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Quality Control of Radio Frequency Interference in UHF Wind Profiler Radar Data

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The test operation of UHF wind profiler developed for 4 years from 2017 was carried out from March to September 2021. During the test operation, radio frequency interference (RFI) contamination was investigated in the spectrum data. We found discontinuous and overlapping RFI as well as the general form of RFI on continuous altitudes as the same magnitude. An algorithm was developed to remove them and to retrieve meteorological signal. Multi-interference refers to RFI that overlaps several times, such as discontinuous peaks by altitude or reappearing even after the first RFI is removed, unlike external RFI. After threshold filtering, a continuity check is checked on the gates that are identified as non-meteorological signals to determine the contamination by RFI. The contaminated spectrum is made noise to remove RFI and a new peak is derived. 5 points (± 2 points) at the corresponding peak become noises by means of the noise-ization method. In addition, in a meteorological signal, 5 points are linearly interpolated on the gate identified as a meteorological signal after the continuity check. In order to prevent the actual meteorological signal from being removed, the continuity criterion was set to 15 gates or more for the vertical beam and 8 or more gates for the tilted beam (about 1/2, 1/4 based on the number of gates in low mode). In order to remove double and triple overlapping RFI, filtering and continuity are repeatedly tested until the peak is found below the reference point. For the newly derived peak in the iterative process, the spectral width was calculated using the single peak moment method and this is used as the threshold value.