Astronomy in Mongolia – an outsider's impressions

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Abstract. The aim of this poster presentation is to make the community aware of the astronomical potential of Mongolia. In addition, the Astronomical Observatory of Mongolia is presented. The blue skies after which the country was named, the increasingly high level of education and motivation among its young inhabitants, plus the fact that there are few observatories in Central Asia, make Mongolia a very suitable place for astronomical observations. Some plans by the IAU to promote astronomy in Mongolia are discussed.

Key words: sites – Mongolia – astronomy education.

1. INTRODUCTION

Mongolia, the huge, land-locked country between China and the Siberian part of Russia, is one of the least densely populated places on Earth. Open to the Western world only since 1990, its population and economy are developing at an impressive speed. Mongolia joined the International Astronomical Union in 2006, after a recommendation made by Prof. John Hearnshaw following his visit to the country in 2004.

I visited Mongolia in July 2006 and returned a second time in May 2007 in the framework of the IAU's "Teaching Astronomy for Development" (TAD) program (see also IAU Information Bulletin 101). The purpose of my visit was to give an intensive course in 10 sessions on basic astronomical concepts at the National University of Mongolia (NUM) in the capital Ulaanbaatar. Some 40-50 undergraduate and graduate students, faculty and staff members attended my daily classes, which were translated simultaneously into Mongolian by a motivated student with excellent knowledge of English. The enthusiasm of the students was inspiring. Many of the attendees asked to have astronomy and astrophysics courses added to the physics

curriculum. This will happen from 2008 onwards. In Ulaanbaatar I met with university officials and the observatory directors and staff. Plans were made to organize a summer school in 2008 in Ulaanbaatar in close collaboration with the local staff. This would be a great opportunity to promote astronomy in Mongolia, especially given the fact that a solar eclipse will be visible from the west of the country on August 1, 2008. The PG-TAD program of the International Astronomical Union has given support for this school.

2. THE ASTRONOMICAL OBSERVATORY OF MONGOLIA

The Astronomical Observatory of Mongolia (latitude: 47.85 degrees N, longitude: 107.1 degrees E, altitude: 1620 m) is located on the „Bogd“ Mountain, about 15 km south of the capital city Ulaanbaatar. The site is named Khureltogot. The Astronomical Observatory was founded during the first International Geophysical Year (1957-1958) by the initiative of pioneering astronomer Mrs. S. Ninjbadgar in close collaboration with scientists from Russia and Germany. The construction of the main buildings started in 1957 and three telescopes produced by Carl Zeiss (Germany) were installed.

Fig.1 – Main building at Khureltogot Observatory

From the early years onwards, various research activities were undertaken, such as the determination of time and latitude in a network of astronomical observatories, the observation of near-Earth artificial satellites and asteroids, the observation of solar active phenomena, the recording and study of earthquakes, investigations of the telluric magnetic field and its variations, and the study of impact of atmospheric

turbulence on seeing quality. There was a lively collaboration, mainly with Russia, and many Mongolian astronomers were trained in Russia.

Fig.2 – A few of the buildings at Khureltogot observatory

3. THE MONGOLIAN SKIES

Batsukh et al. (1995) carried out a detailed study to determine the number of astronomical observation hours (NAOH) for several sites in different regions of Mongolia based on their own observations and on long-term meteorological data. Their results prove that several sites in Mongolia compare well with some foreign international sites, such as La Silla and Cerro Tololo. At Khureltogot, for example, the probable number of astronomical observation hours was determined to be 1900, close to the value obtained for La Silla . A main advantage of the observing sites are a near-absence of strong wind and a small mean humidity. A possible disadvantage is the large daily fall of air temperature due to the continental climate. The greatest contribution to the annual NAOH is from the autumn-winter months. This distinguishes the average daily distributions of the NAOH from those in other sites in Central Asia.

4. ASTRONOMY IN MONGOLIA

During the collapse of the socialist system in Mongolia, astronomy and other fundamental sciences suffered because of insufficient financial support. At present, the restoration of the fundamental sciences is taking a strong pace in Mongolia. In 1996, the Research Center of Astronomy and Geophysics of the Mongolian Academy

of Sciences was founded, and the astronomical observatory has become part of it. With modern information technology, the earlier scientific directions of the observatory are being continued and expanded. Nowadays, about 20 astronomers belong to the observatory staff. The infrastructure consists of the main building with offices and a lecture room, a building providing lodging, and the buildings hosting the coronograph, a permanent GPS station, the Coudé refractor, the meridian circle and the 45-cm Meade Schmidt-Cassegrain telescope. The telescopes and instruments are used for both scientific and educational purposes.

4. THE FUTURE

Mongolia's membership to the International Astronomical Union in 2006 will hopefully be the start of the further development of astronomy in the country. Given the availability and quality of its infrastructure, its location close to the capital Ulaanbaatar, and the available scientific staff, the Mongolian Observatory has good potential for international collaborations. The telescopes at Khureltogot observatory can be used successfully for scientific and educational purposes. Its longitude make this site a very valuable addition to many ground-based telescope networks, such as WET (Whole Earth Telescope), DSN (Delta Scuti Network), the Blazhko Project, SONG (Stellar Oscillations Network Group), etc. Even small telescopes which require only a reasonable budget and maintenance level can deliver extremely valuable data for variable star research.

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