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Long-term validations of annual wind speeds by microwave scatterometers around Japan

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Satellite-borne microwave scatterometers are well known as a useful observation for requiring offshore wind conditions. A new Japanese offshore wind atlas (NeoWINS), actually, employs Advanced SCATterometer (ASCAT) wind vectors. When the offshore wind atlas is made, information about yearlong wind variations is indispensable as well as accuracies of each instantaneous wind fields. The purpose of this study is to examine the long-term wind variation around Japan (120 – 160 °E, 14 - 49°N) from scatterometers, ASCAT and QuikSCAT for the past more than 15 years. ASCAT and QuikSCAT wind vectors are resampled to 0.1° latitudinally and 0.125° longitudinally, using inverse distance weighting for 15 years (from 2000 to 2014). The ASCAT and QuikSCAT wind vectors have quality flags indicating types of errors due to systematic, artificial, atmospheric, and oceanographic phenomena for each pixel. The pixel having the flag is eliminated usually to use only reliable wind vectors. However, we should consider that the eliminating wind with specific atmospheric and oceanographic conditions could lead to an inaccurate frequency distribution of wind speed and direction when accurate offshore wind conditions are required. Here, two types of annual wind vectors are calculated. One is applying all types of the quality flags. Namely, pixels with any types of the flag are eliminated. The other is ignoring all flags. It means all pixels are employed. It is found that annual average wind speeds with considering flags are higher than those with ignoring flags. The cause of the difference may be a low wind speed flag. The eliminating of a range of a low wind speed (< 3 m/s) leads a higher average wind speed, and the impact of the low wind speed flag is stronger than the others (e.g. the high wind speed flags) for the annual average wind speed. On the other hand, it is also found that a spatial distribution of a standard deviation of the annual wind speed is almost same among the two types of the flag considering. Moreover, there is one other thing that is noteworthy. A coastal area located off the south Tohoku region has the standard deviation of more than 0.4 m/s though other coastal areas have the standard deviation of almost less than 0.3 m/s. Further investigations are currently under way in order to describe the cause of the high standard deviation.