On Study of Ocean Circulation in the Western Pacific Ocean

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Ocean circulation in the Northwestern Pacific Ocean (NWPO) is an integral part of the global ocean circulation system and plays important role in global climate change. So it has attracted many scientists including oceanographers and meteorologists to work on for decades.

In the present paper a review is made of the history of ocean circulation research in NWPO with emphasis on field experiments and progress in knowledge of ocean circulation in this region and problems remaining; Present status of oceanographic activities in NWPO is also described; A prospect of future ocean circulation study in the area is provided with proposal.

1. Field experiments.
   (1) The first large scale multi-national field experiment in the history are CSK (Cooperative Study of the Kuroshio), which was carried on from 1960's to 1970's and is reviewed.
   (2) A number of large scale experiments took place during the period of TOGA (Tropical Ocean and Global Atmosphere) and WOCE (World Ocean Circulation Experiment) programs. These are the US-China Cooperative Investigation on Air-Sea Interaction in the Equatorial Western Pacific Ocean (from the middle 1980's to early 1990's), the CAS (Chinese Academy of Sciences with its six institutes) Joint Study on Air-sea Interaction in the Tropical Western Pacific and Short-term Climate Change in China (from the middle 1980's to early 1990's), the WEPOCS (Western Pacific Ocean Circulation Experiment) in the second half of 1980's and TOCS (Tropical Ocean Climate Study) conducted in the early 1990's, etc.
2. Progress in knowledge of ocean circulation in the NWPO.
   (1) 1930's-1950's: The North Equatorial Current (NEC), the Mindanao Current (MC), the Equatorial Undercurrent (EUC), the New Guinea Coastal Current (NGCC), etc.
   (2) 1960's-1970's: Bifurcation of NEC, the Mindanao Eddy (ME), etc.
   (3) 1980's-1990's: the Halmahera Eddy (HE), The New Guinea Coastal Undercurrent (NGCUC), the Mindanao Undercurrent (MUC), etc.
3. Prospect and suggestions.
   (1) The present status of research of ocean circulation in the NWPO.

(2) Remaining scientific problems: gyre interaction associated with climate changes, origin of undercurrents, relation/connection of undercurrents and bifurcation of NEC associated with climate, etc.

(3) Prospect. Introduction to NPOCE (Northwestern Pacific Ocean Circulation Experiment) Workshop held on 17-18 May 2007 in Qingdao, China and suggestions.