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Possible linkage of 8.2 ka event to intermediate stable mode of Atlantic circulation

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The cold climate anomaly about 8200 years ago is suggested to be linked to an intermediate mode of the Atlantic ocean circulation. This mode is characterised by a 30\% reduced North Atlantic Deep Water (NADW) formation rate and a southward shift of the deep convection site from north of Iceland to south of Newfoundland. This result is obtained with the coupled atmosphere-ocean-vegetation model, CLIMBER-2, by indroducing a well-constrained meltwater pulse from the Lake Agassiz to the northern North Atlantic. Such a short-lasting freshwater pulse is seen to initialise a cold event with a surface air temperture drop of 3.6 K in the northern North Atlantic sector and then small natural freshwater fluctuations appear to be sufficient to sustain the circulation mode. The reduced northward oceanic heat transport cools the North Atlantic and adjacent regions, which is intensified by a growth of the sea ice area, and warms the South Atlantic through the seesaw effect. The associated changes of the global patterns of temperature, precipitation and surface winds are in reasonable agreement with observational evidence of the 8.2 ka event. A stability analysis of the ocean circulation indicates that the intermediate mode cannot be traced applying a weak long-lasting freshwater forcing, as used in hysteresis experiments, which may explain why this mode was not discussed so far. Comparisons to similar experiments with the General Circulation Model CLIMBER-3alpha are shown.