

琉球大学学術リポジトリ

太平洋北赤道反流とその変動及びエルニーニョ現象 に対する応答に関する研究

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Abstract

Study on the Pacific North Equatorial Countercurrent, its variations, and its responses to the El Niño event

The North Equatorial Countercurrent (NECC) is an eastward zonal current that establishes the low-latitude North Pacific Gyre. The NECC, which flows along the Pacific Ocean, has aroused the curiosity of scientists due to the likelihood that it may play a key role in the El Niño Southern Oscillation's (ENSO) evolution. ENSO has two phases: the warm period, which we call El Niño, and the cold phase, which we call La Niña. To explore the dominant mode of the NECC in each season, an empirical orthogonal function (EOF) approach was used in this study. Using geostrophic current data from altimetric satellites, we found that the NECC strengthened (weakened) during the developing phase of the El Niño (La Niña) event, which occurs mostly in boreal summer. The NECC magnitude decreased significantly as it entered the mature phase of El Niño, which occurs primarily in boreal winter. The movement of the NECC pathway to the north (south) was also seen when the magnitude was strengthening (weakening). In addition, the response of the NECC in the west and east of the dateline to three types of El Niño over 40 years (1978-2017) was carried out to analyze the differences. El Niño events are classified into three types: east pacific (EP), central pacific (CP), and a combination of both EP and CP (MIX). The results of this study showed that during the MIX El Niño period, the NECC was at its strongest in the west and east of the dateline. In the western Pacific Ocean, EP El Niño episodes usually induced a stronger NECC than CP El Niño episodes throughout the development phase, although it is difficult to detect with EOF analysis. In the mature phase, on the other hand, CP El Niño is detected more regularly, resulting in a greater NECC magnitude. Several oddities, such as episodes EP 1986/1987, CP 1987/1988, and CP 2002/2003, were identified during El Niño's unique years. In the east of the dateline, The NECC was considerably stronger during the EP and MIX El Niño than during the CP El Niño for the spring to fall, which are frequently linked with the development phase. In the mature phase, the NECC during the EP El Niño was weaker than the NECC during the CP and MIX El Niño. The movement of the western Pacific NECC to the south occurs in all types of El Niño events. The NECC east of the dateline, on the other hand, shifted northward during the mature phase of the CP and MIX episodes but not during the EP episodes.

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