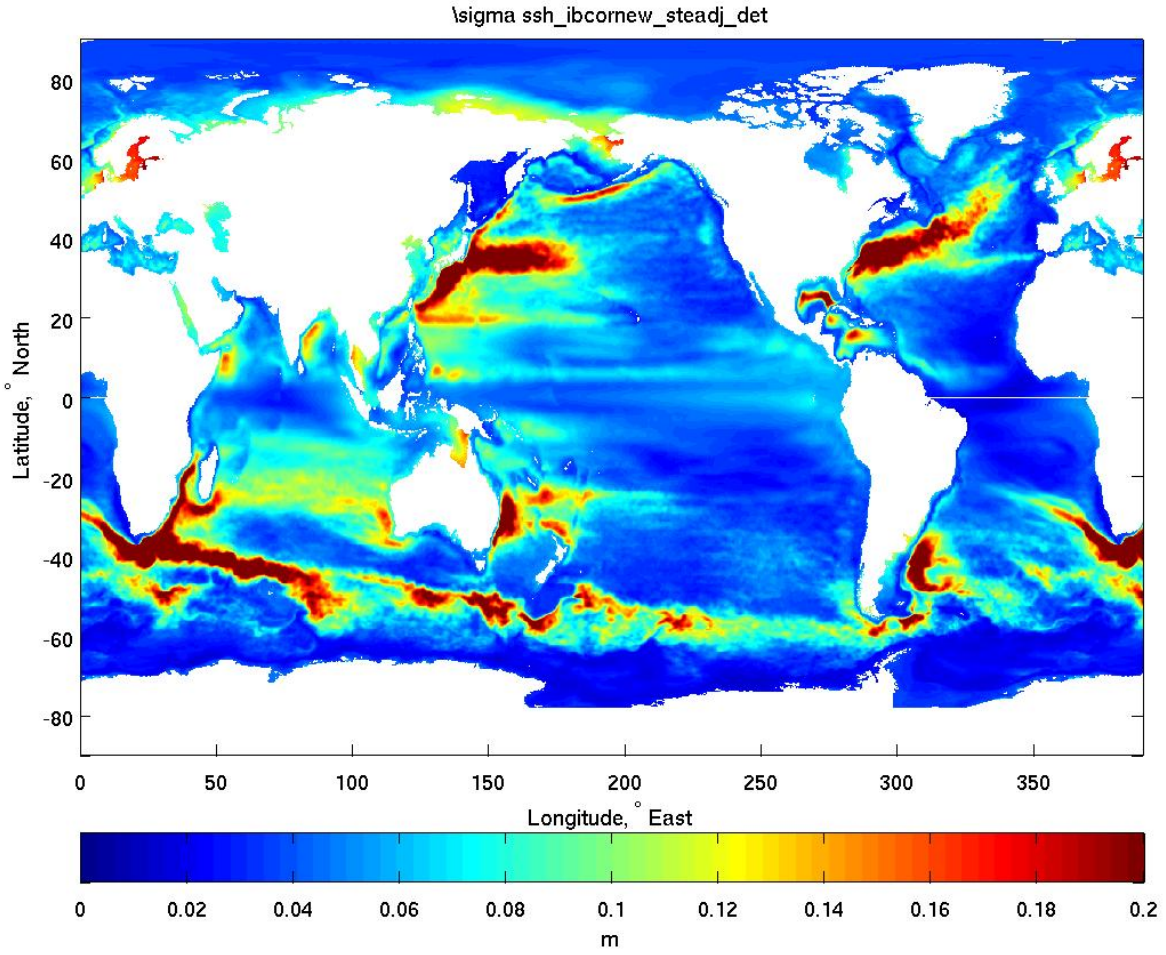
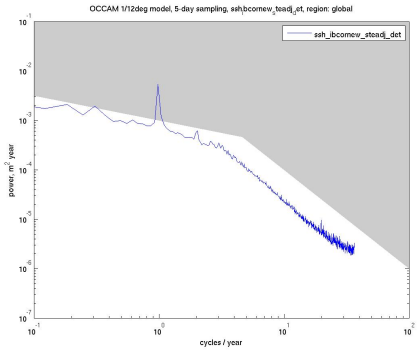
Sea-level spectral maps

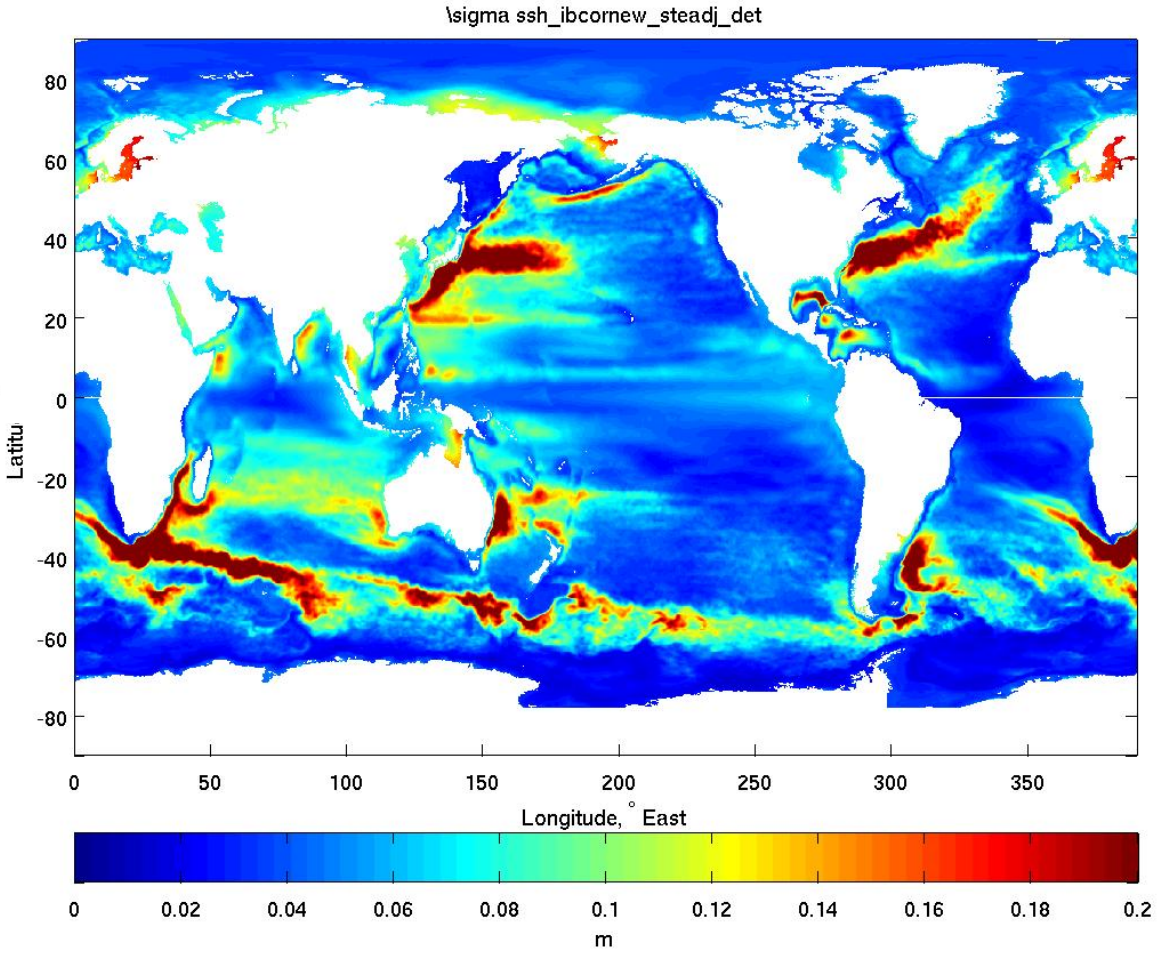
Joanne Williams, Chris W. Hughes

BAMC
April 2011



'OCCAM': a global ocean model run by Beverly A. de Cuevas & Andrew C. Coward at NOC Southampton, $1/4^\circ$ or $1/12^\circ$ resolution, forced with atmospheric conditions for 1985 to 2004 ($1/4^\circ$) and 1988 to 2005 ($1/12^\circ$).


OCCAM 1/12deg model, 5-day sampling, ssh_ibcornew_steadj_det, region: global
ssh_ibcornew_steadj_det
power m² / year
cycles / year


\sigma ssh_ibcornew_steadj_det
Latitu
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Longitude, ° East
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0.02
0.04
0.06
0.08
0.1
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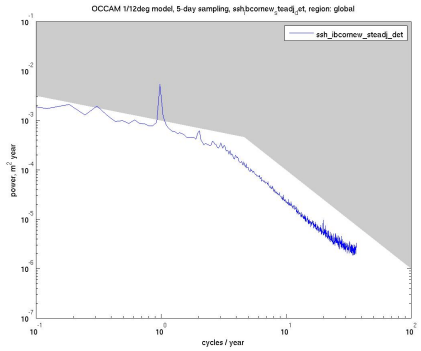
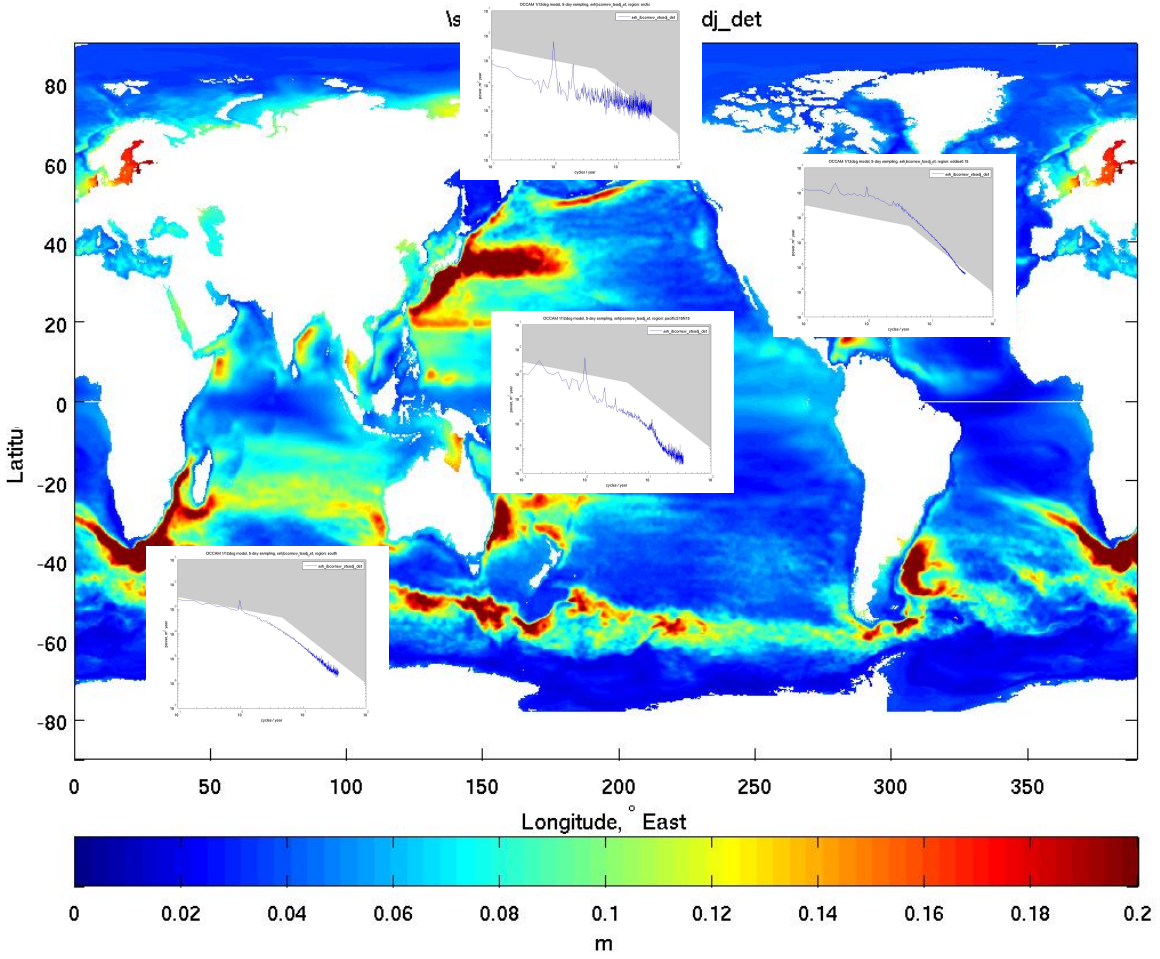
0.14
0.16
0.18
0.2
m


OCCAM 1/12deg model, 5-day sampling, ssh_ibcornew_steadj_det, region: global
ssh_ibcornew_steadj_det
power m² / year
cycles / year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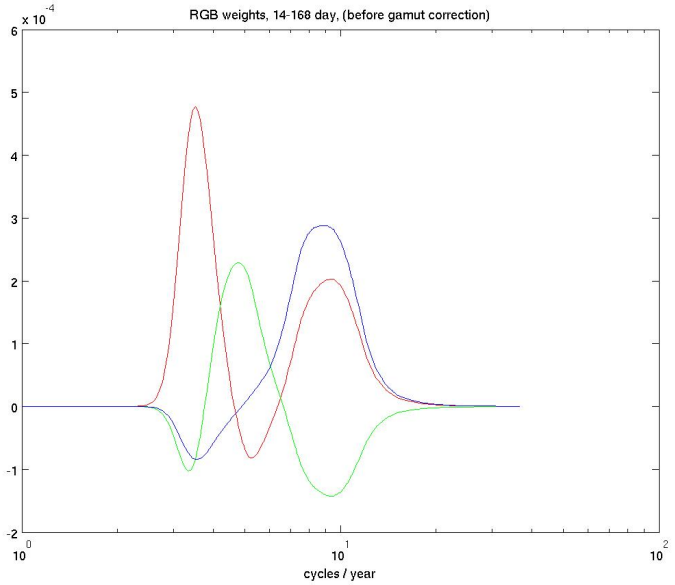
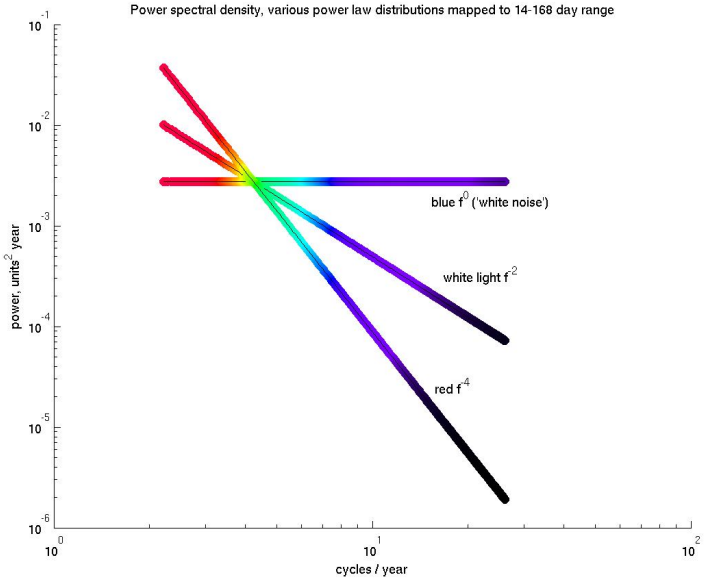
Longitude, ° East
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
m

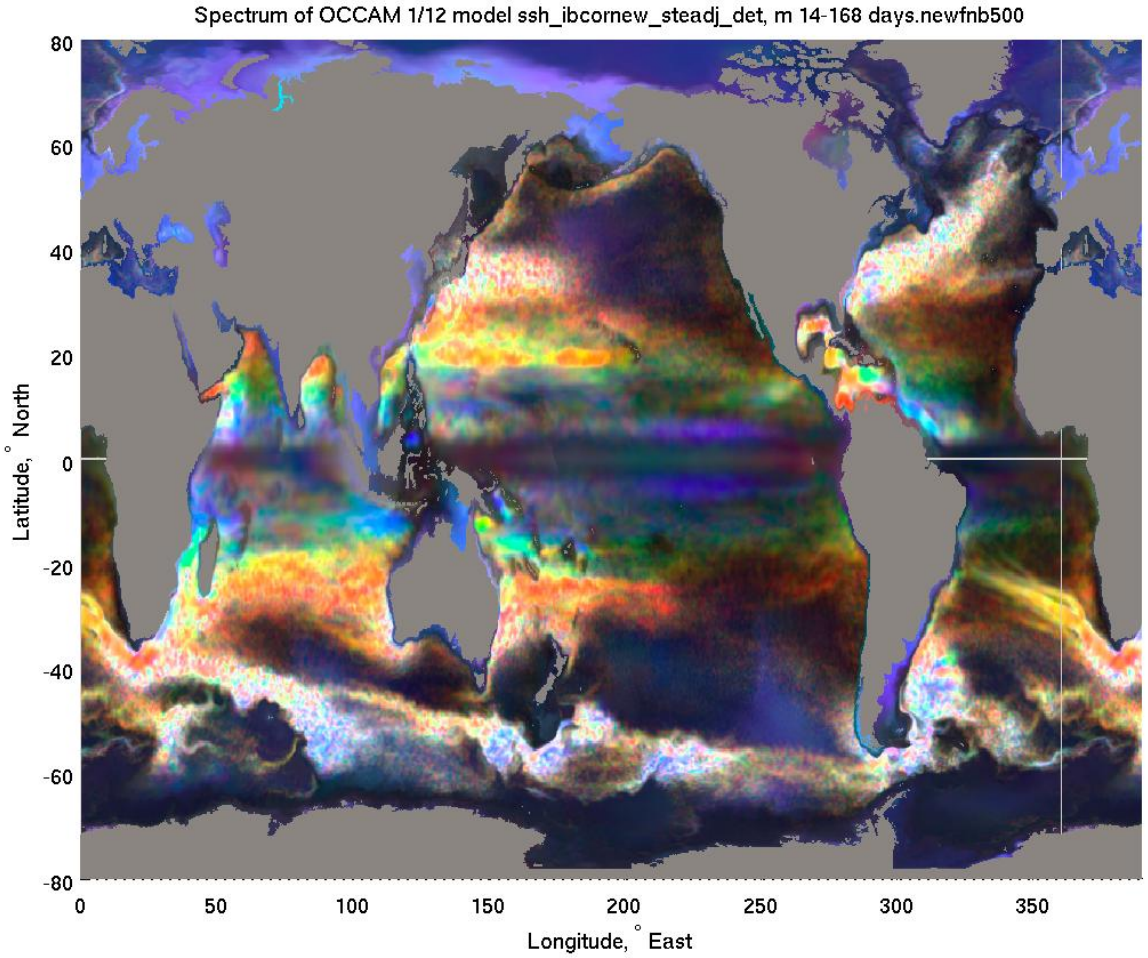
Apply a rgb weighting to the Power Spectral Density

$$\begin{pmatrix} R \\ G \\ B \end{pmatrix} = \int_0^\infty S(\sigma) \begin{pmatrix} r(\sigma) \\ g(\sigma) \\ b(\sigma) \end{pmatrix} \mathrm{d}\sigma \qquad (1)$$



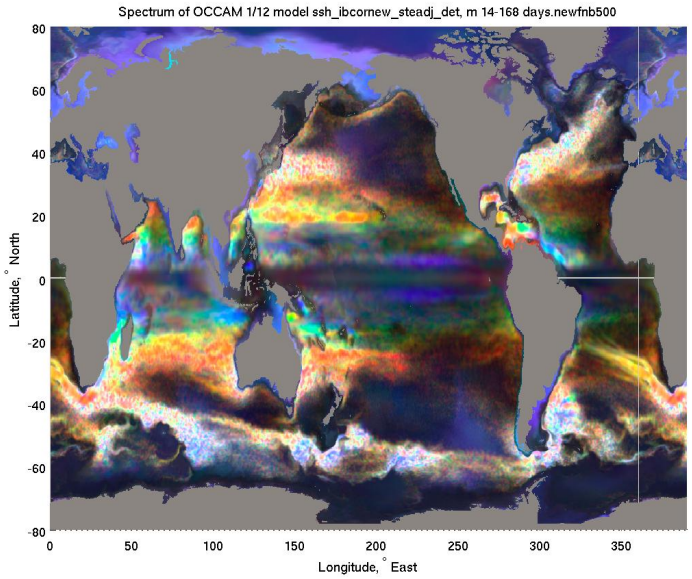


Sea level spectra 14-168 days

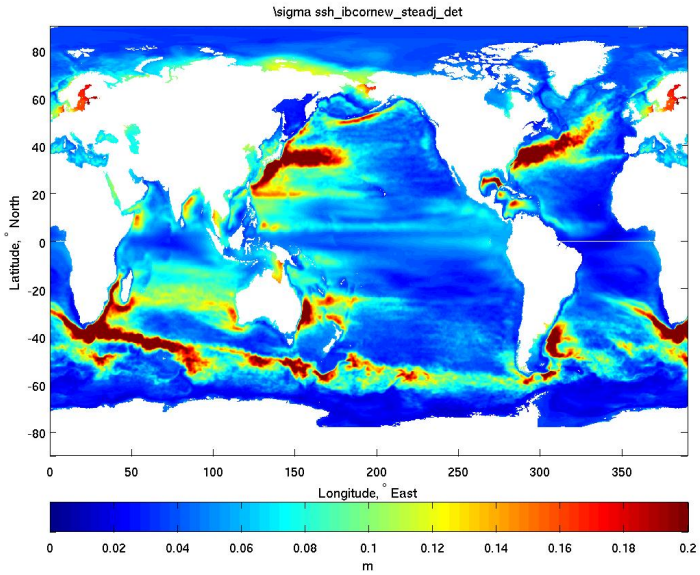


OCCAM $1/12^\circ$ ssh spectra 14-168 days

Sea level 14-168 days

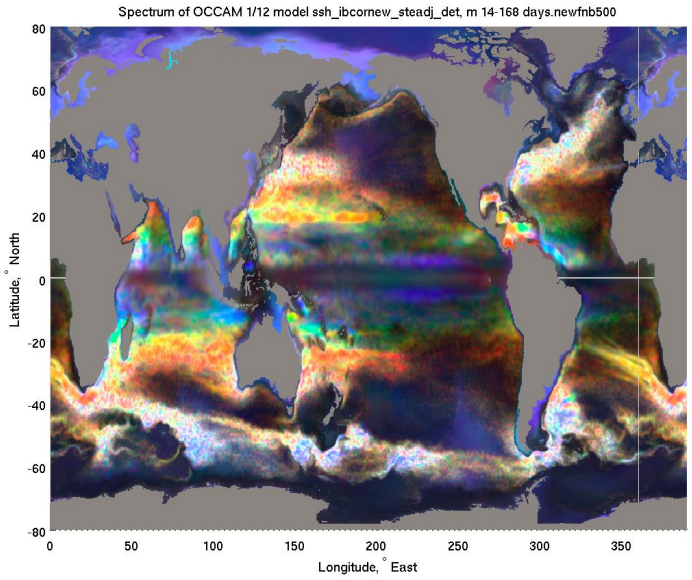


OCCAM $1/12^\circ$ ssh spectra 14-168 days

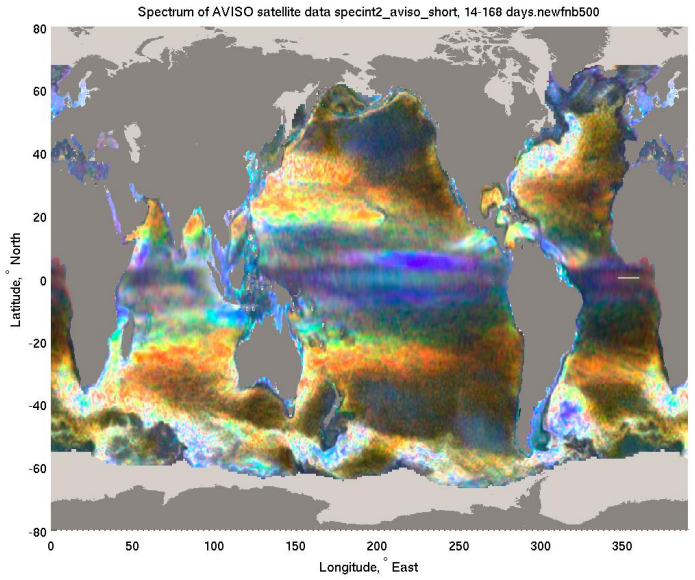


OCCAM ssh variance

Sea level spectra 14-168 days

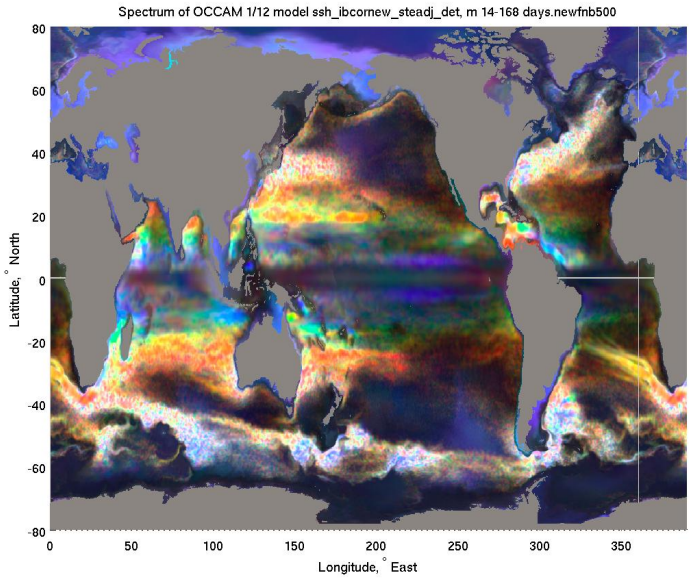


OCCAM $1/12^\circ$ ssh 14-168

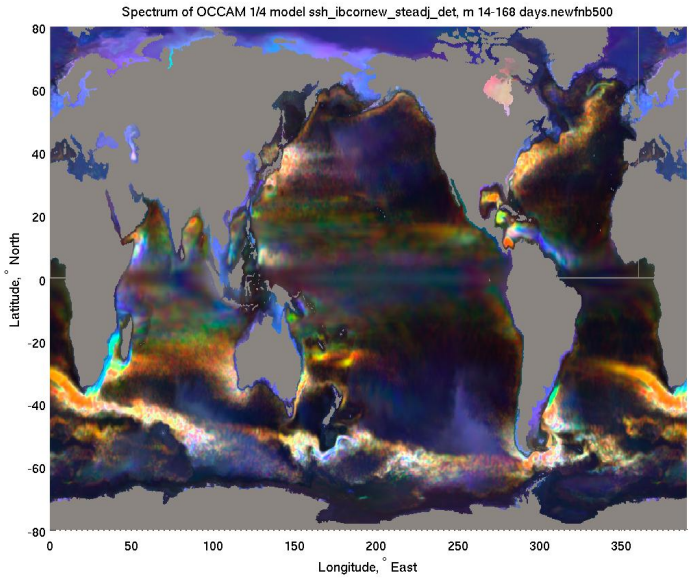


Altimetry (from AVISO)

Sea level spectra 14-168 days

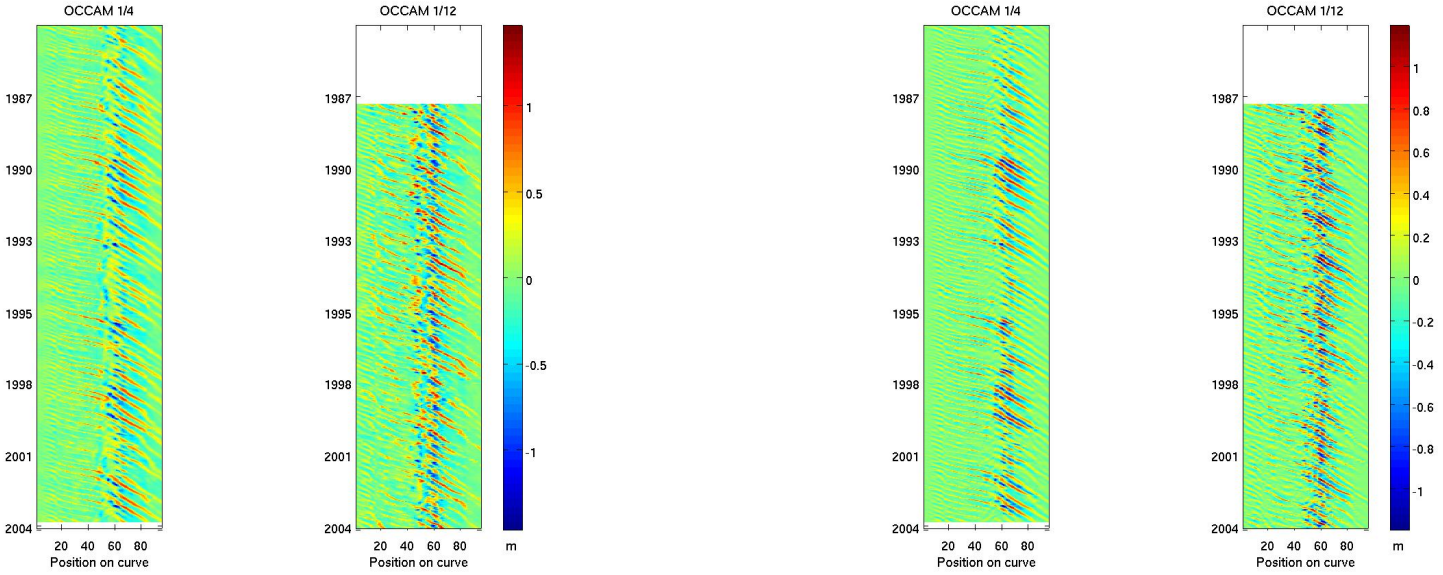


OCCAM $1/12°$



OCCAM $1/4°$

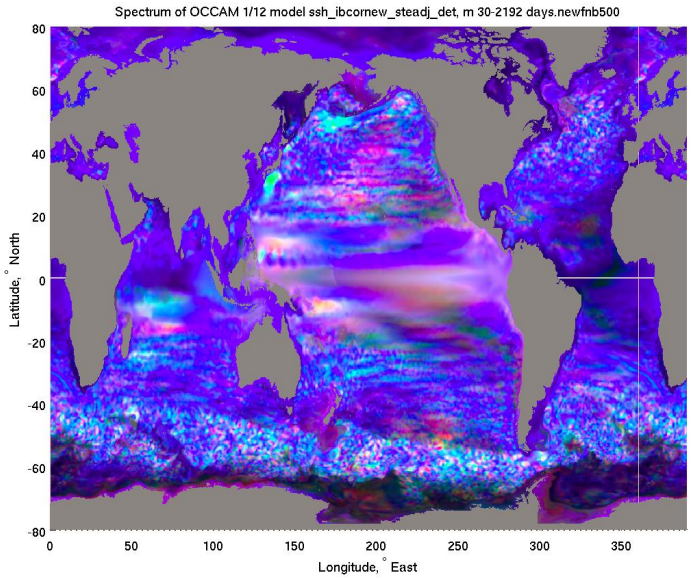
Sea-level in the Agulhas current, OCCAM $1/12°$ *vs* $1/4°$

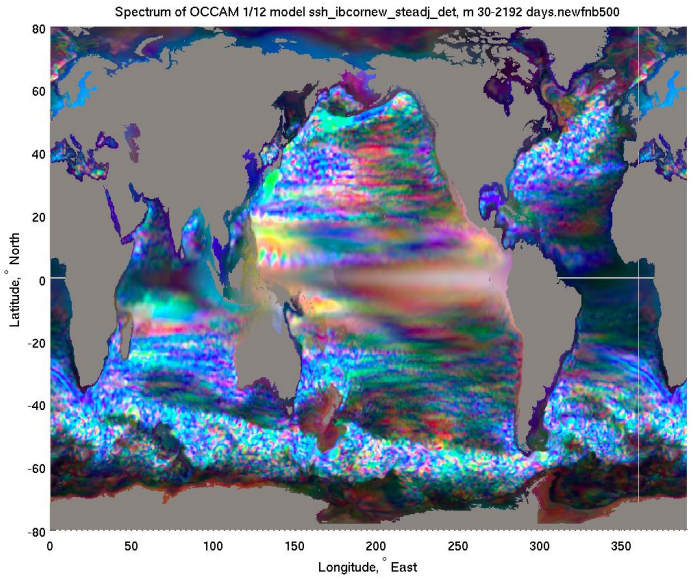


Full signal

Filtered, 14-168 days

Sea level spectra 30-2192 days

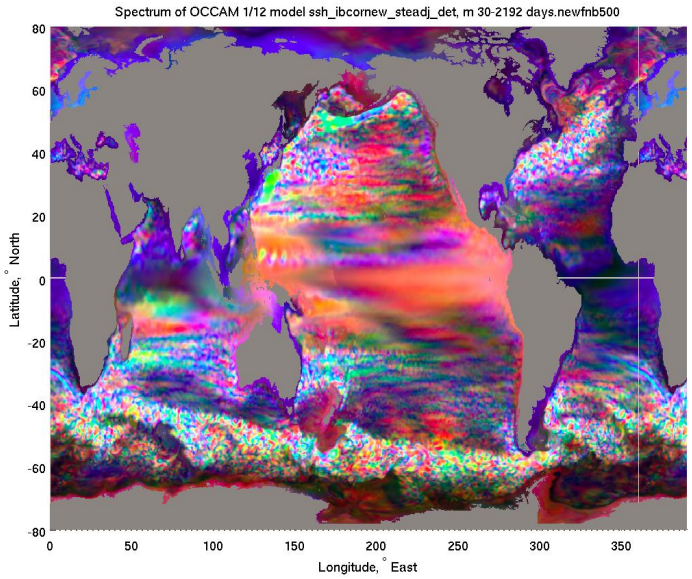


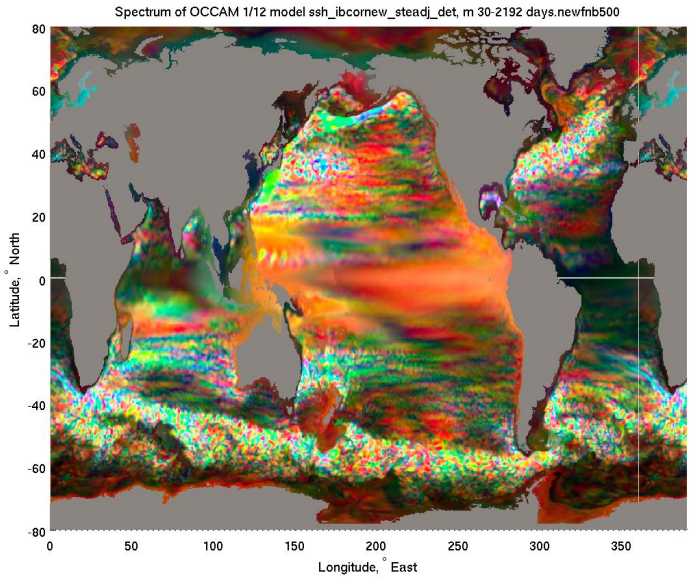


Annual & semi annual filtered

Sea level spectra 30-2192 days

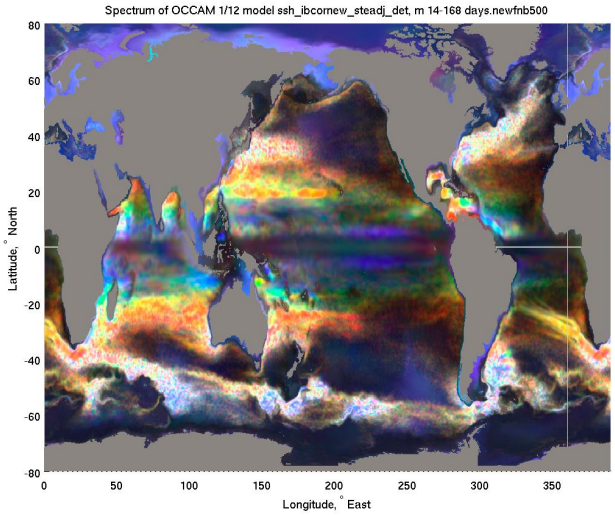
After scaling spectrum by $f^{1.5}$:

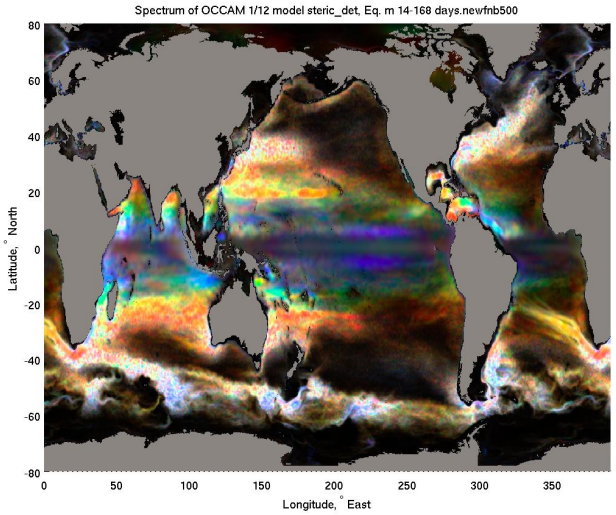


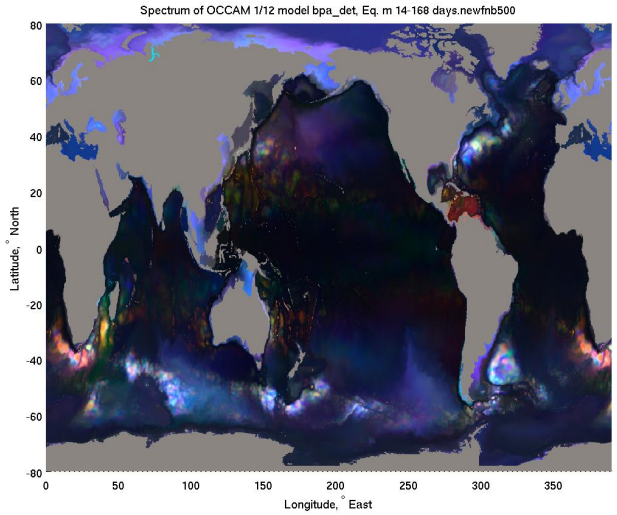


Annual & semi annual filtered

OCCAM 1/12 spectra, 14-168 days

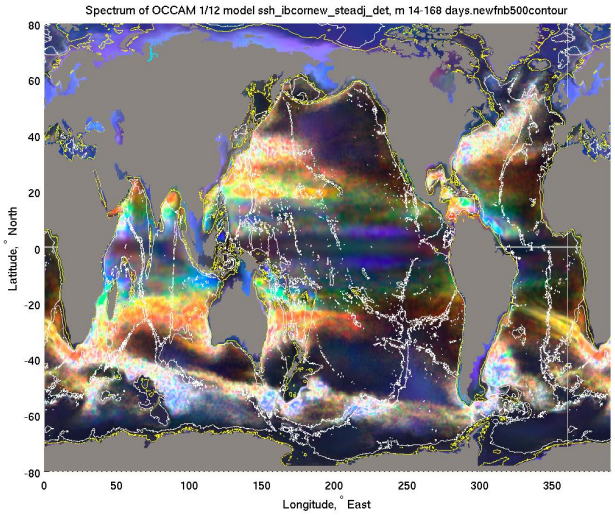


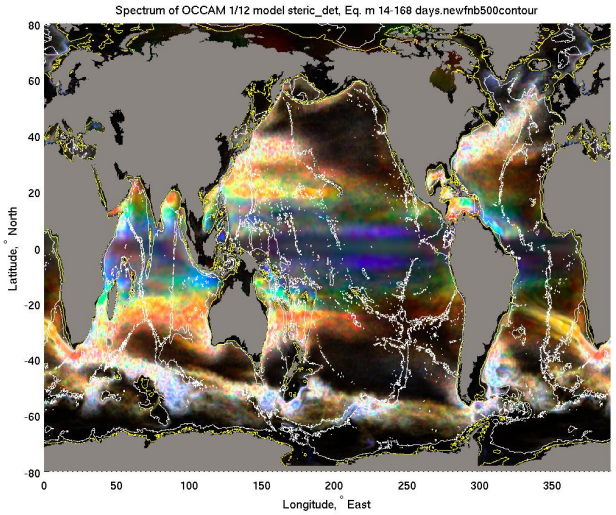


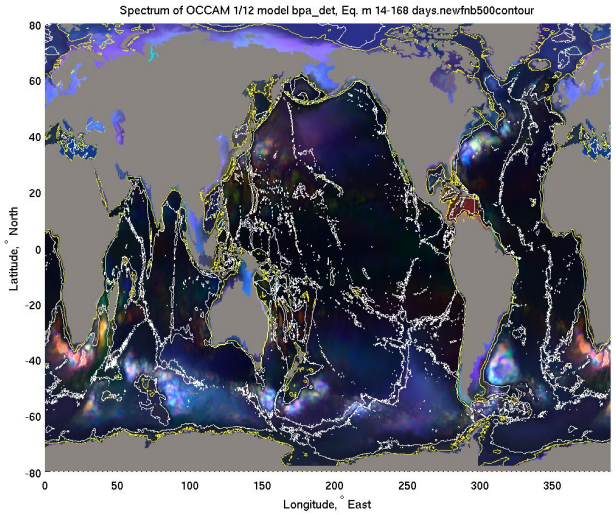


sea surface height = bottom pressure + steric height

OCCAM 1/12 spectra, 14-168 days

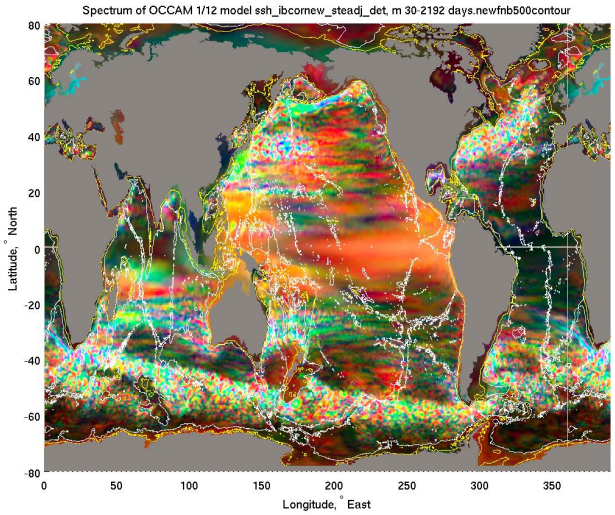


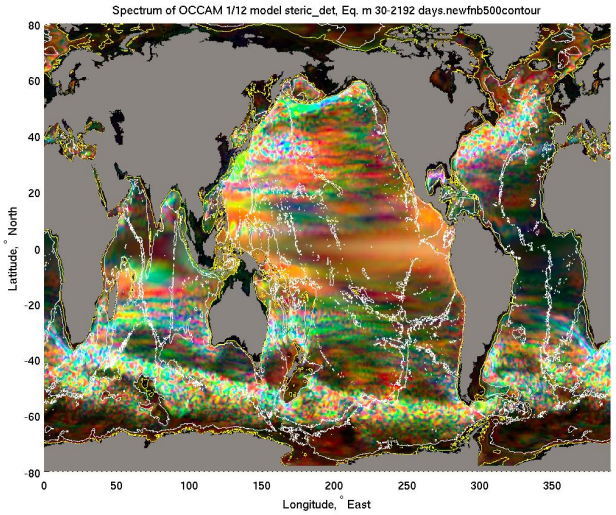


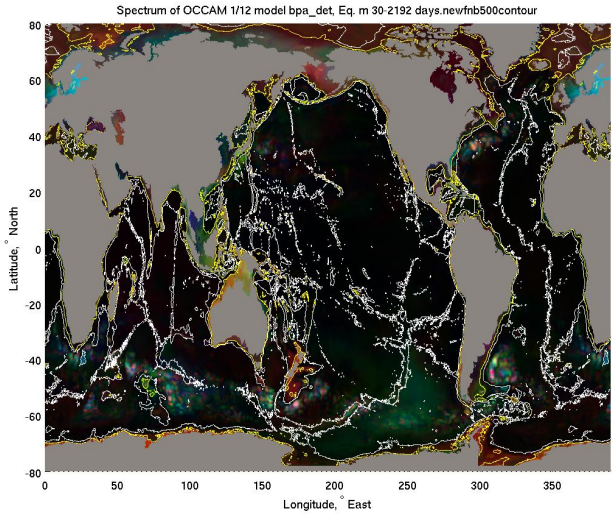


sea surface height = bottom pressure + steric height

OCCAM 1/12 spectra, 30-2192 days







sea surface height = bottom pressure + steric height