2016 年 3 月 1 日受付，2016 年 6 月 21 日採録

Abstract

Air-sea CO_2 gas transfer velocity is used to estimate the air-sea CO_2 gas flux and is generally expressed as a function of wind speed. There has been considerable research on the air-sea CO_2 gas transfer velocity including wind speeds due to the fact that the difference in wind speeds impacts the air-sea CO_2 gas flux. On the other hand, CO_2 solubility to estimate the air-sea CO_2 gas flux and the Schmidt number to measure the air-sea CO_2 gas transfer velocity are expressed as a function of sea surface temperature. Given this, different data sets of global sea surface temperature have been proposed. Therefore, it is imperative to evaluate the effect of the air-sea CO_2 gas flux caused by the difference in sea surface temperature. In this study, we estimated and then investigated the global air-sea CO_2 gas flux using wind and wave data sets by ECMWF, as well as seven kinds of sea surface temperature data sets (ERA40, JRA-25, JRA-55, NCEP R1, NCEP R2, ERA-interim-high, and ERA-interim-low). Our findings show that the largest difference of the data sets in annual global air-sea CO_2 gas flux was 13.2%, and the largest difference by 10-degree latitude was 0.11 (PgC/year) at 60–70 degrees south latitude. To conclude, these results clearly demonstrate that the difference in sea surface temperature has a significant effect on the air-sea CO_2 gas flux.