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# Is the Atlantic Multidecadal Variability useful for predicting East Asian surface-air temperature?

Paul-Arthur Monerie<sup>\*1</sup>, Jon Robson<sup>2</sup>, Buwen Dong<sup>3</sup>, and Dan Hodson<sup>2</sup>

<sup>1</sup>University of Reading – Reading, UK, United Kingdom

<sup>2</sup>National Centre for Atmospheric Science (Reading) – Department of Meteorology, University of Reading, PO Box 243, Earley Gate, Reading RG6 6BB., United Kingdom

<sup>3</sup>National Centre for Atmospheric Science – Department of Meteorology, University of Reading, United Kingdom

## Abstract

We show in a previous study that the Met Office DePreSys3 prediction system has a significant skill at predicting surface air temperature over North East Asia (NEA) at a 2–5-year lead-time. We suggested the skill at predicting low-variability in NEA surface air temperature to be due to the relationship between the North Atlantic Ocean Sea Surface Temperature (NASST) and East Asia. We assess the effects of the NASST by performing a set of sensitivity experiments with MetUM-GOML2, an atmospheric general circulation model coupled to a multi-level ocean mixed layer model, to mimic warming and cooling over the North Atlantic Ocean. We show that a warming of the North Atlantic is associated with a significant warming over NEA. Two mechanisms are pointed out, (i) through the propagation of a Rossby wave (i.e., the circumglobal teleconnections) and (ii) through the effects of the warming of the NASST over the tropical Pacific Ocean. Both mechanisms allow modulation of the atmospheric circulation, allowing an increase in heat advection and a change in net surface shortwave radiation over NEA. Additional simulations, in which Pacific Ocean sea surface temperatures are kept constant, show that the modulation of the circumglobal teleconnection is key to explaining the impacts of the NASST on NEA surface temperature.

**Keywords:** Atlantic Multidecadal Variability, North East Asia, Decadal Variability, Predictability

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<sup>\*</sup>Speaker