The Bangladesh Obseruer

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What Others Say On Oceanography

43 countries participating at a Paris meet in 1988 were invited to contribute to a five-year programme to find out more about the deep blue seas and their effect on climate changes. It took 100 scientists several years to design the experiment to be known as the World Oceans Experiments (WOCE) the outcome of which is expected to permit scientists to forecast climatic changes for decades at a time instead of just the few weeks at present.

China has been involved almost from the beginning and several other developing countries expressed a keen interest from the start to be involved. Some, however, are too sensitive about releasing information on deep oceanography off their shores for economic and strategic reasons. Indonesia for instance, is particularly sensitive, but Indonesia is also of special significance to the experiment because of its changing rainfall patterns and pivotal role of the phenomenon known as "El Nino".

El Nino is the most notorious connection between the behaviour of the oceans and the climate occurring about every four years when the easterly trade winds fail. It causes changes in ocean circulation which pushes warm water from the area off Indonesia on to the Pacific coast of South America where it causes torrential rains while bringing drought in India and Sahel. Its unusually high sea surface temperatures and saltiness—coupled with low levels of oxygen in the water—can last for up to eighteen months. The last big one took place in 1982-83 raising sea-surface temperatures by as much as 10 degrees Celsius, destroying 80% of the coral reefs off Panama and reducing Peru's GDP by 5% by killing its anchovies!

The success of crops, survival of animals, design of homes, bridges and ports all depend on the level of heat and humidity in the atmosphere. Accurate forecasts of pending climatic changes would help nations considerably in preparing themselves for any economic impact. Although current models can predict the direction of change, they cannot forecast how, when, or where those changes will occur. The need to understand how the climatic system works over time has been reinforced by the possibility of global warming giving the experiments an added urgency.

Meteorologists know how the atmosphere works for they have been monitoring it closely at hundreds of stations around the world for some good period of time. The oceans, however, remain a relatively unknown quantity but the World Oceans Experiment (WOCE) a five-year experiment begun in 1990 when the advance guard set sail from southern Argentina, hopes to remedy that or at least be able to provide some of the answers.

The vessels will measure the distribution of salt, temperature and nutrients in the South Atlantic. Another group of ships will study the Pacific and the Indian oceans. Salt and temperature determine water density which in turn determines currents. Two other programmes will look at the speed and direction of water movements. One involves submerging 3,000-4,000 ball-shaped instruments, which relay specific water temperature and air pressure to a satellite. The second programme will measure the velocity of moving water at a depth of 1500 metres.

In another experiment merchant ships from many countries equipped with special instruments will measure the temperature of the ocean's top kilometre. The heat in the top segment is more important than salt in determining density and this is the part of the ocean that responds fastest to changes in temperature, rainfall, clouds and wind.

Several satellites have been enlisted for the collection of global information on the interaction between the atmosphere and the oceans. Precision altimeters aboard the satellites will map the topography of the ocean surface, scatterometers will measure surface winds, and radiometers the surface temperatures. Plans are also underway for a tropical rainfall measurement mission.

By making use of elaborate mathematical procedures they believe they will be able to get wind speeds of every 100 square kilometres every 24 hours. They will then know the shape of the surface of the oceans which constantly changes due to ocean currents, within a tolerance limit of 5 cm. Once the shape is known the currents are also known and from the changes in shape the changes in currents can be forecast with reasonable accuracy. If everything goes according to plan, WOCE scientists will be able to predict climatic changes on a scale of from 5 to 50 years. Considering the importance for crops, livestock, and other intricate matters concerning mankind, this will be achievement enough.