



**A CONCEPTUAL MODEL RELATING
THE QUASI-BIENNIAL OSCILLATION AND
THE TROPOSPHERIC BIENNIAL OSCILLATION**

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By

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DEDICATION

To my beloved wife, Qui Ching,
and
my daughters, Mei Sham, Mei Fong and Mei Fern,
for their unwavering support and understanding.

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LIST OF ABBREVIATIONS

EASM	East Asian summer monsoon
ENSO	El Nino Southern Oscillation
GrADS	Grid Analysis and Display System
NCEP	National Centre of Environment Prediction
QBO	Quasi-Biennial Oscillation
SST	Sea Surface Temperature
SSTA	Sea Surface Temperature Anomaly
TBO	Tropospheric Biennial Oscillation
UAO	Upper Air Observation
UTC	Universal Time Coordinate
WMO	World Meteorological Organization

ABSTRACT

A survey of the zonal wind throughout the troposphere and the lower stratosphere near the equator is made for the 41-year period of 1958-98. A similar survey of the 500-hPa geopotential height, sea surface temperature (SST) and tropopause height is also made, except that the survey period for the tropopause height is shorter than 41 years due to unavailability of data.

Other than the well-known Quasi-Biennial Oscillation (QBO) feature in the lower stratosphere and the Tropospheric Biennial Oscillation (TBO) feature exhibited by the SST, similar oscillation features are found throughout the whole troposphere by both surveys. Autocorrelation functions, Pearson cross correlation functions and smoothed power spectrums of all meteorological parameters used in the surveys indicate that all these features are statistically significant at the 90-95% confident level.

The Pearson cross correlation functions are further used to deduce a conceptual model relating the QBO in the lower stratosphere and the TBO feature found in the interannual variability of monsoon pattern at and near the surface of the earth. The QBO and TBO seem to be interrelated to each other thermodynamically.