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Ocean farfield response to projected Arctic sea ice loss.

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An ensemble of 20 fully coupled CESM simulations is used to elucidate the ocean's role in shaping the global climate response to projected Arctic sea ice loss. The ensemble allows us to separate unambiguously between internal variability and forced changes. Thus, it is possible to identify the oceanic processes by which sea ice induced changes in Arctic and North Pacific sea level pressure are transmitted across the world ocean. Of particular interest is the Kelvin wave train that connects the North Atlantic with the equatorial Pacific. Within 10 years after the loss of sea ice the oceanic signal arrives in the Pacific and leads to a slow and steady deepening of the equatorial thermocline and, after another 5 decades, the subtropical thermocline. This suggests that the current Arctic sea ice loss already set into motion changes in tropical Pacific climate that will be felt several decades from now. We will dicuss these ocean induced changes in the mean climate as well as ENSO and explore possibilities of observational verification.