Geophysical Research Abstracts, Vol. 8, 09135, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09135

Looking for oceanic oscillations in time-variable gravity signal

B. F. Chao (1), I. Vigo (2), D. García (2)

(1) Space Geodesy Laboratory, NASA Goddard Space Flight Center, (2) Space Geodesy Laboratory, Dept. Applied Mathematics, University of Alicante

Interannual oscillations in the ocean basins are of fundamental importance in climatic system. Traditionally these oscillations have been studied in terms of sea-surface pressure, temperature, and height. In this paper we will use a new global data type - time-variable gravity, which signifies the changing distribution of (oceanic water) mass. The data we have available are in two monthly sets of low-degree harmonic components of the time-variable gravity: (i) from the satellite-laser-ranging (SLR) observations up to degree and order 4x4, for 1992-2005; (ii) the GRACE Mission data taken up to degree and order 12x12, for 2002-2005. Neither data set is ideal for the application: SLR suffers from poor spatial resolution whereas GRACE is relatively short in time span., Numerical experiments are conducted in extracting information about oceanic oscillations using the empirical orthogonal functions (EOF) and the complex EOF techniques. We focus on the El Nino/Southern Oscillation in the tropical Pacific-Indian Ocean region and the extratropic Pacific Decadal Oscillation, pertaining to the water mass redistribution. We study their oscillation patterns and the corresponding time evolutions as well as any propagation feature, in contrast to corresponding results from TOPEX/Poseidon and Jason-1 ocean altimeter data. These represent complementary information to the traditional parameters and contribute to better understanding the dynamics of the Earth's climatic system.