



Barents Sea Inflow Shutdown: A New Mechanism for Rapid Climate Changes

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A new mechanism for rapid climate transitions in the high latitudes is described which involves complex ocean-sea ice-atmosphere interactions. A shutdown of the Barents Sea Inflow (BSI) which carries a vast amount of heat into the Arctic Ocean is at the heart of the mechanism. The BSI shutdown is studied in a multi-millennium integration with a global climate model forced by periodically (1000 yr) varying solar constant ($\pm 2\text{W/m}^2$). A positive feedback exists in the model between the inflow, the sea ice cover, and the atmospheric circulation, and BSI shutdown events are associated with a strong cooling in the northern latitudes and a subsequent rearrangement of the Arctic Ocean surface current system. The results reveal the existence of a bifurcation point in the Arctic climate system and provide a new perspective for understanding rapid climate fluctuations evident in paleo-climate records of the North Atlantic, the Nordic Seas, and Europe.