



Effect of wind stress forcing uncertainties on predictability of the current through the beginning of Kuroshio

Xixi Wen and Wansuo Duan

LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China

Predictability of the current through the beginning of Kuroshio (i.e. the oceanic section at 18°N ranging from 122°E to 125°E) is explored by using the Regional Ocean Model System (ROMS). Statistic of 25 one-year predictions suggests that the errors superimposed in zonal or meridional wind stress forcing fields tend to cause larger prediction errors than the initial errors existing in oceanic current or sea surface height. We use the idea of nonlinear forcing singular vector (NFSV) to identify the zonal wind stress errors that are more likely to result in a worse prediction of current velocity of Kuroshio. Especially, the wind stress errors around 18°N , east of 180°E , which exhibit significant meridional gradient, contribute most to the prediction errors for current velocity of Kuroshio. These wind stress errors present either positive or negative curls in the region around 18°N , east of 180°E , which induces an anti-cyclone or cyclone gyre across the Pacific basin due to a time-dependent Sverdrup balance and enhances or weakens the oceanic current through the beginning of Kuroshio, finally making the predicted oceanic current to be over- or under-predicted. These results may provide useful information on improving prediction skill for the current through the beginning of Kuroshio.