

What are the Sources of Sea Level Rise ?

- Results from a 50 year hindcast with a global OGCM -

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The Model:

For this investigation the Hamburg LSG model is used with a 2° horizontal resolution, 23 layers in the vertical and a timestep of 10 days. It is run for 50 years from 1950 to 1999.

The model is forced at the surface by:

air temperature:

COADS data blended with NCEP re-analysis

windstress:

from NCEP re-analysis surface winds

freshwater flux (P-E):

precipitation from NCEP re-analysis
evaporation via latent surface heatflux

spin-up:

1600 years perpetual 1950
starting from an optimal climatological annual cycle

sea level changes are caused by:

non-steric effects

and

steric effects

$$\frac{\partial}{\partial t} \zeta = P - E$$

freshwater flux

$$+ \nabla \cdot \int_{-H}^{\zeta} \vec{v} dz$$

divergence

$$+ A_h \Delta \zeta$$

subgrid gravity waves

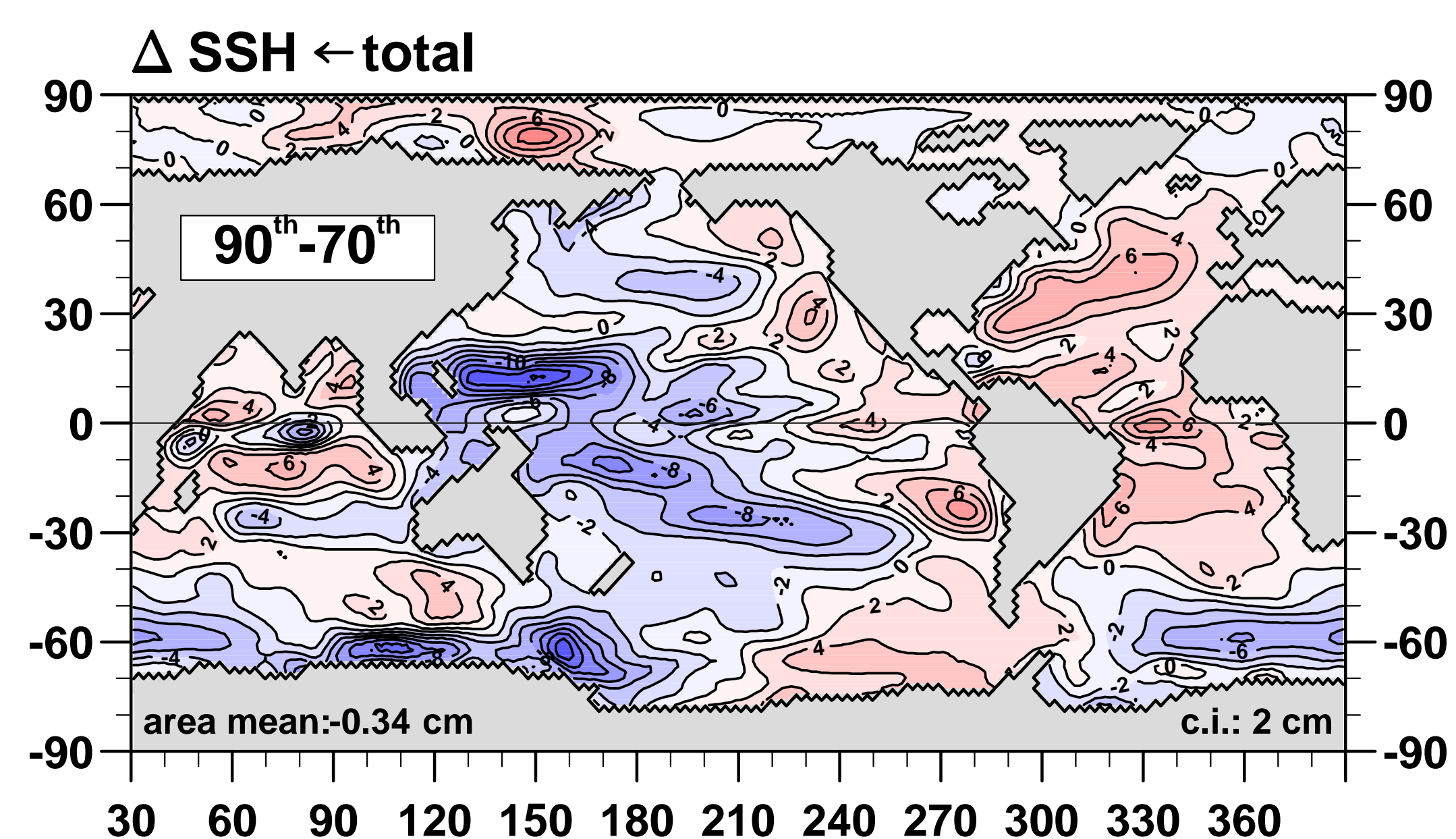
$$+ \int_{-H}^{\zeta} \frac{1}{\alpha} \frac{\partial \alpha}{\partial T} \bigg|_{S,p} \frac{\partial T}{\partial t} dz$$

thermosteric

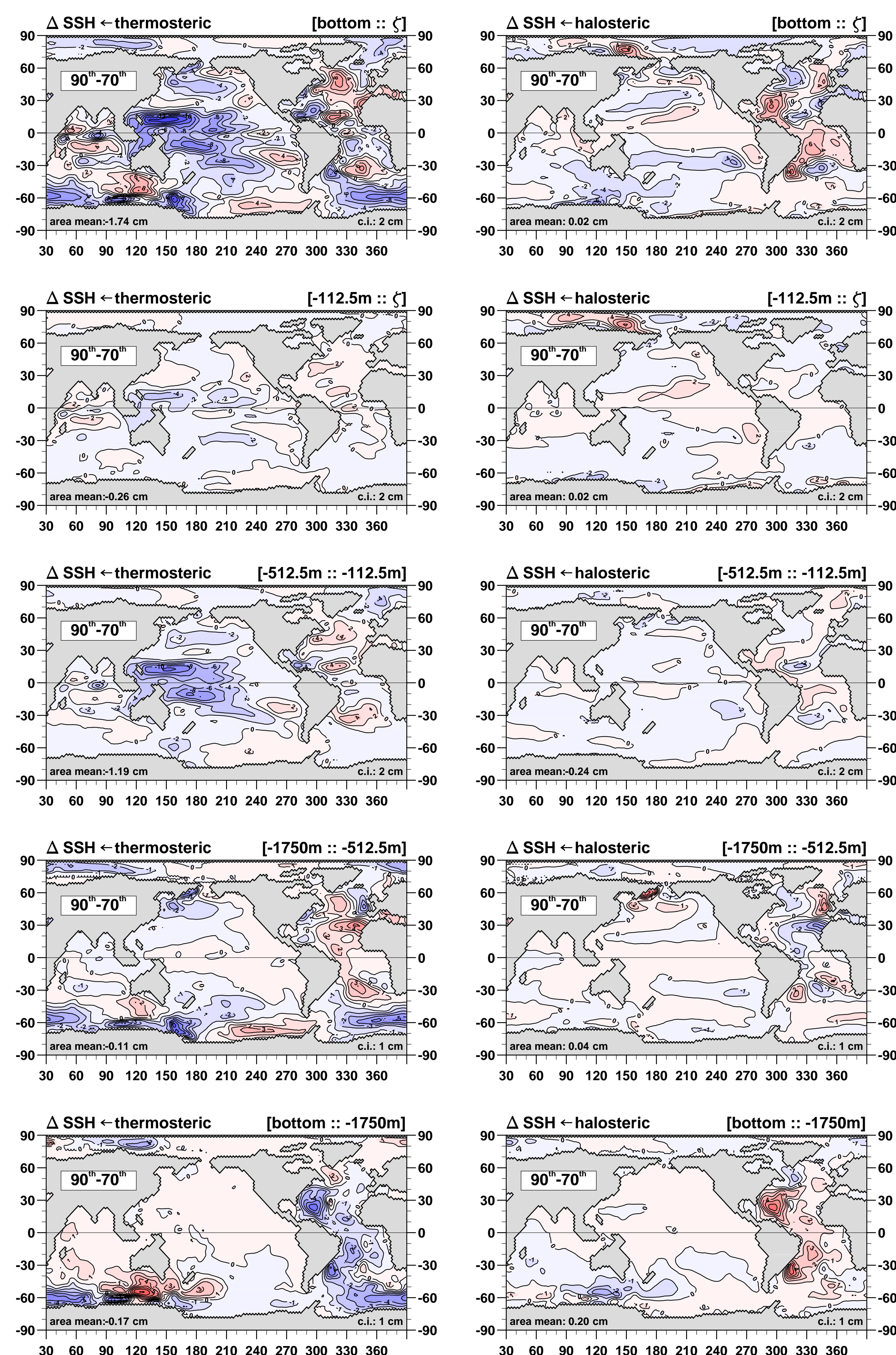
$$+ \int_{-H}^{\zeta} \frac{1}{\alpha} \frac{\partial \alpha}{\partial S} \bigg|_{T,p} \frac{\partial S}{\partial t} dz$$

halosteric

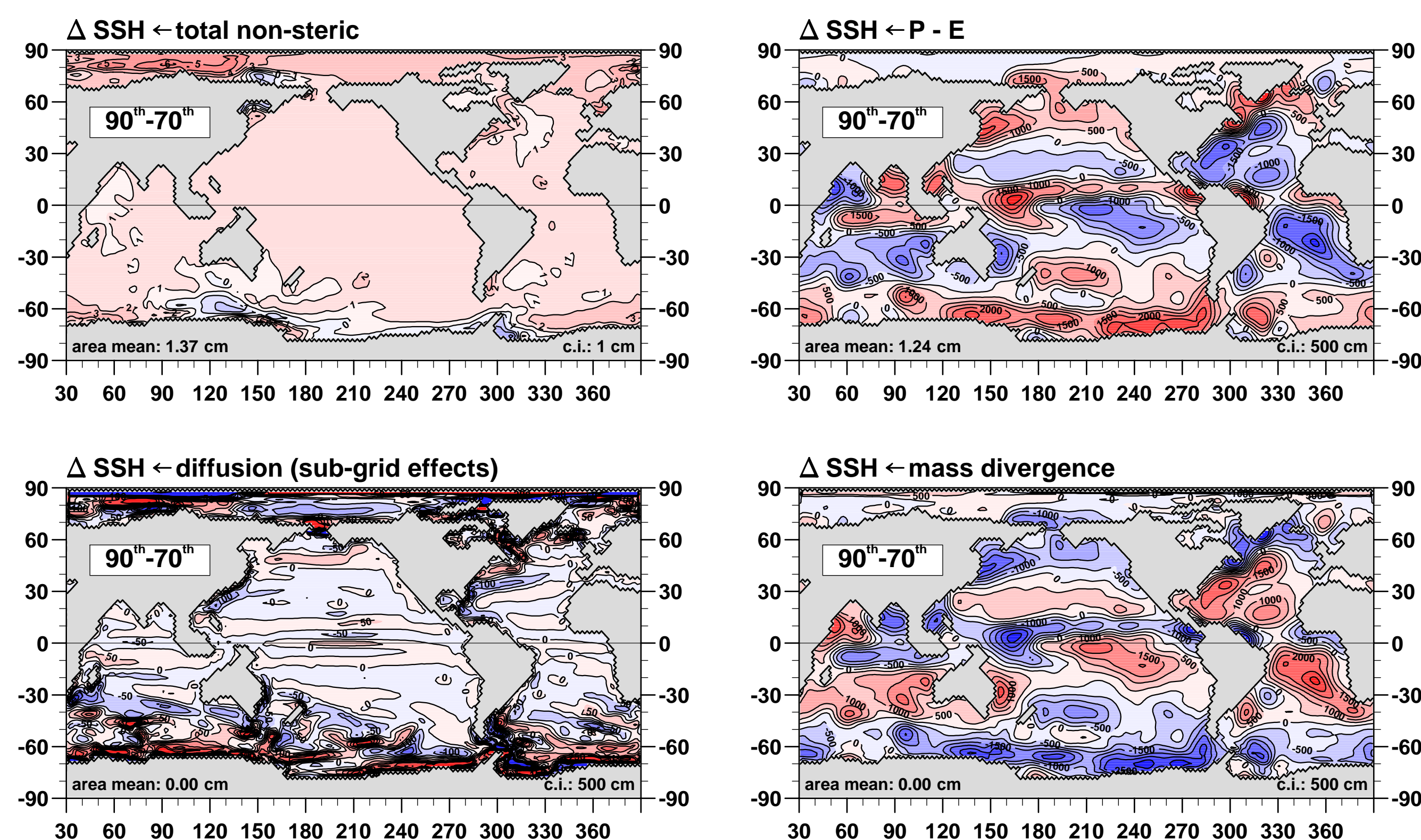
difference between the decadal mean SSH from the 70th and the 90th



steric contributions



non-steric contributions



temporal evolution of the area mean sea level

model regions

