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Astrometry Observations of Asteroids at Oukaimeden Observatory (J43)

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Abstract: We found in our solar system, many rocky bodies, sometimes metal, smaller than planets and usually irregular in shape. They are called "asteroids". In this paper we present the initial results of asteroids observed at Oukaimeden Observatory in the High-Atlas mountains Moroccan, these detections have been identified using C14 telescope on AP900GTO mount and the SBIG ST7XME camera equipped with an focal reducer. The results obtained, allows us to identified four asteroids already known, their trajectories on three nights of observation it was noted and the coordinates sent to the MPC, which has proceed the validation of these measurements before ascribing the J43 code and the Oukaimeden Observatory name.

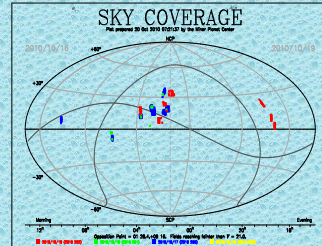
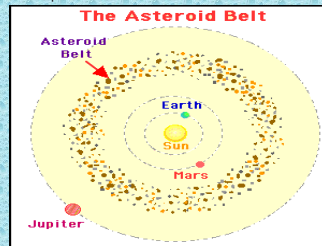
Introduction: Asteroids are rocky and metallic objects that orbit the Sun but are too small to be considered planets. They are known as minor planets. Asteroids range in size from Ceres, which has a diameter of about 1000 km, down to the size of pebbles. Sixteen asteroids have a diameter of 240 km or greater. They have been found inside Earth's orbit to beyond Saturn's orbit. Most, however, are contained within a main belt that exists between the orbits of Mars and Jupiter. Some have orbits that cross Earth's path and some have even hit the Earth in times past. Oukaimeden observatory is located at 2700 m above sea level (7°52'52" N, 31°12'32" W), 70 km from Marrakech city. The observatory has been fully operational since 1988 (see the picture). A programme of astrometry was started on 10th July 2007. Observatory code J43 was allocated to Oukaimeden Observatory by the Minor Planet Center in July 2007.



Three modules of observation and experimentation (2 towers and a solar hut).

How to Find And Observe Asteroids

To find an asteroid you will need to find out exactly where it is at the particular time you wish to observe it. To find an asteroid you will need to determine the position of the asteroid for the time you will be observing and perhaps make a finder chart showing the position of the asteroid among the stars. This can best be done by using the internet to access the Minor Planet Center at <http://cfa-www.harvard.edu/cfa/ps/mpc.html>. This web page contains many resources to assist you in finding asteroid positions and help you develop a list of targets to observe. the asteroids orbiting the Sun between the orbits of Mars and Jupiter



The C14 with the AP900GTO mount on pillar

Data recovery and pretreatment

- Using the camera SBIG ST7XME controlled by software (PRISM5) and the exposure of 60 seconds, we saved a series of images as format ".fit".
- Reads FITS (8, 16 and 32 bit integer files) and SBIG image files. The size of the images is only limited by the available memory.
- Automatic image calibration (Dark Frame and Flat Field correction).
- Blinking with automatic image alignment.
- Zoom and 'Magnifying Glass' for closeup image inspection.
- Automatic reference star identification.
- Automatic moving object detection and identification.
- 'Track and Stack' function to follow fast or very faint moving objects.
- Access to the complete MPC database of orbital elements (MPCOrb).
- Access to new-generation Stars Catalogs (UCAC 3, NOMAD, USNO-B1.0 and CMC-14).
- Includes Internet access (Send e-mail to the MPC, download the MPCOrb database or query reference stars catalogs)

Pretreatment procedure:

We begin by eliminating the dark current generated by the CCD. For this we made a "superdark" which is obtained by taking the median darks which is subtracted from each offset corresponding to it. Subtracting this superdark to the raw image we want to preprocess. (Here is the only dark superdark taken)
 • Then it removes dust and vignetting due to the telescope. For this we made a "Superflat" which is obtained by averaging the flats which was subtracted the offset that corresponds to it. Dividing this superflat to the image that was subtracted superdark. This gives a picture pretreated.
 This procedure is done automatically using the Astrometrica software.
 We can now exploit the acquisitions.

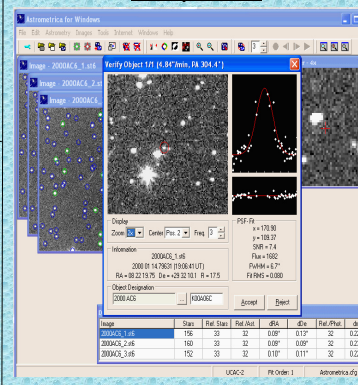
Asteroids :	Set N°1	Set N°2
Alpha= 22 05 49	1 ^h) 01 :06 :37	11 ^h) 02 :48 :17
Delta= -05 30 21	2 ^m) 01 :08 :18	12 ^m) 02 :51 :06
N°= 21356
Mag= 18.5	10 ^m) 01 :19 :46	20 ^m) 03 :05 :14
2002TN169
Alpha= 22 05 01	1 ^h) 01 :24 :04	11 ^h) 03 :09 :07
Delta= -05 08 02	2 ^m) 01 :25 :37	12 ^m) 03 :12 :03
N°= K02TG9N
Mag= 19.6	10 ^m) 01 :37 :13	20 ^m) 03 :21 :14



The observatory building with the white Sky dome



Principal tower



Astrometrica software and reduction astrometric

Results

Longitude	:07deg 52' 52" West		
Latitude	:31deg 12' 32" North		
Altitude	:2750 meters (above sea)		
Name	:Oukaimeden Observatory		
COD XXX			
OBS Z. A. Habib, M. Sabil, M. Ory			
MEA Z. A. Habib, M. Sabil, M. Ory			
TEL 0.36-m f/7.37 reflector + CCD			
ACK First measurements from Oukaimeden Observatory			
AC2 habib_af@yahoo.fr, pivatte@bluewin.ch			
NET GST-ACT			
08282	C2007 07 17.14311 22 13 51.07 -10 54 15.0		XXX
08282	C2007 07 17.15603 22 13 50.79 -10 54 16.5		XXX
08282	C2007 07 17.17236 22 13 50.43 -10 54 18.7		XXX
08282	C2007 07 17.18139 22 13 50.21 -10 54 19.5	18.0 R	XXX
NET UCAC-2			
03775	C2007 07 18.01918 22 34 56.34 -06 03 56.2	12.2 R	XXX
00376	C2007 07 19.03155 22 34 56.03 -06 03 54.4	12.2 R	XXX
05049	C2007 07 19.00817 22 22 04.71 -11 58 12.9	17.7 R	XXX
05060	C2007 07 19.04159 22 22 03.87 -11 58 16.3	18.4 R	XXX
05282	C2007 07 18.99241 22 13 10.62 -10 58 17.4	18.0 R	XXX
08282	C2007 07 19.01130 22 13 10.19 -10 58 20.1	17.7 R	XXX
08282	C2007 07 19.02506 22 13 09.88 -10 58 22.1	17.9 R	XXX
08282	C2007 07 19.04642 22 13 09.33 -10 58 25.0	17.9 R	XXX
09767	C2007 07 19.01447 22 08 05.38 -10 41 07.5	17.5 R	XXX
09757	C2007 07 19.02848 22 08 04.98 -10 41 09.1	17.4 R	XXX
88718	C2007 07 19.00984 21 49 02.20 -10 54 14.9	18.5 R	XXX
68718	C2007 07 19.03959 21 49 01.21 -10 54 23.9	18.2 R	XXX
68718	C2007 07 19.04104 21 49 01.13 -10 54 24.1	18.7 R	XXX
68718	C2007 07 19.05712 21 49 00.54 -10 54 27.6	18.8 R	XXX
A GARDER			
OUK001	C2007 07 19.01818 22 34 28.09 -06 11 48.3	17.9 R	XXX
OUK001	C2007 07 19.03155 22 34 26.91 -06 11 52.2	18.4 R	XXX

COD J43

OBS M. Sabil, Z. Benkhaldoun			
MEA M. Sabil, Z. Benkhaldoun			
TEL 0.36-m f/7.37 reflector + CCD			
ACK MPCReport file updated 2007.07.24 15:36:22			
AC2 zohair@ucam.ac.ma			
NET UCAC-2			
K02TG9N	C2007 07 20.95512 22 07 55.82 -05 16 46.5	19.4 R	J43
K02TG9N	C2007 07 21.01566 22 07 53.70 -05 16 39.6	19.7 R	J43
K00R37O	C2007 07 20.01022 22 13 06.41 -11 05 43.7	18.1 R	J43
K00R37O	C2007 07 20.02181 22 13 06.12 -11 05 41.8	18.2 R	J43
K00R37O	C2007 07 20.03067 22 13 05.92 -11 05 39.2	17.9 R	J43
08979	C2007 07 20.98793 22 04 31.05 -03 52 22.4	17.6 R	J43
08978	C2007 07 21.05963 22 04 28.68 -03 52 17.5	17.9 R	J43
22338	C2007 07 20.97998 22 03 22.96 -03 26 32.9	16.0 R	J43
22338	C2007 07 21.04344 22 03 22.08 -03 27 07.8	16.1 R	J43
71043	C2007 07 20.95512 22 07 30.09 -05 16 08.3	18.4 R	J43
71043	C2007 07 21.01566 22 07 28.29 -05 16 09.6	18.5 R	J43
C1286	C2007 07 20.96529 22 01 49.92 -05 56 30.2	18.9 R	J43
C1286	C2007 07 21.00273 22 01 48.91 -05 56 32.7	18.5 R	J43

Conclusions:

This work has identified four asteroids already known from the observatory Oukaimeden, their trajectories on three nights of observation it was noted and the coordinates sent to the MPC who performed the validation of these measures before assign the J43 code and the name is "Oukaimeden Observatory" that currently wearing to the International Community University Astronomical Observatory of Oukaimeden