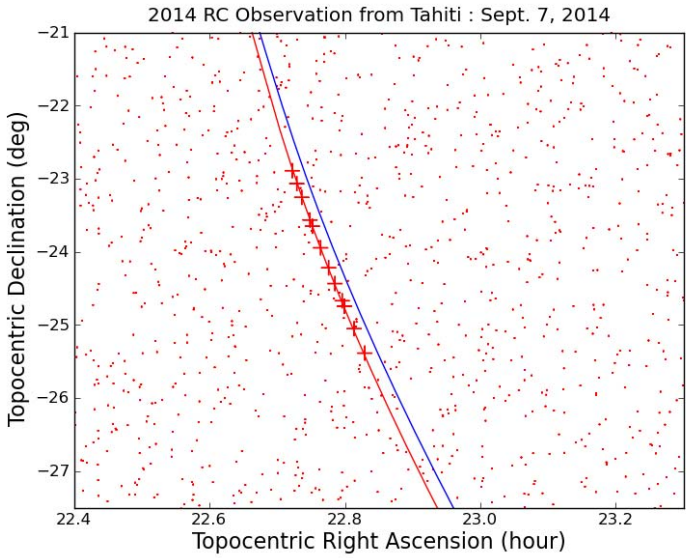


Figure 1: Observations (red crosses) from Tahiti, and JPL computed orbit (in blue)

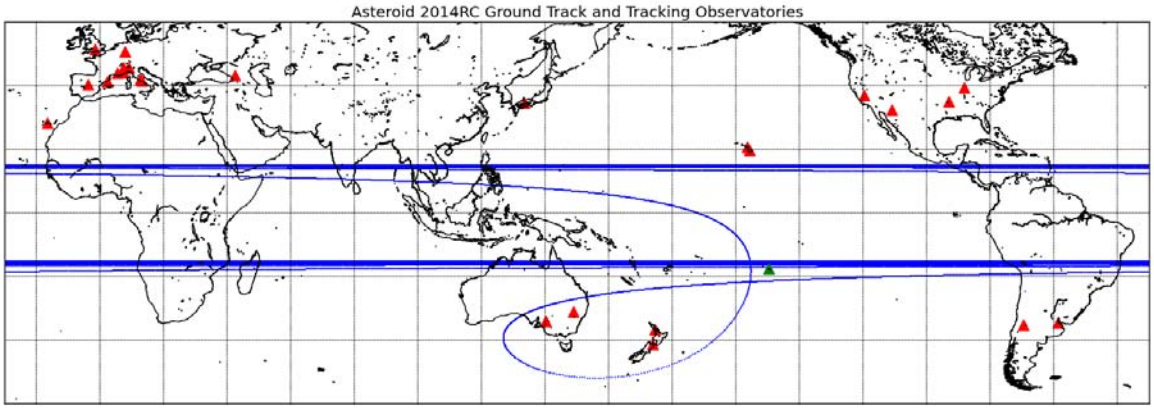


Figure 2: ground track of asteroid 2014 RC (in blue), with MPC observatories that contributed to its orbit determination (red triangles). Tahiti SAT observatory is shown as the green triangle in the middle of the South Pacific.

## CONCLUSION

This observation sequence demonstrates the value of operating a site in French Polynesia (Tahiti, green triangle in Figure 2) for the survey of NEOs. This could be envisioned in the frame of the ESA's SSA programme.