

Impact of ocean surface vector wind in the Japanese 25-year Reanalysis (JRA-25)

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The Japanese 25-year Reanalysis (JRA-25) started to assimilate high-resolution surface winds observed by the European Remote-Sensing (ERS) and QuikSCAT satellites from 1995. We investigated an impact of those scatterometer winds in JRA-25 by comparing periods before and after 1995.

One of the most sensitive variables is an upward vertical velocity. Over the Kuroshio Extension (KE) east of Japan, for example, a narrow band of surface wind convergence is formed by sharp SST front. The QuikSCAT-assimilated JRA-25 captures this narrow band of surface convergence along the KE front, and exhibits that it is roughly collocated with upward vertical velocities at 700 hPa and the Baiu cloud band in early summer. However, the narrow band of surface convergence and upward motion is not present in JRA-25 prior to 1995, the period when no scatterometer wind observation is assimilated. A similar feature is found over the Gulf Stream and ITCZ regions, where surface wind convergence along SST front causes deep atmospheric response. Intensifications of the surface wind convergence and upward motion in JRA-25 suggest a significant role of SST fronts in those regions.