Prediction and predictability of decadal variability

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The prediction of the decadal variability against a background of global warming is one of the most important and challenging tasks in extended weather prediction and climate science. Not only does natural variability have a large-amplitude influence over broad regions of the globe, it is an integral component of climate variability that modulates not only the low frequency climate phenomena but the extreme climate events, such as tropical cyclone activities. For example, the Pacific Decadal Oscillation (PDO) and Atlantic Multi-decadal Oscillation (AMO) has been shown to modulate the North Atlantic hurricane activity, and by considering these slowly varying climate signals as predictors of the seasonal hurricane activity, additional predictive skill has been found. Therefore, for the determination of the increase or decrease of probability of catastrophic events in the future, it is important to determine the projected decadal variability on the future climate change. We will show how decadal oscillations are interlinked and how they modulate extreme climate events such as tropical cyclones and how well the CMIP5 model simulates the decadal variability.