

1. How does glacial growth or shrinkage result from the balance between ablation and accumulation?

If ablation is equal to accumulation, the glacier is gaining as much ice as it is losing and will neither grow nor shrink. If accumulation is greater, the glacier will grow. If ablation is greater, the glacier will shrink.

2. How do glaciations affect sea level?

The majority of the snow that forms glaciers originates as water vapor from the oceans. As ice accumulates on land, moisture is permanently removed from the oceans and sea level goes down. As glacial ice melts, sea level rises.

3. How does carbon dioxide (CO<sub>2</sub>) in the Earth's atmosphere affect climate?

Carbon dioxide is a "greenhouse" gas. This means that it absorbs infrared radiation and warms the atmosphere. Increases in the atmosphere's carbon dioxide content are expected to correspond to warmer climates.

4. When did humans first begin to affect Earth's climate? (Note that there are opposing viewpoints on this issue. For example, look up Anthropocene in Wikipedia also search the web for 'Ruddiman' and 'Anthropocene')

Most people equate the beginning of Man's influence on Earth's climate with the Industrial Revolution (approximately the 18<sup>th</sup> century). However, in a recent paper published in *Climate Change* in 2003, William Ruddiman proposes that the Anthropocene began not with the Industrial Revolution, but with the transition of people from hunter-gatherers to farmers. Ruddiman proposes that through primitive agriculture humans began to change the Earth's climate approximately 8,000 thousand years ago. Ruddiman suggests that humans began to clear forests in southern Europe and northern China to make way for agriculture roughly 8,000 years ago, and deforestation gradually spread to other parts of southern Eurasia over the next several thousand years. Burning of trees and other vegetation to make room for farm fields added CO<sub>2</sub> and methane (CH<sub>4</sub>) to the atmosphere increasing Earth's greenhouse effect.