

Verification of multiple-Doppler-radar derived vertical velocity using profiler data

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The retrieval of vertical velocity using Doppler radar data always contains large uncertainty. In this study the quality of the vertical velocity retrieved by a 3DVar-based multiple-Doppler wind analysis system named WISSDOM (WInd Synthesis System using DOppler Measurement) is investigated. Data from one S-band (RCWF) radar and two C-band radars (RCTP and NCU) in northern Taiwan are utilized.

The accuracy of the vertical velocity from WISSDOM is examined using two profilers (L-band and UHF) observations. The inter-comparison shows that WISSDOM-derived vertical velocity agrees reasonably well with the profiler data. The highest correlation and the smallest RMSD (Root-Mean-Square Deviation) take place when comparing against the L-band profiler data obtained under vertical beam scanning mode. The WISSDOM-derived results are generally better than those reported in a previous study using ARM scanning radar network in Oklahoma.

The winds from the L-band profiler are also merged into WISSDOM, resulting in an overall improvement of the three-dimension wind field at low levels. UHF and RCTP are applied to verify the accuracy of the method. It is shown that WISSDOM assimilating the L-band can reduce RMSD and enhance correlation with UHF and RCTP. The result suggests that the method can get better three-dimension wind field.

Keywords: profiler, WISSDOM