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Albedo and ice: positive feedback in action

Worksheet 3: Explain

Consider the following diagram of part of the climate cycle of the polar environment. Write a short text explaining the interaction between the three components. Hint: how does each component affect the next one?

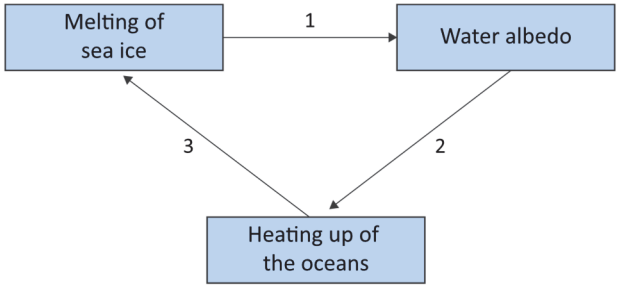

Diagram of components and interactions

Image courtesy of the author

1. Write a short text explaining the interactions between the three components. Hint: how does each component affect the next one?

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What you have just described is a type of loop mechanism called 'feedback' because the original stimulus to the system (the melting of the ice) leads to a series of responses and consequences (exposure of more black surface) that affect the stimulus itself. This altering of the original stimulus is what is known as a feedback mechanism.

2. Now read the short text provided by the teacher carefully, and discuss answers to the following questions:
   a. What does the term 'positive' refer to in the context of feedback action?

   _____
   _____

   b. What does the term 'negative' refer to in the context of feedback action?

   _____
   _____

   c. What other example of positive feedback is the article talking about? What are the components of this example? Describe briefly how they mutually interact.

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   _____
   _____

3. Can you think of any other systems (e.g., from the environment, the body, or technology) where feedback occurs?

_____
_____
_____
_____

Extension question

The three components of the system you have just investigated can be considered a 'tiny' part of the broader climate system, which is made up of countless elements and various types of feedback interactions. This diagram represents a larger system that includes these three components (highlighted in blue). Discuss with your group and identify another consequence related to the increasing melting of sea ice. Can you also identify another feedback loop? If so, describe it briefly.

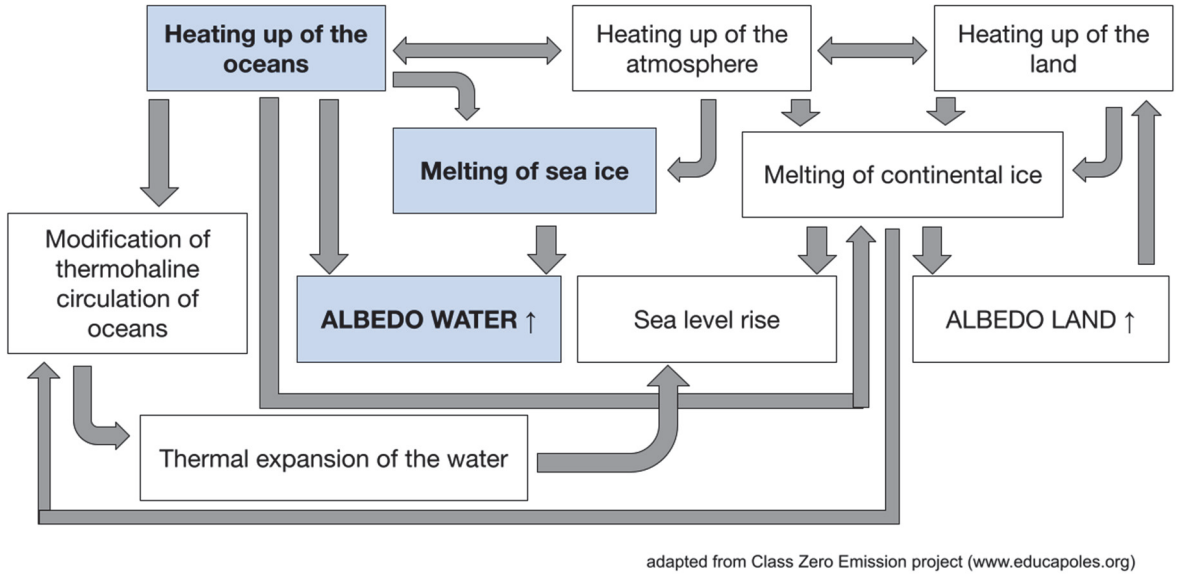

Diagram of interactions (those in blue are investigated in this experiment)

Image based on information from Climate change experiments, International Polar Foundation