

The Destructive Typhoon Frequency Decrease in Japan from the Mid-20th to Early-21st Centuries

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Although historical data indicate a steady increase in sea surface temperature (SST) in the past decades, several uppermost intense class typhoons have struck Japan and caused catastrophic damage in the mid-twentieth century. Most of the uppermost intense class typhoons in the mid-twentieth century approached Japan in September according to the besttrack datasets. Based on large-ensemble historical simulations, we show that the significant reduction in the uppermost intense class typhoon frequency in Japan from the mid-twentieth century to the early-twenty-first century in September. Several uppermost intense class typhoons approached Japan in September of the mid-twentieth century owing to the high SST and weak vertical wind shear (VWS) conditions; SST in the vicinity of Japan in September in the mid-twentieth century was as warm as that in the early-twenty-first century. In the early-twenty-first century, however, in addition to a significant reduction in the total typhoon numbers, westward shifts in tracks by westward expansions of the subtropical western North Pacific high and strengthened VWS in September prevented these typhoons from approaching Japan. Though destructive typhoons have occurred in October in recent decades, the atmospheric conditions surrounding Japan have been unfavorable.

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