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Long-term variability of the quasi-biennial oscillation teleconnection for the Southern Hemisphere atmosphere

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This study identifies quasi-decadal variability in the influence of the quasi-biennial oscillation (QBO) derived from observational and reanalysis data. We find that the sign of the QBO's influence on zonal wind around the southern polar vortex fluctuates on a quasi-decadal timescales over the entire depth from the surface to upper stratosphere during the Southern Hemisphere (SH) spring. This means that the impact of the QBO on the SH polar vortex has variation on the quasi-decadal timescale and that its effects on ozone transport is seen from the low-latitudes to the polar region in the stratosphere, whereas the impact on the Northern Hemisphere polar vortex has small variation without changing the sign. These results somewhat explain the quasi-decadal variation in the relationship between the QBO and the enhanced ozone hole that has occurred in recent decades.