An impact of CYGNSS surface wind speed observation on air-sea flux estimate

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Surface wind speed over the oceans is an essential variable to state boundary condition of both ocean and atmosphere as an important element of air-sea flux. In the past decades from 1990s, several satellite missions for near surface wind speeds over the global oceans have been conducted with a microwave radiometer and a scatterometer mounted on large satellites (e.g., DMSP/SSMI, Aqua/AMSR-E, and QuikSCAT/SeaWinds). Recently, a new method to measure surface wind speed is drawing attention. Cyclone Global Navigation Satellite System (CYGNSS) is a new mission in NASA using eight micro satellite platforms for observing near surface wind speed. Using Global Navigation Satellite System (GNSS) and its reflectance wave from the ocean surface they can measure wind speeds over the ocean area. In this research, we investigated the impact of near surface wind speed observations by the CYGNSS micro satellite group on the following two aspects, with the aim of utilizing CYGNSS observations for the estimation of the air-sea flux. One is to investigate the difference in the observation method itself and show some results of case studies in the situation where it is difficult to measure by the current microwave instruments (for example, an extremely high wind speed region and a heavy rain region). The other is about the difference in sampling characteristics by using micro satellite group. Figure 1 shows an example of observation of the surface wind speed around Japan on March 18, 2017 by AMSR2 (FIG. 1a) mounted on a large satellite, GCOM-W, and CYGNSS (FIG. 1b) of a micro satellite group. It can be seen that the sampling characteristic by the CYGNSS is quite different from that by AMSR2. It is also found that CYGNSS can observe wind speed in the area where AMSR2 can not observe it due to heavy rain rainfall. We will investigate the impact of such differences in sampling and measurement characteristics on estimation air-sea flux.

Keywords: Remote sensing, air-sea interaction

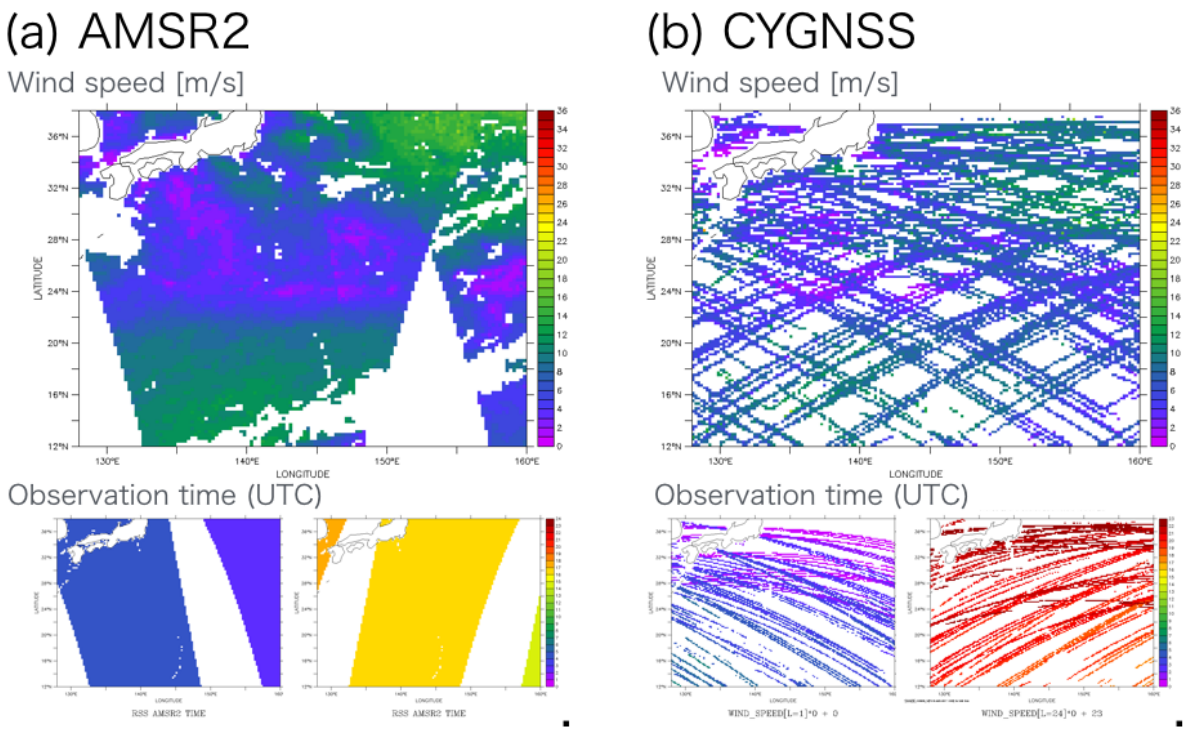

Figure 1 Surface wind speeds observed by (a) AMSR2 and (b) CYGNSS on 18 March, 2017.

