

Section 6: Some Practical Matters

Some Cooperative Activities in East Asia

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Abstract. We report the activity of continued and sequential cooperation among Asian countries/regions, especially in East Asia. Such efforts started in 1990 from a small-size China-Korea-Japan meeting on star-forming regions. Being aware of the importance of cooperation among those neighboring countries, participants agreed to hold sequential “East Asian Meetings for Astronomy (EAMA)”. The 1992 meeting entitled “Millimeter-Wave and Infrared Astronomy” was held in Korea, the 1995 meeting entitled “Ground-Based Astronomy in Asia” was held in Japan, and the 1999 meeting entitled “Observational Astrophysics in Asia and its Future” was held in China. These meetings achieved quite high activity with 100-200 participants, each. An important product of those meetings was active exchange between young astronomers, including graduate students. The primary aim of these meetings/activities was to promote small but practical cooperation in the field of astronomical instrumentation, as well as to widen the contact among Asian astronomers. An East-Asian co-experiment to search for good sites for a possible “Asian Observatory” was among such efforts. The close cooperation between Japan, China (Peoples’ Republic and Taipei) and Korea, on millimeter and sub-millimeter wave technology is another good example of joint developments of new instruments.

1. East-Asian Meetings for Astronomy (EAMA)

In 1990 Chinese and Japanese radio and IR astronomers held a meeting on “Star-Forming Regions” in Huang-Shiang, China, co-chaired by C. P. Liu and N. Kaifu. There were 50 participants from China and 15 from Japan. Three astronomers from Korea were also invited. It was one of the first active meetings for observational astronomy (except the field of solar astronomy) ever held under the cooperation of East-Asian Countries. The important products from this meeting were:

- 1 Awareness of the importance and usefulness of cooperation between those Asian neighboring countries/regions.

- 2 From the above point of view, participants agreed to hold sequential “East Asian Meetings for Astronomy (EAMA)” setting a target for observational astronomy and instrumentation, and to invite other neighboring countries as well.

Following the above consensus the second EAMA was organized by Y.K. Minn and Korean astronomers in 1992. This meeting entitled “Millimeter-Wave and Infrared Astronomy” was held in Daejeon, Korea with 100 astronomers from Korea, China, Japan, Taiwan, and the U.S.A., and was very fruitful, reflecting the rapidly increasing activities of Korean astronomy. The proceedings were published by the Korean Astronomical Observatory (edited by Y.K. Minn, 1992). Importantly, many Korean graduate students attended this meeting, and it was followed by active exchange among graduate students. Japanese graduate students invited many Chinese, Korean and Taiwanese friends to their “Young Astronomers’ Summer School” in 1993, 1994 and 1995. The YASS is a traditional activity of Japanese graduate students in the field of physics and astronomy; they organize self-educating summer schools every year by themselves, with limited financial support from senior scientists. Such exchanges of young astronomers had a tremendous positive effect in those neighboring countries/regions.

In 1995 the third EAMA, “Ground-Based Astronomy in Asia” was held in Tokyo, Japan. This was a first attempt in an EAMA to extend the cooperation to other Asian countries. 215 astronomers from 13 countries/regions attended, and 210 papers (including posters) were presented. We made an attempt to list all of the astronomical observatories, institutes, groups and telescopes in the Asian region, aiming to achieve better information, contacts and cooperation in this region. The proceedings published by the National Astronomical Observatory of Japan (edited by N. Kaifu) lists all the data collected as well as the scientific reports presented, and it can be used as a reference book of the Asian astronomical observatories/institutes though it requires much more improvement. Some copies of the proceedings are still available from NAOJ on request.

The latest and 4th EAMA was “Observational Astrophysics in Asia and its Future” held in Kunming and Lijiang, China. 118 participants from 13 Asian countries/regions discussed future telescopes, instrumentation and cooperation. The proceedings were published by the Chinese Academy of Sciences (edited by P.S. Chen, 1999). In this meeting participants agreed to hold a young astronomers/graduate-students seminar in Hawaii in the near future. This has not yet happened because of the busy situation of the Subaru Telescope (NAOJ), but such activity will open a lot of good possibilities of scientific cooperation using the Subaru telescope, and will activate observational astronomy in Asia. Taiwanese astronomers expressed the intention to invite the next EAMA.

2. Site-Testing for an Asian Observatory

The primary target of those EAMA activities was to promote small but practical cooperation in the field of astronomical instrumentation as well as to widen contacts among Asian astronomers. Among those efforts was an East-Asian

collaboration to search for good sites for a possible future "Asian Astronomical Observatory". In 1993 "Site Experiment for Astronomical Observations in the Northwest Region of China" was organized as an East-Asian Regional Cooperation, with support from the Chinese Academy of Sciences and the Japanese Society for Promotion of Science. Twenty-four participants from Mainland China, Korea, Taiwan and Japan visited Qinghai and other dry and high-altitude places in west China and made various site measurements for optical, IR and mm-wave observations. This visit, especially to the Qinghai Station (Purple Mountain Observatory) in Delingha created good relations among the mm-wave astronomers and was followed by the realization of a cooperation program in mm-wave and sub-mm-wave instrumentation between China and Japan, as described later. The report of this experiment was published by NAOJ (edited by N. Kaifu and C.P. Liu, 1995).

3. Cooperation in mm-Wave and sub-mm-Wave Instrumentation

A program of close cooperation program in millimeter-wave and sub-millimeter-wave technology was another by-product of the EAMA, and it is a good example of the small but practical and realistic cooperation that bore scientific fruit.

1 *Millimeter-wave cooperation between Purple Mountain Observatory and Nobeyama Radio Observatory, NAOJ.*

An SIS receiver at 115GHz was developed jointly for the 20-m mm-wave telescope of the Qinghai Station (PMO), and now is in operation.

POST: A portable sub-mm wave telescope and 230GHz (and 350GHz) SIS receiver were developed jointly by PMO and Nobeyama for the observations in the Delingha area which proved to be a good site for the sub-mm wave observations while above-mentioned 1993 experiments.

2 *Millimeter-wave cooperation between Korea Astronomy Observatory and Nobeyama Radio Observatory, NAOJ.*

100GHz and 150GHz SIS receivers were jointly developed for the 14-m mm-wave telescope in Daejon, KAO and are producing large amount of observing data.

3 *SMA/ASTE cooperation.*

The Institute of Astronomy and Astrophysics of Academia Sinica, Taiwan (ASIAA), Nobeyama, NAOJ and PMO, China are about to start a new cooperation program for the development of a 650GHz sub-mm wave receiver for the SMA by using Nobeyama SIS mixer.

This last cooperation will also include scientific cooperation by using the SMA which will soon be in operation. In parallel to it, observational cooperation and joint developments will start for the Atacama Sub-mm Telescope Experiments (ASTE). The central instrument of ASTE is a 10-m sub-mm wave telescope which was built by NAOJ and will be transported to the Atacama

high plateau (altitude 5000m; near the ALMA site) in 2001. This will be one of the highest performance sub-mm wave telescopes, and will be operated with the cooperation of NAOJ and several groups from Japanese universities. The participation of China (PMO), Taiwan (ASIAA), and possibly Korea in ASTE in the near future will considerably add to the activities both in science and instrumental developments in the field of sub-mm wave astronomy. We foresee more Asian cooperation for the ALMA, a global joint project by North America, Europe and Japan of which we hope to start the construction in 2002.

References

- Millimeter-Wave and Infrared Astronomy* ed. Minn, Y.K. ed. 1992, Korea Astronomy Observatory
- Report on Site Experiments for Astronomical Observations in Northwest Region of China* ed. Kaifu, N. and Liu, C.P. eds. 1995, National Astronomical Observatory of Japan
- Observational Astrophysics in Asia and its Future* ed. Chen, P.S. 1999, Chinese Academy of Sciences

Discussion Anandaram congratulated Kaifu on the successful Japanese efforts made to achieve scientific cooperation through EAMA. He thought that the objectives of EAMA were very similar to those of the Third-World Astronomy Network proposed by Narlikar of (see pp. 324-8). Anandaram hoped that other countries could be brought into this kind of cooperation through suitable arrangements set up under IAU. Kaifu replied that he was aware of Narlikar's proposal and hoped to discuss it with him. Hearnshaw pointed out that the IAU already recognizes the Asian-Pacific region for organizing Asian-Pacific Regional Meetings and the EAMA meetings are outside this structure. He wondered if countries like Australia and New Zealand would be welcome at the EAMA meetings? Kaifu replied that the Asian-Pacific Regional meetings were more general and the EAMA is specifically for observational astronomy and the East-Asian region. Any countries and regions of Asia would be very welcome. There were participants from Australia for ALMA in 1995 and 1999 and from India and even the Middle East. Orchiston commented that Australia already has two professional mm-wave telescopes and there is Australian-Japanese collaboration on the square-kilometer array, but there has not yet been any attempt at Australian-Japanese collaboration in mm radio astronomy. Kaifu was unaware of Australian-Japanese collaboration on the square-kilometer array but agreed that it would be useful to discuss collaboration between Asia and Australia in mm-wave astronomy. Rieu said that he had heard that the Qinghai millimeter telescope was not in active operation because of logistical problems. Qinghai is indeed very far from any radio astronomy observatories in China. He wondered if the problems had been solved. Kaifu replied that the Qinghai station is certainly quite far from the main cities of China but he understood from Chinese friends that the telescope is in active use, especially by Dr. Y. Chi and his group from PMO who took the SIS mm-wave receivers to Qinghai. Wang remarked

that the Qinghai telescope is definitely in operation and Delingha is an observing base of the National Astronomical Observatories of the Chinese Academy of Sciences. The young and able group headed by Yang, Shi and Pei is operating the 13.7m mm-telescope and obtaining good results.

Chen commented that the difference between the EAMA consortium and TWAN is that the former deliberately avoids not only the words "third-world" but also the word "countries". He took the opportunity to draw attention to IAU Colloquium 183 "Small-Telescope Astronomy on Global Scales" to be held January 2001 in Taiwan. All were cordially invited.