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The association between tropical sea surface temperature variability and sentinel reporting of travel-related dengue

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Oceanic-atmospheric interactions play a crucial role in the modulation of monsoon rainfall. This is the first study that directly investigates the impact of tropical sea surface temperature (SST) variability on the frequency of sentinel reporting of travel-related dengue from the Geosentinel global emerging infectious disease surveillance network, by using the latest climate reanalysis ERA-5 produced by the European Center for Medium-Range Weather Forecasts, for the period 2007 to 2019. More specifically, we explore lag structures and the associated spatial correlation patterns between travel-related dengue cases, SSTs, and total precipitation over the tropics. We found that the Indo-Pacific and Atlantic Ocean SSTs have a remote influence on dengue risk in global regions that exhibit distinct monsoon characteristics. The coupling between SST variations and rainfall is an important driver of travel-related dengue cases and could act as an early warning signal for outbreak preparedness and travel medicine preventive advice. Finally, our findings highlight the need to better understand the large-scale and local circulation response to changes in the pattern of tropical ocean warming, to be able to better predict extreme events such as droughts and floods and devise adaptation measures against dengue outbreaks.