

Continuation of Regional Climate Modeling (RCM) Development and Application for Asia

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Report from Advanced Training Course on the Application of Regional Climate Modeling for Asia

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Executive Summary

An Advanced Training Course on the Application of Regional Climate Modeling (RCM) for Asia was held in Beijing, China from November 23rd to December 2nd, 1998. It was sponsored by Asia-Pacific Network for Global Change Research (APN), International Global Change System for Analysis, Research and Training (START), Chinese Academy of Sciences (CAS) and China Association for Science and Technology (CAST). START Regional Center for Temperate East Asia (START RC-TEA) hosted this activity.

The training course is one of the components of the ongoing START/TEACOM-APN project "Continuation of Regional Climate Modeling Development and Application for Asia" committed to modeling the general monsoon system (coupled climatic, ecological, chemical and social monsoon system) in Asia at regional level. The project is under implementation by a team of research organizations with multiple funding sources.

There were over 60 participants attending the course, including seven invited lecturers from Italy, U.S.A., Canada, Korea, Denmark and China, respectively, and 25 selected students from 11 countries and regions in Asia, Africa and the Pacific such as China, Korea, Mongolia, Russia, Japan, India, Thailand, Malaysia, Kenya, Fiji and U.S.A. All these students were young scientists at doctoral level with experience in numerical modelling and good command of computer languages. A large number of local students from institutes under CAS and other agencies also audited the course.

Prof. Roland Fuchs, Director of International START Secretariat, and several officials from CAS and China Natural Science Foundation attended the opening ceremony of the training course. They spectated of the demo of a Regional Integrated Environmental Model for Asia (RIEM-tea) developed by START RC-TEA and other major research results, Prof. Fuchs highly rated the achievements of the START RC-TEA and said the regional climate modelling project led by START RC-TEA is the best organized and implemented project in all START regions.

They also expressed great expectation for the results of the course because greater participation of developing countries in Asia-Pacific is needed to cooperate with the international global change science community so as to make concerted efforts to address the challenges of regional climate change against human society. It was strongly hoped the training course would provide a solid scientific base for the more accurate projection of future climate

and environmental change throughout Asia.

The training course was divided into two phases. The first phase was set aside for invited lectures. This provided an opportunity for these young students to learn various scientific issues and techniques about RCM. Each invited lecturer gave a lecture on a ROM-relevant topic. The topics included introduction of regional climate modelling, introduction of GCM and its performance in Asia, land surface processes, radiation transfer and cloud radiation, cumulus convection parameterization, lateral boundary and nesting techniques, RCM comparison, and application of RCM for Asia. These presentations provided valuable inputs and served as theoretical base for the second phase of hands-on training.

The second phase was hands-on training on workstations. Participants were given an introduction to the RIEM-tea model, including its structure and physical processes, operating and analytical methodologies. They ran the entire model system and conducted a case study using the model. Three tutors guided their work during this phase. This experience was very helpful for the students. They not only familiarized themselves with the general structure and physical processes of RCM, and the entire progress of running the model, but also learned how to analyse and validate model results, and how to diagnose and solve problems encountered with the model.

After ten days of hard work by the participants, the training course turned out very successful in attaining its training tasks. The students from different parts of the world with different skin colors enjoyed learning from teachers as well as from each other, laying a solid foundation for using the RIEM-tea model to make accurate projection of regional climate changes in their own counties and regions. The computational facilities and model interface and organizational work of the training course received unanimous acclaims from all participants.

From the training course, there was cognizance among participants that the computing system of START RC-TEA need to be more enhanced because the speed, the capacity and the number of high-performance workstations were still quite limited to meet all of participants' requirements. More service work was anticipated from START RC-TEA for participants to use the RIEM-tea model remotely.

A meeting of TEACOM RCM Steering Committee was arranged in conjunction with the training course. Some SC members attended the meeting to examine the results of the training course and blueprinted the future development for the RCM research in East Asia.

- a. It was acceded to publish the teaching notes provided by the invited lectures to be used as a part of serial textbooks for RCM training.
- b. Further direction to the students of the training course in the use of the model was needed, particularly the analytical and diagnostic methodologies that would be used in the projection of regional climate change.
- c. A proposal was proposed to conduct a regional model intercomparison project for Asia (RMIP) in order to assess in a quantitative way the performance of several different RCMs applied for Asia with different characteristics.
- d. Improvement of the RIEM-tea model was needed which can better delineate the major processes of regional climate and environmental change in East Asia, including quantification of the process that human impose on regional climate and environment.
- e. Results of the improved RIEM-tea model need to be provided for the next version of IPCC Integrated Assessment Report as scientific bases for decision makers.