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北西太平洋の台風強度: 結合・非結合モデルを用いた数値実験
Intensity of typhoons in the western North Pacific: numerical experiments with atmosphere-ocean coupled models

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Intensity of tropical cyclones (TCs) greatly depends on the sea surface temperature (SST) distribution. Cold SST distribution is observed locally around the track of a TC passing, which is produced by mixing/upwelling in the upper layer in the ocean. In numerical experiments utilizing with atmosphere-ocean coupled models, local decrease of the SST after TCs passing is simulated with representing mixing/upwelling in the ocean, resulting in suppression of the minimum central pressure of TCs, one of the indexes of the intensity of TCs. Suppression of the intensity is apparent in the TCs of slow moving. On the other hand, the ocean itself has currents. The SST decreasing in a TC passing is recovered and canceled by strong warm horizontal ocean currents, which leads to less suppression of the intensity of the TC.

In this study, the intensity change of TCs with air-sea interaction was investigated in the western North Pacific, where local warm SST distributes around Kuroshio currents. Numerical experiments were performed utilizing with atmosphere-ocean regional coupled/non-coupled model; slab ocean model was for one-dimensional ocean coupled experiments and CReSS-NHOES was for three-dimensional ocean coupled experiments. In the comparison of the results, remarkable differences of intensities resulting from air-sea interaction were represented, with successfully simulating typical structures of typhoons. The magnitude of the central pressure deepening in the mature stage was not always more suppressed in the three-dimensional ocean coupled experiment including upwelling, compared to that in a slab ocean experiment of one-dimensional vertical mixing heat transfer in the ocean upper layer around the strong Kuroshio currents, which suggested heat supply by the warm horizontal currents.

We will discuss intensity change of TCs (typhoons) in the western North Pacific in focusing three-dimensional air-sea interactions around the Kuroshio currents.

キーワード: 台風, 熱帯低気圧, 大気海洋相互作用, 大気海洋結合モデル, 非静力雲解像領域モデル, 数値実験
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