

3.5.6.2 Special Bureau for the Oceans

Introduction

The oceans have a major impact on global geophysical processes of the Earth. Nontidal changes in oceanic currents and ocean-bottom pressure have been shown to be a major source of polar motion excitation and also measurably change the length of the day. The changing mass distribution of the oceans causes the Earth's gravitational field to change and causes the center-of-mass of the oceans to change which in turn causes the center-of-mass of the solid Earth to change. The changing mass distribution of the oceans also changes the load on the oceanic crust, thereby affecting both the vertical and horizontal position of observing stations located near the oceans. As part of the IERS Global Geophysical Fluids Center, the Special Bureau for the Oceans (SBO) is responsible for collecting, calculating, analyzing, archiving, and distributing data relating to nontidal changes in oceanic processes affecting the Earth's rotation, deformation, gravitational field, and geocenter. The oceanic products available through the IERS SBO web site at <<http://euler.jpl.nasa.gov/sbo>> are produced primarily by general circulation models of the oceans that are operated by participating modeling groups and include oceanic angular momentum, center-of-mass, and bottom pressure.

Data Products

Five different oceanic angular momentum series are currently available from the IERS Special Bureau for the Oceans:

- (1) *ponte98.oam*, a series computed by Ponte *et al.* (1998) and Ponte and Stammer (1999, 2000) from the products of a simulation run of the MIT ocean general circulation model which spans January 1985 to April 1996 at 5-day intervals;
- (2) *johnson01.oam*, a series computed by Johnson *et al.* (1999) from the products of version 4B of the Parallel Ocean Climate Model (POCM) which spans January 1988 to December 1997 at 3-day intervals;
- (3) *c20010701.oam*, a series computed by Gross *et al.* (2003, 2004) from the products of a simulation of the oceans' general circulation run by the Estimating the Circulation and Climate of the Ocean (ECCO) group at JPL which spans January 1980 to March 2002 at daily intervals;
- (4) *ECCO_50yr.oam*, a series computed by Gross *et al.* (2005) from the products of a simulation of the oceans' general circulation run by the ECCO group at JPL which spans January 1949 to December 2002 at 10-day intervals; and
- (5) *ECCO_kf049f.oam*, a series computed by Gross *et al.* (2005) from the products of a data assimilating model of the oceans' general circulation run by the ECCO group at JPL which spans January 1993 to December 2003 at daily intervals.

Five different oceanic center-of-mass series are also currently available from the IERS Special Bureau for the Oceans:

- (1) `dong97_mom.cm`, a series computed by Dong *et al.* (1997) from the results of a version of the Modular Ocean Model (MOM) run at JPL which spans February 1992 to December 1994 at 3-day intervals;
- (2) `dong97_micom.cm`, a series also computed by Dong *et al.* (1997) from the results of running the Miami Isopycnic Coordinate Ocean Model (MICOM) at JPL which also spans February 1992 to December 1994 at 3-day intervals;
- (3) `c20010701.cm`, a series computed by Gross (personal communication, 2003) from the results of a simulation run of the ECCO ocean model done at JPL which spans January 1980 to March 2002 at daily intervals;
- (4) `ECCO_50yr.cm`, a series computed by Gross (personal communication, 2004) from the products of a simulation of the oceans' general circulation run by the ECCO group at JPL which spans January 1949 to December 2002 at 10-day intervals; and
- (5) `ECCO_kf049f.cm`, a series computed by Gross (personal communication, 2004) from the products of a data assimilating model of the oceans' general circulation run by the ECCO group at JPL which spans January 1993 to December 2003 at daily intervals.

Time series of the ocean-bottom pressure are currently available from the IERS SBO through a link to the JPL ECCO web site at <http://ecco.jpl.nasa.gov/external> from which two dimensional ocean-bottom pressure fields can be obtained that have been produced from purely surface flux-forced ocean models as well as ocean models that additionally assimilate satellite and in situ data. A link is also provided to the GLObal Undersea Pressure (GLOUP) data bank of ocean-bottom pressure measurements at <http://www.pol.ac.uk/psmslh/gloup/gloup.html>.

In addition to these data sets, a subroutine to compute oceanic angular momentum, center-of-mass, and bottom pressure from the output of general circulation models can be downloaded from the IERS SBO web site along with a bibliography of related articles.

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