## Seminar on *"Development and Application of Isotope Tracer Diagnostics in Regional Climate Models"*

## *Miramare, Trieste, Italy* 22 - 26 September 2003

The Abdus Salam International Centre for Theoretical Physics (Abdus Salam ICTP), and the International Atomic Energy Agency [IAEA, Vienna], are jointly organizing a **Seminar on** *"Development and Application of Isotope Tracer Diagnostics in Regional Climate Models"* to be held from **22** to **26 September**, in Trieste,Italy.

The Earth's hydrological cycle is fundamentally linked with the climate system. The atmospheric heat engine is driven primarily by energy exchanges associated with the condensation of water. As a result, variations in isotopic ratios of oxygen (<sup>16</sup>O, <sup>18</sup>O) and hydrogen (<sup>1</sup>H, <sup>2</sup>H) contained in the water molecule can be used to extract information on the history of a water parcel. Indeed, present day isotope patterns are found to be correlated with present day climatic and hydrological processes. Recent advances have been made to integrate the stable isotopes of water into ocean, atmosphere, and land hydrological models by tracking the isotopic composition of reservoirs and fluxes and simulating fractionation processes. This has provided a potentially powerful tool for validation, sensitivity analysis, and inverse modeling of water cycling processes.

Currently, expertise in the development of tracer-capable models is limited to a few research and government organizations. Wider application of isotope tracer diagnostics in regional climate models for water resources and climate change studies requires that expertise be shared between tracer modeling experts and the modeling community. The seminar is intended to improve the current situation by offering expert technical instruction and training to a limited number of skilled modelers who can develop tracer models for their home institutions.

The seminar will cover the following topics:

- Integrating and parameterizing isotope fractionation processes in water cycle models;
- Review of potential applications of isotopes in water cycle models for hydrology and climate studies;
- Description of the structure and operation of regional climate models and discussion of the performance and limitations of such models;
- > Review of research efforts in coupling atmospheric and hydrologic models;
- Use of isotopes in climate models; Presentation of the ECHAM model and other climate models that incorporate isotopes;
- Hands-on sessions with climate and hydrologic models.

The seminar is intended for scientists and graduate students working in the areas of Atmospheric Physics and Dynamics, Climatology, Hydrology, Physics and Mathematics.

## PARTICIPATION

Scientists and students from all countries which are members of the United Nations, UNESCO or IAEA may attend the course. Although the main purpose of the Centre is to help researchers from developing countries, through a programme of training activities within a framework of international cooperation, students and scientists from developed countries are **DIRECTORS** P. AGGARWAL (IAEA, Austria) F. GIORGI (ICTP, Italy)

## LECTURERS

- P. Aggarwal (IAEA, Austria)
- F. Giorgi (ICTP, Italy)
- J. Pal (ICTP, Italy)
- F. Solmon (ICTP, Italy)
- M. Werner (MPI, Germany)



<u>25 April 2003</u>

also welcome to attend. The activity will be conducted in English.

Limited funds are available for some participants who are nationals of, and working in, developing countries, to be selected by the organizers. There is <u>no registration fee</u>.

The deadline for submitting requests for participation to the seminar is <u>25 April 2003</u>. The **Application Form** is obtainable from the ICTP WWW server: <u>http://agenda.ictp.trieste.it/</u> (which will be constantly up-dated) or from the activity Secretariat. It should be completed and returned to:

Seminar on Development & Application of Isotope Tracer Diagnosticssmr1518 (c/o Lisa Iannitti)and a copy to: Isotope Hydrology Sectionthe Abdus Salam International CentreIAEA- Vienna International Centrefor Theoretical PhysicsP.O. Box 100Strada Costiera 11, 34014 Trieste, ItalyWagramer Strasse 5A-1400 Vienna, Austria

or

<u>mailto: smr1518@ictp.trieste.it</u> <u>and to</u> L.L.Gourcy@iaea.org (please save and send file attachments in RTF format)

Telephone: +39-040-2240227Telefax: +39-040-2240558E-mail: smr1518@ictp.trieste.itActivity Home Page. <a href="http://www.ictp.trieste.it/~smr1518">http://www.ictp.trieste.it/~smr1518</a>

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