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Comparison of atmospheric vertical motion of three reanalysis datasets over Tibetan Plateau

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Vertical motion is an important feature of the atmosphere, being closely linked to clouds and precipitation. We present a comparison of the vertical velocity of air over Tibetan Plateau during the period 1981–2010 using three reanalysis datasets: ERA-Interim, JRA-55 and NCEP/NCAR. Statistical analysis methods were used to examine consistency between the datasets and their suitability in research and application in Tibetan Plateau. The results show that the vertical velocity fields from ERA-Interim and JRA-55 are more consistent than they are with those from NCEP/NCAR. The atmospheric vertical velocity fields from NCEP/NCAR lack details compared with those obtained from ERA-Interim and JRA-55. Use of ERA-Interim or JRA-55 may be preferable over NCEP/NCAR. The intensity of atmospheric vertical motion in the lower troposphere in JRA-55 is significantly higher than in ERA-Interim and NCEP/NCAR. In summer, the JRA-55 data are closest to the observed wind fields and the data stability best for the Tibetan Plateau region. Our results provide guidance for better application of reanalysis data and more accurate climate prediction for this region.