

Wind Field Variations in the Tropical Pacific Ocean from Satellite Scatterometer Data

HO Chung-ru ¹, ZHENG Zhe-wen ¹, LIN Chun-yi ¹, KUO Nan-jung ¹, TSAO Chih-chung ²

¹Department of Marine Environmental Informatics, National Taiwan Ocean University, Keelung, Taiwan, China
E-mail: chungru.ho@gmail.com

²Department of Social Studies Education, National Taipei University of Education, Taipei, Taiwan, China

Abstract

Satellite scatterometers have provided an opportunity to monitor wind fields in the world oceans. The sea surface wind stress data from ERS-1/2 and QuikSCAT scatterometers from 1993 to 2007 has been used to study the variation in the tropical Pacific Ocean by vector empirical orthogonal function (VEOF) method. The first VEOF mode shows an increase trend of planetary wind stress. The significantly increasing period is found from 1999 to 2000 when is the data transferred from ERS-2 to QuikSCAT. The consistence between ERS-1/2 and QuikSCAT winds during the overlap period from 1999 to 2000 is examined. The results show that there is a significant difference between the two datasets. The ERS-1/2 data is then adjusted to fit the wind data from QuikSCAT by least squares method. VEOF is then applied to the wind dataset again and no increasing trend is found in the first VEOF mode which is related to the trade winds. The second VEOF mode indicates the seasonal variation which is related to the East Asia monsoon. After removing the annual signal, the anomaly wind data are decomposed by VEOF again. The first mode shows the interannual variability which is highly related to El Niño/La Niña events.

Keywords

satellite scatterometer, wind stress, vector empirical orthogonal function, tropical ocean
