

## **The advective feedback on the AMOC in GCMs**

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Several studies have proposed that the transport of fresh water into the Atlantic by the Atlantic Meridional Overturning Circulation (AMOC) is a good indicator of the stability of the AMOC. The argument is that the sign of this index ( $F_{ov}$ ) indicates the sign of the advective feedback of fresh water, and hence whether a stable 'off' state of the AMOC can exist. Analysis is presented from different global climate models (GCMs) with both negative and positive values of  $F_{ov}$ , and causes of model biases from observations are discussed.

We also explore whether the advective feedback between the AMOC and  $F_{ov}$  is present in GCMs and how the role of the gyre transport of fresh water modifies this relationship. Results from idealised hosing experiments with HadCM3 show that  $F_{ov}$  does indicate the sign of the advective feedback and that this feedback can significantly affect the recovery of the AMOC leading to a delay in recovery of ~100 years.