Long term variability on Campbell Plateau, changes in SST and SSH.

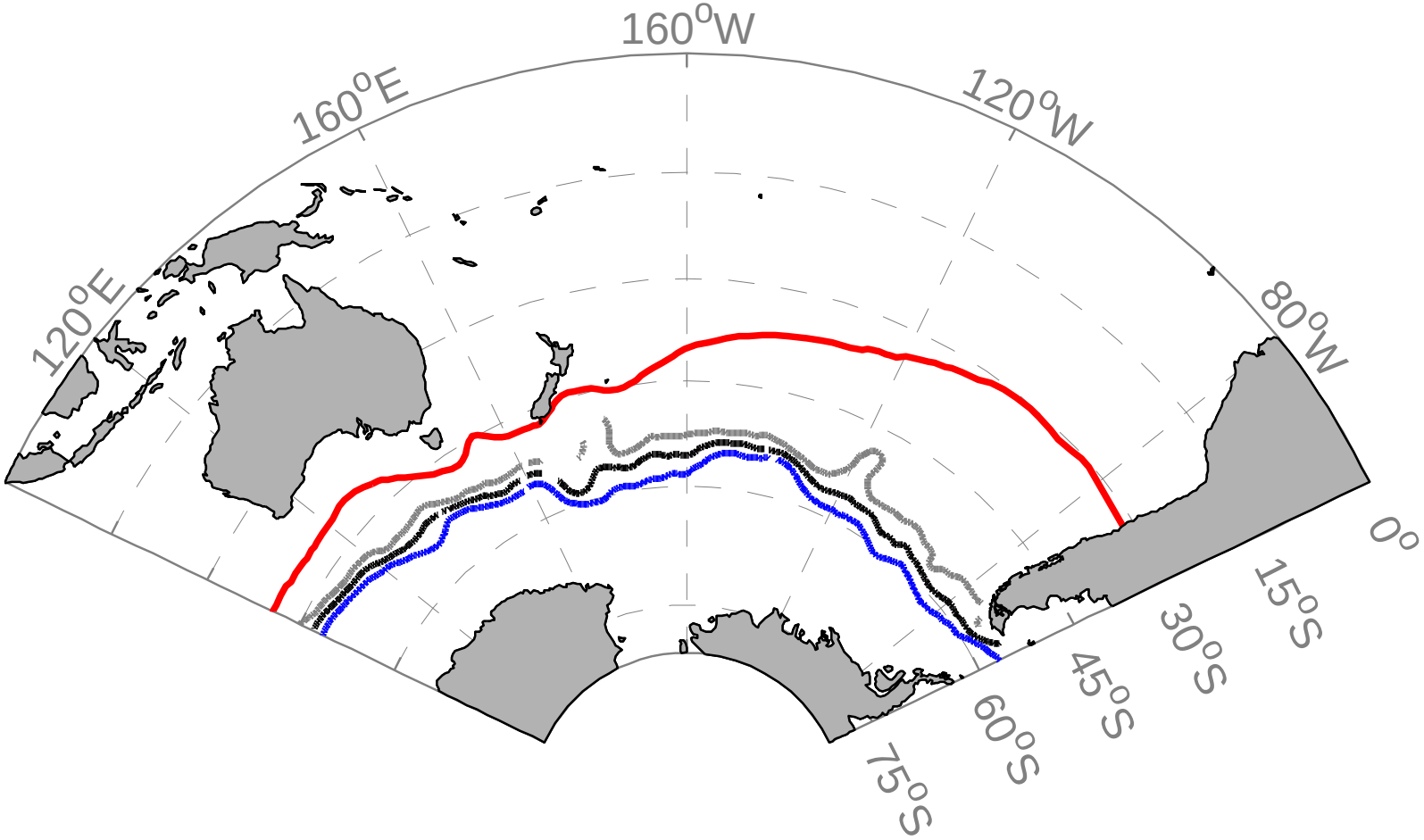
Aitana Forcén Vázquez [1;2], Michael J. M. Williams [2]
Lionel Carter [1], Melissa Bowen [3]

[1]Victoria University of Wellington, Wellington, New Zealand
[2]National Institute Water and Atmospheric (NIWA), Wellington, New Zealand
[3]University of Auckland, Auckland, New Zealand
aitana.forcen@niwa.co.nz

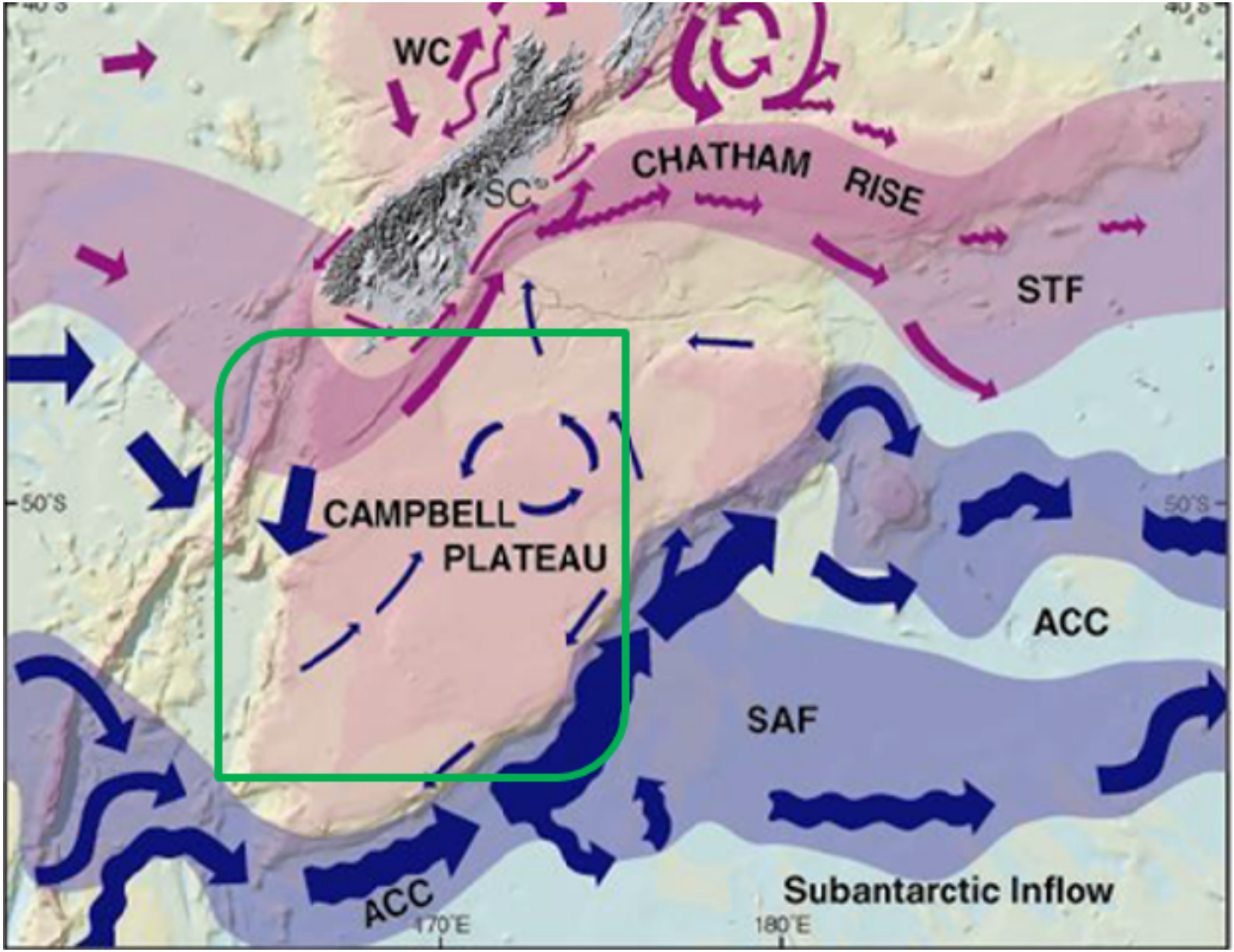
Satellite Oceanography Users Workshop, Melbourne.
November 10th, 2015

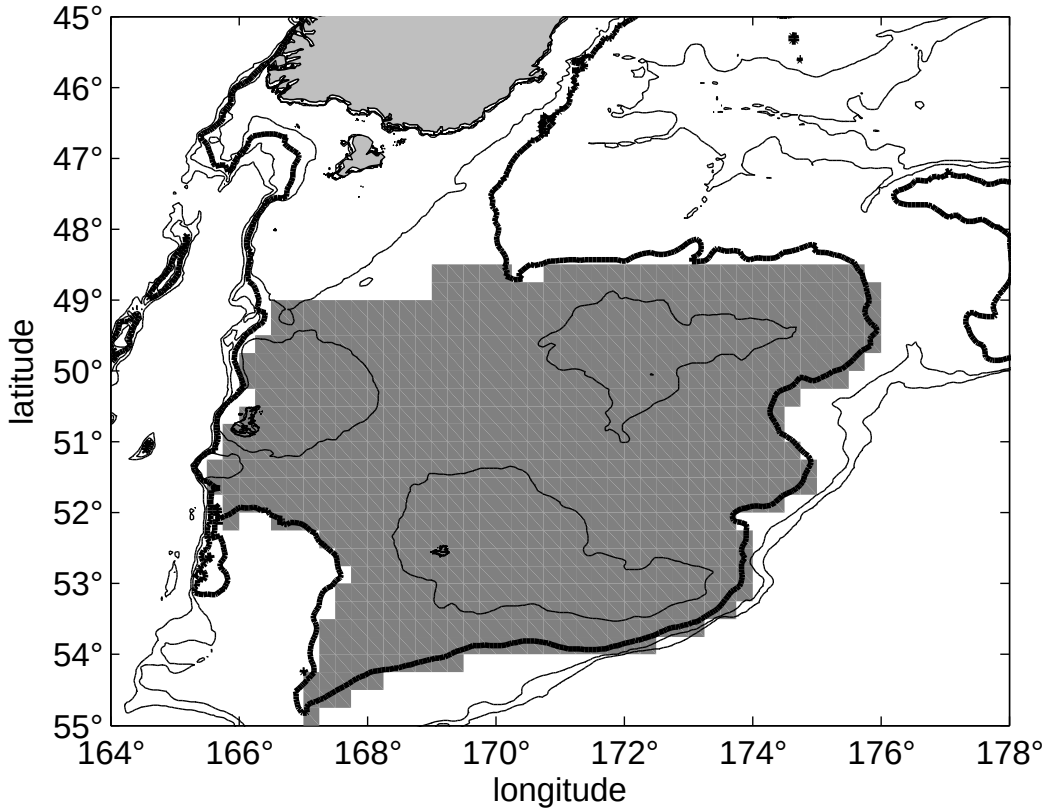
Thanks to:

- NIWA for my Post-Doctoral Fellowship
- Denise Fernandez, Phil Sutton and Stefan Jendersie for the helpful conversations

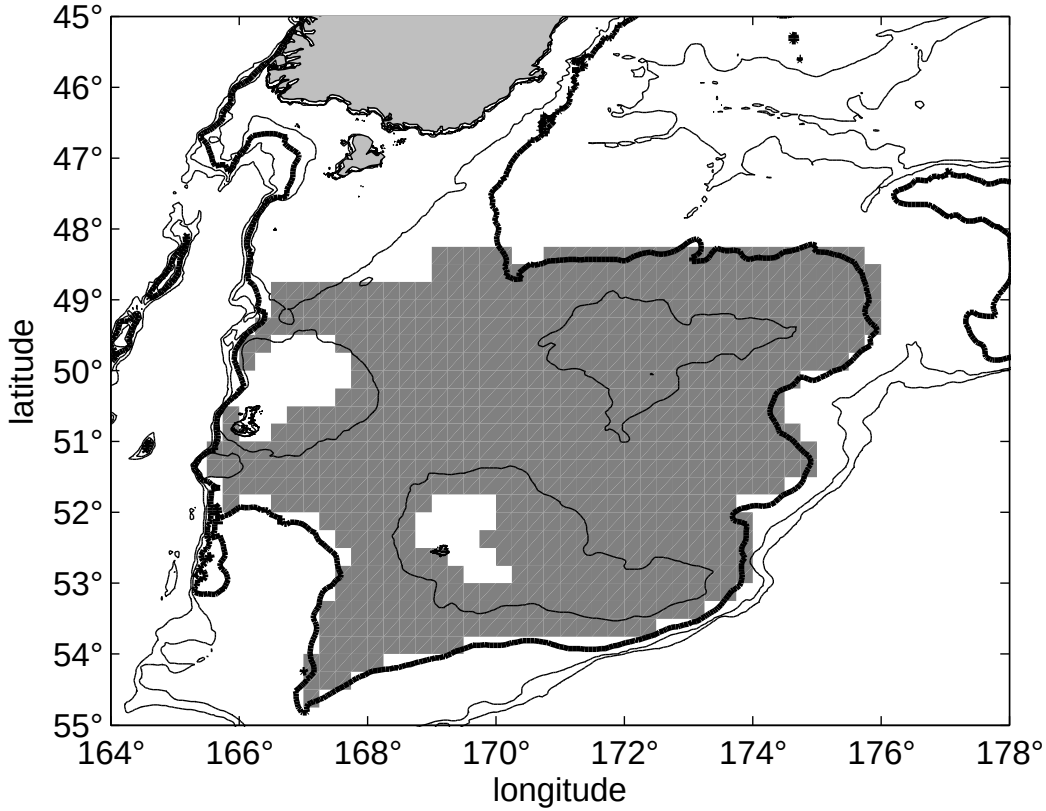


- Long term variability of sea surface temperature (SST) and sea level (SLA) of Campbell Plateau

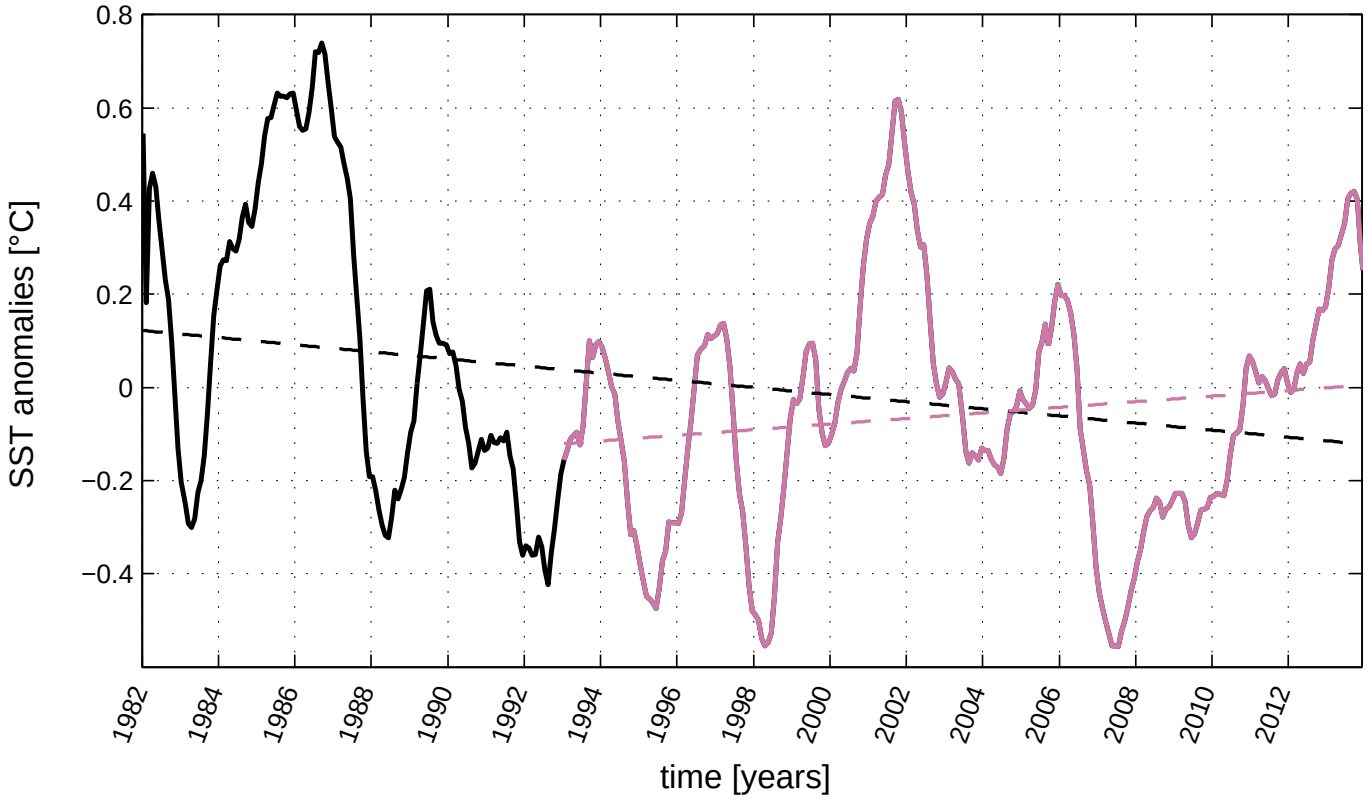




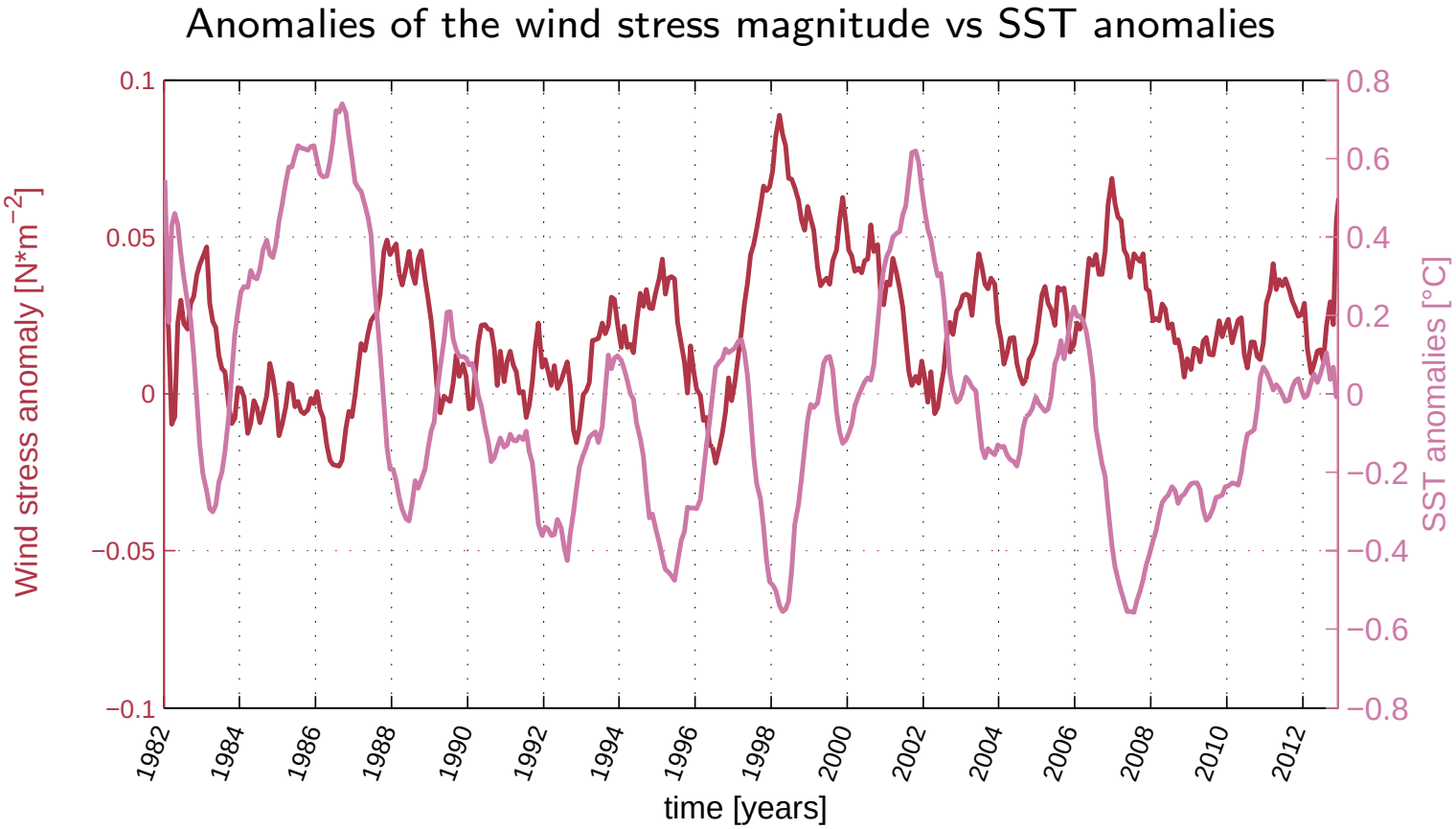
- **S**ea **S**urface **T**emperature (SST)
  - 1982-2013 **A**dvanced **V**ery **H**igh **R**esolution **R**adiometer (AVHRR)
  - Weekly data, 1° x 1° spatial resolution interpolated into a 1/4° x 1/4° grid
  - Data provided by the NOAA/OAR/ESRL PSD; `http://www.esrl.noaa.gov/psd/`



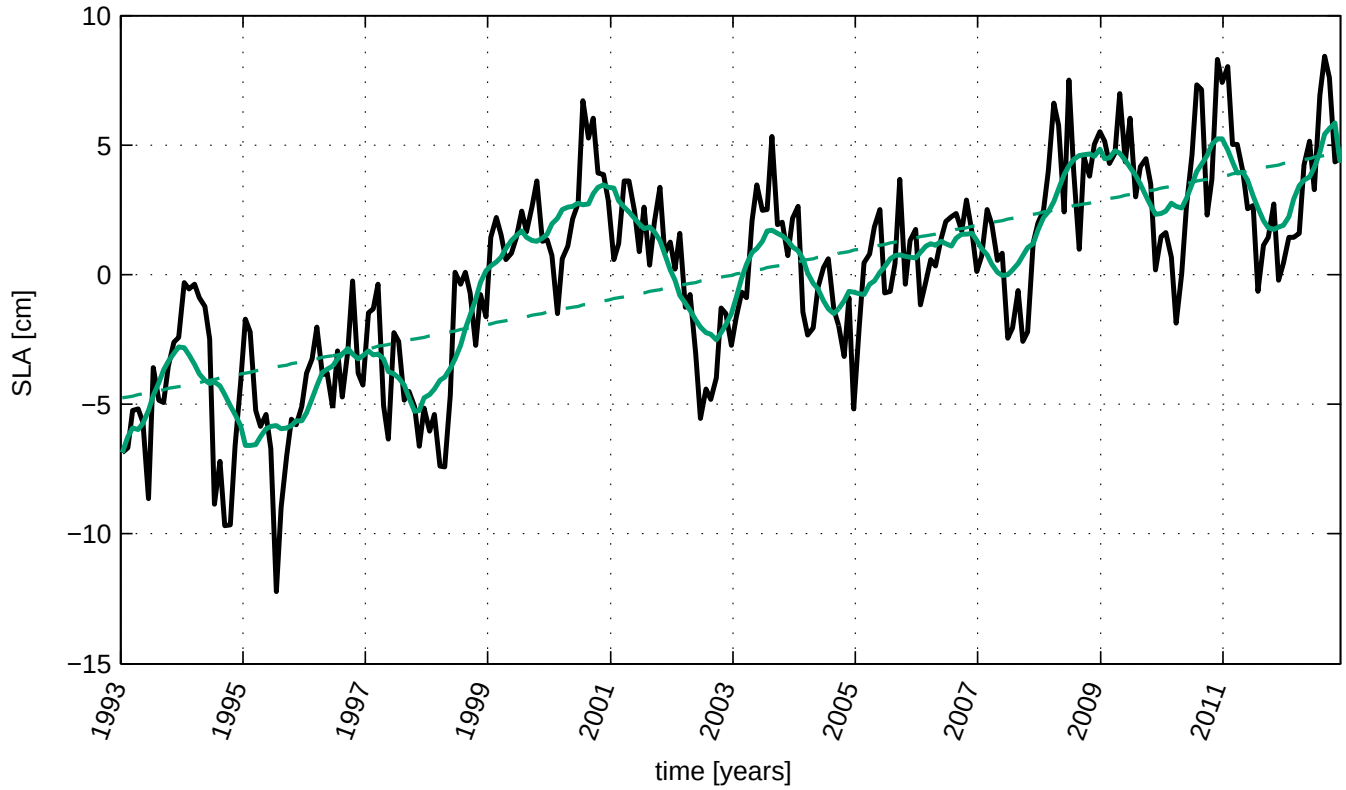
- **S**ea **L**evel **A**nomalies (SLA)
  - 1992-2013 data from **A**rchiving, **V**alidation and **I**nterpretation of **S**atellite data in **O**ceanography (AVISO)
  - **M**aps of **S**ea **L**evel **A**nomaly (MSLA)
  - Weekly data, 1/4° x 1/4° spatial resolution
- Mask is applied for depths shallower than 200 m



- ΔSST trend is 0.12 °C over the last 20 years



- max r = -0.48 with a lag of 2 months
- *p-value* = 0.04; significant
- mechanisms: wind stirring the ocean surface

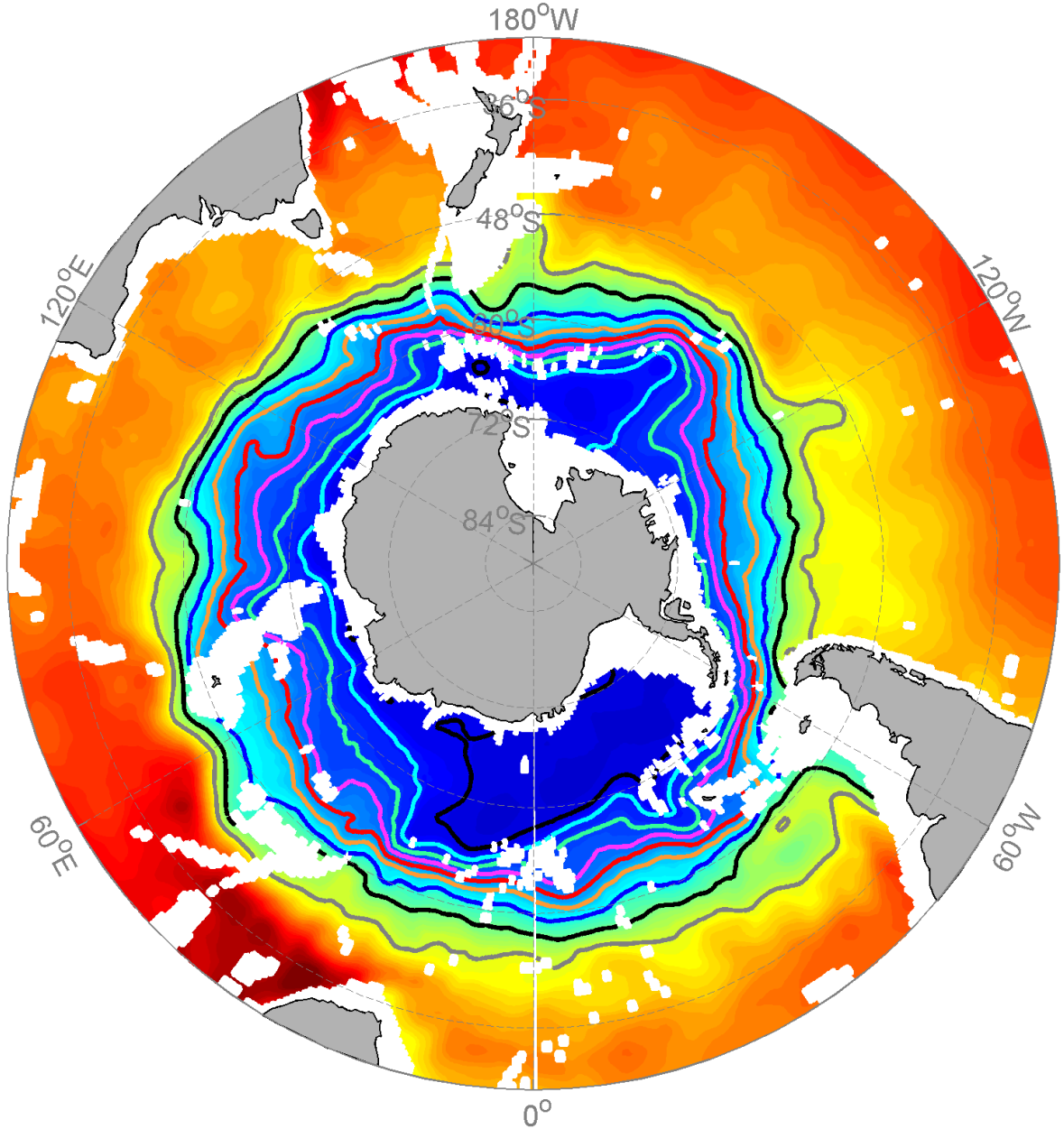


- ΔSSH (SLA) trend is $5.2\,\mathrm{cm\,decade^{-1}}$

$$\partial T = 0.30\,^{\circ}\mathrm{C\,decade^{-1}}$$
over a water column of 1000 m

- The observed SST trend of $0.06\,^{\circ}\mathrm{C\,decade^{-1}}$ cannot explain all the SLA trend

Following (Sokolov and Rintoul, 2009a)[1]



[1] *Sokolov, S. and Rintoul, S. R. (2009). Circumpolar structure and distribution of the Antarctic Circumpolar Current fronts: 2. Variability and relationship to sea surface height. Journal of Geophysical Research, 114, C11019, 115.*