



A propagating freshwater mode in the Arctic Ocean with multidecadal time scale

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The variability of the liquid freshwater content in the Arctic Ocean is regarded to be governed mainly by variations in the wind stress via Ekman convergence. Here, this view is challenged by the analysis of the spatiotemporal pattern of the Arctic Ocean freshwater content from a 500 year long control run with a global climate model. By applying POP-analysis two modes emerge: A dominant mode, explaining overall 67 % of the variance, which is a clockwise propagating freshwater signal with a period of around 80 years, and a less dominant standing mode, explaining overall 12 % of the variance, with a decadal time scale and center in the Beaufort Gyre. It is concluded that why the second mode is the wind-driven gyre mode identified in earlier work, the first mode is a baroclinic Rossby mode. This last conclusion is supported by theoretical considerations of a reduced gravity idealized Arctic Ocean.