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Generation of Global Hyper Climate Modes

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It is shown that the leading mode of global multi-decadal sea surface temperature (SST) and the variance increase of SST variability to multi-decadal time scales can be explained by local air-sea interactions. A concept for "Global Hyper Climate Modes" is formulated: surface heat flux variability associated with regional atmospheric variability patterns is integrated by the large heat capacity of the extra-tropical oceans, leading to a continuous increase of SST variance towards longer timescales. Atmospheric teleconnections spread the extra-tropical signal to the tropical regions. Once SST anomalies have developed in the Tropics, global atmospheric teleconnections spread the signal around the world creating a global hyper climate mode. A simple model suggests that hyper climate modes can vary on timescales longer than 1,000 years. Ocean dynamics may amplify theses modes and influence the regional expression of the variability, but are not at the heart of the mechanism which produces the hyper modes.