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Statistics of pan-oceanic extreme near-surface winds

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We investigate statistics of extreme 10 m winds over the midlatitude Atlantic, Pacific and Southern Ocean basins, regions associated with the extratropical storm tracks. We compute statistics of 10 m wind speed using reanalysis (ERA5) and satellite scatterometer datasets (NOAA NCEI Blended Seawinds), as well as the outputs from CMIP6 climate models. To select the regions with climatologically strong winds, we study the 10 m wind speeds over the oceans only in the regions where the local 98th percentiles exceed 20 ms^{-1} .

Annually, the median of 10 m wind speed distribution is the highest in the Southern Ocean, while the extreme winds (starting from 90th percentile) are higher over the oceans in the Northern Hemisphere. The hemispheric differences in the extreme winds are greater and more evident during the respective winter seasons, potentially indicating differences in the dynamics of extreme winter storms. These findings are consistent over all data products analyzed. Additionally, tails of distributions of winds at 850 hPa in the basins during the winter calculated from reanalysis and observations mirror the patterns observed in 10 m wind distributions, pointing to the influence of large-scale processes in creating stronger extreme winds over the Northern Hemisphere.