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Study of the Decadal Predictability of Mediterranean Sea Surface Temperature Based on Observations

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Sea surface temperature (SST) changes in the Mediterranean Sea have profound impacts on both the Mediterranean regions and remote areas. Previous studies show that the Mediterranean SST has significant decadal variability that is comparable with the Atlantic multidecadal variability (AMV). However, few studies have discussed the characteristics and sources of the decadal predictability of Mediterranean SST based on observations. Here for the first time we use observational datasets to reveal that the decadal predictability of Mediterranean SST is contributed by both external forcings and internal variability for both annual and seasonal means, except that the decadal predictability of the winter mean SST in the eastern Mediterranean is mostly contributed by only internal variability. Besides, the persistence of the Mediterranean SST is quite significant even in contrast with that in the subpolar North Atlantic, which is widely regarded to have the most predictable surface temperature on the decadal time scale. After the impacts of external forcings are removed, the average prediction time of internally generated Mediterranean SST variations is more than 10 years and closely associated with the multidecadal variability of the Mediterranean SST that is closely related to the accumulated North Atlantic Oscillation forcing.