

Water vapor profiles from AMSU-B data using an empirical inversion neural networks

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The AMSU-B is operating at several frequencies, which are sensitive to water vapor at different levels of the troposphere (from ground to about 12 Km). Therefore, it can provide good information about the vertical profile of water vapor structures in the troposphere. Using two years AMSU-B and ground-based radiosonde measurements, the meso-scale atmospheric water vapour, in terms of mixing ratio, at five atmospheric altitudes over Iran (23-45N, 45-65E), has been investigated, based on neural network technique. The input vector is comprised of nine elements. Three of these are the ground-level pressure, temperature and dew point temperature. The others are cosine of viewing angle of the satellite and the five brightness temperatures at five AMSU-B channels, (89, 150, 183.3 ± 7 , 183.3 ± 3 , and 183.3 ± 1 GHz) in the passes between 23.00 to 24.00 GHT. The output vector is five-element vector of mixing ratios at the five levels of the troposphere through surface, 850, 700, 500, and 400 mbar (from radiosonde measurements). Of special significant is that fact that the method shows acceptable retrieval water vapour profile below 500 mbar even when is used for the unknown station. The ambiguity in predicted values for above 500 mbar may be due to very low concentration of water vapour at these levels (and its variability).