

A TOPEX/POSEIDON EDUCATIONAL PROGRAM

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NASA and CNES investigators have produced much material useful for science, mathematics and technology teachers and students in elementary, middle, and high school and for college and university teachers and students. The material is contained in CD ROMs, web pages, scientific documents, and special publications. Some of the material is readily available to teachers and students, some needs to be rewritten to be useful. Of the easily usable material, how much is being used in the classroom? What are the obstacles preventing teachers and students from using the material? And, what is the most useful material for teaching students about Earth, the role of the oceans, and the observations of the ocean made by TOPEX/POSEIDON?

TOPEX/POSEIDON Extended Mission Work

Our program is designed to help answer these and similar questions and to provide material useful to teachers and students. The program is organized into three tasks:

1. Determine what teaching materials are useful for teachers and students interested in Earth and its oceans.
2. Produce teaching materials that serve the needs of teachers and students and which does not duplicate material already available.
3. Train teachers in the use of NASA/CNES materials in the classroom.

Determining What is Useful

We have identified technical, scientific, and pedagogical criteria for evaluating web sites. The criteria are based on ideas developed by Yale University for the design of web sites, on national standards for integrated science education, on Texas Essential Knowledge and Skills for all science courses taught in the state of Texas, and on widely accepted pedagogical criteria for good teaching. The criteria are being used to evaluate web sites, and they will be used when designing our web site and the teaching material we will produce later in the project.

We are also polling science teachers throughout the state to determine what types of material they actually use in the classroom. For example, do they and their students have easy access to the web? Do they use web based material? Are they familiar with data from Mission to Planet Earth? And, do they use NASA produced material in the classroom? The results of the poll will be included in a paper to be submitted to an education journal for science teachers.

Produce Teaching Materials

Our initial assumption is that teaching materials are most useful for the most users when distributed through the web. If the results of our poll validate the hypothesis, we intend to produce teaching materials based on TOPEX/POSEIDON, WOCE, and other elements of NASA's Mission to Planet Earth and then include the material in a web site. The material will complement material being produced by other teams, such as material on the Gulf of Mexico produced by George Born's team at the University of Colorado, and material produced by the Jet Propulsion Laboratory.

One of us, Bob Stewart, is writing a textbook on Introduction to Physical Oceanography. The book includes much new material resulting from the new global oceanographic programs including TOPEX/POSEIDON, WOCE, TOGA/TAO, and the new high-resolution numerical models of the ocean. The book is in electronic form, and it will be available through the web together with links to useful oceanographic sites and color gif images. In addition, it will be published by Oxford University Press.

Train Teachers

Toward the end of the program, after we have produced and evaluated new materials, we will investigate how to train teachers in the use of the material. The traditional way, through summer workshops, is inefficient. We expect that by teaching coordinators in twenty-one regional offices throughout the state, we can reach more teachers than through workshops. We will also consider the use of help desks and other on-line support services to teachers and the use of teams that could travel to school districts where they would conduct workshops on the use of web material. The goal is to devise methods for training large numbers of teachers in the most cost effective way.

We will also conduct workshops at the annual Conference for the Advancement of Science Teaching sponsored by the Science Teachers Association of Texas.