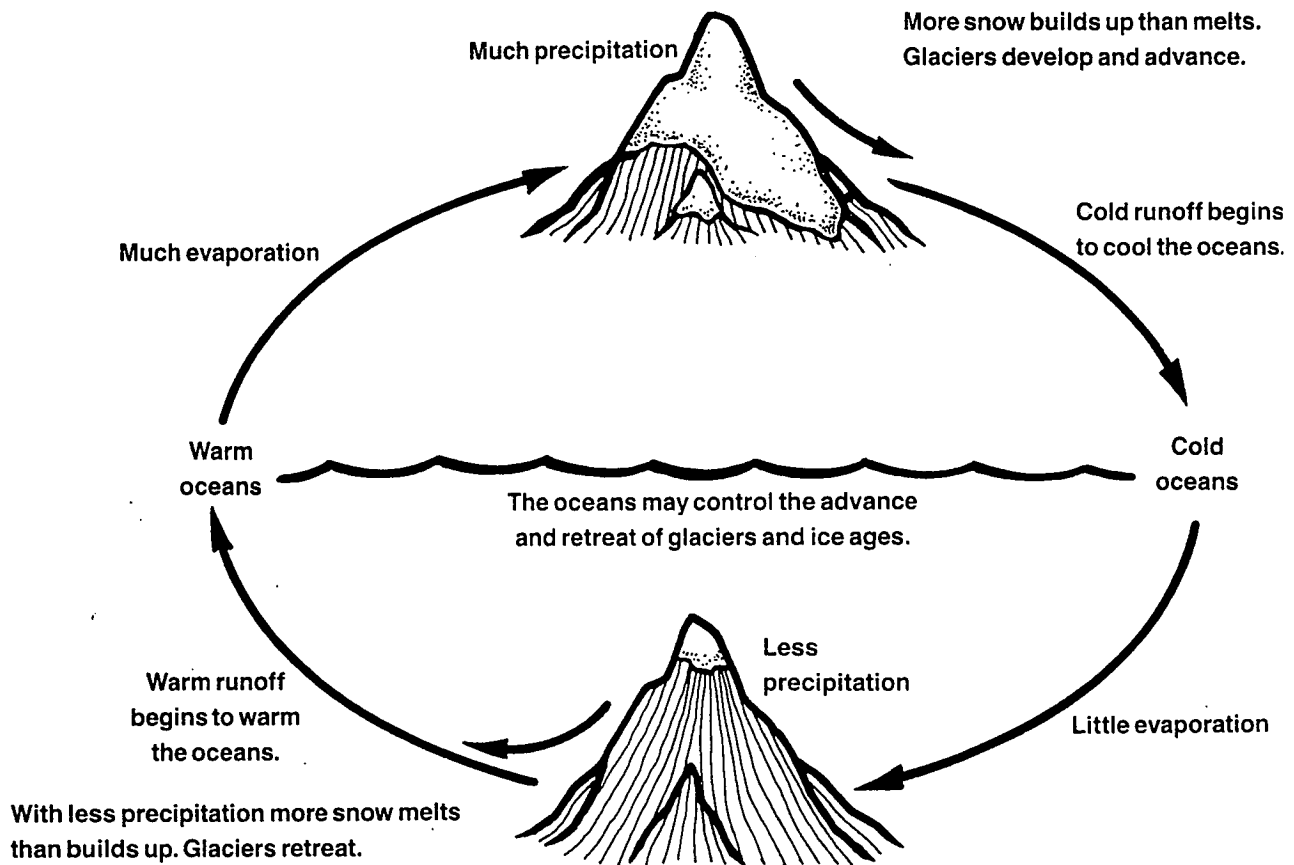


Problem Solving Activity: What Causes an Ice Age?

Approximately 15,000 years ago, much of Northern Europe and North America was covered by *continental glaciers* more than 1 km thick. Continental glaciers greatly influence the radiation and heat budgets of the Earth. Glacial ice represents 75% of the world's fresh water. Growth and shrinkage of the ice sheets results in changing sea levels.

The question of what causes an ice age, or *glaciation*, has been asked many times by many scientists over the years. There is no simple answer. Ice ages have many different and interconnected causes. It is important to remember that there have been many different ice ages that have occurred at different times during Earth's history.

Many theories have been proposed to explain what causes an ice age. Any useful *theory* must explain what caused the ice to build up, how and why the ice advanced and retreated at different times during a glaciation, and why the ice eventually disappeared. One theory that attempts to explain these events is called the *ocean-control theory*. This theory is illustrated by the diagram below:



Simple illustration of the Ocean-Control Theory

Problem Solving Activity: What Causes an Ice Age?

PART I: ANALYSIS: Study the diagram of the Ocean - control Theory of ice age formation. Then complete the following exercises.

1. Could the ice age formation process be considered a cycle? Explain.

2. What is the major controlling factor for the Earth's heating and cooling system according to this theory? _____

3. How is it possible for a major warming, rather than a cooling trend to bring about an ice age? _____

4. Why would cold runoff be considered a negative feedback in the glacial formation process? _____

5. Which factor would be considered the positive feedback in the process? Why?

6. Which major biogeochemical cycle is involved in ice age formation?
