

## ACTIVITIES OF VALJEVO ASTRONOMERS FROM 2003. TO 2005.

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**Abstract.** Activities of the Department of Astronomy of Research Society "Vladimir Mandić Manda" from Valjevo in period from 2003. to 2005. are presented. Results of observation projects (solar activity, variable stars, meteor showers, astrophotography...) and ethnoastronomical researches are described in detail. All activities on education and popularization of astronomy among Valjevo citizens are also mentioned. Cooperation with other astronomical organizations in Serbia and Montenegro and neighboring countries are described, as are all published materials and papers. Finally, we present some future plans of the Department.

### 1. HISTORICAL OVERVIEW

Research society "Vladimir Mandić Manda", from Valjevo was founded in 1969. The Society founded Young Researchers of Serbia, and Petnica Science Center. There are several departments in the Research society: astronomical, biological, geographical, for food in nature, speleological, archaeological.

The Department of Astronomy was founded in December of 1973, when one group of young fans of astronomy assembled and started their own observations. Since foundation, the Department of Astronomy has been working on observation of meteors, comets, planets and their satellites, variable stars, binaries and Sun. The big attention has been devoted to astrophotography, so there is now a rich collection of photographs of interesting and beautiful objects of northern sky. In addition to observation there are the ethnoastronomical researches. The work on astronomical education and popularization is highly regarded.

### 2. EDUCATIONAL ACTIVITIES

Department of Astronomy has realised two types of activities, one for its own members, and the other for all interested citizens of Valjevo city.

From September 2003. to September 2005, two one-year courses were realized, with one lecture per week during nine months. These courses included two parts. First one analyze basic fields of astronomy (sky sphere and elements, coordinate systems,

time, astronomy instruments, constellations, solar system, planet moving, planet orbit elements, planet groups, physical characteristics of planets, Sun, eclipses, small bodies of solar system, spectral analysis, evolution of the stars, star systems, Milky Way, out-of-galaxy objects, cosmology). Second part of courses included methodology of practical research as well as analysis of data, like: constellations, parts of telescope and working on it, eclipse observation, occultation, observing variable stars and binaries, meteors, Sun activity etc. There were around 100 participants on these two courses.

As an addition to knowledge from the courses Department of astronomy were organized 4 educational camps (one in the spring, and other in the autumn). These 3-4 days long camps were used for practical education with the instruments and observations. There were 93 participants on these camps.

Some educational activities The Department was realised in Petnica Science Center.

In this period the Department was organized 5 public lectures and round tables in the manifestation "Valjevo astronomical meetings". The lecturers were Zoran Knežević, Milan Ćirković, Aleksandar Zorkić, and they explained the newest discoveries in astronomy to citizens of Valjevo. During 2005, the World Year of Physics, the Department organized lecture about Albert Einstein and his influence on the cosmology (Milan Ćirković).

On regular basis, all information about activities of the Department and latest astronomical news were published on the web site, and on the mailing lists. Also, using media, the public were regularly informed about all important news from the field of astronomy.

### 3. PRACTICAL ACTIVITIES

In this period the Department of Astronomy of Research Society "Vladimir Mandić Manda" from Valjevo organized 14 observational camps (duration 3 to 5 days). On every camp were around 25 participants, and they realized following projects: activities of meteor showers, observing variable stars and binaries, Sun activity, planets, extra-galactic objects, astrophotography and ethnoastronomy research. The camps have been organized out of city area, in hill regions, where observing conditions are much better.

There were observed the most active meteor showers: Quadrantids, Lyrids, Pegasids, Perseids, Orionids, Draconids, Leonids, and Geminids. Beside meteor showers there were realised projects of observation of variable stars, Sun activity, astrophotography, photographic observation of meteor showers. Due to activities of showers are being followed each year, there is a lot of information about them. Upon that, we got many conclusions about changes of meteor's activities, orbits of meteoroids, or objects that caused them. The Department has good cooperation with International Meteor Organization (IMO), so it sends all collected information to IMO.

Observing variable stars and binaries was comprised of observation of short periodical stars such as  $\delta$  Cepheus, RR Lyrae, Algol... Observers used visual and photographic methods. Observations were handled constantly during the whole period.

Observation of the Sun was being handled indirectly, by observation its projection (through a telescope) on a paper. This project consisted of observation of the Sun's

activity (Wolf's number) and determination of Sunspot's coordinates. Due to observations were handled during a whole this period, there are monthly, seasonal and annual changes of Sun's activity.

Besides these observing projects, The Department of Astronomy handled ethnoastronomical researches. People's belief about astronomical phenomenon are very interesting and they should not be forgotten. These researches were based on interviews with peoples. The researches have been done in the area of Valjevo (and its surrounding) and Zavojsko jezero (near Pirot), and they are still being done in other regions of Serbia. The results of this project have been presented on the Internet ([www.ethnoastronomy.cjb.net](http://www.ethnoastronomy.cjb.net)). The whole project started in 1997. and it is called "Ethnoastronomical researches in Serbia". In realization of this project we have had very good cooperation with Astronomical Observatory of Belgrade and personally with Slobodan Ninković, a member of its staff.

Astrophotography is project that was being done during each observation. All interesting, fascinating astronomical objects have been photographed. It should be mentioned that astrophotography is used in almost every project for collecting data.

#### 4. OUTCOME

All gathered results the Department of Astronomy presented inside the Proceeding of Research Society No. 16 (edited by Nikola Božić). There were 3 astronomical papers in these Proceedings:

- ♣ Observation of the transit of Mercury
- ♣ V2M2S:Sunspots recognition program
- ♣ Observing of d Cepheus variable star

Two papers were presented on the 3<sup>rd</sup> conference "Development of astronomy among Serbs".

Also members of the Department published numerous articles in popular scientific magazines "Astronomija", "Vasiona", "Planeta", "Istraživač".

#### 5. OTHER ACTIVITIES

The Department of Astronomy of Research Society had a very good cooperation with other astronomical institutions in Serbia and Montenegro and the region of South East Europe.

In December 2003, the Department celebrated 30 years of establishing, and during 2004. there was celebration of 35 years of foundation of the whole Research Society.