

Abstract

It is commonly understood that a potential for skillful climate prediction resides in the ocean. It nevertheless remains unresolved to what extent variable ocean heat is imprinted on the atmosphere to realize its predictive potential over land. Here we assess from observations whether anomalous heat in the Gulf Stream's northern extension provides predictability of northwestern European and Arctic climate. We show that variations in ocean temperature in the high latitude North Atlantic and Nordic Seas are reflected in the climate of northwestern Europe and in winter Arctic sea ice extent. Statistical regression models show that a significant part of northern climate variability thus can be skillfully predicted up to a decade in advance based on the state of the ocean. Particularly, we predict that Norwegian air temperature will decrease over the coming years, although staying above the long-term (1981 – 2010) average. Winter Arctic sea ice extent will remain low but with a general increase towards 2020.

摘要

依過去普遍認知，從海洋可得知潛在的有效氣候預測，雖然尚未得知，海洋熱量的擴散變化至大氣，如何藉此了解其對陸地的潛在預測。

這篇文章中，我們透過觀測，是否在 Gulf Stream 的北側擴散的異常熱量，能提供我們預期的結果至西北歐並影響北極的氣候。我們發現，在高緯的北大西洋和 Nordic Seas 的海溫變化，反映在西北歐的氣候變化和冬天時北極的海冰擴張。統計出的回歸模式顯示，藉由海洋的狀態，可以有效的預測，在北方特定地區，將近十年氣候變化。

從中舉例，雖然是以長期平均結果，我們預測了挪威的氣溫將在近幾年下降；冬天時的北極海冰擴張依然相當小，但至 2020 年，會漸漸地擴大。