Climate change and computational compromises

François Massonnet

Pierre-Yves Barriat

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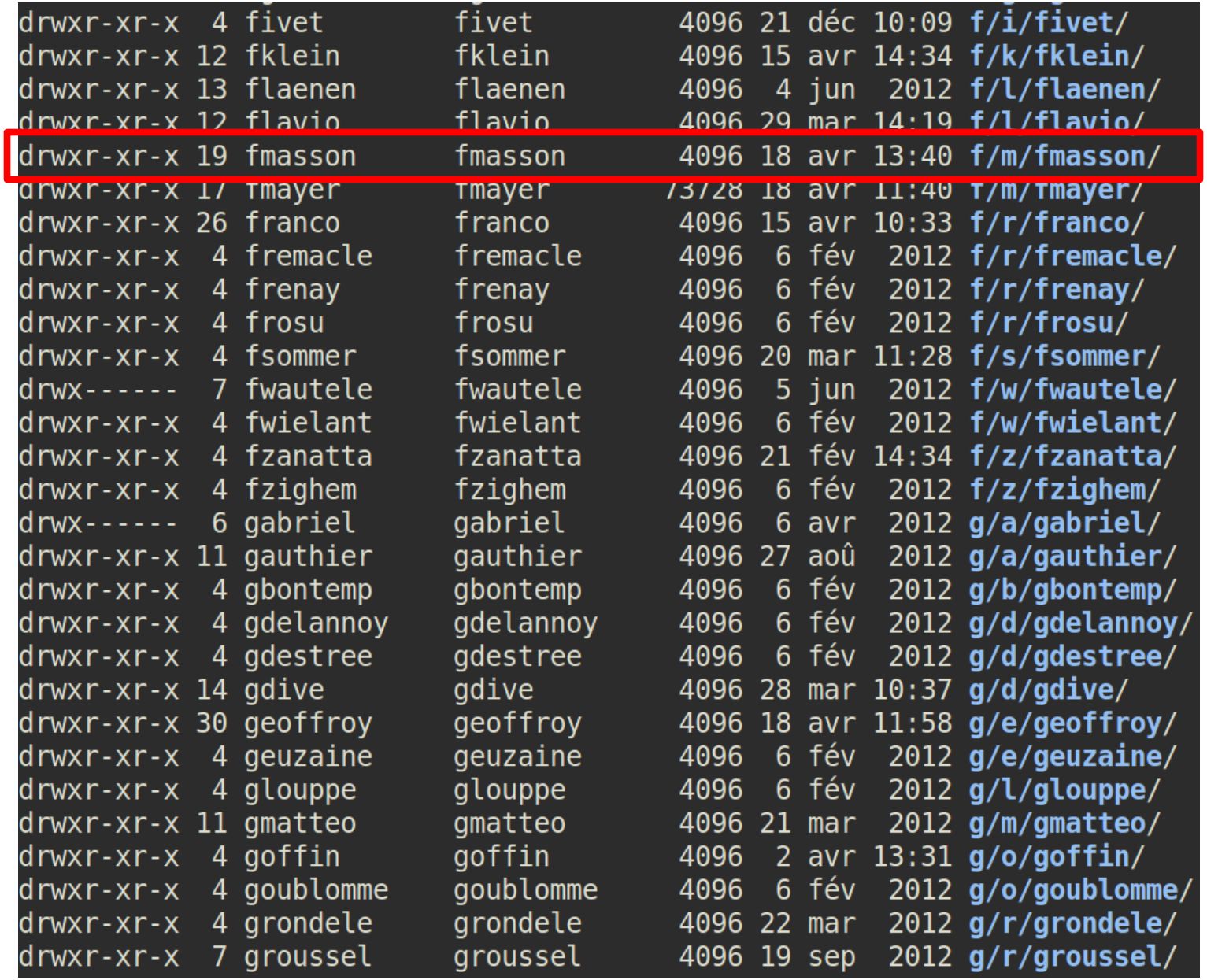
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drwxr-xr-x 7 groussel groussel 4096 19 sep 2012 g/r/groussel/

Climate change and computational compromises

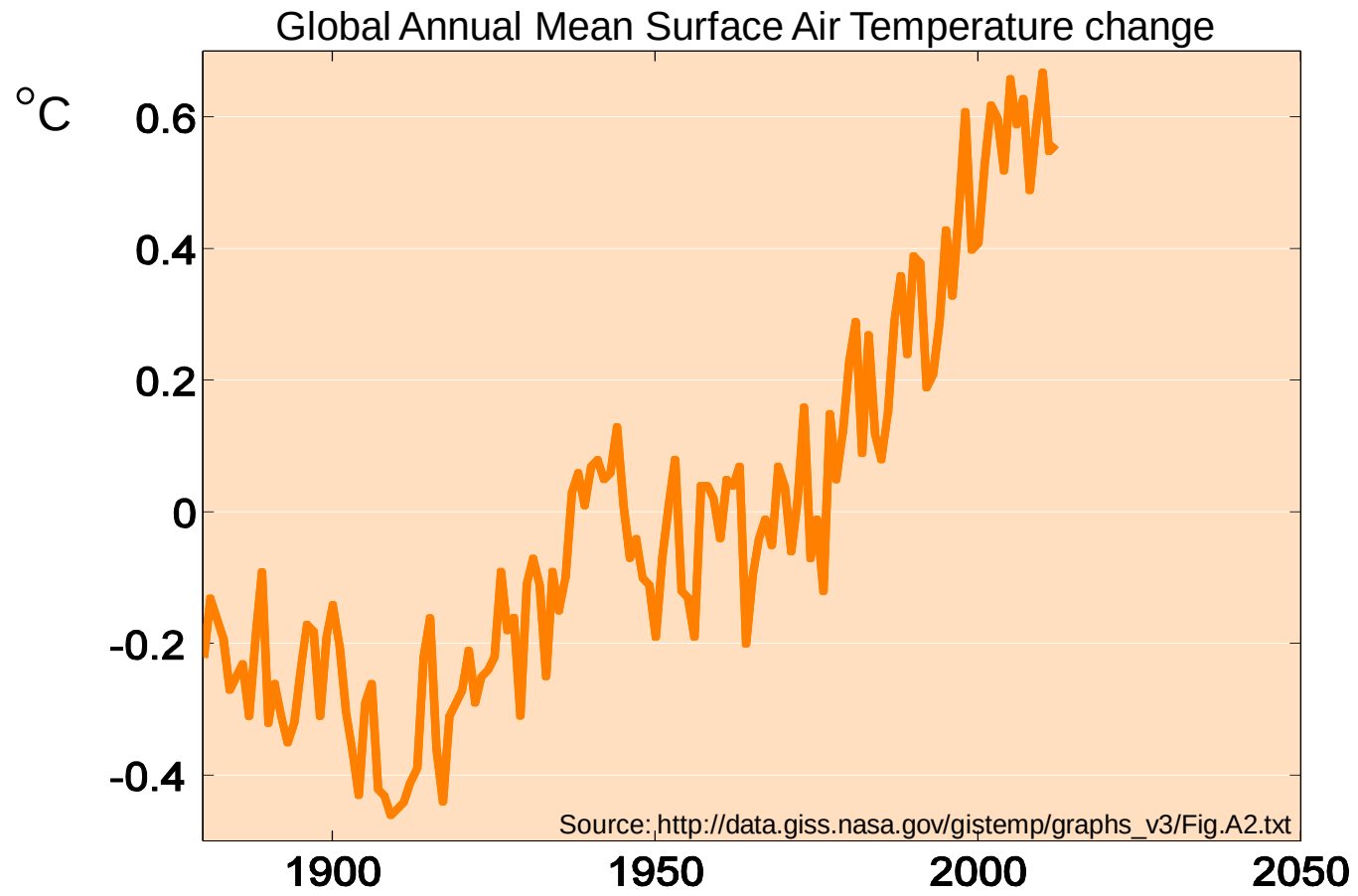
fmasson

pbarriat

Climate characteristic scales are large compared to human scales

http://earthobservatory.nasa.gov

Climate characteristic scales are large compared to human scales



Characterizing geophysical fields

Characterizing uncertainties

Antarctic sea ice volume changes

Characterizing geophysical fields

Characterizing uncertainties

Antarctic sea ice volume changes

About 10^8 variables to store and forward in time

Space demanding

~15 Go per year of simulation

Time consuming

~1 month for 100 years of simulation on ~16 CPUs

http://www.gfdl.noaa.gov/pix/user_images/atw/research/gcm_grid_globe_aus.png

Characterizing geophysical fields

is expensive both in disk space and CPU

Characterizing uncertainties

Antarctic sea ice volume changes

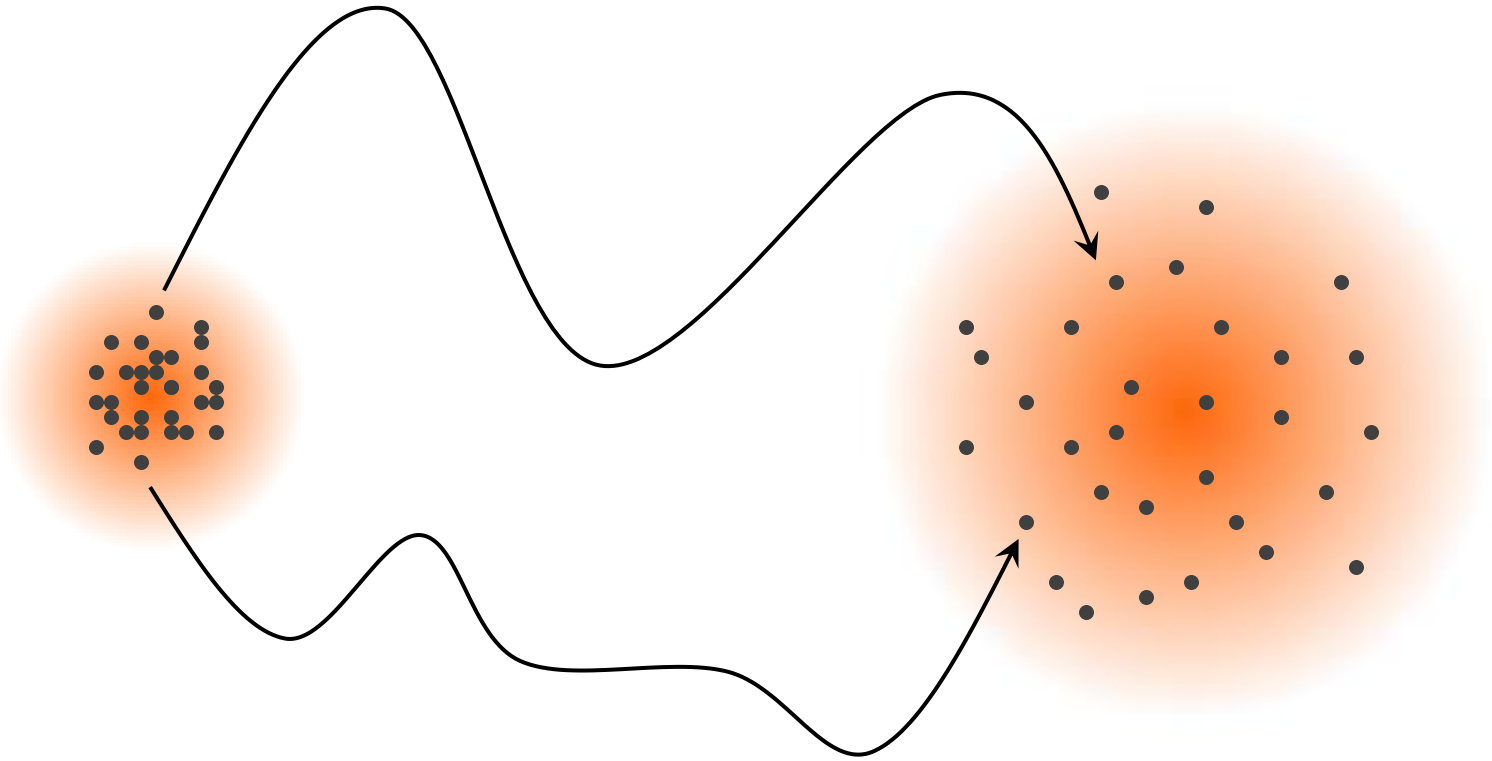
Characterizing geophysical fields

is expensive both in disk space and CPU

Characterizing uncertainties

Antarctic sea ice volume changes

Ensemble simulations allow to explore the uncertainties of the model



Characterizing geophysical fields

is expensive both in disk space and CPU

Characterizing uncertainties

with ensemble simulations

Antarctic sea ice volume changes

Characterizing geophysical fields

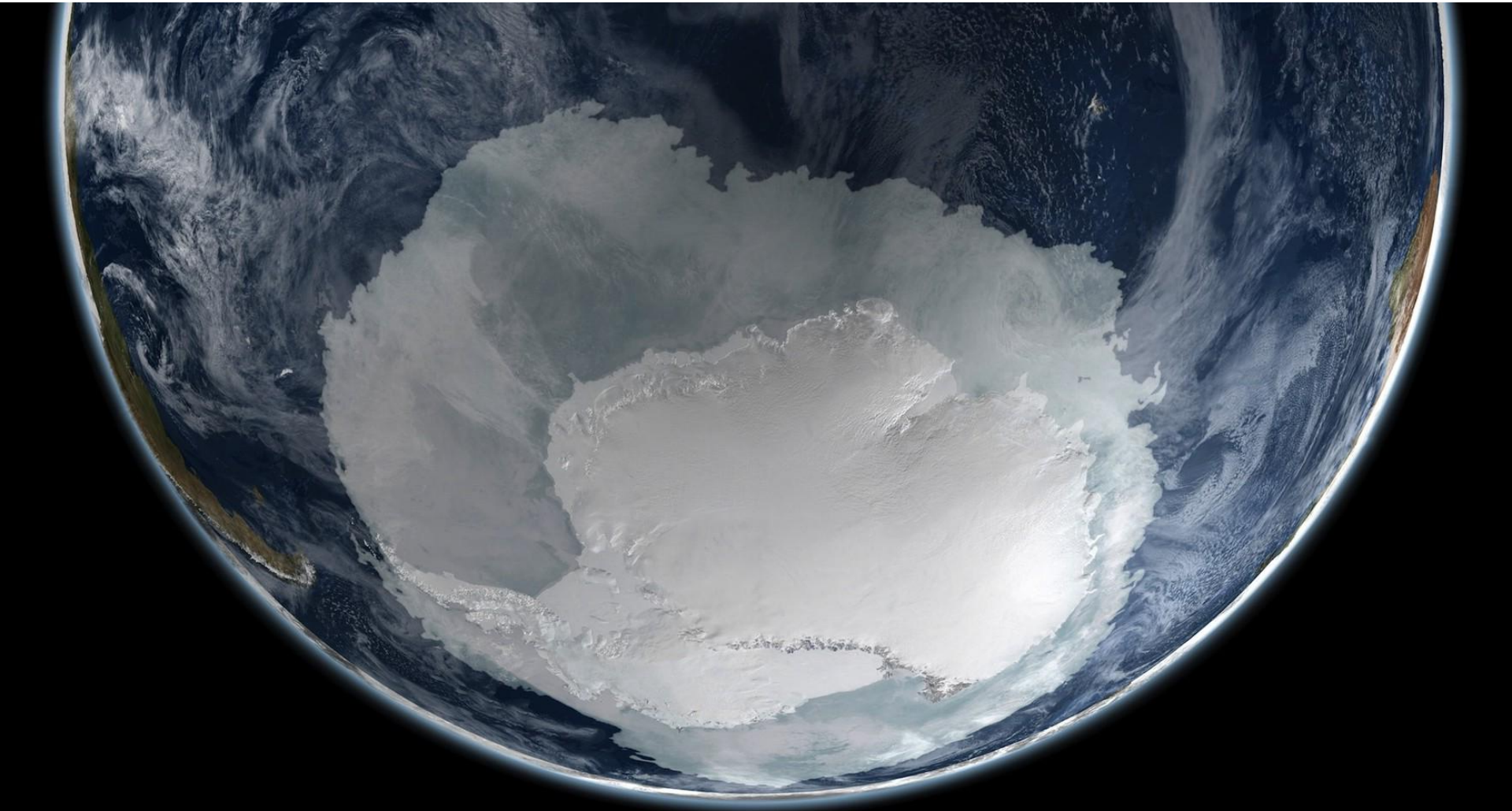
is expensive both in disk space and CPU

Characterizing uncertainties

with ensemble simulations

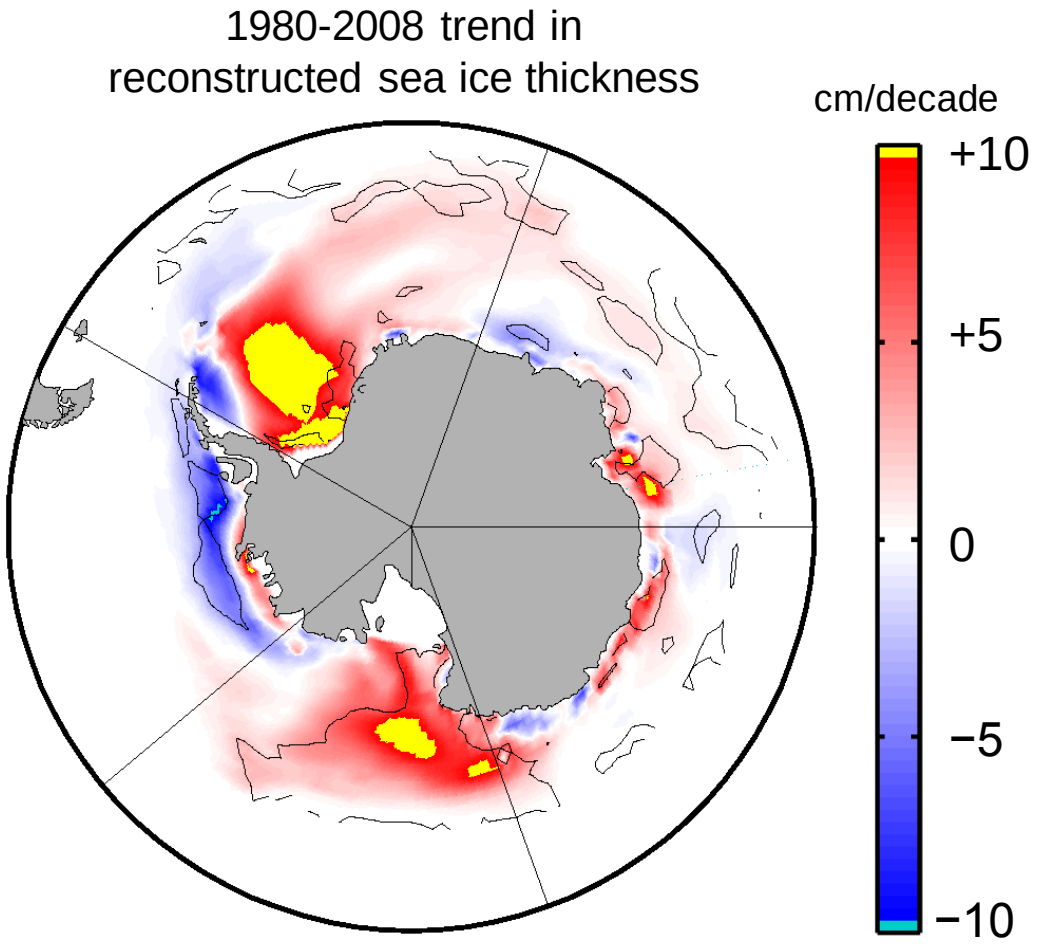
Antarctic sea ice volume changes

Antarctic is one of the least observed region on Earth



http://www.wakingtimes.com/2012/03/01/black-whole-nassim-haramein-video/wiki-nasa-antarctica/

Antarctic sea ice thickness changes reconstructed for the first time



Characterizing geophysical fields

Disk space and CPU time expensive

Characterizing uncertainties

with ensemble simulations

Antarctic sea ice volume changes

reconstructed with CÉCI-hosted simulations

Thank you!