The GGFC Special Bureau for the Oceans: Providing Ocean Products for Geodesy

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International Earth Rotation & Reference Systems Service

Special Bureau for the Oceans

WELCOME

Welcome to the IERS Special Bureau for the Oceans home page!

The oceans have a major impact on global geophysical processes of the Earth. Non-tidal 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. Recognizing the important role that non-tidal oceanic processes play in Earth rotation dynamics and terrestrial reference frame definition, the International Earth Rotation Service, now known as the International Earth Rotation and Reference Systems Service (IERS), created a Special Bureau for the Oceans in order to facilitate research into these and other solid Earth geophysical processes affected by the oceans.

The IERS Special Bureau for the Oceans (SBO) is one of seven Special Bureaus of the IERS Global Geophysical Fluids Center (GGFC) which was established on January 1, 1998 in order to help relate dynamical properties of the atmosphere, oceans, mantle, and core to motions of the Earth, including its rotation. In particular, the IERS Special Bureau for the Oceans is responsible for collecting, calculating, analyzing, archiving, and distributing data relating to non-tidal changes in oceanic processes affecting the Earth's rotation, deformation, gravitational field, and geocenter.

Through the IERS SBO web site, oceanic data can be downloaded and a bibliography of publications pertaining to the effect of the oceans on the solid Earth can be obtained. Additional information about the IERS Special Bureau for the Oceans can be found in an unpublished manuscript available here and in the SBO chapter of IERS Technical Note 30 (Proceedings of the IERS Workshop on Combination Research and Global Geophysical Fluids).

Members of the IERS SBO Team

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International Earth Rotation & Reference Systems Service

Special Bureau for the Oceans

SOFTWARE

- calc_sbo2.f Fortran routine to calculate core SBO products from modeled oceanic velocity and density fields

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PUBLICATIONS

- Unpublished manuscript describing the IERS Special Bureau for the Oceans (PDF file)
- SBO chapter of IERS Technical Note 30 (PDF file)
- Bibliography of publications pertaining to the effect of the oceans on the solid Earth (PDF file)

PDF files can be read with Adobe Acrobat Reader which is available at no cost from Adobe

International Earth Rotation & Reference Systems Service

Special Bureau for the Oceans

DATA

The IERS SBO data archive is also accessible by anonymous ftp to euler.jpl.nasa.gov/sbo

Global Oceanic Angular Momentum & Excitation Functions

Name	Ocean Model	Data Span	Resolution	Contents
ponte98.oam	MIT	Jan 1985 to Apr 1996	5 days	OAM
johnson99.warning	POCM_4B	Jan 1990 to Dec 1993	15 days	OAM
johnson01.oam	POCM_4B	Jan 1988 to Dec 1997	3 days	OAM
c20010701.oam	ECCO_JPL	Jan 1980 to Mar 2002	1 day	OAM
c20010701.chi	ECCO_JPL	Jan 1980 to Mar 2002	1 day	excitation
ECCO_50yr.oam	ECCO_JPL	Jan 1949 to Dec 2002	10 days	OAM
ECCO_50yr.chi	ECCO_JPL	Jan 1949 to Dec 2002	10 days	excitation
ECCO_kf049f.oam	ECCO_JPL	Jan 1993 to Mar 2006	1 day	OAM
ECCO_kf066a2.oam	ECCO_JPL	Jan 1993 to Dec 2008	1 day	OAM
ECCO_kf066a2.chi	ECCO_JPL	Jan 1993 to Dec 2008	1 day	excitation
ECCO_kf066b.oam	ECCO_JPL	Jan 1993 to Dec 2008	1 day	OAM
ECCO_kf066b.chi	ECCO_JPL	Jan 1993 to Dec 2008	1 day	excitation
ECCO_kf079.oam	ECCO_JPL	Jan 1993 to Dec 2011	1 day	OAM
ECCO_kf079.chi	ECCO_JPL	Jan 1993 to Dec 2011	1 day	excitation
ECCO_kf080.oam	ECCO_JPL	Jan 1993 to Dec 2011	1 day	OAM
ECCO_kf080.chi	ECCO_JPL	Jan 1993 to Dec 2011	1 day	excitation

Oceanic Center-of-Mass

Name	Ocean Model	Data Span	Resolution
dong97_mom.cm	MOM	Feb 1992 to Dec 1994	3 days
dong97_micom.cm	MICOM	Feb 1992 to Dec 1994	3 days
c20010701.cm	ECCO_JPL	Jan 1980 to Mar 2002	1 day
ECCO_50yr.cm	ECCO_JPL	Jan 1949 to Dec 2002	10 days
ECCO_kf049f.cm	ECCO_JPL	Jan 1993 to Mar 2006	1 day
ECCO_kf066a2.cm	ECCO_JPL	Jan 1993 to Dec 2008	1 day
ECCO_kf066b.cm	ECCO_JPL	Jan 1993 to Dec 2008	1 day
ECCO_kf079.cm	ECCO_JPL	Jan 1993 to Dec 2011	1 day
ECCO_kf080.cm	ECCO_JPL	Jan 1993 to Dec 2011	1 day

Ocean-Bottom Pressure (Modeled)

Name	Ocean Model	Data Span	Resolution
ECCO simulation	MIT	Jan 1980 to present	12 hours
ECCO assimilation	data assimilated	Jan 1993 to present	12 hours

Ocean-Bottom Pressure (Measured)

GLOUP (GLObal Undersea Pressure) data bank of ocean-bottom pressure measurements

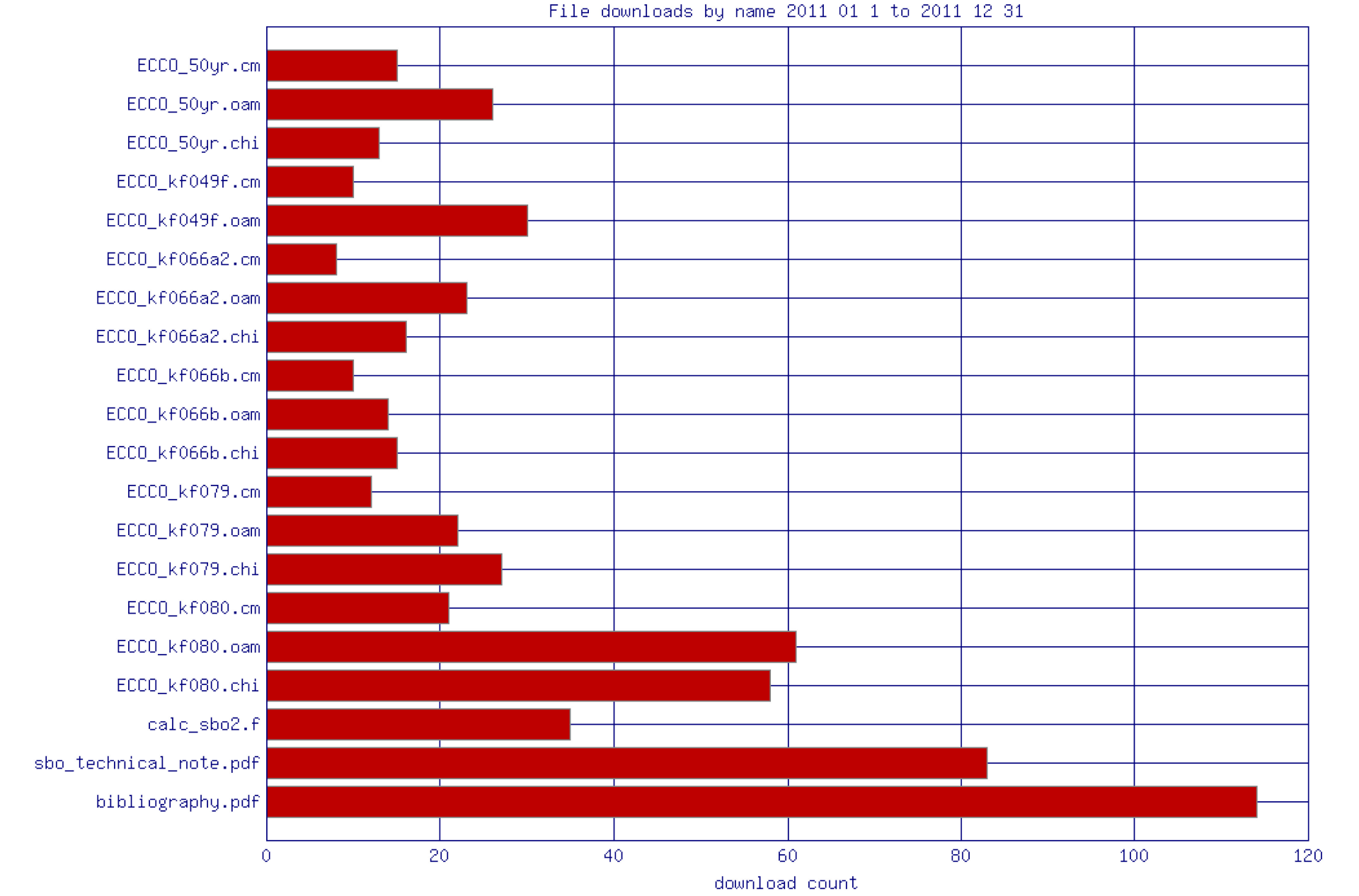
Ocean Loading from Ocean-Bottom Pressure

University of Luxembourg (ECCO)

Global Angular Momentum From Earth System Models

Helmholtz Centre Potsdam - GFZ (consistent atmospheric, oceanic, and hydrologic angular momenta)

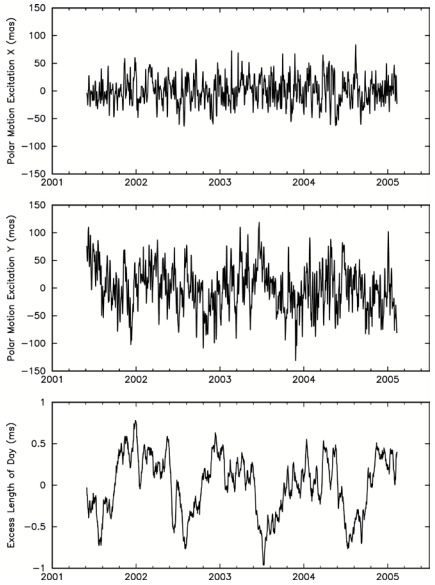
2011



0 Downloads 120

Observed Residual Excitation
(2001.4 – 2005.1)

observed



Variance (percent reduction)

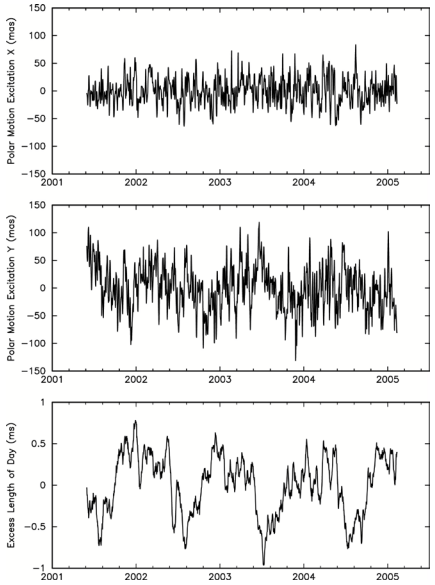
chi-x: 554 mas^2

chi-y: 1611 mas^2

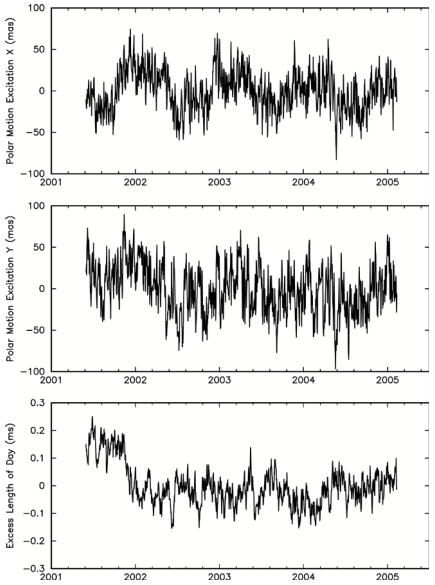
lod: 0.127 ms^2

Observed Residual Excitation
(2001.4 – 2005.1)

observed



obs-atm

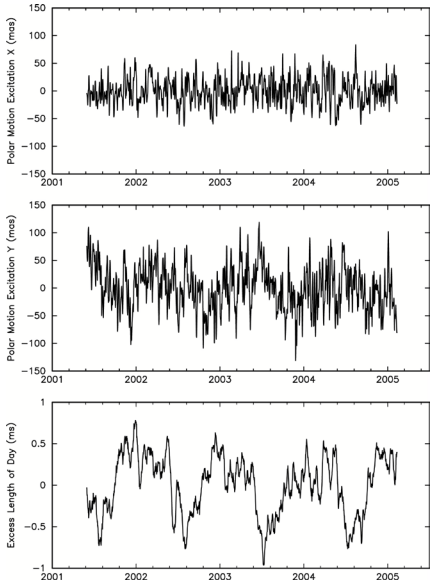


Variance (percent reduction)

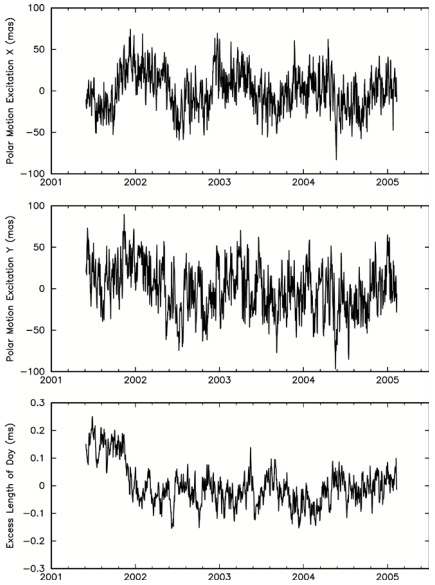
chi-x:	554 mas^2	570 mas^2 (-3%)
chi-y:	1611 mas^2	863 mas^2 (46%)
lod:	0.127 ms^2	0.0055 ms^2 (95.7%)

Observed Residual Excitation
(2001.4 – 2005.1)

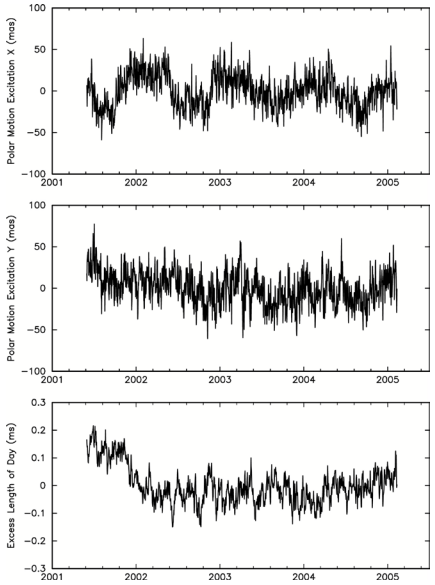
observed



obs-atm



obs-atm-ocn

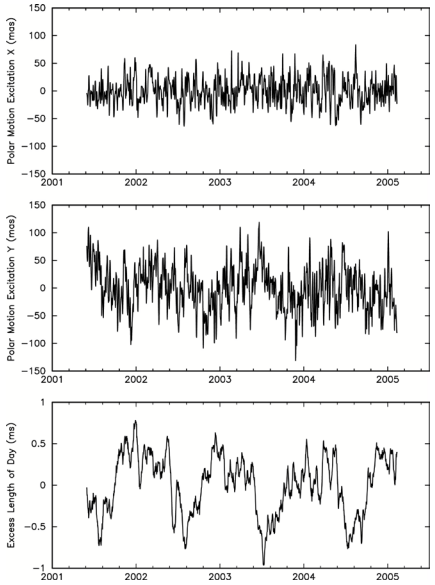


Variance (percent reduction)

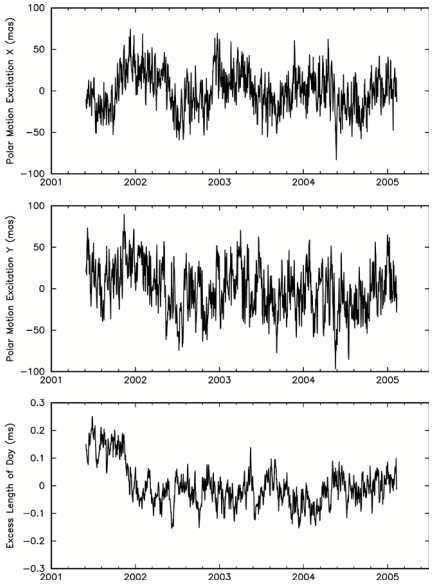
chi-x:	554 mas^2	570 mas^2 (-3%)	405 mas^2 (27%)
chi-y:	1611 mas^2	863 mas^2 (46%)	412 mas^2 (74%)
lod:	0.127 ms^2	0.0055 ms^2 (95.7%)	0.0045 ms^2 (96.5%)

Observed Residual Excitation
(2001.4 – 2005.1)

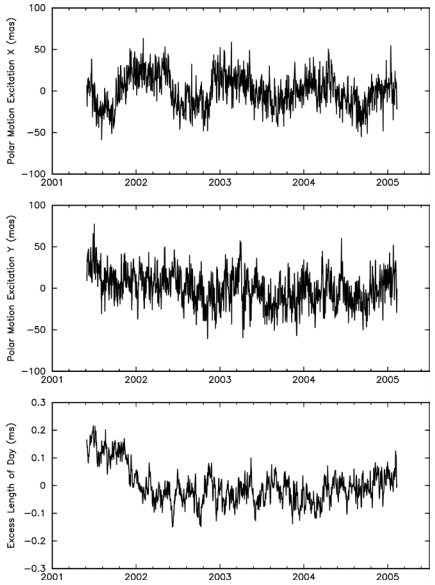
observed



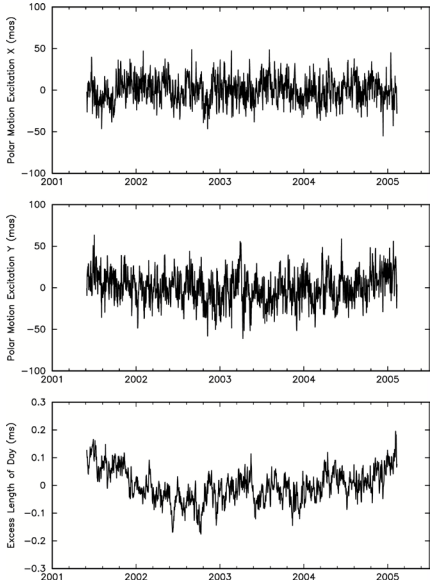
obs-atm



obs-atm-ocn

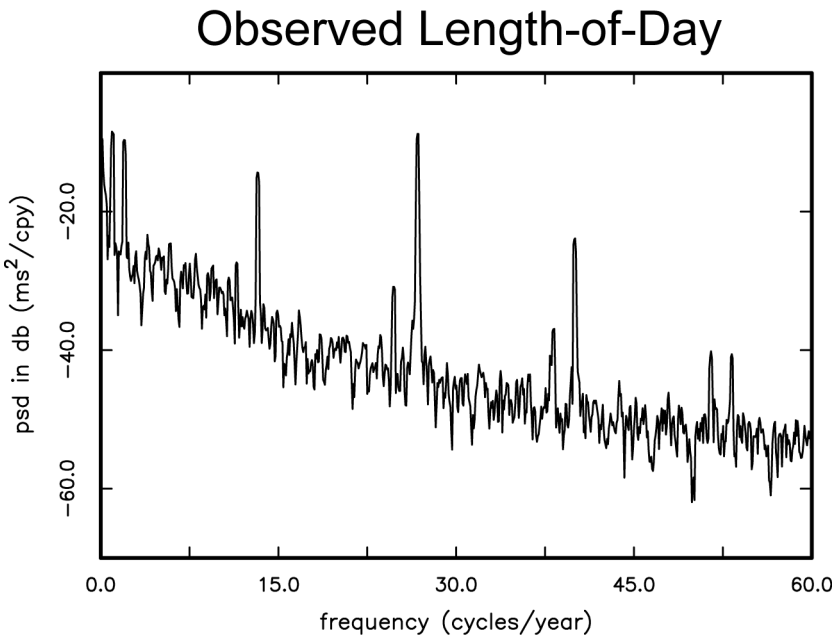


nonseasonal obs-atm-ocn



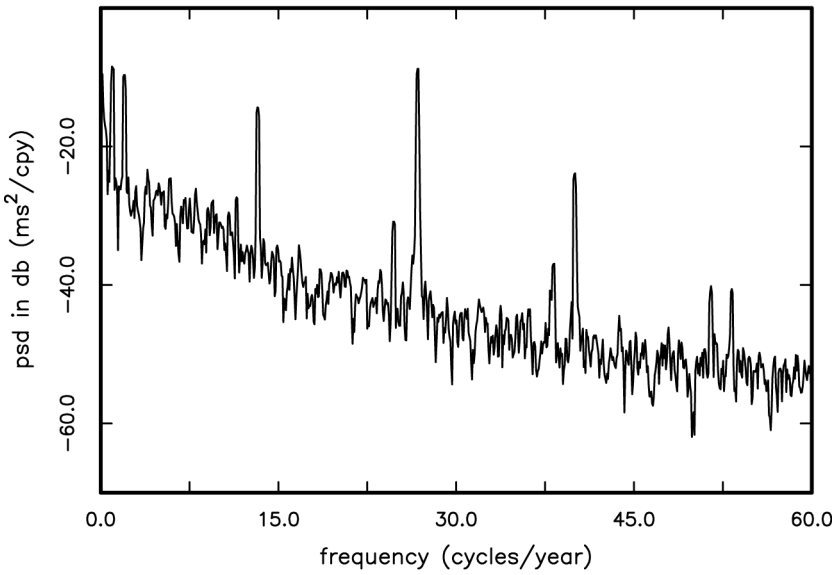
Variance (percent reduction)

chi-x:	554 mas^2	570 mas^2 (-3%)	405 mas^2 (27%)	232 mas^2 (58%)
chi-y:	1611 mas^2	863 mas^2 (46%)	412 mas^2 (74%)	340 mas^2 (79%)
lod:	0.127 ms^2	0.0055 ms^2 (95.7%)	0.0045 ms^2 (96.5%)	0.0033 ms^2 (97.4%)

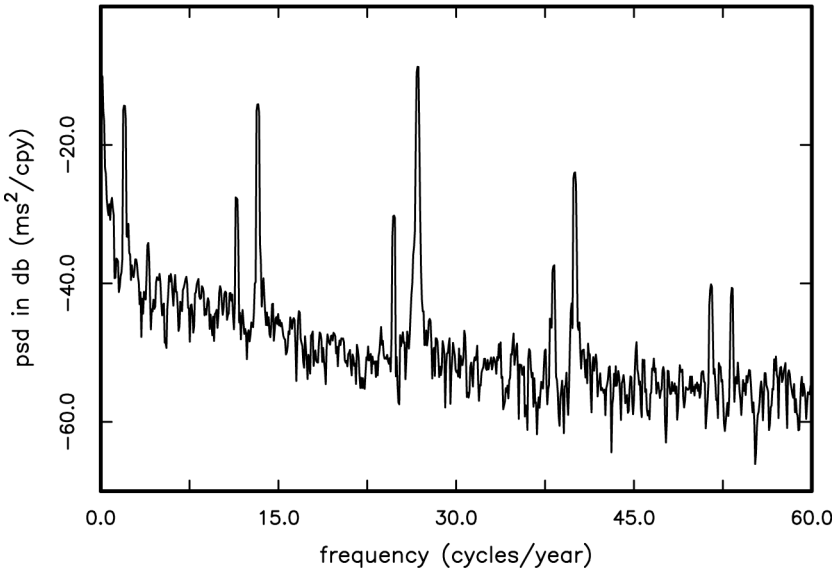


(January 2, 1993 to September 10, 2006)

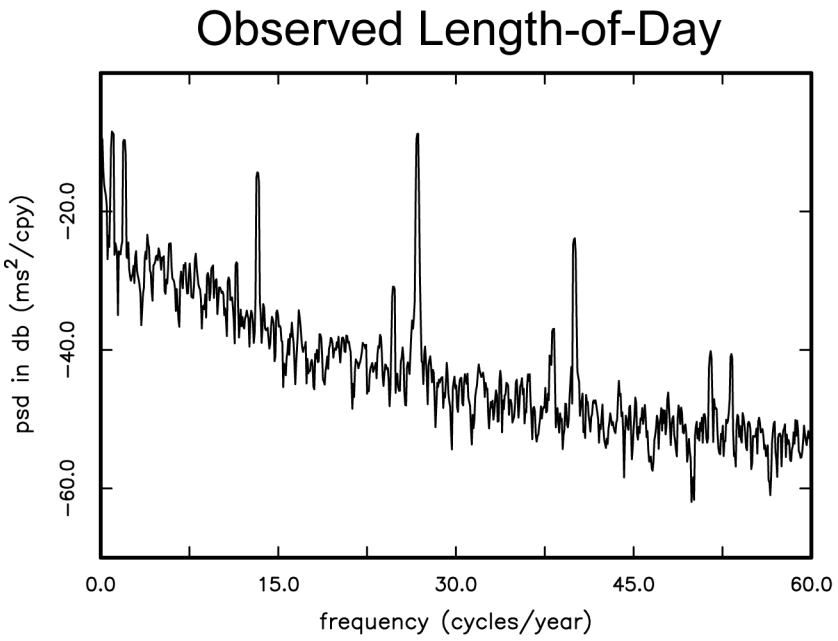
Observed Length-of-Day

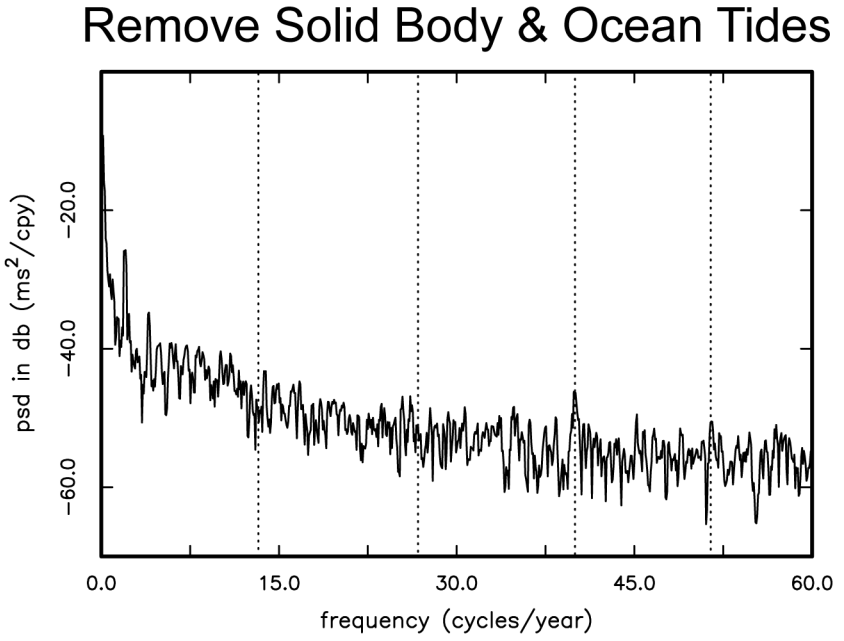


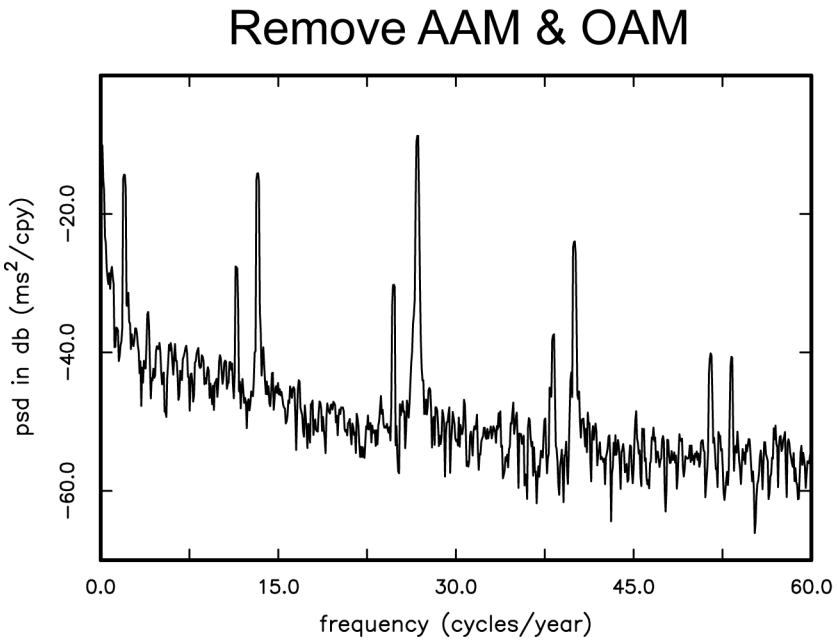
Remove AAM & OAM

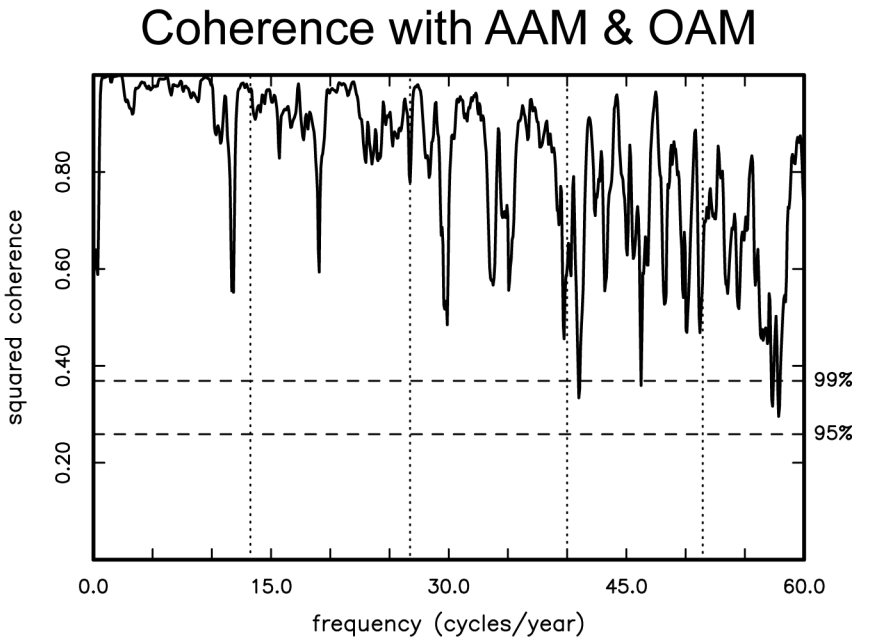


(January 2, 1993 to September 10, 2006)

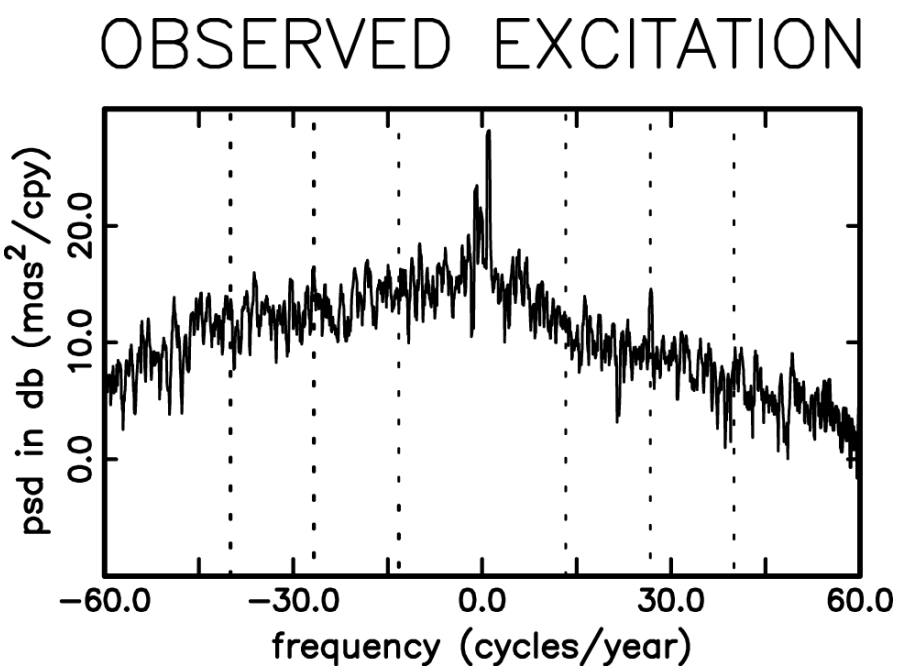




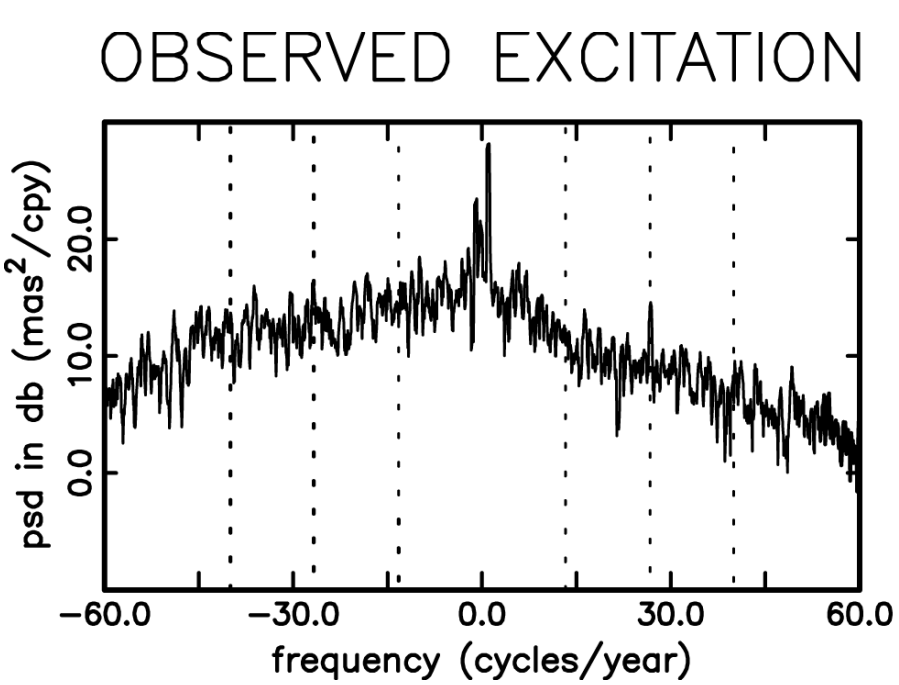


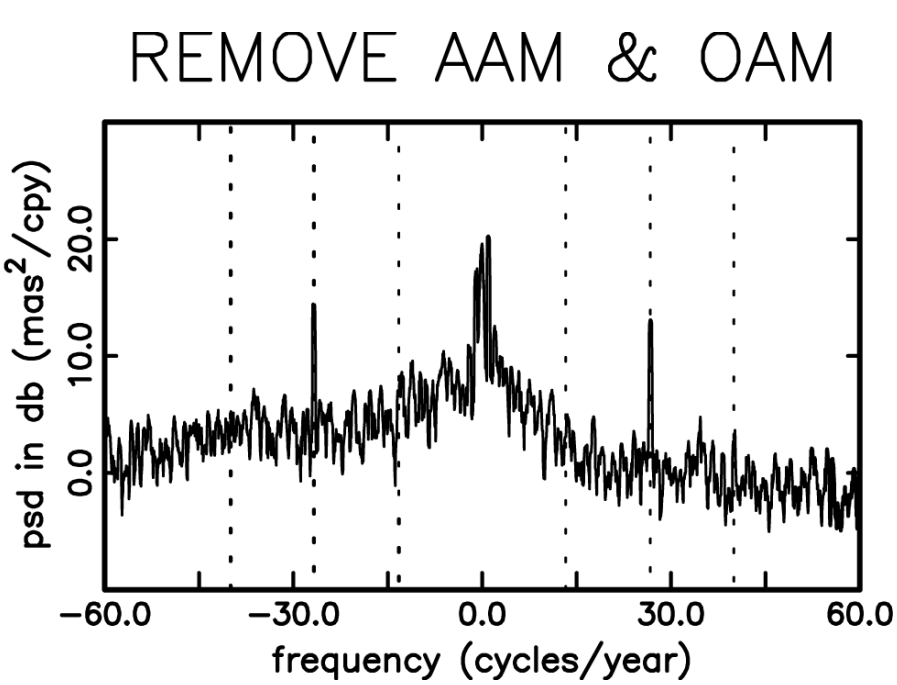


(January 2, 1993 to September 10, 2006)



(March 25, 1995 to May 28, 2010)





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