



Report for the Developing Astronomy Globally Cornerstone project International Year of Astronomy 2009 on

Workshop “Empowering Astronomy Communities in Mongolia”

July 1-2, 2009



NUM-ITC-UNESCO Remote Sensing and Space Science Laboratory

National University of Mongolia

Prepared by

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1.1 Introduction

Mongolia has suffered great economic hardship since 1990 while undergoing both economic and political transition into a market economy. Since the collapse of the communist system due to economic difficulties, little attention has been paid to science and astronomy education. International activities for astronomy began when Mongolia joined the IAU at the General Assembly held in Prague in August 2006, because space scientists, astronomers and researchers in Mongolia are coming to understand that astronomy can help Mongolian socioeconomic development. For instance, astronomy can increase general interest and encourage public engagement in the sciences. Today, Mongolia does not have a planetarium for public viewing. The younger generation as well as the general public find planetariums fascinating, and we hope this funding will help us to raise awareness by giving us the means to provide a public planetarium. There is a lack of training opportunities for Astronomy amateurs and the public. Mongolian decision makers and development planners think of astronomy as an esoteric science with little relevance for economic development and do not concern themselves with the development of astronomy education.

How can Mongolia justify large investments in telescopes and observatories and astronomical research while there are people living in poverty? Besides these concerns, there is a lack of training opportunities for students in universities and colleges. The history of astronomical teaching began at elementary and high schools in the early 1950's but has now almost disappeared from elementary and high school teaching curricula because astronomy is often not a high priority of the government. Today the teaching of astronomy continues only in the National University of Mongolia (NUM). The educational system of Mongolia has no astronomy textbook in Mongolian. In the libraries one can only find Russian textbooks from the 1960s and '70s. Astronomy education falls even further behind other developing countries. We desperately need more research opportunities and education in astronomy in Mongolia.

Developing Astronomy Globally Cornerstone project International Year Astronomy 2009 Supported us to organize a workshop titled "Empowering astronomical communities in Mongolia" in order to develop astronomy education in Mongolia.

1.2 Summary

This workshop was designed for space science researchers, astronomers, amateurs, students and government officials and herders from nomadic areas with a knowledge that strengthening astronomy education in Mongolia can help promote socioeconomic development. The workshop focused to raise public and government officials' awareness of the importance of creating a network of astronomy activities.



Title of the workshop is: “Empowering Astronomy communities in Mongolia”. The workshop went successfully in the National University of Mongolia on July 1-2, 2009 . The WS was organized by NUM-ITC-UNESCO Remote Sensing laboratory, National University of Mongolia. There were 48 participants from the different organizations in Ulaanbaatar City and in provinces and countryside. The other 27 participants came from different organizations and provinces related to scientific organizations in Mongolia. The government officials understood how important government’s role in development astronomy in Mongolia. Nomadic people and herders who live in the remote countryside where the skies are very dark and unpolluted had a good opportunity to use small telescopes. Herders from the nomadic lifestyle can benefit all year using small telescopes to attract local and international tourists and amateur astronomers. During the workshop Galileo telescopes were provided by National Astronomical Observatory of Japan. Participants became aware of how different nations are responding for astronomy year 2009 and experienced how astronomy can help their socioeconomic life.

1.3 Workshop objectives

The objectives of the workshop “Empowering astronomical communities in Mongolia” is to strengthen and create an astronomy network including scientists, government officials and herders from nomadic life in Mongolia. This workshop allow space science researchers, astronomers, amateurs, students, government officials and herders from nomadic lifestyle to understand that strengthening astronomy education in Mongolia is important and can promote socioeconomic development. The workshop emphasized raising public and government officials’ awareness of the importance of creating a network of astronomy activities.

The following specific topics were discussed:

- How important is government’s role and support in astronomy development;
- Strengthening an astronomy network in urban and remote areas
- Lessons from other countries



1.4 Program curriculum

Programme 1

| <i>July 1, 2009 - Mongolia- Japan Center, Ulaanbaatar, Mongolia</i> | | | |
|---|--|--|--|
| 9 ⁰⁰ -9 ³⁰ | Registration | | |
| 9 ³⁰ -10 ⁰⁰ | Opening ceremony 1. Gurragchaа D. - Mongolian first astronaut 2. Prof.Lkhagvajav Ch, Ph.D - Dean of the School of Physics and Electronics, NUM | | |
| Session 1: Astronomy activities in Mongolia | | | |
| 10 ¹⁰ -10 ²⁰ | R.Tsolmon | NUM-ITC-UNESCO Laboratory for Remote sensing/GIS, NUM | Activities for International Astronomy year 2009 in Mongolia |
| 10 ²⁰ -10 ⁴⁰ | Kaz Sekiguch | National Astronomical Observatory of Japan | The International Year of Astronomy 2009 globally |
| 10 ⁴⁰ -11 ⁰⁰ | U.Sukhbaatar | Director of center of national Astronomy-Geophysic | Activities for year 2009 of Center of national Astronomy-Geophysic in Mongolia |
| 11 ⁰⁰ -11 ²⁰ | Coffee break | | |
| Session 2: Astronomy in Mongolia | | | |
| 11 ²⁰ -11 ⁴⁰ | U.Sukhbaatar | Director of center of national Astronomy-Geophysic | Activities for year 2009 of Center of national Astronomy-Geophysic |
| 11 ⁴⁰ -12 ⁰⁰ | D.Batmunkh | Mongolian Astronomical Union | About the Mongolian Astronomical Union |
| 12 ⁰⁰ -12 ²⁰ | Narangarav T. Batsukh G, Ph.D | Department of Geophysics, School of Physics and Electronics, NUM | Improvement Astronomy teaching in schools of Mongolia |
| 12 ²⁰ -12 ⁴⁰ | Davaakhuu G. Batmunkh D. | Research centre of astronomy and Geophysics | User need to develop Astronomy in Mongolia |
| 12 ⁴⁰ -14 ⁰⁰ | Lunch time | | |
| 14 ⁰⁰ -14 ²⁰ | A.Dulmaa | School of Physics and Electronics, NUM | Relevant activities to international astronomical year |
| 14 ²⁰ -14 ⁵⁰ | N.Tugjsuren | Mongolian University of Science and Technology | Aerosol optical thickness studies in Mongolia |
| 14 ⁵⁰ -15 ¹⁰ | Sh.Jargalsuren | University of Khovd | Development astronomy community in Mongolia |
| 15 ¹⁰ -17 ¹⁰ | Discussion | | |

Programme 2

| <i>July 2, 2009 - Mongolia- Japan Center, Ulaanbaatar, Mongolia</i> | | | |
|---|---------------------|---|---|
| Session 3: Astronomy in Mongolia | | | |
| 9 ⁰⁰ -9 ²⁰ | Dulmaa A. | School of Physics and Electronics, NUM | Comparative Research for Astronomical Education in the Mongolian Universities |
| 9 ²⁰ -9 ⁴⁰ | Ekhmaa B | School of 105, teacher of Physics | The Results of Measurement in Mongolia on the Effects from the Sun to the Earth using a Space Weather Monitor |
| 9 ⁴⁰ -10 ⁰⁰ | Bayarmaa G | School of Physics and Electronics, NUM, student | Exploring and Studying the Universe' - an electronic astronomical tetxbook |
| 10 ⁰⁰ -10 ²⁰ | Coffee break | | |
| 10 ²⁰ -10 ⁴⁰ | Ganzul B. | School of Physics and Electronics, NUM, student | The Analyze for some astronomical problems of the 9 th Physics Olimpiad |
| 10 ⁴⁰ -11 ⁰⁰ | Bat-Erdene B. | School of Physics and Electronics, NUM | The infrared and ultraviolet absorption spectra of fullerenes in the cosmos and on the earth |
| 11 ⁰⁰ -12 ⁰⁰ | Discussion | | |



1.5 NUM-ITC-UNESCO Remote Sensing and Space Science Laboratory, NUM

The NUM-UNESCO–ITC Remote Sensing/GIS and Space Science Laboratory was established with help from UNESCO and ITC in the Netherlands in 2003 for physical, natural, and social science researchers, graduate and undergraduate students interested in the quantitative assessment of remotely-sensed/GIS data to solve environmental problems. The purpose of the Remote Sensing and Space Science Laboratory is to provide a systematic survey of basic environmental concepts within the spatial dynamics of Remote Sensing/GIS and to introduce the theoretical, technical and applied aspects of Space Science as a tool for monitoring and managing earth resources. The RS/GIS course offers students an opportunity to understand and cope with our rapidly changing world and understand the relationships between humans and the environment. The laboratory course provides an overview of remote sensing, the applications of remote sensing in a variety of disciplines, and the significance of remote sensing in today's world for students, government workers, NGO and organizations related to Environment field. Students learn how to design and plan interventions to mitigate environmental problems, and establish sustainable land use systems and management practices in Mongolia and other regions. Undergraduate students will gain a basic understanding of remote sensing emphasis on: electromagnetic radiation transfer; data collection with aerial photographic and satellite sensor systems; and visual interpretation of air photos and satellite imagery and astronomy. For graduate students who intend to specialize in remote sensing/GIS, the laboratory course offers an opportunity to further develop their knowledge and assessment capacities. In addition, this team has prior experience organizing School of Astronomy for local and international tourists in 2008 which incorporated an eclipse trip to the western part of Mongolia.



1.6 International Year of Astronomy 2009 and Mongolia

The International Year of Astronomy 2009 (IYA2009) is a global celebration of astronomy and its contributions to society and culture and marks the 400th anniversary of the first use of an astronomical telescope by Galileo. The aim of the Year is to stimulate worldwide interest, especially among young people, in astronomy and science under the central theme "The Universe, Yours to Discover". IYA2009 events and activities will promote a greater appreciation of the inspirational aspects of astronomy that embody an invaluable shared resource for all nations.

The IYA2009 activities are taking place at global and regional levels, and especially at the national and local levels. National Nodes in each country are running activities throughout the year, aimed at establishing collaborations between professional and amateur astronomers, science centers, educators, and science communicators. (<http://www.astronomy2009.org/>)

Mongolian astronomy activities are taking place locally. Detail information of all activities is in the website (<http://astromongolia.yolasite.com/news.php>)

2. Recommendations for Follow-up

During the workshop participants were able to discuss on Mongolian astronomy network communities. They also were able to familiarize with Galileo telescopes. By the end of the workshop the participants shared and transferred their skills with the other colleagues on amateur activities and astronomy teaching in secondary schools. The participants discussed on how telescopes can be used for their life style improvements. The Galileo Telescopes lecture was given by Dr. Kaz Sekiguchi from National Astronomical Observatory in Japan.

The course participants especially astronomy teachers have strongly expressed their interest in using telescopes and need to be taught Astronomy in schools as separate subject. Since, astronomy has been taught as the part of the science class in schools. Many participants expressed great frustration at the lack of progress in developing the building integrated Science center including planetarium. Mongolia has not a planetarium ever.

Participants are aware that astronomy is often not a high priority of a government in Mongolia. The participants have told their user need to have the first ever Planetarium interests to government officials. Planetarium will be used as an astronomical centre that is widely open to serve the requirement of interested scientists, teachers, students, pupils and people all over the country.



There is a strong interest at National University of Mongolia and in the Mongolian Academy of Sciences in developing astronomy in Mongolia.

However they also recognize that the government support is most important in development astronomy in Mongolia.

It is accordingly recommended as follows:

-There is need more cooperation work between international communities and Mongolian Astronomers to encourage Mongolian university to develop astronomy further and to enroll graduate students in astronomy and science.

- Organize National Astronomical Summer School and possible annual Astronomical Conference in Mongolia

-Increase scientific awareness among the public and herders in countryside

-Support and improve science education in schools

-Strengthen existing networks by connecting amateur astronomers

- Establish national committee for development astronomy including government officials



3. Summary of activity funding

Summary of activity funding: Developing Astronomy Globally

| Activity name | Total cost (Euro) |
|-----------------------|-------------------|
| Rent of Workshop room | 100 Euro |
| Rent of equipments | 50 Euro |
| Travel support | 400 Euro |
| Handouts and printing | 100 Euro |
| Coffee breaks | 300 Euro |
| Total | 950 Euro |

Acknowledgement

We would like to thank Developing Astronomy Globally Cornerstone project for support for this project and contribution to development astronomy in Mongolia.



4. Appendices

4.1 List of participants

| № | Name | Occupation | Email address |
|----|----------------|---|--|
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The participants of the Workshop “Empowering Astronomical communities in Mongolia” Opening day



Dr .Kaz Sekiguchi (second the left side) and Mr. Gurraghaa Mongolian first Astronaut (second from the right)



A. Dulmaa is one of the organizer of the Workshop



During the Workshop there was class for Galileo Telescopes for school kids



Dr. Sekiguchi during his teaching class on Galileo telescope training



Astronomy and physics teachers with Galileo telescopes



Nomads in countryside are learning about Northern stars on 1 July evening after WS



Over a hundred people have looked at the sky through a telescope for the first time during star party on evening 1 July, 2009



Young researchers and students participating in the WS with Dr. SIKIGUCHI and Mrs. DULMAA



Teachers for Astronomy and Physics from country sides in Mongolia



r. Butmunkh from Astronomical Union in Mongolia



During discussion at the end of the WS