



## **A Mechanism for Lagged North Atlantic Climate Response to Solar Variability.**

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Variability in solar irradiance has been connected to changes in surface climate in the North Atlantic through both observational and climate modelling studies which suggest a response in the atmospheric circulation that resembles the North Atlantic Oscillation or its hemispheric equivalent the Arctic Oscillation. It has also been noted that this response appears to follow the changes in solar irradiance by a few years, depending on the exact indicator of solar variability. Here we propose and test a mechanism for this lag based on the known impact of atmospheric circulation on the Atlantic Ocean, the extended memory of ocean heat content anomalies and their subsequent feedback onto the atmosphere. We use results from climate model experiments to develop a simple model for the relationship between solar variability and North Atlantic climate.